

# Barriers and Facilitators Related to Delivery of Hospital Pharmacy Services to Women, Children, and Their Families during a Pandemic: A Qualitative Study

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## ABSTRACT

**Background:** When the COVID-19 pandemic was declared in March 2020, health care professionals were challenged to adapt quickly and efficiently to change their work practices. However, an evidence-informed approach has not yet been used to systematically gather data on barriers and facilitators related to delivery of hospital pharmacy services in Canada.

**Objectives:** The primary objective was to identify and describe barriers and facilitators related to the delivery of hospital pharmacy services to women, children, and their families during the COVID-19 pandemic. The secondary objective was to provide recommendations for improvement in delivery of pharmacy services to enhance patient care during pandemics.

**Methods:** This qualitative study involved semistructured virtual interviews with pharmacists who worked in direct or nondirect patient care throughout the pandemic (since March 2020) at women's and/or children's hospitals in Canada. Individual interviews were completed virtually using conferencing software. An interview guide mapped to the Theoretical Domains Framework version 2 (TDFV2) was used to facilitate the interviews. Interviews were audio-recorded and transcribed verbatim by the principal investigator. Transcribed interviews were coded, mapped to the TDFV2, and analyzed using thematic analysis.

**Results:** Interviews were completed with 21 pharmacists in 7 provinces across Canada. Barriers and facilitators coded to the TDFV2 were grouped into 4 main themes: communication and collaboration, adaptability, health and well-being, and preparedness.

**Conclusions:** Participants highlighted a significant number of barriers that they experienced during the COVID-19 pandemic; overall, however, participants reported that they felt prepared for subsequent waves of the COVID-19 pandemic and future pandemics.

**Keywords:** hospital pharmacy services, COVID-19, pandemic, women's and children's hospitals

**Note:** This article contains supplementary material (Supplements 1 and 2), available at <https://www.cjhp-online.ca/index.php/cjhp/issue/view/209>.

## RÉSUMÉ

**Contexte :** Lors de la déclaration de la pandémie de COVID-19 en mars 2020, les professionnels de la santé ont été mis au défi de s'adapter rapidement et efficacement à la situation en changeant leurs pratiques professionnelles. Cependant, une approche fondée sur des données probantes pour recueillir systématiquement des données sur les obstacles à la prestation des services de pharmacie hospitalière au Canada et les éléments facilitant celle-ci n'a pas encore été utilisée de manière systématique.

**Objectifs :** L'objectif principal consistait à identifier et à décrire les obstacles à la prestation de services de pharmacie hospitalière aux femmes, aux enfants et à leur famille et les éléments facilitant celle-ci pendant la pandémie de COVID-19. L'objectif secondaire consistait, quant à lui, à fournir des recommandations pour améliorer la prestation de services de pharmacie afin d'améliorer les soins aux patients pendant une pandémie.

**Méthodes :** Cette étude qualitative comprenait des entrevues virtuelles semi-structurées avec des pharmaciens ayant travaillé dans le domaine des soins directs ou non directs aux patients tout au long de la pandémie (depuis mars 2020) dans des hôpitaux pour femmes et/ou enfants au Canada. Les entretiens individuels ont été réalisés virtuellement à l'aide d'un logiciel de conférence. Un guide d'entretien adapté de la 2<sup>e</sup> version du cadre des domaines théoriques (TDFV2) [*Theoretical Domains Framework*] a été utilisé pour faciliter les entretiens. Ceux-ci ont été enregistrés sur bande audio et retranscrits textuellement par le chercheur principal. Les entretiens ainsi retranscrits ont été codés, reportés sur le TDFV2 et analysés par thème.

**Résultats :** Des entrevues ont été réalisées auprès de 21 pharmaciens dans 7 provinces du Canada. Les obstacles et les éléments facilitateurs codés selon le TDFV2 ont été regroupés en 4 grands thèmes : communication et collaboration; adaptabilité; santé et bien-être; et état de préparation.

**Conclusions :** Les participants ont mentionné un nombre important d'obstacles qu'ils ont rencontrés pendant la pandémie de COVID-19; dans l'ensemble, cependant, les participants ont déclaré qu'ils se sentaient préparés aux vagues ultérieures de la pandémie de COVID-19 et aux futures pandémies.

**Mots-clés :** services de pharmacie hospitalière, COVID-19, pandémie, hôpitaux pour femmes et enfants

## INTRODUCTION

On March 11, 2020, the World Health Organization declared a global pandemic involving the novel coronavirus SARS-CoV-2, which causes COVID-19.<sup>1</sup> The first case of COVID-19 in Canada was reported in January 2020. By August 2021, more than 1.4 million confirmed cases of COVID-19 had been reported in Canada.<sup>2</sup>

During the COVID-19 pandemic, pharmacists have played an important role in delivering pharmacy services,<sup>3</sup> with community and hospital pharmacy teams becoming actively involved in patient care. In addition, hospital pharmacists have played a key role in completion of clinical trials; generation of evidence-based reviews; development of protocols, clinical order sets, and guidelines; management of drug shortages; and antimicrobial stewardship.<sup>4</sup> A scoping review of pharmacists' response globally to the COVID-19 pandemic highlighted the role of hospital pharmacists in collaboration and teamwork, education, and patient care.<sup>5</sup> Pharmacists have also been acknowledged as key players in the COVID-19 vaccine rollout and in addressing the misinterpretation of vaccine information.<sup>5</sup>

At the same time, pharmacists have faced several challenges in delivering services. In a national survey of community pharmacists conducted by the Canadian Pharmacists Association during the pandemic,<sup>6</sup> respondents reported a variety of challenges, including lack of personal protective equipment, drug shortages, higher workload accompanied by staffing shortages, and increased harassment of staff.<sup>6</sup> However, the experiences of hospital pharmacy teams in Canada were not captured by that survey.

The Canadian Society of Hospital Pharmacists released a statement (in mid-2020) highlighting the important role of the profession and acknowledging the risk to its members in their service to public health.<sup>7</sup> The International Pharmaceutical Federation published a COVID-19 guideline that included responsibilities and roles of hospital pharmacy, such as ensuring adequate supply and procurement of necessary medical supplies and devices, promoting hospital infection control practices, and providing collaborative care.<sup>8</sup> Some of these responsibilities are uniquely challenging for pharmacy teams that provide services to special populations such as pediatric patients and pregnant or lactating individuals. There has been limited evidence available to guide management of COVID-19 in these specific patient populations. Recommendations for COVID-19 vaccination in these populations has been evolving since the vaccines were licensed; vaccination is now recommended for children as young as 5 years of age,<sup>9</sup> and vaccines are deemed safe for use in pregnancy and lactation.<sup>10</sup> Although fewer pediatric patients than adults have experienced hospitalization from COVID-19, some studies have shown that children with chronic diseases are at increased risk for admission to the intensive care unit and mechanical

ventilation.<sup>10</sup> Hospital restrictions limiting caregiver support have also been implemented across Canada and may have affected delivery of pharmacy services; for example, pharmacists may have been unable to provide medication counselling to all caregivers who needed it. In addition, pregnant people with COVID-19 are at increased risk for preterm birth, maternal mortality, and preeclampsia relative to pregnant people without COVID-19.<sup>11</sup>

To our knowledge, efforts to systematically gather data about the barriers and facilitators related to delivery of pharmacy services for women, children, and their families using an evidence-informed approach in the Canadian context have not been undertaken. The goal of this study was to better understand the delivery of pharmacy services by hospital pharmacists during the COVID-19 pandemic in Canada. The primary objective was to identify barriers and facilitators related to the delivery of hospital pharmacy services to women, children, and their families. The secondary objective was to provide recommendations for improvement in delivery of pharmacy services to enhance patient care during the COVID-19 pandemic and future pandemics, based on the results of this study.

## METHODS

### Study Design

This was a qualitative study using virtual interviews to gather opinions and perceptions from Canadian pharmacists.

### Development of Interview Guide

The semistructured interview guide was based on the Theoretical Domains Framework version 2 (TDFV2), with the interviews designed to gain understanding of individual-level barriers and facilitators related to behaviour change, which were then linked to the Behaviour Change Wheel (the COM-B model, where "COM" refers to capability, opportunity, and motivation, as explained in more detail below).<sup>12,13</sup> Best practices for qualitative interviewing<sup>14,15</sup> were reviewed, which further aided in creation of the interview questions. The PubMed and Embase databases were searched to identify previous literature related to barriers and facilitators related to delivery of pharmacy services during pandemics. Combinations of the following keywords, including variations on the same terms (e.g., plural and singular), in conjunction with the controlled vocabulary of each database, were used to retrieve articles exploring both community and hospital pharmacy services: "pharmacist", "pharmacy services", "hospital pharmacy services", "clinical pharmacist", "COVID-19", "coronavirus", and "pandemics". The search yielded 51 articles, with an additional 5 articles identified through hand-searching. The report of the Canadian Pharmacists Association survey provided additional context for question development.<sup>6</sup>

The interview questions were developed through the literature search and team discussion. Four semistructured, open-ended interview questions, with example prompts, were mapped to the TDFV2 domains a priori. The team included clinical pharmacists involved in direct patient care and pharmacy practice researchers with experience in qualitative research. In addition, further consultation was held with a qualitative researcher from the Research Methods Unit of Nova Scotia Health.

The 4 interview questions were piloted by the principal investigator (E.R.), by interviewing 5 staff pharmacists who did not meet the study's inclusion criteria. Participants in this pilot project were asked whether the questions and prompts addressed the research question, were well explained, and were detailed enough to capture the intended data. Feedback was encouraged and incorporated in development of the final set of interview questions. Results from the pilot interviews were not included in the study analysis.

### Participant Recruitment and Data Collection

Potential participants were licensed staff pharmacists at hospitals for women and/or children across Canada, who were working in at least one direct or nondirect patient care area, to capture different perspectives and experiences, during the COVID-19 pandemic (March 2020 onward).

Potential participants were excluded if they were unable to speak, read, and write in English and if they did not consent to being audio-recorded during the interview.

Pharmacy directors and managers at 14 women's and children's hospitals across Canada (as suggested by the pharmacy director of a local children's hospital), representing all regions of Canada, were contacted by email and asked to disseminate an invitation to participate to pharmacists at their respective institutions. Interested pharmacists then contacted the principal investigator by email. The interview questions (Supplement 1, available at <https://www.cjhp-online.ca/index.php/cjhp/issue/view/209>) and a demographic questionnaire (Supplement 2, available at <https://www.cjhp-online.ca/index.php/cjhp/issue/view/209>) were distributed to participants before the virtual interview. We provided the questions to participants in advance to reduce recall bias.

This study was approved by the IWK Research Ethics Board (REB 1026187). Consent was discussed with and obtained from each participant before the person was interviewed, and participants agreed to be audio-recorded and agreed for anonymous use of direct quotations for presentations and publication of study results. Consent was completed electronically on REDCap, a secure, web-based application (<https://www.iwk.nshealth.ca/research/redcap>).

At the time of consent, demographic information, including the area of care in which the participant was working, years of clinical experience in a women's and/or children's hospital, and geographic region, was collected electronically on REDCap. The virtual semistructured interviews were

conducted through the Webex video conferencing platform (Cisco; <https://www.webex.com/>) during February and March 2021. The interviews were audio-recorded and transcribed verbatim by the principal investigator, who also completed field notes during the interviews; the field notes were used to record nonverbal communication by and reactions of the participants and to state any biases that the interviewer (i.e., principal investigator) might have had.<sup>16</sup>

### Coding and Analysis

NVivo12 software (2018; QSR International Pty Ltd; <https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home>) was used to facilitate coding of the data. Initial coding was completed independently by 2 team members (E.R., E.K.B.) using the 14 domains of the TDFV2, and was then discussed by the 2 coders. Where consensus could not be achieved, a third team member (J.E.I.) reviewed and provided feedback, which led to consensus. Overarching themes of barriers and facilitators based on the TDFV2 coding were then identified by 2 team members (E.R., E.K.B.) and agreed upon with all members of the team.

### Trustworthiness of Data

Various approaches were used to determine and demonstrate the trustworthiness of the data. Before the study interviews began, the research supervisor (E.K.B.) reviewed the audio-recorded pilot interviews and provided guidance on the interviewing process. The interviewer used self-reflective journaling to capture any subjective biases or thoughts throughout the interviews that might have affected the credibility of the analysis process.<sup>16</sup> Anonymous quotes from participants were included in the analysis and this report, to further add to the trustworthiness of the findings and interpretation of the results.<sup>17</sup> Furthermore, 2 team members independently coded each interview, and an audit trail was produced to document the development of codes into categories and themes.<sup>18</sup>

## RESULTS

### Demographic Characteristics

In total, 21 participants working in 12 tertiary hospitals in 7 provinces were interviewed. Most worked in pediatric direct care ( $n = 15, 71\%$ ), and the mean duration of work experience was 17 years.

### Themes

Barriers and facilitators were coded using all 14 TDFV2 domains, but all fell within only 12 of these domains. These 12 domains were then categorized under the following 4 overarching themes (Figure 1): communication and collaboration, adaptability, health and well-being, and preparedness. In the following descriptions of these themes, domains are noted parenthetically. Detailed examples of

barriers and facilitators, with representative quotes, are presented in Table 1. The most consistently discussed domains are outlined in Figure 2.

### Communication and Collaboration

Key barriers consistently discussed within the theme of communication and collaboration included virtual care, limited workspace, caregiver and visitor restrictions, student restrictions, and personal protective equipment (PPE) (environmental context and resources; social influences), as well as limited face-to-face interactions (social influences). One participant stated, “Because you have the nursing contracted position presenting at rounds, and then the pharmacy team was trying to interject where they could ... I found it very difficult on a virtual interface to make my presence well known” (Participant 8) (environmental context and resources; social influences).

While virtual care was identified as a barrier by some, other participants felt it was a facilitator. For example, one participant said, “They’re [the patients] not driving an hour to get to our facility and then back, they just Zoom in then Zoom out for the meeting. So, facilitating care is so much better in the virtual world” (Participant 11) (environmental context and resources).

### Adaptability

Adaptability of pharmacists in the workplace during the COVID-19 pandemic was another theme identified. The key barriers discussed in most interviews included confusion associated with rapidly evolving information (memory, attention, and decision processes), stress associated with constant change, increased workload secondary to staff shortages (emotion; environmental context and resources), and the need to adjust to virtual care and changing professional roles (environmental context and resources; social/

professional role and identity). One participant stated, “A lot of workload is just because there’s so many unknowns and too many policy changes...so I think that was the real stressor, all the changes” (Participant 12) (memory, attention, and decision processes; emotion).

The main facilitators for the theme of adaptability included accessibility of and training in technology and PPE (environmental context and resources; skills). One participant stated, “I also think that we are all more comfortable with all of the technology that we can use, so that also helps, so we understand what some of the different counselling options that we can use are and some of the other workarounds if you can’t actually go into the patient’s room” (Participant 10) (beliefs about capabilities; skills).

### Health and Well-Being

One participant stated, “It’s just overwhelming, and it’s never-ending, there’s just too much going on. There was already too much going on without a pandemic to manage from a workload perspective” (Participant 14) (emotion; memory, attention, and decision processes; environmental context and resources). Barriers that participants reported included increased workload and working hours, as well as the initial conservation and allocation of PPE (environmental context and resources). In addition, the daily stress from increased workload, the unknown, fear of spreading or contracting COVID-19, exhaustion due to constant change (emotion), and limited patient interactions (social influences) were described as barriers.

Key facilitators that participants reported within this theme included feeling like they were helping the collective cause and were a valued part of the team (social/professional role and identity) and coping strategies such as physical exercise (emotion), as well as managerial and co-worker support (social influences).

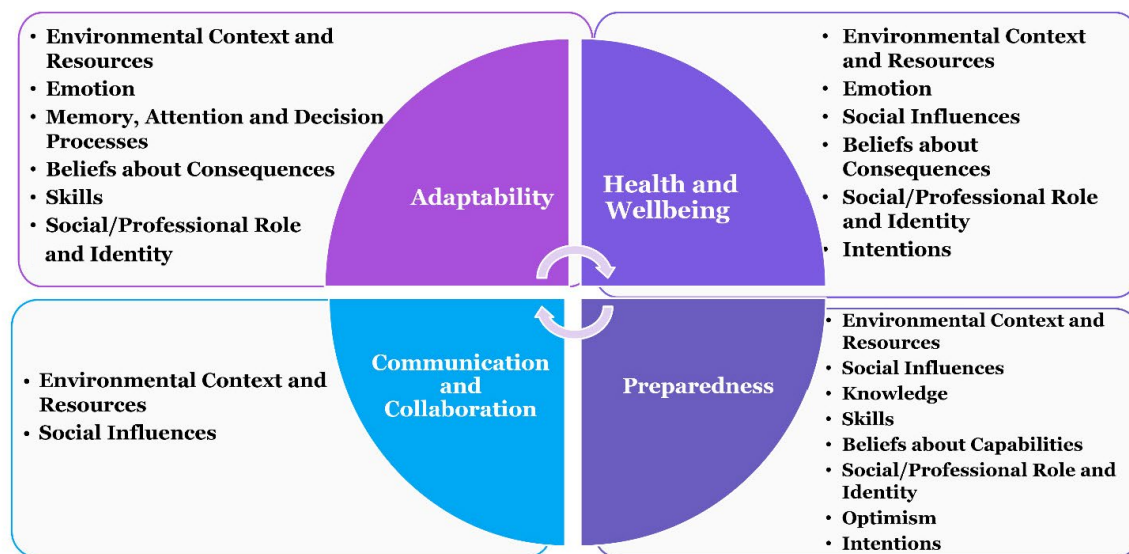


FIGURE 1. Themes (the 4 segments of the graphic) and domains coded within each theme (entries within each segment), based on the Theoretical Domains Framework version 2.

**TABLE 1 (Part 1 of 2). Barriers and Facilitators Coded to the Theoretical Domains Framework (Version 2)**

Domain	Barriers	Facilitators	Representative Quotation
Knowledge	Initial lack of knowledge about COVID-19 in children and pregnant/breastfeeding women The unknown about the COVID-19 virus	Increasing knowledge about: <ul style="list-style-type: none"> <li>• Infection control/PPE</li> <li>• Screening protocols</li> <li>• Technology available for patient care</li> <li>• Educational resource changes and procedures (e.g., guidelines, policies)</li> <li>• Transmission of the virus</li> </ul>	"So, I think there were so many uncertainties at the start of the pandemic, that it did unfortunately create some barriers in terms of our ability to develop or deliver rather the best pharmacy services possible." (Participant 8)
Skills	Lack of competency and ability to use technology	Experience with the technology used for patient care Skill development for donning and doffing PPE	"You know does everyone have access to the same platforms and does everyone know how to use them?" (Participant 14)
Social/professional role and identity	Increased responsibilities Decreased scope of practice (e.g., fewer patient interactions) Role changes due to virtual care Professional boundaries	Professional role in prescribing Increased scope of practice (e.g., vaccinations) Planning for role change Role in providing education	"We quickly had to figure out how we were going to do our job, and not even just do our job, but safely provide care which was a real concern because we got so much of our work done on rounds and all of a sudden our job turned into more reactive instead of proactive." (Participant 6)
Beliefs about capabilities	Self-confidence in vaccinating Unfamiliarity and comfort covering different clinical areas	Empowerment in vaccinating Self-confidence in virtual care	"I feel more comfortable now participating in virtual rounds and virtual meetings." (Participant 4)
Optimism	Staff shortages Workspace	Preparedness for another wave Communication with colleagues Vaccinations Knowledge gained from the first wave Plans in place for subsequent waves or pandemics (e.g., policies on PPE and self-isolation, drug shortages, pharmacy scheduling, restricting hospital capacity/ elective surgeries) Managerial staff support	"I think also the communication is much better and more information is available. So, I think we are definitely more prepared." (Participant 7)
Beliefs about consequences	Change in pharmacist's role Virtual care Impact of PPE on communication Staff shortages		"We've had a little less patient contact which is probably one of the major detriments because, unless something is absolutely needed to go speak to patients and families, just to limit contacts and exposure." (Participant 21)
Intentions		Prioritizing work–life balance Planning (e.g., vacation planning, planning for short-staffed situations)	"One thing that I have done is to prioritize my work and the emails that come to me, I'm very selective as to how I manage my emails, because I can't get to them all." (Participant 11)
Memory, attention, and decision processes	Information overload/tiredness Rapidly evolving evidence Loss of focus due to virtual care Fatigue with PPE, planning protocols		"The perpetual and constant changing of information is a lot to process for anybody and we're right there in it. It's just never-ending." (Participant 14)

**TABLE 1 (Part 2 of 2). Barriers and Facilitators Coded to the Theoretical Domains Framework (Version 2)**

Domain	Barriers	Facilitators	Representative Quotation
Environmental context and resources	Hospital restrictions Workspace and working remotely Students Conservation, allocation, and communication of PPE Scheduling (long shifts) and overwork/understaffing Virtual rounding and patient care (as a resource/IT capability)	Email handover, weekend coverage Daily huddles/communication Impact on communication from management PPOs/policies Virtual care (efficiency)	"I think the biggest barrier was really to just get the whole virtual scheduling and virtual technology in place." (Participant 11)
Social influences	Poor communication because of virtual rounds and PPE Limited face-to-face interactions Hospital restrictions on support people	Structured patient handover	"I would say the first thing was just the visitation policy, that's probably the biggest one. Obviously when you're caring for children that circle of care is a big part of their support system." (Participant 12)
Emotion	Stress from increased workload, change, the unknown, and spreading infection Guilt from neglecting patients Exhaustion from constant change Frustration with technology Stress on families because of hospital restrictions	Coping strategies Resources available to staff (e.g., employee and family assistance program)	"I think it was a bit challenging especially in the beginning, it was new for everyone, everyone was more concerned around being in the hospital environment and I think it was a bit more stressful, getting used to new practices and all of the PPE that you had to wear on a regular basis." (Participant 16)

IT = information technology, PPE = personal protective equipment, PPO = preprinted order.

### Preparedness

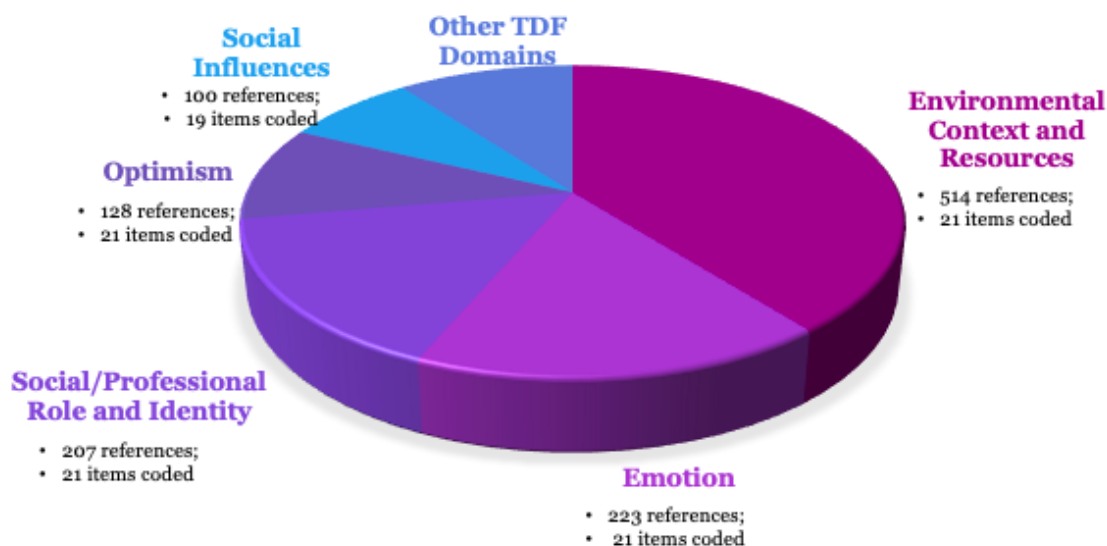
Overall, there was a consistent perception that individual pharmacy departments and institutions were well prepared for future waves of the COVID-19 pandemic. Key facilitators included confidence in, familiarity with, and training for new processes and technology (knowledge; skills; beliefs about capabilities) and the optimism that comes with having systems in place to deliver care (optimism). Furthermore, managerial support, clarity regarding organizational expectations (social influences), and new roles and responsibilities to fit the restructured work environment (social/professional role and identity) facilitated how participants felt in terms of preparedness. One participant stated, "I definitely think that management has thought about how pharmacy, the profession, can help in terms of managing the second wave or the next waves ... once we get through the mass immunization and things move along and if COVID is here to stay ... then maybe it'll be another aspect that pharmacists can help with moving forward" (Participant 15) (optimism; social/professional role and identity).

Barriers were drug and staff shortages (environmental context and resources) and pessimism related to staffing and space limitations (optimism). One participant highlighted, "I think we're well prepared, other than we don't have enough staff. That's really the biggest problem we have" (Participant 11) (optimism; environmental context and resources).

### DISCUSSION

This study identified perceived barriers and facilitators of hospital pharmacists working in pediatric and women's health care during the COVID-19 pandemic, grouped under 4 main themes. Some of the key barriers identified consistently by participants included the need to adapt to virtual care, increased workload and staff shortages leading to heightened stress at work, and the challenge of keeping up to date with rapidly evolving information. To our knowledge, this is the first study evaluating this research question in a Canadian context. The perceived barriers and facilitators reported by pharmacists in this study can be used by Canadian institutions for future pandemic planning. Despite the barriers identified, most participants remained optimistic and felt well prepared for future waves of the COVID-19 pandemic and subsequent pandemics.

Few studies focusing on the delivery of hospital pharmacy services have been reported in the literature, and we found no studies addressing our specific research question. One survey that explored perceived barriers related to pharmacists' emergency roles during the COVID-19 pandemic was distributed to community and hospital pharmacists and pharmacy students in Jordan.<sup>19</sup> Consistent with our study, pharmacists in Jordan expressed concerns about their new emergency roles and expectations during the pandemic.



**FIGURE 2.** References and items mapped to the most commonly identified domains of the Theoretical Domains Framework (TDF) version 2, where “references” means the number of data references coded to the respective domains and “items mapped” means the number of interviews that contained the respective domains.

Pharmacists and pharmacy students responding to the survey believed that pharmacy education providers have a key role in preparing future pharmacists to deal with pandemics.<sup>19</sup> A qualitative study in Saudi Arabia showed an overall positive uptake of nontraditional roles by pharmacists.<sup>20</sup> A Canadian study found that community pharmacists struggled with working longer shifts, which led to emotional overload, but they viewed the scheduling of separate, consistent teams as a facilitator.<sup>21</sup> The barrier represented by longer work hours was consistent with our study. Another similarity between our study and the previous one was the initial challenge with learning new technologies, although technology had an overall positive affect on daily tasks.<sup>21</sup>

### Future Pandemic Planning

Identified barriers coded to the TDFV2 can be linked to the Behaviour Change Wheel (or COM-B model) to identify strategies for addressing barriers to future pandemic planning. Based on the COM-B model, the TDFV2 domains are sorted into 1 of 3 factors that need to be present for any behaviour to occur: capability, opportunity, and motivation.<sup>22</sup> These factors can then be linked to intervention functions that can in turn guide the specific strategies that may be implemented to effect behaviour change.<sup>22</sup>

One component of the COM-B that should be targeted is capability.<sup>22</sup> Participants in the current study noted that keeping up to date with new, constantly changing information and adapting to virtual care were major barriers during the pandemic. Strategies that address capability include educational training sessions for various virtual care platforms (intervention function: training) and daily huddles or meetings to keep up to date with rapidly evolving information (intervention function: education/enablement).

Another component of the COM-B model that should be targeted is opportunity.<sup>22</sup> Participants felt that being constantly pulled to different clinical areas and having limited space for learners were barriers during the pandemic. These barriers could be addressed through more cross-coverage training in different clinical areas to combat staff shortages during pandemics, and more training of pharmacists in pediatric and women’s health care areas (intervention function: training). Another strategy may be to create more space or reorganize existing space for learners (intervention function: environmental restructuring).

Motivation is the third component of the COM-B model.<sup>22</sup> Participants reported stress associated with increased workload and the unknowns that arose during the pandemic. Strategies such as making mental health resources (such as mindfulness sessions) easily accessible to staff (intervention function: enablement) may be helpful to implement during pandemics.

Some of the above ideas have been brought forward in a new online engagement platform at IWK Health, with the purpose of providing an interactive forum to fast-track innovative solutions in health care.

### Strengths and Limitations

To our knowledge, this study is the first to assess individual-level barriers and facilitators experienced by hospital pharmacists working in women’s and children’s health care institutions in Canada. The qualitative study design allowed collection of detailed information from participants, so the researchers could delve into real-world experiences. The interview guide was reviewed by hospital pharmacists for content and face validity, and was then adapted according to the feedback received. Interviews were coded independently

by 2 research team members to reduce individual-level biases and to increase the trustworthiness of the results. The interviews achieved representation from 7 provinces and 12 different hospital sites across Canada. Although recruitment was a challenge, given the study time frame, regional representation was achieved, as was data saturation, with no new themes being identified in the later interviews. Despite this extent of representation, generalizability of our findings to all hospital pharmacists across Canada may be limited, because the COVID-19 pandemic affected women's and children's hospitals differently from adult institutions. Additionally, interviews were audio-recorded only (without video), which may have limited the observation of participants' nonverbal cues; however, field notes were taken to help in identifying nonverbal cues. Interviews were conducted several months after the first wave of the COVID-19 pandemic, and recall bias may therefore have been a limitation. Lastly, the interviews were completed before the third wave of the pandemic in Canada, which saw significant hospitalizations and deaths nationally. The timing of interviews also preceded mass immunization efforts in most jurisdictions. If follow-up interviews had been completed after these experiences, they might have yielded different results, as roles may have changed during the third wave and in relation to vaccine rollout, with community and hospital pharmacists playing a large role in many jurisdictions.

## CONCLUSION

Many barriers to the provision of pharmacy services during the COVID-19 pandemic were identified in this study. Overall, however, participants were optimistic in terms of preparedness to deliver standard pharmacy services during subsequent waves of the COVID-19 pandemic or during other pandemics.

These results have led to recommendations to improve delivery of pharmacy services, which may in turn inform development of policies and initiatives to enhance pharmacy services and patient care during pandemics. Next steps include the implementation of intervention strategies into clinical practice. Future studies may include follow-up interviews with the same study participants after they have experienced additional waves of COVID-19, vaccine rollout, and implementation of the recommended interventions. Additionally, studies examining implementation of the recommended interventions in different patient populations would provide useful information.

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