BMC Primary Care

RESEARCH

Open Access

Innovations that helped with accessing and delivering primary care for infants and young children during COVID-19

Kimberley McFadden[1*], Helen Valkanas[2], Leslie Rourke[3], Patricia Li[4] and Imaan Bayoumi[5]

Abstract

Background For children under age six, regular preventative primary care is needed for administration of vaccinations, surveillance of development, and early diagnosis and intervention for any potential health conditions or developmental delays. The COVID-19 pandemic created many barriers to providing and accessing primary care. While many studies have explored these barriers, it is important to understand how primary care adapted to ensure these crucial early-years appointments were not missed throughout the pandemic. The objective of this study, therefore, was to discover innovative programs or services that were used, and suggestions for programs or services that could have been implemented, to facilitate delivery of, and access to, primary care for young children during the COVID-19 pandemic (March 2020-May 2023).

Methods This qualitative descriptive study used a survey and semi-structured interviews to discuss primary care programs or services with parents or caregivers of children who were under the age of 6 during the pandemic and with primary care providers who deliver care to young children. The survey was sent to parent groups and primary care providers across the Canadian provinces of Ontario and Quebec from May to October 2023. Survey participants who indicated interest in further participation were subsequently contacted for an interview. Results were analyzed using content and thematic analyses.

Results 102 individuals (33 primary care providers and 69 parents or caregivers) responded to the survey and of those, 19 participated in the interviews. Six themes emerged from the innovative services or procedures that were discussed: Prioritization of young children; Creation or modification of primary care spaces; Clear decision-making guidelines; Virtual care integration; Proactive communication; and Interdisciplinary collaboration.

Conclusions This qualitative study explored some creative and positive solutions to the struggle of providing and accessing primary care for young children during the COVID-19 pandemic. The results from this research highlight the importance of flexibility and innovation within the primary care system, especially under circumstances of sudden and unexpected increases in barriers to providing and accessing care. On-going development of innovations that improve communication, take a more collaborative approach, and adapt systems, spaces, and methods will improve primary care access and delivery.

*Correspondence:
Kimberley McFadden
kimberley.mcfadden@queensu.ca

Full list of author information is available at the end of the article

Clinical trial number Not applicable.
Keywords Well-child visits, Pediatrics, COVID-19, Qualitative research

Background

Preventative primary care visits for infants and preschool children, also known as well-child visits (WCV), are important for monitoring growth and development, treating disease, delivering routine immunizations, and providing parents or caregivers with education and guidance to ensure children get the best start to life [1]. In North America, it is recommended that children attend up to 13 WCV between the ages of one week old and six years old, in accordance with guidelines for health supervision endorsed by the Canadian Pediatric Society and the American Academy of Pediatrics (i.e., Rourke Baby Record [2, 3] and Bright Futures [4]).

When the World Health Organization declared COVID-19 a global pandemic on March 11, 2020 [5], the implementation of widespread lockdowns and restrictions impacted primary care service provision and access. These pandemic-induced restrictions had a significant impact on WCV attendance rates. For example, a study of 2.5 million children in Ontario showed that WCV attendance rates declined, on average, by 20% during COVID-19, with the largest monthly decrease occurring in April 2020 [6]. Another Canadian study showed that there were 16.2% less WCV during the first year of the pandemic compared to pre-pandemic rates [7]. In terms of visit modality, one study showed that in-person visits to pediatric primary care clinics dropped from 99% pre-pandemic to 18% during the first wave of COVID-19 [8].

Commonly cited barriers to accessing WCV from parents' perspectives during the pandemic include parental anxiety about COVID-19 exposure or being a burden on the healthcare system [9, 10], confusing or conflicting information about when and where to go for healthcare [11], and limits on family and caregiver accompaniment to appointments [12]. From the health care provider perspective, primary care providers have indicated that unclear and rapidly changing guidelines from their governing bodies were overwhelming and stressful to navigate [13].

Despite the evidence of missed or delayed WCV during the pandemic, there is emerging research suggesting that WCV rates for infants and young children recovered and, in some cases, exceeded pre-pandemic rates within a year of the initial lockdown in March-May 2020 [14, 15]. Therefore, the purpose of this study is to discover innovative programs or services that were developed and/or implemented to facilitate delivery of, and access to, primary care in Ontario and Quebec, Canada during the COVID-19 pandemic (March 2020 to May 2023). By exploring what programs and services helped with recovery and maintenance of WCV attendance rates during the COVID-19 pandemic, there is potential to better advise current and future healthcare systems under stress.

Methods

Participants

To gain a well-rounded picture from both the delivery and access perspectives of primary care, we invited primary care providers (e.g., family physicians, pediatricians, primary care nurses, etc.) who deliver care to children under the age of six, and parents or caregivers who sought care for their young child(ren) during the COVID-19 pandemic to participate. Recruitment was conducted broadly across the Canadian provinces of Ontario and Quebec.

Materials

The authors developed a survey to gather information on the types of primary care programs or services that were implemented and utilized to facilitate WCV attendance for young children during the pandemic. Certain survey questions were crafted uniquely depending on whether the participant was a primary care provider or a parent/caregiver. For example, primary care providers were asked to "Please describe in a few sentences how this program or service helped overcome barriers to the delivery of primary care for young children during COVID-19" while parents/caregivers were asked to "Please describe in a few sentences how this program or service helped you access primary care for your child(ren) during COVID-19." In addition to questions regarding what programs or services were implemented during the pandemic, all participants were asked for suggestions of what would have been helpful. This gave participants the opportunity to share creative ideas for future implementation or any knowledge they have of services they heard were successful elsewhere. The survey questions were developed specifically for this study and were reviewed by an expert panel of primary care physicians, parent partners, and family medicine researchers. Please refer to Additional File 1 for a full copy of the survey.

To gain more depth of knowledge and detail regarding the programs and services that were used during the pandemic, follow-up interviews were conducted with a subset of the survey respondents. Semi-structured interview guides were developed to delve deeper into the context surrounding how and why the innovations mentioned or suggested in the survey were (or would have been) helpful. The Lévesque Conceptual Framework of Access to

Primary Care [16] was used to develop questions about participants' experiences of the approachability, acceptability, availability, accommodation, affordability, and appropriateness of primary care services delivered or accessed during COVID-19. Both the survey and interviews were available in English and French to accommodate the bilingual state of Ontario and Quebec.

Procedure

Once approval was obtained from the Queen's University Health Sciences Research Ethics Board, prospective survey participants were informed about the online survey via social media posts, email, and word-of-mouth. The survey link was shared widely within Faculties of Medicine at Queen's and McGill universities, networks of physician and parent partner stakeholders, and through contacts at parenting groups, daycares, and primary care clinics across Ontario and Quebec. All individuals who participated in the survey were entered in a draw for one of four $50 gift cards. The survey was available to providers and parents/caregivers via Qualtrics from May to October 2023.

Recruitment for the interviews involved a convenience sample selected from participants who had completed the online survey and who indicated they would be interested in participating in additional research. Two researchers conducted semi-structured interviews via Microsoft Teams from June to December 2023. All interviews were audio recorded and transcribed verbatim using the Microsoft Teams automatic transcription service. Transcripts were subsequently checked for accuracy, with errors or missing data being corrected by a research assistant. Interviews conducted in French were transcribed and subsequently translated to English by a bilingual research assistant. All interview participants were offered the opportunity to review their transcripts and provide additional comments prior to data analysis.

Analysis

This qualitative descriptive study involved inductive content and thematic analyses. Data from the demographic survey questions were summarized to describe the sample population. Open-ended survey questions were tabulated and analyzed in accordance with methods recommended for content analysis of open-ended survey questions [17, 18]. Specifically, individual responses were manually compiled into a spreadsheet and all innovative programs or services were reviewed by two different research team members (Preparation and Organization phases of analysis). Summaries of the programs and services mentioned and/or described were presented to the wider research group, allowing for reflection on the novelty and impact of these innovations (Reporting phase of analysis).

The interviews were analyzed using thematic analysis methods described by Saunders and authors [19]. First, two coders (KM and HV) manually reviewed all the transcripts independently and created initial themes. The coders met to review and discuss these themes prior to a second independent read-through of the interview data. Once the coders came to agreement on the refined overarching themes, sample quotes from all transcripts were manually extracted and tabulated. The coding team independently reviewed and assigned all quotes to the established themes. The themes and accompanying quotes were then shared with the larger author group for a more robust review and discussion prior to finalizing the results.

Several strategies were used to ensure rigour and trustworthiness throughout the research process [20]. At every step of data collection and analysis, the interviewers and coders engaged in reflexivity to be self-aware of individual biases and work to minimize their potential impact. Participants were invited to engage in member-checking through review of their transcripts and provision of any additional information or context to their responses. The research team engaged in peer debriefing by seeking feedback from experts in family medicine research, primary care, and parent groups. Additionally, detailed descriptions of sampling strategies and contextual information allowed the research team and broader public audience to assess the transferability and relevance of findings beyond the scope of the current study.

Results

Survey

A total of 1,743 responses were recorded for the online survey. After filtering out bots by reviewing data quality indicators and location meta-data (see Fig. 1 for the process for filtering bots), 102 complete and valid responses remained. In total, 33 primary care providers and 69 parents/caregivers responded to the survey. Two-thirds of the total sample were from Ontario ($n=66$, 64.7%), the majority were women ($n=92$, 90.2%), and most self-described as White ($n=74$,72.5%). Over 30% ($n=35$, for both groups) of both the primary care provider and parent/caregiver groups had a postgraduate degree. Table 1 contains the sample's demographic information divided by participant group.

Fifty-two programs or services were described in the open-ended questions of the survey. Table 2 contains examples of services and programs described by parents and providers, including health care services that remained open to infants up to one year old, and walk-in pediatric urgent care clinics that helped parents get quick access to health care for their children without having to take them to a hospital emergency department. Any clinics or services that survey participants mentioned by

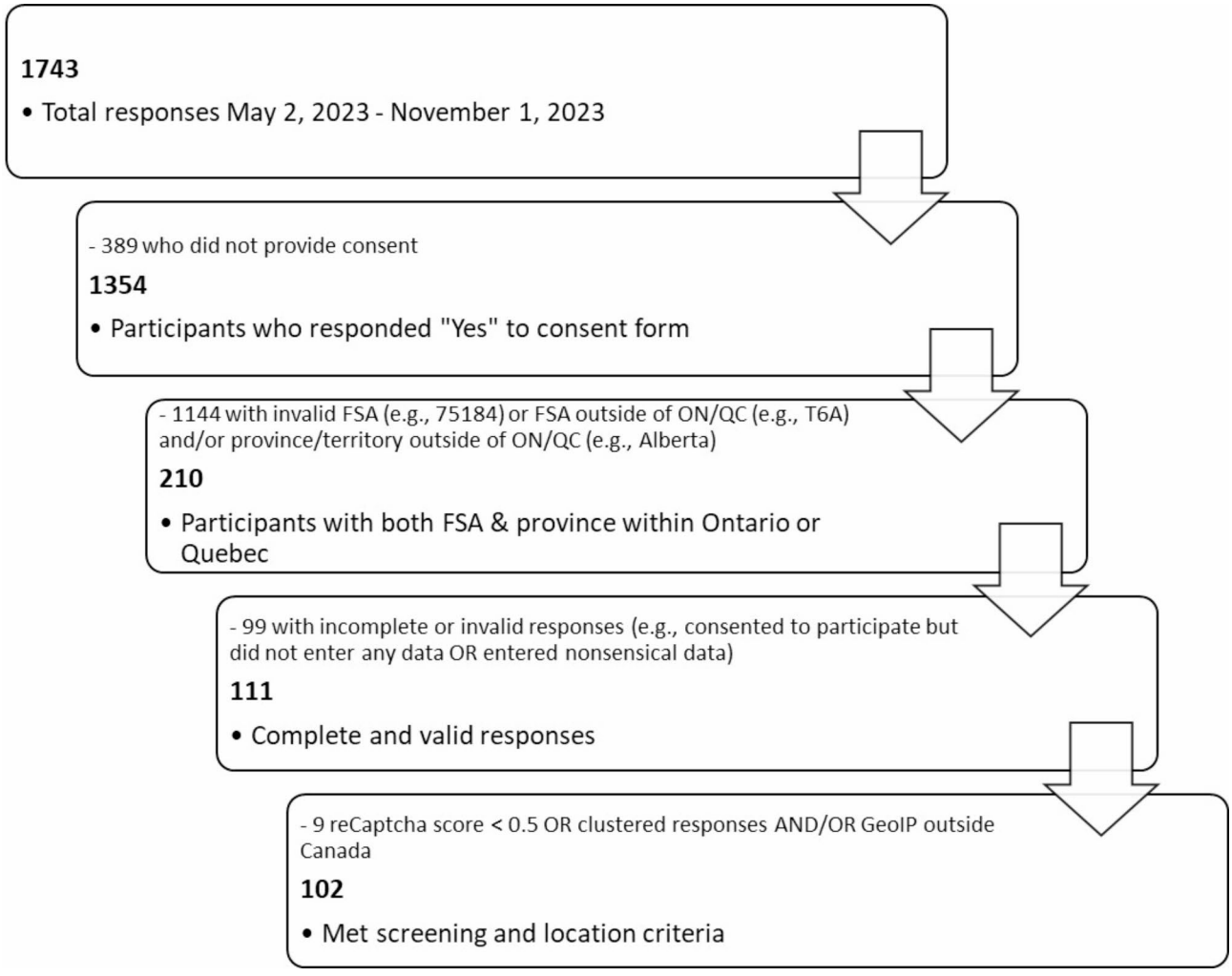

Fig. 1 Flowchart of filtering bots from survey responses

name were further explored via publicly available information (i.e., websites). In response to a question asking for suggestions of what would have been helpful to ensure continued provision and access to WCV during the pandemic, survey participant responses included: targeted outreach to families who missed WCV, infant first aid courses, in-home visits, access to a parenting group to feel connected and discuss issues with other parents, pediatric specific walk-in clinics, and recruitment of more physicians.

Interviews

Nineteen individuals (six primary care providers and 13 parents/caregivers) agreed to participate in the interview. Seven interviews were conducted in Quebec and 12 in Ontario. Two overarching topics of discussion emerged from the interviews: barriers to care (i.e., what went wrong), and innovations or services that were, or could have been, helpful.

Barriers to care

Despite the interview guide not explicitly including questions about barriers delivering or accessing primary care during the pandemic, many participants responded to questions about innovations by first describing the challenges they experienced. Parent and caregiver participants discussed elevated anxiety about seeking healthcare. This anxiety was in relation to both risk of exposure to COVID-19 and perception of being a burden on the healthcare system. As one parent explained:

> *Probably the biggest barrier was just like my own stress and anxiety, either about my kids getting COVID or about, like, not knowing, like, should I go? Your balance, your decision-making kind of changes because you're sort of always erring on the side of like not going to access health care. Because you're like, is this trivial? They don't have time for this nonsense.*

Table 1 Descriptive statistics of Survey participants (*N* = 102)

	Primary Care Provider *N* (%)	Parent or Caregiver *N* (%)	Total *N* (%)
Province			
Ontario	21 *(63.6)*	45 *(65.2)*	66 *(64.7)*
Quebec	12 *(36.4)*	24 *(34.8)*	36 *(35.3)*
Gender			
Female	31 *(93.9)*	61 *(88.4)*	92 *(90.2)*
Male / Non-binary / Prefer not to answer	2 *(6.1)*	8 *(11.6)*	10 *(9.8)*
Education Level			
Doctoral degree	6 *(18.2)*	5 *(7.2)*	11 *(10.8)*
Master's degree	5 *(15.2)*	19 *(27.5)*	24 *(23.5)*
Undergraduate degree	11 *(33.3)*	20 *(28.9)*	31 *(20.4)*
Professional degree	8 *(24.2)*	9 *(13.0)*	17 *(16.7)*
College or trade school	1 *(3.0)*	15 *(21.7)*	16 *(15.7)*
High school / Prefer not to answer	2 *(6.1)*	1 *(1.4)*	3 *(2.9)*
Age Range			
< 25 years	2 *(6.1)*	2 *(2.9)*	4 *(3.9)*
25–34 years	6 *(18.2)*	26 *(37.7)*	32 *(31.4)*
35–44 years	10 *(30.3)*	35 *(50.7)*	45 *(44.1)*
45–54 years	9 *(27.3)*	5 *(7.2)*	14 *(13.7)*
55 + years / Prefer not to answer	6 *(18.2)*	1 *(1.4)*	7 *(6.9)*
Race and Ethnicity			
Black / East or Southeast Asian / Indigenous / Latino / Middle Eastern or North African / Multiracial / South Asian	10 *(30.3)*	18 *(26.1)*	28 *(27.5)*
White	23 *(69.7)*	51 *(73.9)*	74 *(72.5)*

Parents/caregivers also struggled to attend appointments due to restrictions around how many people were allowed to physically enter the health care space. The logistics and mental load around arranging time off work and/or figuring out childcare for other children in the household was very difficult. As one parent mentioned,

> *When my son would have procedures, he would have sedation and then somebody would have to sit with him on the way home. And so that meant that I could not come down by myself. So, then I would have to arrange either my husband would have to take time off and drive me down and then sit in the car for multiple hours. Or I would have to arrange somebody else that was out of my household to take me if my husband couldn't get the time off.*

Both parents/caregivers and providers discussed the inappropriateness of virtual care appointments for WCV and certain types of sick visits. As one provider noted, "I wasn't examining them. I didn't have my hands on them. I wasn't weighing them as much, or I was counting on them to weigh themselves. you know, on their bathroom scales, which are always terrible. So, it was just really hard to keep a good eye on them."

Primary care providers found the information and guidelines they received from governing bodies regarding how to operate their clinics were unclear and confusing. As one provider noted, "Nobody knew exactly what was going on, so we were kind of all winging it. I think guidelines were, you know, sent out as things developed. They always seem to be about a month behind what was happening. So, the ability to be more timely, in terms of communicating with the experts, quote unquote, would probably be the best thing."

Additional quotes illustrating the various barriers discussed during interviews can be found in Additional file 2.

Innovations

In terms of innovative programs or services that *helped* or *could have helped* with delivering and accessing primary care, six themes emerged from the interview data: (1) Prioritization of young children, (2) Creation or modification of primary care spaces, (3) Clear decision-making guidelines, (4) Virtual care integration, (5) Proactive communication, and (6) Interdisciplinary collaboration. Table 3 contains illustrative quotes for each theme.

Prioritization of young children Many parents and primary care providers discussed how WCVs were made a priority. In some cases, that meant having exclusive days or times set aside at primary care clinics specifically for children. Primary care providers identified that reductions in the number of personnel allowed in the office at one time forced them to reduce the number of appointments and, therefore, choose which patients would receive priority care. In the case of one clinic, this involved focusing on infants under the age of 18 months and children who were considered at-risk or vulnerable, such as those in foster care or group homes. As one provider noted, the WCV needs to be a priority to ensure the best possible health outcomes in future:

> *I think overall children need to be seen as a priority population within the health system and during infectious disease outbreaks for figuring out like how do we support them and their parents to get basic healthcare. If you're not getting what you need in those first few years, it's gonna completely change the trajectory of your life, and it should be a key focus for the whole health system. To make sure that we're doing as little damage as possible to young children.*

Creation or modification of primary care spaces Many parents observed that clinics adapted to social distancing constraints by creating new locations to receive pri-

Table 2 Sample survey responses regarding primary care programs and services

Name & Location	Services Available	Participant Comments
KidsKare Durham Clinic, Whitby, Ontario	- Urgent care, primary care, consulting pediatric services - On-line or phone bookings - No walk-ins - On-site bloodwork lab - On-site radiology lab - Fully wheelchair accessible - Free parking and easy to get to by Durham Transit	"They saw my newborn three days after birth when I couldn't get an appointment with my family physician." "After the birth and formal submission of the birth details to the government, the local [clinic] sent me a detailed package (unprompted by me) to give me the names and contact of all the local paediatricians who had availabilities to take on new children. This allowed me to find a paediatrician easily for my daughter." "We never closed. We stayed open for primary care and provided service to not only our patients but others who had nowhere else to go. We implemented a screening protocol prior to entering clinic." "We were bringing children in for testing for COVID, strep, or other illnesses in person" "Mastitis: I was able to get antibiotics while breastfeeding and avoid going to ER with an infant (and continue breastfeeding)" "Helped me with food and stuff for my baby such as diapers, clothing, wipes, etc." "The [clinic name] has been a blessing helping us get access to healthcare in a day or two even in the middle of the peak of the crisis."
Clinique UP, Brossard and Saint-Eustache, Quebec	- Specialized pediatric emergency centre outside of a hospital and close to home - Open 8am-8pm, 7 days/week - Treatment of injuries (fractures, concussions) - Blood or urine testing - Antibiotics by injection or intravenous - General surgery (hernia, cyst, deformity correction) - ENT and allergy specialists on-site	
Monarch Centre, Ottawa, Ontario	- Newborn health assessments - Jaundice screening - Specialized newborn feeding support - Postpartum assessments - Wound care - Breast pump rental service - Parent education	
Mississauga Cough and Flu Clinic, Mississauga, Ontario	- In-person testing for COVID and other influenza-like illnesses for patients over the age of 1 year - People without a family doctor can call the clinic directly	
Rocket Doctor, Virtual in Ontario	- Virtual doctor appointments - Primary care, emergency care, specialist care - Routine checkups/preventative health - Prescription refills - Specialist referrals - Sick notes - Sexual health consultations - Cold & flu, allergies, other illnesses - Depression and anxiety issues	
Postpartum information package, Montreal, Quebec	- Mailed out information package for new parents	
The Pavilion Women's Centre, Kirkland Lake and Temiskaming Shores, Ontario	- Emergency shelter and counselling services - Provides resources, information about community services	

mary care, or by modifying their existing spaces. One parent mentioned that a secondary "satellite clinic" was opened to reduce the volume of patients at the primary location. A few parents also mentioned that the COVID assessment centers that were established for polymerase chain reaction (PCR) testing also served as an alternate location for primary care with medical professionals onsite to conduct consultations. One provider from Quebec discussed the implementation of a mobile clinic and how it helped reach vulnerable populations and connect individuals with local resources in their community:

> *The pop-up clinics were three days where there were pediatricians, nurses, and a social worker. The idea was to have a one-stop shop where we would identify, obviously, the medical needs, but also the psychosocial needs and be able to intervene on the spot and more so to connect them with the appropriate resources on their territory. So that was the goal. And it was a combination of working with our mobile clinic, but also with the issues and the Community organizations that were that remain connected during the pandemic with the families.*

A few parents described how their clinics found creative ways to modify their existing spaces. One parent described "a very fortunate building feature" at their primary care clinic that involved access to an additional room directly from the parking garage. The clinic was able to transform that room into the main consultation area for sick visits during the pandemic. Another parent discussed how procedures within their primary care

Table 3 Key quotes of innovations

Theme	Representative Quotes
Prioritization of young children	"What the doctor's office did was they organized like a kid's day, so they put all the appointments for all the kids that needed shots on the same day, and they didn't let any other sorts of like patients come in, I guess to, like, reduce the possibility that there would be COVID around." (P6) "I was in a group of five general pediatricians, a nurse and office staff. And basically, what we did is scaled down to have one person in the office at one time, one doctor in the office at one time. So that limited, you know, dealing with all five practices. So that obviously limited our access. So, we focus really on young babies, you know, up to 18 months." (HCP1) "At the time, I worked with a child Welfare agency, so we really tried to focus on those kids. Especially, there's a huge number that had no primary care providers in the community, so they came to us, even kids who were not in the system. So, we had to focus on that. But again, the percentage was a small percentage of what could or should have been done." (HCP1) "You know early childhood, we have a lot of children who are [newcomers] or whose parents are [newcomers], so we thought it was important to keep the preventive examinations like the [initial appointments]. We felt it was important to do this because we didn't want to lose these children, who had already been identified as vulnerable, and who were even more vulnerable if they weren't in daycare, school or whatever. But we still kept a clinic to do the [well-child screening], so the preventive examinations." (HCP5)
Creation or modification of primary care spaces	"They opened up a new kind of like, my particular family doctor opened up like a satellite clinic. Not too far from their main clinic, and I think that helped in terms of just getting people in and out of the door, cause obviously the waiting rooms are only so big when the chairs have to be spaced out six feet and you can only have so many people in line waiting to go in and that kind of thing." (P5) "At the assessment center they had set up a primary care kind of consultation area. So, you could go and have your COVID test and then if you had other symptoms, you could stay to see the doctor. And that was really the easiest way to get care for most of the pandemic." (P11) "I think the building just happened to have, like, this weird room in the basement that opened into a car park. And they just turned it into an isolation room. Yeah, so that's a very fortunate, uh, you know building feature that they had this room that you could just access." (P2) "When my child had an ear infection, as soon as we walked in, they brought us to a separate room right away. Close the door. Umm, we didn't go in the waiting area at all. Well, we walked through it, I guess, and then we went to a separate area versus when it was routine appointments, we did go in the waiting room and then get went to our kind of regular doctor's assigned room." (P3)
Clear decision-making guidelines	"At the time it wasn't like there was a super clear decision-making tree and around that. I guess if you're thinking about the future, I think maybe like, more accessible information for parents. Umm, that's like this is how you can decide like if you need to access primary care right or like, this is why you should." (P2) "The number one thing is really just you know visibility, like knowing what's out there. It's impossible to access any services if you don't know that they exist in the first place. So yeah, like having doctors know more about these things would be helpful, but if they're not going to pass that information along, like, how useful is it? I personally use social media to find out a lot of things because that's, you know, maybe not the most reliable source of information, but it is, you know, a quick and easy way of accessing information." (P5)
Virtual care integration	"So, at that point I was able to access virtual care, and got a prescription over the phone, which is amazing. And then I remember also over the course of his first couple of years of life, that there was a few other times when we were able to access virtual care for him, which was also great because it's just, you know, convenient. And we didn't have to worry about exposing him to anything." (P1) "If it was things that they could just give me advice over the phone, it actually was really helpful to not have to pack everyone up and go and sit somewhere for a while." (P11) "Like I mentioned, we're 45 min away and it just doesn't really work for us with little kids to like, it's hard to have to go wait with them somewhere for several hours, when you could, you know, get what you need in a 15 min online appointment in the comfort of your own home." (P1) "I know there are more virtual ones, which is good because sometimes, for certain conditions, you don't necessarily need to travel. It's also easier if you're at work one day, and then you can have a telephone consultation with a doctor. That's easy. We can stay at work and talk to a doctor at the same time. That's a good thing." (P7) "They were always really useful for minor things like, sometimes you can submit photos like, if it was something like skin related, they could kind of look at photo and help determine sort of like what needed to happen. so yeah, like we, my son also has eczema, so I feel like they had several sort of virtual assignments for that, trying to get prescriptions or referrals." (P1) "It was a way of keeping connected when we all felt so disconnected. And it was a way of making me feel like I was still providing some care. I didn't feel like it was amazing care, but it was still some care, and safer than you know, not like some doctors who just completely shut down right." (HCP2) "I had to do neurological exam; how do you do a neurological exam on video? I did. I got the mom to like, I'm like, 'Okay, now, you're gonna press there, this. And you're gonna do that.' And I think what I learned is, it's quite amazing how much you can actually do if you get creative and do things virtually so many lessons." (HCP2)

Table 3 (continued)

Theme	Representative Quotes
Proactive communication	"It was fairly early on they shifted to email communication just to let people know what they're changing hours were gonna be if they had outbreaks, if there was, like, vaccine clinics that were available like that kind of thing and that helped a lot. Just even from knowing like should I even bother to call? Because they're, you know, they're showing that they have zero availability in the next three or four weeks or do they have pop-up clinics that they're providing for flu vaccines and that kind of thing? So, they did that really well. I think just that extra communication about stuff that I wouldn't necessarily have known otherwise." (P5) "Well-baby visits and developmental assessments I think it would be useful to be able to take a more active role in reaching out to people, to remind them and to stress the importance. Some people do send out questionnaires and that sort of thing. I'm not big on that. But any, I think we need to take a more active role in facilitating it and not wait for people just to come to us." (HCP1) "We kept really close contact with the families. Hmm, communicated with them as much as, or even more than, usual. We encourage the nurses to, you know, to call, to be present and to be helpful, and it's really working together to ensure that everyone was safe." (HCP3)
Interdisciplinary collaboration and delegation	"I think the midwives also set up like a well-baby clinic that continued to run during the pandemic. So, I think anything that provided direct support and continued to run and stayed in person as much as possible." (P11) "It was a bit governmental. What I also heard was that there's a clinic that's a bit like the preventive clinic in Quebec City, [clinic name], or something like that, that really does preventive examinations, and it's done by nurses." (HCP5) "And personally, for me it doesn't even like it wouldn't even have to be a doctor. If there were more nurse practitioners that we could see like that would also like just that intermediary." (P5) "What's really difficult right now. During the pandemic, it was all the care you could get in pharmacies. For example, streptococcus. But now, I think it's starting to come back, but all the service would be there when we couldn't, we didn't have access." (HCP4)

P = parent/caregiver, HCP = health care provider

clinic were slightly different depending on what type of visit (i.e., sick visit versus WCV) they had booked, stating: "When my child had an ear infection, as soon as we walked in, they brought us to a separate room right away. Close the door. Umm, we like we didn't go in the waiting area at all. […] and then when it was routine appointments, we did go in the waiting room and then get went to our kind of regular doctor's assigned room."

Clear decision-making guidelines In terms of the confusing and fluctuating messaging regarding what was safe, parents made suggestions for improved communication. One parent noted that creating a visual diagram directing parents where to go for healthcare and under what circumstances or conditions one should go, might ease some of the burden. Another parent mentioned that many services weren't well known and, therefore, people would access care from inappropriate locations (e.g., go to emergency departments for illnesses that are not emergencies). They suggested creating "some kind of super easy-to-see flow chart […] for any and all services that might be available." Similarly, another parent discussed making healthcare service information more centralized, perhaps using social media as a platform since it is a "quick and easy way of accessing information."

Virtual care integration Almost every parent mentioned the convenience of virtual appointments for simple consultations or receiving/renewing prescriptions. Part of the convenience included reducing anxiety about COVID-19 exposure, relieving the mental load of trying to find childcare for other kids at home or reconfiguring their day, and the ability to attend virtual consultations from a variety of locations, such as at work, at home, or in their vehicle. Parents also discussed that submitting photos online was useful and relatively easy for minor conditions (e.g., rashes) that would normally require an in-person visit to their clinic.

From the primary care provider perspective, virtual appointments were "a way of making me feel like I was still providing some care." Several providers discussed how impressed they were by how much they could accomplish during virtual appointments, especially when they got creative with their methods. For example, one provider described performing a neurological exam on video, which she was surprised she was able to do:

> *I had to do neurological exam; how do you do a neurological exam on video? I did. I got the mom to like, I'm like, 'Okay, now, you're gonna press there, this. And you're gonna do that.' And I think what I learned is it's quite amazing how much you can actually do if you get creative and do things virtually. So many lessons.*

Proactive communication Parents appreciated how some primary care providers implemented email or text message notifications to provide clinic updates, new service locations, or appointment reminders. One parent said receiving the information through regular updates helped curb the anxiety they experienced "from knowing, like, should I even bother to call? Because they're showing that they have zero availability." A few providers also discussed how being more proactive in their communication would help to avoid a backlog of patients who have not been seen for important appointments. Rather

than waiting for parents to schedule an appointment for their child, providers suggested that clinics could engage in more outreach activities. One provider observed that during the pandemic, they were communicating with parents even more than they normally would have, since they became cognizant that phone or video calls would be the only opportunity to "see" their patients for the indefinite future.

Interdisciplinary collaboration Participants discussed recruiting other health care professionals to help with care delivery or receiving care from health professionals who were not their primary care provider. For example, one provider mentioned the inclusion of social workers in their unit to relieve some of the additional communication tasks the nursing staff had taken on. Physicians also discussed how receiving support from other types of primary care providers and being able to collaborate or delegate some tasks would help them do their job better. One pediatrician from Ontario acknowledged the desire to collaborate comes from both sides: "I know there's a lot of nurse practitioners, pediatric nurse practitioners who work in the hospital because that's the only place they can work. But I know a lot of them would love to work in the community if it was available."

Participants also discussed receiving care from non-physician primary care providers, stating that in some communities, particularly rural and remote areas, midwives and nurses set up clinics to conduct WCV. Several parents also advocated for delegation of certain aspects of WCVs to non-physician health professionals (e.g., nurses and pharmacists), such as screening or testing and immunizations.

Discussion

The results from this study illuminate primary care providers' and parents' or caregivers' perspectives on how the COVID-19 pandemic affected their ability to deliver and access care for children under the age of six. Participants' responses to the survey and interview questions included details of, firstly, how the pandemic negatively impacted their efforts to deliver or access care and, ultimately, what services or programs facilitated delivery and access.

Barriers to delivering and accessing primary care

The barriers to primary care that participants mentioned during the interviews reiterate what other researchers have previously found, such as parental anxiety, unclear guidelines from governing entities, and restrictions on attendance at medical appointments [9, 11, 12]. In addition to those barriers, participants in the current study discussed how virtual care was inappropriate under certain circumstances. Previous research has shown that virtual appointments are not feasible when certain types of physical assessments are needed, when there are communication difficulties (e.g., language discrepancies, hearing impairments), and when technical equipment (e.g., computer software, digital video capabilities) is unavailable or unsupported [10, 21–23]. In Canada, researchers continue to survey and monitor adverse events from virtual care and provide guidance on how to use virtual care within the pediatric population [24]. Another barrier providers in the current study mentioned includes administrative burden; an issue that predates COVID-19, but the effects of which (e.g., clinician overwhelm, poor work-life balance, cognitive fatigue, burnout, etc.) were found to be amplified during the pandemic [25–28].

Innovations that facilitated delivery and access to primary care

In terms of what helped with delivery and access to primary care for young children, the current study provides several innovative strategies that were used to overcome barriers that emerged from the pandemic. The main pivot that occurred involved moving from in-person to virtual primary care appointments. Both parents and providers had positive feedback regarding the ease and accessibility of virtual appointments when the reason for the appointment could be appropriately addressed virtually. This has been reflected in other research that found virtual appointments, or telemedicine, to be particularly helpful for those who live in rural areas and/or lack the means to travel to a primary care clinic [29]. As noted above, virtual care was not considered appropriate for all appointments, particularly ones in which hands-on assessments were necessary [21], but were appreciated by both parents and providers in situations where they deemed face-to-face interactions unnecessary.

The prioritization of WCV within primary care clinics was reassuring and could help explain how visit attendance rates recovered so efficiently in certain locations [14, 15]. Having reserved days or times and prioritizing the scheduling of WCV was effective for delivering consistent care to this age group throughout the pandemic. These findings echo a pilot program that was implemented in the United States during COVID-19, called "Well-child Wednesdays" [30]. The authors found that dedicating one day a week to pediatric patients helped recover missed immunizations and WCV, reduce staffing issues, and relieve clinic spacing issues [30].

Another innovation several participants mentioned was the creation or modification of primary care spaces. Many clinics were able to implement unique adaptations to allow for continuation of in-person visits, including having designated rooms for sick visits, opening satellite clinics, and positioning primary care providers at COVID

testing locations. These novel approaches are akin to an innovation implemented in the U.S. during the pandemic that involved a drive-through pediatric vaccine clinic for patients 18 months old to 4 years of age [31]. This novel service improved the total number of vaccinations administered in the region, exceeding the previous two years' pediatric vaccination rates [31].

Parents in the current study discussed some ideas for how to ease anxiety around making the decision to seek healthcare for their children. Suggestions of a centralized, updated source of information and easy-to-read flowcharts were put forth to help improve the process. Similar suggestions have been made in other research studies, such as that by Neill and colleagues [32] who found there was a need for "easy access reliable safety netting information" (p. 2044) regarding what symptoms to look out for, what to avoid, normal ranges of symptoms, how long to wait before seeking help, and local services that were available during the pandemic.

Another theme that addressed information sharing and improved connection between providers and parents involved proactive communication. Providers recognized that a more streamlined system should be created to ensure parents are getting their children's preventative care needs met. One suggestion from existing research is to integrate patient portals into electronic health records so that there is a more open channel of communication between clinicians and their patients [26]. As a part of a larger comment on family medicine reform in Canada, the recommendation has been made for "policies, procedures, and tools that implement near-real-time information exchange that follow patients throughout the health care system" (p. 155 [33]), .

Finally, both providers and parents discussed the idea of collaboration or delegation of certain clinical tasks to non-physician personnel. Other studies have shown a collaborative approach to be helpful in relieving some of the demands on primary care physicians. For example, a study of 95 physicians and advanced practice clinicians (i.e., obstetricians, pediatricians, and primary care physicians) showed strong support for occupational therapists providing preventative education and developmental guidance during WCV [34]. The authors suggest this approach may alleviate some of the time pressures clinicians experience in trying to cover all the components of a WCV [34]. One pediatric primary care centre in the U.S. takes a holistic approach by integrating various pediatric clinicians (e.g., family physician, pediatrician, pediatric psychologist, nurses, etc.) in a single location. This approach was found to be successful in increasing access to care, improving provider and patient satisfaction, and reducing emergency room use [35].

Limitations and future directions

Participant characteristics from the survey indicate that our sample was highly educated, mostly White, and contained participants who are actively rostered with a primary care provider. Future research needs to explore perspectives from a more diverse population, including those who are unattached to a primary care provider, from a variety of ethnicities, and from lower income or education levels. There was a low response rate, particularly among primary care providers, which is unfortunate due to the importance of their voices in this research, yet understandable considering their excessive caseloads and administrative burden. More research is needed on how to revitalize the primary care system to make clinician's work more manageable and sustainable. Finally, many of the survey responses included examples of programs that weren't primary care or health care focused, such as social services, parenting support groups, and childcare services. Future research should explore if and how these types of frontline community services may serve as a bridge or avenue of connection and communication for primary care.

Conclusions

This qualitative study explored some innovative ways primary care services were able to overcome barriers that arose during a global pandemic to ensure children received the preventative care that is so important throughout the early years of life. The results from this research speak to the importance of adaptability, creativity, and innovation within primary care, particularly when there is a sudden and unexpected increase in the barriers to providing and accessing care. Finding ways to prioritize WCV, improve communication avenues and message content, take a more collaborative approach, and adapt systems, spaces, and methods are feasible solutions to continued primary care provision at any time, but particularly when collective health anxiety is elevated.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12875-024-02701-0.

Supplementary Material 1

Supplementary Material 2

Acknowledgements

We would like to acknowledge several individuals who provided invaluable feedback throughout the research and writing process, including Dr. Erin Reid, Dr. Kimberly Munro, and Dr. James Rourke.

Author contributions

Co-senior authors I.B. and P.L. conceptualized the study and obtained study funding. All authors contributed to the study design. K.M. and H.V. collected survey data and conducted all interviews. H.V. reviewed all the transcripts. Data analysis was conducted by K.M. and H.V. with support from I.B. and P.L.

K.M. prepared the initial draft of the manuscript. All authors contributed to reviewing and editing the manuscript.

Funding
This study was funded by CIHR grant #6035080.

Data availability
The data that support the findings of this study are not openly available due to reasons of sensitivity and are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate
This study received ethics approval from the Health Sciences Research Ethics Board at Queen's University (#FMED-6871-23). Informed consent was received from all participants.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

Author details
[1]Centre for Studies in Primary Care, Department of Family Medicine, Queen's University, 220 Bagot St, K7L 3G2 Kingston, ON, Canada
[2]McGill University Health Centre Research Institute, Montréal, QC, Canada
[3]Faculty of Medicine, Memorial University of Newfoundland, St. John's, NL, Canada
[4]Department of Pediatrics, Faculty of Medicine and Health Sciences, Research Institute of the McGill University Health Centre, McGill University, Montréal, QC, Canada
[5]Department of Family Medicine, School of Medicine, Queen's University, Kingston, ON, Canada

Received: 29 October 2024 / Accepted: 27 December 2024
Published online: 07 January 2025

References

1. Wolf ER, O'Neil J, Pecsok J, Etz RS, Opel DJ, Wasserman R, et al. Caregiver and clinician perspectives on missed well-child visits. Ann Fam Med. 2020;18(1):30–4. https://doi.org/10.1370/afm.2466
2. Li P, Rowan-Legg A, Kwok B, Bayoumi I, Arulthas S, Tedone E, et al. 2020 edition of the Rourke Baby Record: what is new in preventive care of children up to 5 years of age? Can Fam Physician. 2021;67(7):488–98. https://doi.org/10.46747/cfp.6707488
3. Rourke L, Rourke J, Leduc D, Li P, Rowan-Legg A, Bayoumi I, et al. Knowledge mobilization for primary care: lessons learned from 40 years of the Rourke Baby Record. Can Fam Physician. 2022;68:721–5. https://doi.org/10.46747/cfp.6810721
4. Hagan JF Jr, Shaw JS, Duncan PM, editors. Bright futures: guidelines for Health Supervision of infants, children and adolescents. 4th ed. American Academy of Pediatrics. 2017. https://doi.org/10.1542/9781610020237
5. World Health Organization. WHO Director-General's Opening Remarks at the Media Briefing on COVID-19–11. March 2020. https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020. Published 2020. Accessed June 11, 2024.
6. Piché-Renaud PP, Ji C, Farrar DS, Friedman JN, Science M, Kitai I, et al. Impact of the COVID-19 pandemic on the provision of routine childhood immunizations in Ontario, Canada. Vaccine. 2021;39:4373–82. https://doi.org/10.1016/j.vaccine.2021.05.094
7. Stephenson E, Butt DA, Gronsbell J, Ji C, O'Neill B, Crampton N, et al. Changes in the top 25 reasons for primary care visits during the COVID-19 pandemic in a high-COVID region of Canada. PLoS ONE. 2021;16(8):e0255992. https://doi.org/10.1371/journal.pone.0255992
8. Wagh A, Pan S, Gordon S, Hellerova L, Ji Y, Park H, et al. Pediatric health care use during the COVID-19 pandemic: lessons learned from the initial 2020 wave. J Am Coll Emerg Physicians Open. 2022;3:e12814. https://doi.org/10.1002/emp2.12814
9. Cadwgen J, Goodwin J, Arichi T, Patel A, Turner S, Barkey S, et al. Care in COVID: a qualitative analysis of the impact of COVID-19 on the health and care of children and young people with severe physical neurodisability and their families. Child Care Health Dev. 2022;48:924–34. https://doi.org/10.1111/cch.12925
10. Mardinli A, Weerasuriya R, Gillespie A, Smith L, Sung V. Accessing hearing-health services for deaf and hard-of-hearing children during the COVID-19 pandemic: parent and child perspectives. Aust J Soc Issues. 2023;58:232–58. https://doi.org/10.1002/ajs4.231
11. Watson G, Pickard L, Williams B, Hargreaves D, Blair M. Do I, don't I?' A qualitative study addressing parental perceptions about seeking healthcare during the COVID-19 pandemic. Arch Dis Child. 2021;106:1118–24. https://doi.org/10.1136/archdischild-2020-321260
12. De Angulo NR, Penwill N, Pathak P, Elster M, Ja C, Hochreiter D, et al. Quality and safety challenges in inpatient pediatric care during the COVID-19 pandemic: a national qualitative study. Health Serv Res. 2021;X:51. https://doi.org/10.1111/1475-6773.13819
13. McLaughlin KJ, Khanna M, Allison PJ, Glogauer M, McNally ME, Quiñonez C, et al. Investigating the perceptions and experiences of Canadian dentists on dental regulatory bodies' communications and guidelines during the COVID-19 pandemic. Community Dent Oral Epidemiol. 2024;00:1–7. https://doi.org/10.1111/cdoe.12939
14. Kujawski SA, Yao L, Wang HE, Carias C, Chen YT. Impact of the COVID-19 pandemic on pediatric and adolescent vaccinations and well child visits in the United States: a database analysis. Vaccine. 2022;40:706–13. https://doi.org/10.1016/j.vaccine.2021.12.064
15. Sexton K, Susi A, Lee E, Hisle-Gorman E, Rajnik M, Krishnamurthy J, et al. Trends in well-child visits and routine vaccinations among children of US military members: an evaluation of the COVID-19 pandemic effects. J Clin Med. 2022;11(22):6842. https://doi.org/10.3390/jcm11226842
16. Lévesque J-F, Harris MF, Russell G. Patient-centred access to health care: conceptualising access at the interface of health systems and populations. Int J Equity Health. 2013;12:18. equityhealthj.com/content/12/1/18.
17. Elo S, Kyngäs H. The qualitative content analysis process. J Adv Nurs. 2008;62(1):107–15. https://doi.org/10.1111/j.1365-2648.2007.04569.x
18. Galura SJ, Horan KA, Parchment J, Penoyer D, Schlotzhauer A, Dye K, Hill E. Frame of reference for content analysis with structured teams (FORT-CAST): a framework for content analysis of open-ended survey questions using multidisciplinary coders. Res Nurs Health. 2022;45:477–87. https://doi.org/10.1002/nur.22227
19. Saunders CH, Sierpe A, von Plessen C, Kennedy AM, Leviton LC, Bernstein SL, et al. Practical thematic analysis: a guide for multidisciplinary health services research teams engaging in qualitative analysis. BMJ. 2023;381:e074256. https://doi.org/10.1136/bmj-2022-074256
20. Ahmed SK. The pillars of trustworthiness in qualitative research. J Med Surg Public Health. 2024;2:100051. https://doi.org/10.1016/j.glmedi.2024.100051
21. Braccio S, Holmes E, Hughes T, Kachwala Q, Ruparell K, Hall S. Patients' experience of telemedicine in paediatric allergy. Arch Dis Child. 2021;106:A1–514. https://doi.org/10.1136/archdischild-2021-rcpch.384
22. Hedden L, Spencer S, Mathews M, Marshall EG, Lukewich J, Asghari S, et al. There's nothing like a good crisis for innovation: a qualitative study of family physicians' experiences with virtual care during the COVID-19 pandemic. BMC Health Serv Res. 2023;23:338. https://doi.org/10.1186/s12913-023-09256-3
23. Satti K, Ojugbele O. Lessons learned: Pediatric telemental health in a rural medical center in the age of SARS-CoV-2. J Rural Health. 2021;37(1):260–2. https://doi.org/10.1111/jrh.12512
24. Vanderhout S, Rosenfield D, Goldbloom EBA. Canadian Paediatric Surveillance Program study to guide safe integration of virtual care for children. Paediatr Child Health. 2023;28:468–9. https://doi.org/10.1093/pch/pxad059
25. Frintner MP, Kaelber DC, Kirkendall ES, Lourie EM, Somberg CA, Lehmann CU. The effect of electronic health record burden on pediatricians' work-life balance and career satisfaction. Appl Clin Inf. 2021;12:697–707. https://doi.org/10.1055/s-0041-1732402
26. Jenssen BP, Thayer J, Nekrasova E, Grundmeier RW, Fiks AG. Innovation in the pediatric electronic health record to realize a more effective platform. Curr Probl Pediatr Adolesc Health Care. 2022;52:101–9. https://doi.org/10.1016/j.cppeds.2021.101109
27. Kruse CS, Mileski M, Dray G, Johnson Z, Shaw C, Shirodkar H. Physician burnout and the electronic health record leading up to and during the first year of

COVID-19: systematic review. J Med Internet Res. 2022;24(3):36200. https://doi.org/10.2196/36200
28. Savoy A, Patel H, Murphy DR, Meyer AN, Herout J, Singh H. Electronic health records' support for primary care physicians' situation awareness: a metanarrative review. Hum Factors. 2023;65(2):237–59. https://doi.org/10.1177/00187208211014300
29. Stallings DE, Duetsch JR, Gustin TS, Goode VM. An interdisciplinary telemedicine innovation to enhance pediatric diabetes care in rural communities: a proposed practice initiative. J Spec Pediatr Nurs. 2023;28:e12405. https://doi.org/10.1111/jspn.12405
30. Stewart-Lynch A, Lombardo S, Ceriani D, Mastrangelo S. Well child wednesdays: an interprofessional pilot-program to increase pediatric immunizations post-COVID. JIEP. 2023;31:100606. https://doi.org/10.1016/j.xjep.2023.100606
31. Patil S, Kerby K, Ramick A, Criddle JH. Is that for here or to go? Drive-through pediatric vaccine clinic as a novel approach during a global pandemic. Disaster Med Public Health Prep. 2021;17:1–5. https://doi.org/10.1017/dmp.2021.338
32. Neill S, Carter R, Jones R, Roland D, Bayes N, Tavaré A, et al. Caring for a sick or injured child during the COVID-19 pandemic lockdown in 2020 in the UK: an online survey of parents' experiences. Health Expect. 2021;24:2036–46. https://doi.org/10.1111/hex.13347
33. Katz A, Singer AG. Future of family medicine in Canada: four evidence-based strategies for health care transformation. Can Fam Physician. 2024;70:155–7. https://doi.org/10.46747/cfp.7003155
34. Burmeister S, Kresge L, Brenner A, MacLeod T, McMaster R, Nagle M. Health care clinician perceptions of OTs providing services during well-baby visits: a descriptive research study. Am J Occup Ther. 2022;76(Suppl). https://doi.org/10.5014/ajot.2022.76S1-PO151
35. Stancin T. Reflections on changing times for pediatric integrated primary care during COVID-19 pandemic. Clin Pract Pediatr Psyc. 2020;8(3):217–9. https://doi.org/10.1037/cpp0000370

Publisher's note