



Parents' perspective on pediatric emergency department visits for low-acuity conditions before and during the COVID-19 pandemic: a cross-sectional bicentric study

Karol Samman¹ · Cathie-Kim Le² · Brett Burstein^{2,3} · Salma Rehimini⁴ · Anthony Grenier⁵ · Claudia Bertrand-Bureau⁶ · Myriam Mallet⁷ · David Simonyan⁸ · Simon Berthelot^{9,10}

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Abstract

Objectives The primary objective of this study was to describe and compare the motivation of parents/guardians to bring children with low-acuity conditions to a tertiary-care pediatric emergency department (ED) versus a clinic before and after the pandemic. The secondary objectives were to describe and compare the demographic and clinical characteristics of the population studied and the impact of the pandemic on their access to primary care services.

Methods This is a cross-sectional study based on a survey administered to parents/guardians of patients presenting with low-acuity conditions at one of two EDs.

Results The respondents numbered 659. Children were brought to a pediatric ED generally because of the perceived urgency of the condition, the presumed resource availability in the pediatric ED and the unavailability of the primary care physician. However, most respondents ($n = 438$, 66.5%) indicated preference for a clinic. More respondents before than during the pandemic reported they had been unable to find a doctor outside the ED (48.6% before COVID vs 26.8% during COVID, $p < 0.001$) but patients during the pandemic were less likely to seek care in a primary care practice or walk-in clinic (30.0% during COVID vs 48.6% before COVID, $p < 0.001$). In addition, the number of respondents presenting with symptoms of infection decreased by more than half after the pandemic began while the proportion of musculoskeletal and psychiatric complaints doubled.

Conclusion Although the pandemic has altered the landscape of presenting complaints and pediatric healthcare-seeking behaviors, most respondents indicated they would prefer to receive care in a clinic. This finding contradicts the view that most pediatric ED visits for low-acuity conditions are by choice rather than perceived necessity. Prioritizing improved access to primary care resources would better address the preferences and expectations of parents/guardians.

Keywords Pediatric emergency department · Low-acuity · COVID-19

✉ Simon Berthelot
simon.berthelot@fmed.ulaval.ca

¹ Department of Pediatrics, Centre Hospitalier Régional de Lanaudière, St-Charles-Borromée, QC, Canada

² Division of Pediatric Emergency Medicine, Department of Pediatrics, Montreal Children's Hospital, McGill University Health Centre, Montréal, QC, Canada

³ Department of Biostatistics, Epidemiology and Occupational Health, McGill University, Montréal, QC, Canada

⁴ McGill University, Montréal, QC, Canada

⁵ Department of Family Medicine, GMF Nouvelle-Beauce, Sainte-Marie, QC, Canada

⁶ Université de Laval, Québec, QC, Canada

⁷ Centre de Recherche du CHU de Québec-Université Laval, Québec, QC, Canada

⁸ CHU de Québec-Université Laval, Québec, QC, Canada

⁹ Département de médecine de famille et de médecine d'urgence, Université Laval, Québec, QC, Canada

¹⁰ Centre de recherche du CHU de Québec-Université Laval, Axe Santé des populations et pratiques optimales en santé,, Québec, QC, Canada

Abstrait

Objectifs L'objectif principal de cette étude était de décrire et de comparer la motivation des parents/tuteurs à amener des enfants présentant des troubles de faible sévérité à un service d'urgence (SU) pédiatrique de soins tertiaires par rapport à une clinique avant et après la pandémie. Les objectifs secondaires étaient de décrire et de comparer les caractéristiques démographiques et cliniques de la population étudiée et l'impact de la pandémie sur leur accès aux services de soins primaires.

Méthodes Il s'agit d'une étude transversale fondée sur une enquête menée auprès de parents/tuteurs de patients présentant des problèmes de faible sévérité à l'un des deux SU.

Résultats Les répondants étaient au nombre de 659. Les enfants ont été amenés à un SU pédiatrique généralement en raison de l'urgence perçue de la condition, de la disponibilité présumée des ressources dans le SU pédiatrique et de l'indisponibilité du médecin de soins primaires. Cependant, la plupart des répondants ($n = 438$, 66,5%) ont indiqué une préférence pour une clinique. Plus de répondants avant que pendant la pandémie ont déclaré qu'ils avaient été incapables de trouver un médecin à l'extérieur de l'urgence (48,6% avant la COVID-19 contre 26,8% pendant la COVID-19, $p < 0,001$), mais les patients pendant la pandémie étaient moins susceptibles de solliciter des soins dans une clinique de soins primaires ou une clinique sans rendez-vous. (30,0% pendant la COVID-19 contre 48,6% avant la COVID-19, $p < 0,001$). De plus, le nombre de répondants présentant des symptômes d'infection a diminué de plus de la moitié après le début de la pandémie, tandis que la proportion de plaintes musculosquelettiques et psychiatriques a doublé.

Conclusion Bien que la pandémie ait modifié le portrait des raisons et des habitudes de consultation dans les urgences pédiatriques, la plupart des répondants ont indiqué qu'ils préféreraient recevoir des soins dans une clinique. Cette constatation contredit le point de vue selon lequel la plupart des visites aux urgences pédiatriques pour des problèmes de faible sévérité se font par choix plutôt que par nécessité perçue. Donner la priorité à l'amélioration de l'accès aux ressources de soins primaires permettrait de mieux répondre aux préférences et aux attentes des parents/tuteurs.

Mots-clés service d'urgence pédiatrique · faible sévérité · COVID-19

Clinician's capsule

What is known about the topic?

Pediatric ED visits for low-acuity conditions represent a large proportion of overall ED visits and contribute to longer ED waiting times and clinical workloads.

What did this study ask?

What motivates parents/guardians to seek pediatric care in an ED and did the COVID-19 pandemic change this?

What did this study find?

Among this sample of low-acuity patients, two-thirds would have preferred or accepted an appointment in a clinic rather than being assessed in the ED.

Why does this study matter to clinicians?

Improving access to outpatient primary care services is key to tailor care to the preferences of parents/guardians of pediatric patients with low-acuity conditions.

Introduction

Pediatric emergency department (ED) visits by ambulatory patients with low-acuity conditions account for more than half of total pediatric emergency visits [1]. Some observers report that pediatric EDs are often preferred over clinics by parents and guardians because they represent a more accessible and convenient care alternative [2]. However, concerns have been expressed that the resulting overcrowding of EDs is becoming a clinical and financial burden [3–6].

The COVID-19 pandemic disrupted healthcare services to the pediatric population. Access to clinics was restricted in an attempt to limit the transmission of COVID-19 and telemedicine grew significantly [7–10]. Lockdown measures also had a profound impact on pediatric EDs, with visits dropping by 30–89% worldwide [11–13]. With the return to pre-pandemic practices, it has become important to understand the perspective of parents/guardians to meet their needs and expectations regarding the care of children with low-acuity conditions.

In this study conducted before and during the pandemic, our aim was to survey parents/guardians of children presenting to the ED for low-acuity illnesses to describe their motivations for choosing this care setting over primary care services.

Methods

Study design and setting

This cross-sectional study was based on a survey administered to parents/guardians of pediatric patients at two academic pediatric EDs: Centre Mère-Enfant du CHU de Québec-Université Laval (CME-CHUL) and the Montreal Children's Hospital (MCH). The CME-CHUL ED (Québec City) receives around 35,000 children annually. The MCH emergency department, one of the two recognized level-one trauma centers for pediatric patients in Québec, is one of the busiest pediatric EDs in Canada with more than 80,000 annual visits. In Québec, publicly funded walk-in clinics (known as super-clinics) and primary care clinics represent a potential ED alternative for a wide range of acute ambulatory conditions, such as respiratory or urinary tract infections, but also minor traumatic injuries (e.g., sprains or minor fractures) and, in some cases, laceration repair.

Launched before the COVID-19 pandemic, this study was paused from March 2020 to September 2020 to comply with the sanitary regulations at the participating sites. Recruitment was thus divided into pre-pandemic (November 2019 to February 2020) and pandemic periods (September 2020–March 2021). This study followed STROBE reporting guidelines [14] for cross-sectional studies and received approval from the CHU de Québec-Université Laval research ethics board.

Population

Parents/guardians of ambulatory ED patients aged 0–18 years and assigned Canadian Triage and Acuity Scores (CTAS) of 3, 4 or 5 were invited to participate. Chronic disease and/or no fluency in English or French were criteria of exclusion. Based on a previous similar study, the list of excluded chronic diseases included cystic fibrosis, bronchopulmonary dysplasia, mitochondrial diseases, neoplasia, type 1 diabetes, sickle cell disease, cerebral palsy, severe neuromuscular pathologies, complex cardiac malformations and inflammatory intestinal disease. [15]

Survey tool

A survey instrument was developed in French and English, adapted with the consent of the authors of a previous survey for low-acuity pediatric ED visits [15]. The survey was written for a 6th grade reading level, was pilot-tested and back-translated from English to French. The survey employed multiple choices to collect the following information: access to a primary care physician, motivations for presenting at the pediatric ED as opposed to a community clinic, description

of the child's symptoms and perspective on the illness, and sociodemographic information on the patients and their caregivers. The survey distributed during the pandemic period was modified to include "I am not able to see a doctor in the community because of the COVID pandemic" and "I went to a COVID clinic, but they sent me to the emergency room." in the choices stating their motivations to visit the ED.

Survey administration

A 7-day random sampling recruitment schedule between 9:00 a.m. and 9:00 p.m. was implemented in both participating EDs. This ensured proportional representation of the hours when primary clinics are an alternative to the ED. The number of 6-h recruitment periods was 82, 32 before and 50 during the pandemic.

The parents/guardians of eligible triaged patients waiting for assessment by the physician were approached in person by a research assistant before the pandemic. Participants were given 15 min to fill out a paper copy of the survey, which the research assistant then collected. During the pandemic, patients were contacted on their phone. The patient and accompanying adult were provided with a link via email to fill out the survey online. If the survey was not completed, a reminder call was made 24 h later. Patient exclusions and refusals were documented.

Outcome measurements

The primary outcome was the prevalence proportions of the different reasons for visiting the pediatric ED with a low-acuity complaint. Secondary outcomes were the prevalence proportions of (1) demographic and clinical characteristics of the patients and their guardians; (2) registration with a primary care physician; (3) attempt to be evaluated by a primary care physician or at a walk-in clinic before presenting to the ED; and (4) the parent/guardian's perception of health care resource accessibility.

Sample size

Since the principal objective of this study was descriptive, a sample size was sought that would ensure narrow 95% confidence intervals for descriptive statistical estimates. We calculated that 385 participants would produce a two-sided 95% confidence interval with $\pm 5\%$ precision when the sample proportion was 50%. Adjusting for heterogeneity between the 2 centers (design effect of 1.24, intraclass correlation = 0.1%), a sample size of ≥ 238 participants per center was targeted (total $n \geq 476$). The sample size was estimated using the simple asymptotic method for confidence intervals for one proportion in PASS v13 Power Analysis and Sample Size Software (2014).

Data analysis

Categorical variables were quantitated as frequencies and proportions, continuous variables as means \pm SD and 95% confidence intervals. Subgroup analyses were performed (1) by recruiting site and (2) excluding musculoskeletal disorders, minor traumatic brain injuries and lacerations since in many jurisdictions, these conditions may be more difficult to manage outside the ED. Analyses were also stratified by recruitment period (before and during the pandemic). Results from these two periods were compared using Pearson Chi-squared or Fisher exact tests. All data were anonymized and analyzed using SAS v9.4 with a two-sided significance level set at $p < 0.05$.

Results

Characteristics of the participants

A total of 901 patients were approached and 659 were included, 283 at the CME-CHUL and 376 at the MCH

(Fig. 1). Table 1 shows the demographic characteristics of the respondents.

Motivations to seek care at the Pediatric ED

Choosing to go to a pediatric ED rather than a community clinic resulted from concerns about the severity of the child's condition (36.6%), from presumptions about the availability of resources in pediatric EDs (34.3%) and from the unavailability of the primary care physician (23.5%). Respondents were more likely to cite the inaccessibility of community physicians before the pandemic (31.7% before COVID vs 15.5% during COVID, $p < 0.001$, Table 2) and of primary care providers (32.0% before COVID vs 18.0% during COVID, $p < 0.001$). In stratified analyses, this difference in access to community physicians and primary care providers was significant for infectious presenting complaints such as upper respiratory tract infection and fever, but not for non-infectious complaints such as musculoskeletal conditions and minor head trauma (Online Resource 6).

Access to primary care

Although 58.4% of respondents stated that they preferred a clinic over an ED, only 27.5% attempted to make an appointment with their primary care provider and 23.7% tried to seek care in a walk-in clinic. Preferring or accepting an appointment in a clinic was expressed in 66.5% of cases. More respondents before than during the pandemic reported they had been unable to find a doctor outside the ED (48.6% before COVID vs 26.8% during COVID, $p < 0.001$) but patients during the pandemic were less likely to seek care in a primary care practice or walk-in clinic (30.0% during COVID vs 48.6% before COVID, $p < 0.001$). Respondents were also less likely to prefer a clinic over the ED (48.5% during COVID vs 73.7% before COVID, $p < 0.001$). The sub-group analysis excluding musculoskeletal disorders, minor traumatic brain injuries and lacerations yielded similar results (Table 3).

Presenting complaints

The most common presenting complaints (Table 4) were fever, upper respiratory infection and musculoskeletal. Whereas respondent concerns before the pandemic were mainly fever and infectious illness symptoms, these consultations decreased by more than half among participants recruited during the pandemic. In addition to the fact that the proportion of musculoskeletal and psychiatric problems doubled, respondents presented after shorter symptomatic experiences during the pandemic.

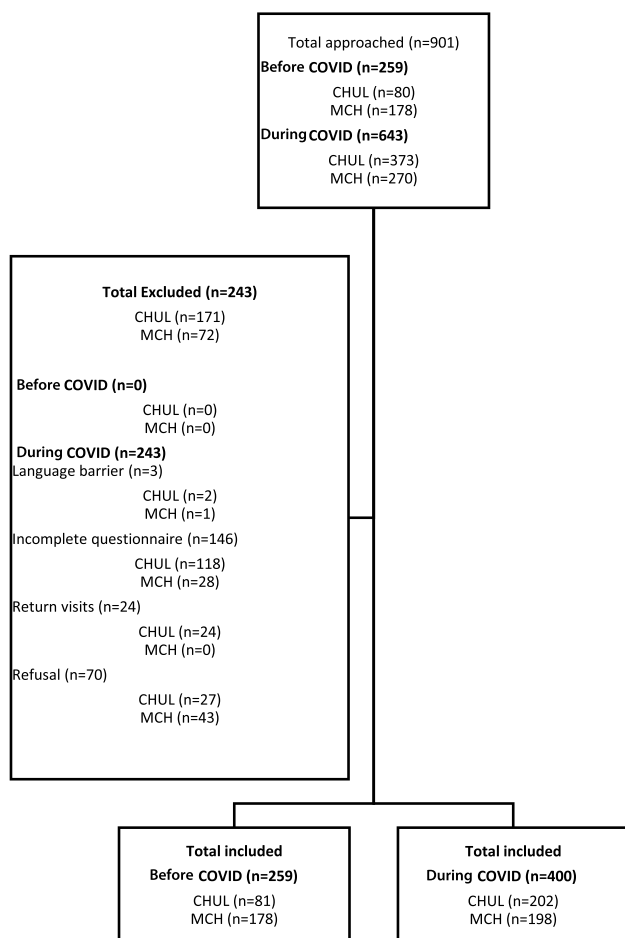


Fig. 1 Participant inclusion flow chart

Table 1 Characteristics of the respondents ($n=659$)

	Total	Before COVID-19	During COVID-19
Mean age, years	5.6	5.5	5.8
Female	46.7	46.3	48.0
Followed by a PCP ^a	82.4	78.4	85.0
Type			
Family physician or resident	45.1	49.3	57.9
Pediatrician or resident	36.0	48.8	40.6
Nurse practitioner	1.4	2.0	1.5
Sought care in this PED ^b in the past	75.4	81.0	70.5
Parent/guardian level of education (completed)			
Elementary school	1.8	3.5	0.8
High school degree	12.0	17.0	8.8
Collegial or CEGEP	30.3	30.9	30.0
University degree	55.8	48.6	60.5
Number of years lived in Québec			
0–1	4.4	8.5	1.8
2–3	5.0	5.4	4.8
4–5	4.9	6.6	3.8
6–10	10.9	13.5	9.3
≥ 11	74.3	65.6	79.8
Parent/guardian national status			
Non-Québec resident	0.6	0.4	0.8
Canadian citizen	83.6	78.4	86.8
Permanent resident	11.7	14.7	9.5
Refugee	1.1	1.5	0.8
Asylum seeker	1.1	1.2	1.0
Other	2.9	4.2	2.0

All characteristics are presented as percentages (%) unless otherwise indicated

^aPrimary care provider

^bPediatric emergency department

Subgroup analysis by site

Subgroup analyses were performed to compare the outcome measurements obtained at the two study sites. Most comparisons showed no statistically significant difference (Online Resources 1–4).

Discussion

Interpretation of the findings

We surveyed parents and guardians of children with low-acuity conditions before and during the pandemic to describe their motivations to visit a pediatric ED instead of a primary care clinic. While the most common reasons for seeking care at the ED were the perceived severity of the condition, the presumed availability of resources in the ED and the lack of access to their primary care professional, the majority of the respondents would have

preferred or accepted to be evaluated in a primary care clinic. Before the pandemic, more parents reported presenting to the pediatric ED due to the lack of availability of physicians outside the ED. This difference before and during the pandemic seems to have been mainly driven by infectious presenting complaints such as fever and upper respiratory tract infection. This may have been influenced by governmental efforts to create rapid-access outpatient COVID designated clinics during the pandemic. Furthermore, respondents recruited during the pandemic were less inclined to attempt to make appointments with their primary care provider.

Comparison to previous studies

In a study conducted in Eastern Ontario, concern about the child's condition and the convenience of obtaining answers promptly from specialists in a resource-rich environment were the major factors underlying preference of pediatric

Table 2 Parent's or guardian's motivations to seek care at the pediatric emergency department

	Total	Before COVID	During COVID	<i>P</i> ^a
Concern about the severity of the health condition	36.6	38.6	35.3	0.41
Presumption that the PED has more resources for diagnosis and treatment	34.3	35.5	33.5	0.61
No physician available outside the PED	21.9	31.7	15.5	< 0.001
No PCP ^b available outside the PED	23.5	32.0	18.0	< 0.001
No PCP OR no physician available outside of the PED	35.4	48.6	26.8	< 0.001
Good prior PED experience	12.0	16.6	9.0	0.005
Referred by the provincial health phone line	15.8	13.5	17.3	0.23
PED always had been regarded as first line medical care for their child	9.3	11.6	7.8	0.10
PCP availability not suitable	7.9	9.3	7.0	0.30
Easier commute to the PED	6.1	6.6	5.8	0.74
Referred by the PCP	9.4	4.6	8.8	0.50
Second opinion requested	2.7	4.6	1.5	0.03
Distrust of the PCP	2.4	3.1	1.0	0.44
Poor service at the PCP's office/clinic	1.2	1.5	1.0	0.72

Bold values represent statistical significance

Motivations are not mutually exclusive

All results are expressed as percentages—%—with the exception of *P* values

^aChi-square test comparing before and during the COVID-19 pandemic

^bPrimary care provider

Table 3 Access to primary care services and walk-in clinics

Questions	All participants (<i>n</i> = 659)				Subgroup without MSKD ^a , mTBI ^b and lacerations (<i>n</i> = 474)			
	Total	Before COVID	During COVID	<i>P</i> ^c	Total	Before COVID	During COVID	<i>P</i> ^c
Appointment with PCP ^d prior to ED visit	20.8	27.1	24.1	0.48	23.8	23.4	24.2	0.94
Attempt to see PCP prior to PED ^e visit	27.5	47.8	24.7	< 0.001	32.1	52.7	30.5	< 0.001
PCP unavailable within 24–48 h								
Unavailable	44.9	47.8	43.2	0.07	46.0	45.5	46.5	0.06
Unaware	17.7	20.7	15.9		13.1	21.2	12.7	
Attempt to seek care in a walk-in clinic	23.7	32.4	18.0	< 0.001	27.0	36.4	19.6	< 0.001
Attempt to see PCP OR to seek care in a walk-in clinic prior to PED visit	37.2	48.6	30.0	< 0.001	42.6	53.1	34.3	< 0.001
Would rather consult at a clinic	58.4	73.7	48.5	< 0.001	60.8	74.6	49.8	< 0.001
Would accept clinic appointment now	36.1	39.0	34.3	0.25	38.2	37.3	38.9	0.78
Would rather consult at a clinic OR would accept clinic appointment now	66.5	78.4	58.8	< 0.001	68.6	78.5	60.8	< 0.001

Bold values represent statistical significance

All results are expressed as percentages—%—with the exception of *P* values

^aMusculoskeletal disorder

^bMinor traumatic brain injury

^cChi-square test comparing before and during the COVID-19 pandemic

^dPrimary care provider

^ePediatric emergency department

EDs [15]. Although a higher proportion of those patients had a primary care provider, timely access to their physician was limited, as we found in the present study. Similarly,

a systematic review of 56 studies from several countries including Canada, USA, UK, Belgium, Australia and Sweden published in July 2020 [17] showed that a pediatric ED

Table 4 Presenting complaints and pre-visit symptom duration before versus after COVID

	Total	Before COVID	During COVID	<i>P</i>
Presenting complaint				
Fever	31.6	46.3	22.0	<0.001
URTI ^a	20.5	34	11.8	<0.001
Feeding-related	15.3	27.8	7.3	<0.001
Fatigue	15.9	26.6	9.0	<0.001
Throat-related	12.6	23.2	5.8	<0.001
Ear-related	10.5	19.3	4.8	<0.001
Vomiting	11.1	17.0	7.3	<0.001
Abdominal pain	11.7	14.3	10	0.11
Musculoskeletal	18.8	12.7	22.8	0.002
Diarrhea	5.3	8.1	3.5	0.01
Genital and urinary	5.3	6.6	4.5	0.29
Traumatic brain injury	7.0	4.6	8.5	0.06
Skin problem	5.0	4.2	5.5	0.58
Constipation	2.9	3.5	2.5	0.48
Laceration	3.3	2.7	3.8	0.51
Oral	1.7	0.8	3.5	0.22
Psychiatric	2.3	0.4	3.5	0.01
Symptom duration				
Less than 24 h	38.1	21.2	49	<0.001
24–48 h	14.1	15.4	13.3	
48–72 h	14.0	17.8	11.5	
72 h to 7 days	16.1	22.0	12.3	
Over 8 days	17.8	23.6	14	

Bold values represent statistical significance

All results are expressed as percentages—%—with the exception of *P* values

^aChi-square test comparing before and during the COVID-19 pandemic

^bUpper respiratory tract infection

is preferred primarily because of the urgency felt but also because of the lack of access to the primary care provider, the ease of access to the pediatric ED and poor relationships with the primary care provider. The latter two factors were not significant in our study.

In our patient sample, less than one-third of the respondents had tried to contact their primary care provider before visiting the PED although 82.4% reported being registered with this professional. This pattern has been observed previously in British Columbia, where only 32% of patients attempted to reach their physician before going to a PED. Of those who did see a primary care provider, nearly two-thirds were sent to a pediatric ED [18]. In contrast, only 9% of our sample reported being sent by a primary care provider.

Finally, we observed a 50% decrease in the proportion of survey respondents with infection-related complaints during the pandemic period. This trend has been documented elsewhere in Canada and in the USA [20–22], due most likely to the sanitary measures [12, 23–25]. Our results also show an increase in the proportion of traumatic, musculoskeletal and mental health complaints, noted throughout North America [16, 22, 26–29]. Since these conditions often require prompt management and resources that are more readily available in a hospital setting, this change may explain why respondents during the pandemic consulted more quickly after the onset of symptoms, made fewer attempts to contact their primary care provider, and were less inclined to consult in a clinic.

Strengths and limitations

This study probes the perspective of parents/guardians on a controversial and recurring healthcare organizational issue: offering emergency care alternatives to patients with low-acuity conditions. We gathered data from a mid-sized adult and pediatric ED as well as one of the largest stand-alone pediatric EDs in Quebec. This makes our findings more generalizable to centers of various sizes.

Among the limitations of this study, let us mention first that we were unable to formally assess whether, medically, survey respondents could have consulted somewhere other than the ED. However, since all respondents were ambulatory, and our stratified analyses excluding musculoskeletal disorders, head injuries and lacerations yielded similar results, we are confident that our data are representative of a patient population that could have been evaluated in community clinics. Second, there may have been a selection bias due to the impossibility of approaching all potentially eligible patients during the recruitment periods. However, the change in the low-acuity conditions noted during the pandemic matches CME-CHUL files on all potentially eligible patients who visited the pediatric ED during this period, suggesting that our sample is representative of the surveyed population (Online Resource 5). Finally, this is a single-province study, which may limit the relevance of the results to other jurisdictions. However, as noted above, multiple studies in North America and worldwide [15, 16, 18, 21, 22, 31] describe similar findings.

Clinical implications

According to Statistics Canada, almost a fifth of Canadians did not have a primary care provider in 2019, the highest proportion being in Québec. Among patients assigned to a primary care provider, only a third on average report being able to get a same-day or next day appointment in the event of emergency [18]. We found that the majority would have

preferred treatment in a clinic. These numbers suggest that the preferences of system users with children presenting with low-acuity conditions would be better met if health authorities improved access to outpatient care by increasing the number of available primary care providers, implementing more telemedicine and developing tools to guide parents to the resources most appropriate to their children's needs.

Research implications

The large number of patients who do not consider the ED to be the most appropriate setting for their needs suggests that the creation of new care pathways offering alternatives to waiting in overcrowded EDs should be explored. These data thus support the relevance of research programs focused on ED-based redirection protocols to refer pediatric patients from EDs to primary care clinics. Current data on ED-based redirection, especially in pediatrics, are scarce and weak [32]. While redirection is already offered in many jurisdictions, including to pediatric patients, a comparative interventional study in a Canadian setting is overdue.

Conclusion

Where children with low-acuity conditions should be treated is a subject of debate. The present study suggests that although one-third of healthcare system users may consider the pediatric ED to be the most appropriate care setting for their child, more than half would seek care preferentially in a clinic when possible. These results contradict the view that most patients with low-acuity conditions are in a pediatric ED by preference. Although the COVID-19 pandemic has temporarily changed care services offered to this population and the types of low-acuity conditions brought to the ED, gradual return to a pre-pandemic state offers new opportunities. Access to primary care services must be improved if the preferences and expectations of most parents/guardians and their children are to be better met.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s43678-023-00609-9>.

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Data availability The data sets generated during this study are available from the corresponding author on reasonable request.

Declarations

Conflict of interest Dr. Berthelot and Dr. Burstein are recipients of career awards from the Fonds de recherche du Québec-Santé. The authors have no other conflicts of interest to declare.

References

- Li J, Ramgopal S, Marin JR. Resource utilization during low-acuity pediatric emergency department visits. *Pediatric Emerg Care*. 2022;38(2):e983–7. <https://doi.org/10.1097/PEC.0000000000002508>.
- Almulhim N, Almulhim F, Al Gharash A, Alghannam Z, Al-Ghamdi RS, Alghamdi MH, Alghareeb AH, Alabduhman AY. Preference for visiting emergency department over primary health care center among population in Saudi Arabia. *Cureus*. 2021;13(12): e20073. <https://doi.org/10.7759/cureus.20073>. (PMID:34900498;PMCID:PMC8648185).
- Sprivulis PC, Da Silva JA, Jacobs IG, et al. The association between hospital overcrowding and mortality among patients admitted via Western Australian emergency departments. *Med J Aust*. 2006;184(5):208–12. <https://doi.org/10.5694/j.1326-5377.2006.tb00416.x>. (published Online First: 2006/03/07).
- Kellermann AL. Crisis in the emergency department. *N Engl J Med*. 2006;355(13):1300–3. <https://doi.org/10.1056/NEJMp068194>.
- Hoot NR, Aronsky D. Systematic review of emergency department crowding: causes, effects, and solutions. *Ann Emerg Med*. 2008;52(2):126–36. <https://doi.org/10.1016/j.annemergmed.2008.03.014>. (published Online First: 2008/04/25).
- Foley M, Kifaieh N, Mallon WK. Financial impact of emergency department crowding. *West J Emerg Med*. 2011;12(2):192–7 (published Online First: 2011/06/22).
- Somekh I, Somech R, Pettoello-Mantovani M, et al. Changes in routine pediatric practice in light of coronavirus 2019 (COVID-19). *J Pediatr*. 2020;224:190–3. <https://doi.org/10.1016/j.jpeds.2020.05.053>. (published Online First: 2020/06/05).
- Bokolo AJ. Use of telemedicine and virtual care for remote treatment in response to COVID-19 pandemic. *J Med Syst*. 2020;44(7):132. <https://doi.org/10.1007/s10916-020-01596-5>. (published Online First: 2020/06/17).
- Hardcastle L, Ogbogu U. Virtual care: Enhancing access or harming care? *Healthc Manage Forum*. 2020;33(6):288–92. <https://doi.org/10.1177/0840470420938818>. (published Online First: 2020/07/21).
- Canadian institute for Health Information. COVID-19's impact on physician services 2021 [Available from: <https://www.cihi.ca/en/covid-19-resources/impact-of-covid-19-on-canadas-health-care-systems/physician-services>. Accessed 7 Nov 2022
- Finkelstein Y, Maguire B, Zemek R, et al. Effect of the COVID-19 pandemic on patient volumes, acuity, and outcomes in pediatric emergency departments: a nationwide study. *Pediatr Emerg Care*. 2021. <https://doi.org/10.1097/pec.0000000000002484>. (published Online First: 2021/06/03).
- Goldman RD, Grafstein E, Barclay N, et al. Paediatric patients seen in 18 emergency departments during the COVID-19

- pandemic. *Emerg Med J.* 2020;37(12):773–7. <https://doi.org/10.1136/emered-2020-210273>. (published Online First: 2020/11/01).
13. Kruizinga MD, Peeters D, van Veen M, et al. The impact of lockdown on pediatric ED visits and hospital admissions during the COVID-19 pandemic: a multicenter analysis and review of the literature. *Eur J Pediatr.* 2021;180(7):2271–9. <https://doi.org/10.1007/s00431-021-04015-0>.
 14. von Elm E, Altman DG, Egger M, et al. The Strengthening of Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *PLoS Med.* 2007;4(10): e296. <https://doi.org/10.1371/journal.pmed.0040296>. (published Online First: 2007/10/19).
 15. Farion KJ, Wright M, Zemek R, et al. Understanding low-acuity visits to the pediatric emergency department. *PLoS ONE.* 2015;10(6): e0128927. <https://doi.org/10.1371/journal.pone.0128927>. (published Online First: 2015/06/18).
 16. Haasz M, Ostro D, Scolnik D. Examining the appropriateness and motivations behind low-acuity pediatric emergency department visits. *Pediatr Emerg Care.* 2018;34(9):647–9. <https://doi.org/10.1097/PEC.0000000000001598>. (published Online First: 2018/09/05).
 17. Nicholson E, McDonnell T, De Brun A, et al. Factors that influence family and parental preferences and decision making for unscheduled paediatric healthcare-systematic review. *BMC Health Serv Res.* 2020;20(1):663. <https://doi.org/10.1186/s12913-020-05527-5>. (published Online First: 2020/07/19).
 18. Smith V, Mustafa M, Grafstein E, et al. Factors Influencing the decision to attend a pediatric emergency department for non-emergent complaints. *Pediatr Emerg Care.* 2015;31(9):640–4. <https://doi.org/10.1097/PEC.0000000000000392>. (published Online First: 2015/03/31).
 19. Kini NM, Strait RT. Nonurgent use of the pediatric emergency department during the day. *Pediatr Emerg Care.* 1998;14(1):19–21. <https://doi.org/10.1097/00006565-199802000-00005>. (published Online First: 1998/03/28).
 20. DeLaroche AM, Rodean J, Aronson PL, et al. Pediatric Emergency Department visits at US Children's Hospitals during the COVID-19 Pandemic. *Pediatrics.* 2021. <https://doi.org/10.1542/peds.2020-039628>. (published Online First: 2020/12/29).
 21. Liang T, Chamdawala HS, Tay ET, et al. Pediatric emergency care in New York City during the COVID-19 pandemic shutdown and reopening periods. *Am J Emerg Med.* 2022;56:137–44. <https://doi.org/10.1016/j.ajem.2022.03.049>. (published Online First: 2022/04/10).
 22. Radhakrishnan L, Carey K, Hartnett KP, et al. Pediatric Emergency Department visits before and during the COVID-19 pandemic—United States, January 2019–January 2022. *MMWR Morb Mortal Wkly Rep.* 2022;71(8):313–8. <https://doi.org/10.15585/mmwr.mm7108e1>. (published Online First: 2022/02/25).
 23. Kostopoulou E, Gkenti D, Papatotiriou M, et al. The impact of COVID-19 on paediatric emergency department visits. A one-year retrospective study. *Pediatr Res.* 2022;91(5):1257–62. <https://doi.org/10.1038/s41390-021-01815-w>. (published Online First: 2021/11/01).
 24. Pines JM, Zocchi MS, Black BS, et al. Characterizing pediatric emergency department visits during the COVID-19 pandemic. *Am J Emerg Med.* 2021;41:201–4. <https://doi.org/10.1016/j.ajem.2020.11.037>. (published Online First: 2020/12/02).
 25. Haddadin Z, Blozinski A, Fernandez K, et al. Changes in pediatric emergency department visits during the COVID-19 pandemic. *Hosp Pediatr.* 2021;11(4):e57–60. <https://doi.org/10.1542/hped.2020-005074>. (published Online First: 2021/01/14).
 26. Krass P, Dalton E, Douppnik SK, et al. US Pediatric Emergency Department visits for mental health conditions during the COVID-19 pandemic. *JAMA Netw Open.* 2021;4(4): e218533. <https://doi.org/10.1001/jamanetworkopen.2021.8533>. (published Online First: 2021/05/01).
 27. Bram JT, Johnson MA, Magee LC, et al. Where have all the fractures gone? The epidemiology of pediatric fractures during the COVID-19 pandemic. *J Pediatr Orthop.* 2020;40(8):373–9. <https://doi.org/10.1097/BPO.0000000000001600>. (published Online First: 2020/05/21).
 28. Liguoro I, Pilotto C, Vergine M, et al. The impact of COVID-19 on a tertiary care pediatric emergency department. *Eur J Pediatr.* 2021;180(5):1497–504. <https://doi.org/10.1007/s00431-020-03909-9>. (published Online First: 2021/01/08).
 29. Kalem M, Ozbek EA, Kocaoglu H, et al. The increase in paediatric orthopaedic trauma injuries following the end of the curfew during the COVID-19 period. *J Child Orthop.* 2021;15(4):409–14. <https://doi.org/10.1302/1863-2548.15.210071>. (published Online First: 2021/09/04).
 30. Government of Canada. Statistics on official languages in Canada 2019. <https://www.canada.ca/en/canadian-heritage/services/official-languages-bilingualism/publications/statistics.html>. Accessed 7 Nov 2022.
 31. Erlichman M, Zalut T, Schwartz S, et al. The ongoing indirect effect of the COVID-19 pandemic on a pediatric emergency department. *PLoS ONE.* 2021;16(5): e0251003. <https://doi.org/10.1371/journal.pone.0251003>. (published Online First: 2021/05/07).
 32. Kirkland SW, Soleimani A, Rowe BH, et al. A systematic review examining the impact of redirecting low-acuity patients seeking emergency department care: is the juice worth the squeeze? *Emerg Med J.* 2019;36(2):97–106. <https://doi.org/10.1136/emered-2017-207045>. (published Online First: 2018/12/05).

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