



# Best practices for virtual care to support youth with chronic pain and their families: a rapid systematic review to inform health care and policy during COVID-19 and beyond

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## Abstract

The COVID-19 pandemic has acutely challenged health systems and catalyzed the need for widescale virtual care and digital solutions across all areas of health, including pediatric chronic pain. The objective of this rapid systematic review was to identify recommendations, guidelines, and/or best practices for using virtual care to support youth with chronic pain and their families (CRD42020184498). MEDLINE, CINAHL, Embase, APA PsychINFO, and Web of Science were searched the week of May 25, 2020, for English language peer-reviewed articles published since 2010 that (1) discussed children and adolescents aged <18 years reporting any type of chronic pain (ie, pain lasting >3 months); (2) focused on any type of virtual care (eg, telephone, telehealth, telemedicine, mHealth, eHealth, online, or digital); and (3) reported on guidelines, best practices, considerations, or recommendations for virtual care. Abstract and full text screening and data extraction were performed in duplicate. Meta-ethnography was used to synthesize concepts across articles. Of 4161 unique records screened, 16 were included addressing diverse virtual care and pediatric chronic pain conditions. Four key themes were identified: (1) opportunities to better leverage virtual care, (2) direct effective implementation of virtual care, (3) selection of virtual care platforms, and (4) gaps in need of further consideration when using virtual care to support youth with chronic pain and their families. No existing guidelines for virtual care for pediatric chronic pain were identified; however, best practices for virtual care were identified and should be used by health professionals, decision makers, and policymakers in implementing virtual care.

**Keywords:** Virtual care, Digital health, Chronic pain, Youth, Best practices, Guidelines, Systematic review

## 1. Introduction

The COVID-19 pandemic has acutely challenged health systems and catalyzed the need for widescale virtual care and digital solutions across all areas of health, including chronic pain,<sup>11,27</sup> a common, undertreated, often debilitating disease and expensive

public health issue.<sup>32,42,55</sup> In response to challenges posed by the COVID-19 pandemic, health professionals and health systems pivoted from in-person to virtual delivery of ambulatory care on a large scale to respond to immediate needs (Killackey et al., *under review*). Virtual care refers to remote interactions between patients and health professionals using any form of

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communication or information technologies to facilitate delivery of effective, quality health care (eg, apps, videoconference, and telephone consultation).<sup>65</sup> Virtual care is touted for its ability to facilitate rapid access to care for more people at reduced cost while also reducing the financial and time burdens of patients who may otherwise have to travel to hospital and risk virus exposure during the current COVID-19 pandemic.<sup>11</sup> A recent report from the Canadian Medical Association revealed that Canadians have a high demand for virtual care that is not currently being met.<sup>75</sup>

Poor access to care for youth living with chronic pain is a long-standing problem.<sup>57</sup> Indeed, before the COVID-19 pandemic, increasing access to pediatric chronic pain care was identified as a top patient-oriented research priority.<sup>9,18</sup> The COVID-19 pandemic has significantly exacerbated difficulties accessing pain care because of initial closures of medical clinics and continued limited access to in-person therapies relevant for effective chronic pain management, such as psychological or physical interventions.<sup>21,27,64</sup> Pain may also be worsened by exacerbation of other risk factors related to the pandemic such as inactivity, poor sleep, and social isolation.<sup>20</sup> These impacts may be long-lasting because the prolonged stress and chronic pain experienced by youth today can influence their mental, physical, social, and occupational functioning well into adulthood.<sup>33,41,53,56,78,79</sup> Early, effective, and accessible virtual treatments for pain in youth is critical to prevent the exacerbation of these persistent health issues. Research focused on youth and evidence-based virtual delivery of clinics and resources have identified mental health and chronic pain priorities for the COVID-19 pandemic.<sup>19,36</sup> A variety of emerging, evidence-based digital treatments (apps, online modules, and telehealth clinics) exist to improve chronic pain management and mental health in youth and their parents; however, prepandemic implementation and uptake were sparse.<sup>25,27,30,43</sup>

To date, published guidance for adapting chronic pain management to virtual settings during the COVID-19 pandemic has been based on expert opinion without a systematic evidence review.<sup>27,64</sup> Indeed, a systematic review of clinical practice guidelines developed rapidly and early in the COVID-19 pandemic (February–April 27, 2020) across different areas of health identified that most guidelines were of insufficient methodological quality due to a sole reliance on informal expert consensus (83% of 188 guidelines), with only 8 guidelines (4%) built on a systematic literature search and one guideline involving patients (<1%).<sup>67</sup> The objective of the current rapid systematic review was to rigorously review the published literature to identify recommendations, guidelines, and/or best practices for using virtual care to support youth with chronic pain and their families. High-quality knowledge syntheses, such as this article, serve to enhance knowledge about a particular topic, thereby enabling evidence-informed decision making to guide implementation and policy across the health system.<sup>31,70</sup> Knowledge syntheses form a critical foundation from which to develop clinical practice guidelines and to improve health care by reducing unwanted variability in care delivery,<sup>26</sup> as is in pediatric chronic pain care both before<sup>18,57</sup> and since the start of the COVID-19 pandemic (Killackey et al., *under review*). This article represents the first phase of a larger multimethods knowledge synthesis project identifying best practices and virtual care solutions across the stepped care continuum to support children and adolescents living with chronic pain and their families.

## 2. Materials and methods

This rapid systematic review protocol was registered in PROSPERO (CRD42020184498). The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement for

systematic reviews guided the conduct and reporting of this review.<sup>46</sup>

### 2.1. Patient engagement

The team overseeing this rapid systematic review used a patient-oriented and patient-partnered approach,<sup>16,17</sup> engaging 3 people with lived experience (patient and parent partners) as collaborators and equal members of the research team.<sup>49</sup> The aim of collaborating with people with lived experience was to involve them in this review to ensure knowledge translation was meaningful and responsive to the needs of people for whom the evidence is most immediately relevant. Patient and parent partners were engaged in designing and overseeing the review, refining descriptions and examples of the emerging themes, and codeveloping knowledge translation outputs, including coauthorship of this publication. Specifically, patient and parent partners improved clarity of language of the described themes. Patient and parent partners also provided input to interpretation and presentation of the emerging themes to ensure diversity, equity, and inclusion.

### 2.2. Eligibility criteria

English language peer-reviewed scientific articles published in the past 10 years were identified for inclusion if they (1) discussed children and adolescents aged <18 years reporting any type of chronic pain (ie, pain lasting >3 months); (2) focused on any type of virtual care (eg, telephone, telehealth, telemedicine, mHealth, eHealth, online, and digital); and (3) reported on guidelines, best practices, considerations, or recommendations for virtual care. All article types were considered eligible (eg, systematic reviews or meta-analyses, clinical practice guidelines, editorials, commentaries, and qualitative studies); however, primary studies with the identified purpose of evaluating the effectiveness of virtual care were excluded (eg, randomized controlled trials and nonrandomized treatment studies) because they are included in a subsequent scoping review mapping all virtual care solutions for pediatric chronic pain.

### 2.3. Search strategy and conduct

The search strategy was developed in collaboration with a medical research librarian (D.L.L.). Database searches were conducted in MEDLINE, CINAHL, Embase, APA PsychINFO, and Web of Science during the week of May 25, 2020. A sample search strategy is available in Supplementary Material 1 (available at <http://links.lww.com/PR9/A108>).

### 2.4. Screening and selection

Three research assistants or clinical research coordinators screened all abstracts and subsequent full-text articles for eligibility, in duplicate using Covidence.<sup>22</sup> Disagreements were resolved by consultation with 2 other authors (K.A.B. and T.K.) as needed.

### 2.5. Data extraction and synthesis

Data extraction and synthesis were conducted independently by 2 team members (K.A.B. and T.K.) with disagreements resolved through consensus. Extracted data included the following: author; publication year; article type; and type(s) of virtual care; key concepts, recommendations, or guidelines identified for virtual care. Articles were also coded for their relevance to level(s) of stepped care (steps 1–5).<sup>52</sup> Stepped care models enable matching of levels of care to

individual need from self-guided resources up to tertiary, specialist care. Stepped care is a patient-oriented model recommended by the Canadian Pain Task Force<sup>19</sup> and the Mental Health Commission of Canada,<sup>52</sup> is a framework increasingly applied in chronic pain care,<sup>2,7,60</sup> and is well-suited for addressing the expected surge of youth mental health needs during and postdisaster.<sup>51</sup>

Stepped care levels were coded as follows:

- (1) *Level 1*: self-guided (whole population; eg, apps and educational websites).
- (2) *Level 2*: peer-to-peer (low needs; eg, real-time peer support).
- (3) *Level 3*: minimal health professional involvement (moderate needs; eg, real-time psychoeducational workshop, health professional-assisted e-supports [through app or website]).
- (4) *Level 4*: ongoing real-time health professional interaction (high needs; eg, online individual or group programming).
- (5) *Level 5*: real-time specialist health professional(s) (complex needs; eg, tertiary interdisciplinary clinic).

Meta-ethnographic techniques were used to synthesize concepts, recommendations, and guidelines that commonly occurred across articles.<sup>5,54</sup> Meta-ethnography is a widely accepted form of qualitative synthesis involving translation of findings from primary studies into one another, in order for overarching themes or concepts to emerge.<sup>5,54</sup> Specific steps include the following: determining the research question, determining the scope of the synthesis, reading the articles, determining how the articles are related, identifying themes, synthesizing themes across articles, and reporting the synthesis.<sup>5,54</sup> Although various article types were included in this review, for the purposes of data extraction and synthesis, all content included in the published articles was treated as qualitative data. This strategy was used given the authors' expectation of a lack of rigorously developed clinical practice guidelines focused on provision of virtual care for children and adolescents with chronic pain, as well as the pressing pragmatic need in light of the COVID-19 pandemic to offer evidence-informed guidance to health care providers and decision makers supporting this population. Each article was read multiple times and the key concepts identified. A table was created describing concepts from each article and then synthesized across articles. Concepts that were described in only one article were also retained.

Our original systematic review protocol indicated that identified articles would be coded for quality as assessed using AGREE II for guidelines.<sup>12,13</sup> This method was not ultimately used because specific guidelines were not identified and the AGREE II tool was not deemed appropriate.

## 3. Results

### 3.1. Study selection

Database searches identified 6334 records. Three additional articles known to the study authors published since the start of the COVID-19 pandemic were also included. After duplicates were removed, 4161 unique abstracts remained for review. Of these, 4101 were deemed not eligible. A total of 60 full texts were reviewed, of which 44 were excluded. Sixteen full texts met inclusion criteria. Refer to **Figure 1** for the PRISMA review flowchart, including reasons for full-text exclusion.

### 3.2. Study characteristics

Of the 16 articles meeting review inclusion criteria, 10 were scoping or systematic reviews or meta-analyses,<sup>14,30,34,62,66,68,69,71,73,74</sup> 3 were commentaries or editorials or opinion articles,<sup>27,28,38</sup> 2 were qualitative studies,<sup>37,76</sup> and one was a nonsystematic literature review.<sup>44</sup> Refer to

**Table 1** for a summary of data extracted from each article. Articles were from a variety of countries, including 4 articles each from Canada,<sup>28,37,44,69</sup> the United States,<sup>34,38,66,68</sup> and the United Kingdom<sup>14,27,30,74</sup>; 2 articles from Australia<sup>62,76</sup>; one from China<sup>71</sup>; and one from New Zealand.<sup>73</sup> Most of these articles shared comparable health care contexts and focus on publicly funded health systems, although variety is noted. Articles addressed virtual care for a variety of chronic pain conditions, including headaches, migraines, musculoskeletal pain, recurrent abdominal pain, chronic widespread pain or fibromyalgia, and pain associated with arthritis, postconcussion, sickle cell disease, and irritable bowel syndrome. Types of virtual care discussed included apps, telephone support, virtual peer-to-peer, and web-based self-management with or without coach support. Most articles addressed lower levels of the stepped care continuum, such as apps, educational websites, and peer support interventions (**Table 1**).

### 3.3. Synthesis of results

Meta-ethnography across the 16 articles identified 4 key themes: (1) opportunities to better leverage virtual care (theme 1), (2) direct effective implementation of virtual care (theme 2), (3) selection of virtual care platforms (theme 3), and (4) gaps in need of further consideration when using virtual care (theme 4) to support youth with chronic pain and their families. Key points related to each theme are synthesized in **Figure 2** (available for download: [www.partneringforpain.com/portfolio/virtual-care/](http://www.partneringforpain.com/portfolio/virtual-care/)).

#### 3.3.1. Theme 1: leveraging virtual care

Virtual care for youth with chronic pain and their families has been described as acceptable,<sup>71</sup> reasonable,<sup>73</sup> and effective.<sup>14,34,71,73</sup> Various studies included in this review reported that virtual care interventions resulted in significant reductions in pain,<sup>34,38</sup> anxiety, and depressive symptoms,<sup>71</sup> as well as improvements in sleep.<sup>71</sup> Although according to Fisher et al.<sup>30</sup> there is insufficient evidence to determine that virtual psychological therapies can reduce pain severity or other symptoms associated with chronic pain, there are encouraging outcomes resulting from some studies included in this review. Specifically, interventions such as internet-delivered cognitive behavioural therapy<sup>71</sup> or computer-delivered cognitive behavioural therapy<sup>74</sup> both demonstrated clinically significant improvements in pain and mental health symptoms (eg, anxiety). Overall, the quality of evidence is low due to the small samples and fairly heterogeneous group of studies available, and therefore there is a need for more randomized controlled trials to increase understanding of the efficacy of these treatments.<sup>30,73,74</sup>

The use of virtual care can ensure better access to care, particularly in rural or remote areas.<sup>34,38</sup> Multidisciplinary and multimodal pain treatments are not always available to pediatric patients, and therefore innovative virtual care solutions may be especially useful in this population.<sup>38</sup> However, virtual care remains underutilized, especially for real-time symptom assessment and psychological treatment. Many existing technologies or applications have not been widely disseminated or are unable to sustain prolonged engagement with users, which signals low uptake.<sup>38</sup> Overall, there are significant opportunities to better leverage virtual care in the pediatric population with chronic pain going forward.

#### 3.3.2. Theme 2: implementing virtual care

This review identified key considerations for the implementation of virtual care in the pediatric population with chronic pain. Virtual care for youth with chronic pain and their families should work

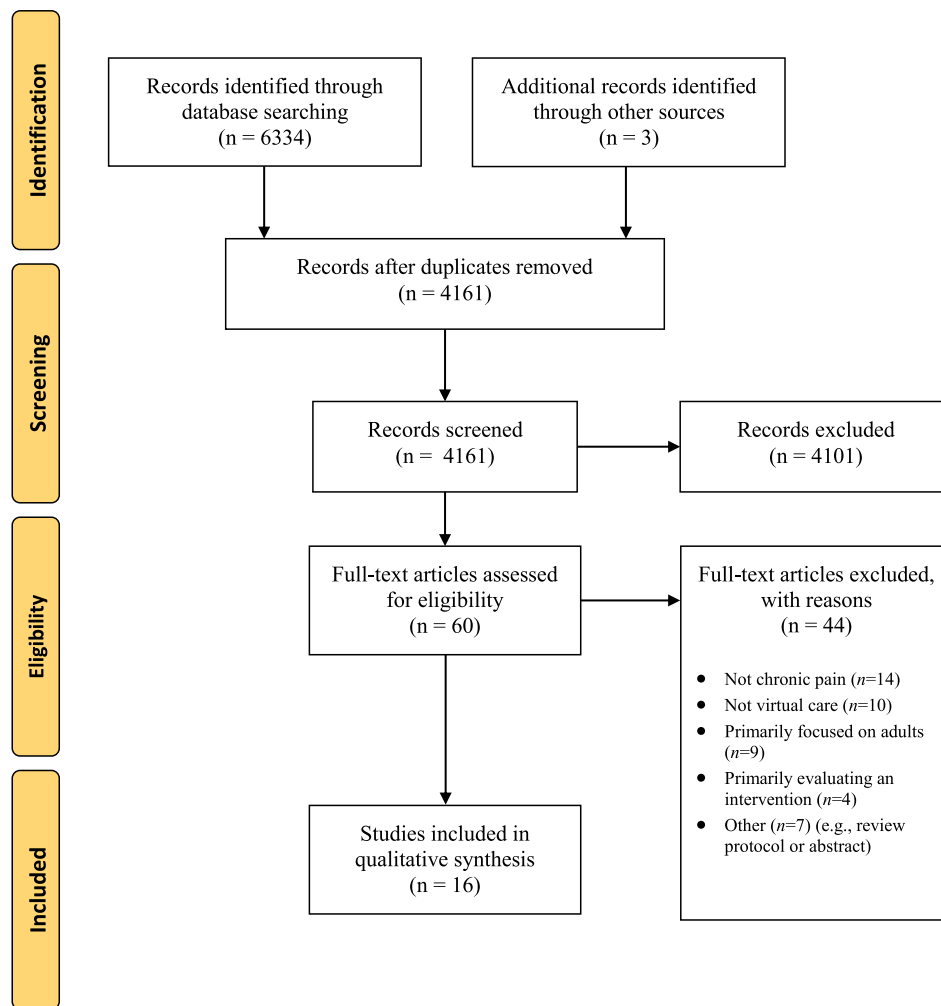


Figure 1. PRISMA flow diagram.

towards being freely available across all technologies, including but not limited to telephone, apps, websites, and videoconferencing.<sup>27</sup> Virtual care implementation should include training, terms of use, and guidelines for health professionals, youth, and families.<sup>27,37</sup> As Eccleston et al.<sup>27</sup> noted that understanding who struggles to engage and use virtual care solutions is crucial to ensure effectiveness, along with supporting training needs of staff who are accustomed to providing face-to-face pain care.<sup>27,37</sup> Huguet et al.<sup>37</sup> outlined that guidelines for the use of the virtual care solution should be created, clearly understood by participants and also enforced by a system administrator (ie, users should be taught not to post identifying information). In their qualitative study exploring what users want in virtual health technology, one of the main concerns articulated by potential users was the risk of breaching privacy issues,<sup>37</sup> and therefore platforms should use secure infrastructure (ie, encrypted, password protected, and authorized access).<sup>37</sup> In addition to privacy and training considerations, virtual care solutions should be developmentally appropriate, meet ethical standards of care, and be transparent in communication (ie, clearly indicate whether content is being shared by a therapist vs computer-generated messaging).<sup>27</sup> Privacy was repeatedly raised as a critical ethical issue requiring greater consideration in virtual care, in addition to liability and monitoring of peer-to-peer discussions for incorrect information.<sup>27,37,76</sup> Overall, implementation of virtual care

requires careful consideration of many aspects related to accessibility, training, privacy, and security to ensure that users feel confident and safe to use this technology.

### 3.3.3. Theme 3: selecting virtual care platforms

Multiple sources noted that platforms used to provide virtual care for youth with chronic pain and their families should be user-friendly and acceptable to youth and families. Youth, families, and health professionals should be involved in the development and testing process of various virtual care platforms, such as user-centered design<sup>37,38,62,69</sup>; codesigning virtual care interventions with participants allows for improved acceptability and engagement with target audiences.<sup>73</sup> Importantly, platforms should be theoretically sound and integrate evidence-based content shown to be effective when delivered through that platform<sup>66</sup>; as mentioned, more high-quality trials testing the effectiveness of virtual care interventions are needed.<sup>62,71</sup> When selecting a platform, the opportunity to individualize or customize the technology to the youth and family's needs is beneficial,<sup>37,38</sup> as is the use of interactive multimedia content (eg, videos, text, and images) to enhance engagement. For example, in the study by Huguet et al.,<sup>37</sup> participants described wanting the ability to decide the content and format of a pain reporting diary, flexibility for entering information in the diary, and the ability to create personalized profiles and set notifications for specific

**Table 1****Description of included articles.**

Author, year	Article type	Pediatric chronic pain population	Description of virtual care included	Relevance to Level of Stepped Care Continuum				
				Step 1	Step 2	Step 3	Step 4	Step 5
Caes, 2018 <sup>14</sup>	Systematic review (or meta-analysis)	Chronic musculoskeletal pain: JIA and fibromyalgia	Online remote delivery of psychological interventions	Yes	Yes	Yes	No	No
Eccleston, 2020 <sup>27</sup>	Commentary or editorial or opinion	Chronic pain: SCD, musculoskeletal, JIA, and headache	Telemedicine, remotely delivered self-management programs, and psychological therapies delivered through the internet or mobile apps	No	Yes	Yes	Yes	Yes
Ellis, 2019 <sup>28</sup>	Commentary or editorial or opinion	Migraine headache	Telemedicine	No	No	No	Yes	Yes
Fisher, 2019 <sup>30</sup>	Systematic review (or meta-analysis)	Headache, JIA, SCD, IBS, recurrent abdominal pain, and musculoskeletal pain	Remote delivery of psychological interventions (eg, internet, smartphone applications, or CD-ROMs)	Yes	Yes	Yes	No	No
Harrison, 2019 <sup>34</sup>	Systematic review (and/or meta-analysis)	Functional abdominal pain (FAP) and chronic pain	Online remote delivery of psychological interventions	Yes	Yes	Yes	No	No
Huguet, 2014 <sup>37</sup>	Qualitative study (survey or interviews)	Headache	Online remote delivery of psychological interventions (smartphone pain diary, internet-based self-management treatment, and social support)	Yes	Yes	Yes	No	No
Hunter, 2018 <sup>38</sup>	Commentary or editorial or opinion	Acute and chronic pain	Apps and websites	Yes	Yes	Yes	Yes	Yes
Lalloo, 2014 <sup>44</sup>	Book chapter	JIA	Pain assessment apps and electronic pain diaries	Yes	No	No	No	No
Schults, 2019 <sup>62</sup>	Scoping review	JIA, SCD, fibromyalgia, headache, and persistent pain	Apps	Yes	Yes	No	No	No
Smith, 2015 <sup>66</sup>	Systematic review (or meta-analysis)	Chronic pain	Apps	Yes	Yes	No	No	No
Stiles Shields, 2019 <sup>68</sup>	Systematic review (or meta-analysis)	Chronic pain (n = 5 articles), chronic fatigue syndrome (n = 1), JIA (n = 1), and cerebral palsy (n = 2)	Web-based or app-based self-management programs (75% included real-time professional support)	Yes	Yes	Yes	Yes	No
Stinson, 2013 <sup>69</sup>	Systematic review (or meta-analysis)	Recurrent headache, JIA, and SCD	E-diaries on a handheld device	Yes	No	No	No	No
Tang, 2018 <sup>71</sup>	Systematic review (or meta-analysis)	Chronic pain and headache	Online remote delivery of psychological interventions	Yes	Yes	Yes	No	No
Thabrew, 2018 <sup>73</sup>	Systematic review (or meta-analysis)	Chronic idiopathic pain, abdomen pain, MSK pain, multiple pain areas, headache, and chronic respiratory illness (cystic fibrosis, asthma, and others)	Remote delivery of psychological interventions (eg, static or interactive websites, automated emails, or web-based applications, automated phone calls or short text messages, or mobile websites or smartphone applications).	Yes	Yes	Yes	No	No
Velleman, 2010 <sup>74</sup>	Systematic review (or meta-analysis)	Headache, recurrent abdominal pain, and MSK pain	Online remote delivery of psychological interventions	Yes	Yes	Yes	Yes	No
Waite Jones, 2018 <sup>76</sup>	Qualitative study (survey or interviews)	JIA	Apps (self-management, symptom tracking, and social support)	Yes	Yes	No	No	No

IBS, irritable bowel syndrome; JIA, juvenile idiopathic arthritis; MSK, musculoskeletal; SCD, sickle cell disease.

# Virtual care solutions to support youth with pain and their families during COVID and beyond



**Pain** is one of the most common symptoms that youth experience when dealing with stressful events, such as the COVID-19 pandemic.

- ★ At least two million Canadian youth already have chronic pain.
- ★ They are more likely to experience mental health concerns now...
- ★ ...and have pain, mental health concerns, and misuse drugs as adults.

We need to treat new and pre-existing pain **now** to prevent lifelong issues for our youth.

## ✓ OUR GOAL

To identify recommendations for virtual care for youth <18 years old with pain and their families, like using apps, websites, or therapy over video call.

## ✓ OUR PROCESS

Our team of youth, parents, healthcare providers, and researchers conducted a rapid systematic review and found 16 relevant scientific articles published in the past 10 years.

## What we know about Virtual Care for youth with chronic pain and their families:

Leveraging Virtual Care	Implementing Virtual Care	Best Platforms for Virtual Care	Identified Gaps in Virtual Care
<ul style="list-style-type: none"> <li>- is acceptable, reasonable, and effective</li> <li>- ensures better access to care (particularly rural or remote areas)</li> <li>- is underutilized (especially for real-time symptom assessment and psychological treatment)</li> </ul>	<ul style="list-style-type: none"> <li>- should work towards free availability across all technologies (including telephone, apps, websites, and video conference)</li> <li>- needs to include training, terms of use, and guidelines for health professionals, youth and families</li> <li>- must use secure infrastructure (encrypted, password protected, and authorized access)</li> <li>- should be developmentally appropriate</li> <li>- must meet ethical standards of care</li> <li>- should be transparent in communication (therapist vs. computer-generated messaging)</li> </ul>	<ul style="list-style-type: none"> <li>- need to be user-friendly and acceptable to youth and families</li> <li>- should be based in theory and integrate evidence-based content</li> <li>- should involve youth, families, and health professionals in their development</li> <li>- should be individualized or customizable</li> <li>- must be comprehensive in terms of pain management (provide pharmacological, psychological, and physical strategies)</li> <li>- need to use interactive multimedia content (videos, text, and images)</li> <li>- must meet technology accessibility standards</li> <li>- should be able to integrate social and peer support</li> </ul>	<ul style="list-style-type: none"> <li>- requires standardized practice guidelines for implementation and evaluation</li> <li>- must have evidence showing its effectiveness for all concerns identified by youth and families</li> <li>- needs to include knowledge about its limitations and suitability for all aspects of care (such as physical exam)</li> <li>- need to consider potential harms and impact on the therapeutic relationship</li> <li>- requires strategies to enhance engagement</li> <li>- needs integration into clinical care pathways, face-to-face care, and electronic medical record</li> </ul>

Visit [partneringforpain.com/portfolio/virtual-care](https://partneringforpain.com/portfolio/virtual-care) to see a range of **virtual care solutions** identified in an **evidence and gap map** for youth with chronic pain and their families.

## Want to learn more?

For more information, please contact:

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Figure 2. Best practices for virtual care to support children and adolescents with chronic pain and their families.

activities (eg, medication reminders). Furthermore, youth have stressed the importance of app ownership, and the ability to choose how and when to use these apps, and control the apps' presentation and its interactivity.<sup>76</sup> Overall, virtual care technologies should be comprehensive in pain management offerings (ie, provide pharmacological, psychological, and physical strategies). However, a recent review of existing Apple (iOS) applications for pediatric pain and pain-related stress demonstrated that none of the apps were considered to be sufficiently comprehensive to be an independent alternative to

psychological services.<sup>66</sup> Finally, it is recommended that platforms be age-, gender-, and developmental stage-appropriate and be able to integrate social and peer support.<sup>37,62,76</sup>

### 3.3.4. Theme 4: identified gaps in virtual care

As noted by Smith et al.,<sup>66</sup> "there are currently no established guidelines for app-related real-time communications (eg, direct text or video messaging communications between app users or

with a health care provider), meaning that providers must think critically about the use of these communication features before integrating them into practice” (p. 105). In addition, there is a need for robust evidence demonstrating the effectiveness of virtual care solutions.<sup>14,38</sup> Further investigation is also needed regarding the limitations of virtual care and suitability for all aspects of care (eg, conducting physical examinations virtually).<sup>27</sup> Although there are many benefits of harnessing virtual care technologies, there is a need to consider the potential harms and impact (positive or negative) on the therapeutic relationship, as well as strategies to enhance uptake and ongoing engagement with virtual interventions over extended periods.<sup>38</sup> Addressing accessibility for people with disabilities is required as few studies have examined, tracked, or reported specifically on this.<sup>27,38</sup> Finally, there is a need to ensure virtual care solutions are integrated into existing clinical care pathways, in-person care, and the electronic medical record.<sup>14</sup> A thorough list of research priorities for virtual care for individuals with chronic pain during the COVID-19 pandemic was additionally outlined in one of the included articles.<sup>27</sup>

#### 4. Discussion

The objective of this rapid systematic review was to identify recommendations, guidelines, and/or best practices for using virtual care to support youth with chronic pain and their families. Previous practice recommendations were rapidly developed based on expert consensus early during the COVID-19 pandemic<sup>21,27,64</sup>; this review builds on this work by providing a rigorous and rapid review of the literature. Unfortunately, no pre-existing guidelines were identified to support effective implementation of quality virtual care for youth living with chronic pain and their families. Our review identified an urgent need for the development of such standardized practice guidelines for the implementation and evaluation of virtual care for youth with chronic pain and their families. However, 16 peer-reviewed articles reporting scoping or systematic reviews or meta-analyses,<sup>14,30,34,62,66,68,69,71,73,74</sup> commentaries or editorials or opinion articles,<sup>27,28,38</sup> qualitative studies,<sup>37,76</sup> or nonsystematic literature review<sup>44</sup> provided evidence to inform best practice recommendations. Qualitative synthesis across articles identified key themes when using virtual care to support youth with chronic pain and their families, including (1) opportunities to better leverage virtual care, (2) effective implementation of virtual care, (3) selection of best virtual care platforms, and (4) identified knowledge gaps in need of further research. The need for timely decisions on health care and health policy is a key indication for conducting a rapid review.<sup>63</sup> The rapid nature of this review and creation of a 1-page infographic was conducted with the goal of stimulating immediate practice change, based on the best available evidence, without delay.<sup>63</sup>

This article represents the first phase of a larger multimethods knowledge synthesis project identifying best practices and virtual care solutions to support children and adolescents living with chronic pain and their families. The second phase is creation of an interactive Evidence and Gap Map of virtual care solutions across the stepped care continuum for children and adolescents with chronic pain and their families (Birnie et al., *under review*). The Evidence and Gap Map synthesizes virtual care solutions identified from the scientific literature, apps and websites, and a call for emerging and demonstrated innovations in virtual care for pediatric chronic pain. A full project description and outputs from all project phases are available online: [www.partneringforpain.com/portfolio/virtual-care](http://www.partneringforpain.com/portfolio/virtual-care).

In response to the COVID-19 pandemic, researchers, health professionals, and policymakers have called for better access to virtual care to support individuals with chronic pain.<sup>19,21,27,58,64</sup> Consensus recommendations from multiple international panels of adult chronic pain health professionals identified the value of telemedicine (virtual care) to manage pain during the COVID-19 pandemic and need to ensure selected technology is easy to use, maintains confidentiality of personal health information, and is ethically delivered as per health professional jurisdictional requirements.<sup>21,58,64</sup> Issues related to opioid prescribing, the provision of interventional treatments, and comorbidities for increased risk of adverse COVID-19 outcomes are also discussed,<sup>21,27,58,64</sup> albeit generally less relevant to pediatric populations with chronic pain. The most thorough provision of practical recommendations for introducing pain management strategies virtually during the COVID-19 pandemic are provided by Eccleston et al.<sup>27</sup> in an article included in the current review. They outline guidance for the best use of technology platforms, navigating technical challenges, scheduling considerations, use of complementary or combined virtual resources (eg, apps or websites in combination with remote sessions with health professional), flexibility in approach, and pain self-management strategies (ie, positive reinforcement, problem solving, experiential learning, and goal setting).<sup>27</sup> Findings from the current systematic review of the literature expand on published recommendations for virtual chronic pain care in the time of the COVID-19 pandemic based on expert opinion by providing additional guidance for implementation and selection of virtual care platforms particularly related to cost, accessibility, usability, suitability and developmental appropriateness, and customizability, specifically for the pediatric population.

Some guidance regarding the use of virtual care during the COVID-19 pandemic has been predominantly physician centric.<sup>3</sup> Given the evidence-based multimodal approach to pediatric chronic pain care,<sup>47</sup> there is a need to ensure virtual chronic pain care comprehensively address pharmacological, psychological, and physical treatments. Currently, much of the discussion surrounding virtual care for chronic pain supports the delivery of psychological interventions (ie, cognitive behavioural therapy).<sup>14,30,34,71</sup> This mirrors the proportionally larger evidence base for psychological interventions—as opposed to pharmacological or physical interventions—delivered digitally for pediatric chronic pain,<sup>10</sup> as well as the ease of delivering psychological interventions remotely. Furthermore, the added psychological burden of the COVID-19 pandemic is present<sup>59</sup> such that virtual psychological treatment of mental health of children and adolescents is also an identified priority.<sup>4,36</sup> Notably, the use of a variety of information technologies is covered in this review (eg, email, apps, websites, and videoconference platforms); however, as the evidence develops for virtual or augmented reality for pediatric chronic pain, specific additional considerations may be needed,<sup>27,60,81</sup> particularly to address the challenges posed by remote physical therapies. There is also further need to address the challenges related to virtual physical examinations for pain.<sup>25,72</sup> This current review identified articles focused predominantly on virtual care at lower levels of the stepped care continuum (eg, apps and websites). This is important to note because best practices for virtual care identified here do not incorporate evidence from virtual care interventions higher in the stepped care continuum (eg, tertiary care interdisciplinary chronic pain clinics) that are rapidly being delivered remotely in response to the COVID-19 pandemic.<sup>25</sup> This speaks to the need for iterative refinement of these guidelines for virtual care for pediatric chronic pain as new evidence and learnings emerge.

The long-standing call for increased access to chronic pain care is one of equity, diversity, and inclusion.<sup>9,18,19</sup> However, virtual care is not the panacea. Although virtual care offers the potential for better access to care for those living in rural and remote areas as identified by articles in this review, this is not a guarantee. The COVID-19 pandemic has shone a spotlight on social inequities, including in digital health.<sup>24</sup> Individuals who live outside of urban centers face slower, less reliable access to the internet, and challenges with affordability of high-speed connectivity.<sup>39</sup> Barriers to accessing digital health care include lack of access to technology required, low technical literacy, or poor engagement with digital health.<sup>24</sup> Strategies for addressing inequities within the health system include equal access to digital health care and equal outcomes from this care irrespective of social factors, health professional training, consideration of necessary adaptations, integrated measurement and quality improvement, and involvement of people from vulnerable groups in codesign.<sup>24</sup> Aligned with this, findings from this review stress the importance of virtual care to include training for health professionals, being accessible to people with disabilities, include empirical evaluation and evidence-based content, and involve youth, families, and health professionals in their development (ie, user-centered design). Although authors of included articles mentioned the importance of accessibility, this concept was not defined beyond emphasizing the importance of enabling access to people with disabilities. Compliance with existing established technology accessibility standards, such as the Web Content Accessibility Guidelines, including for mobile (WCAG 2.0)<sup>82</sup> and for web developers may be useful for ensuring virtual platforms and content are perceivable, operable, understandable, and robust to people with a wide range of disabilities, including blindness and low vision, deafness and hearing loss, learning disabilities, cognitive limitations, limited movement, speech disabilities, photosensitivity, and combinations of these. In addition, much of the research contributing to this review may disproportionately represent White populations. To address this, our group is seeking input regarding the best practices for virtual care identified here with specific groups at-risk for inequities in chronic pain care,<sup>1,23</sup> including Black youth living with sickle cell disease,<sup>40,77</sup> indigenous youth with chronic pain,<sup>45,50,83</sup> and youth with medical complexities<sup>6</sup> and their families. Stepped care approaches to chronic pain care are increasingly recommended,<sup>2,19,60</sup> as are potential hub-and-spoke models,<sup>28</sup> to reach rural and remote communities.

Overall, these results highlight that virtual care was underutilized pre-pandemic for youth with chronic pain, and given the current COVID-19 pandemic and associated restrictions with widespread virtual care implementation, there is an urgent need for evidence-based guidelines to direct virtual care practices. Furthermore, some identified best practices from articles included in this review may be less relevant today given the rapid advancement of technology over the past 10 years; certain aspects of virtual care may be more common today such as standard integration of customizability and/or use of multimedia content. Despite the evaluation of virtual care for pediatric chronic pain before the COVID-19 pandemic, there remain numerous empirical questions for consideration. Health systems decision makers and health professionals require best practice guidelines to select, implement, and evaluate virtual care practices. Specifically, recommendations are needed to ensure virtual care platforms and technologies provide comprehensive and evidence-based pain management, suitable to the patient population, safe, accessible, and use design methodologies, such as human-centered design and design thinking,<sup>35,61</sup> that integrate the input from end users to ensure patient-centered care in a post-COVID-19 digital world.<sup>11</sup>

This review also revealed the need to include routine collection of patient-reported outcomes to evaluate the efficacy of care delivered virtually.<sup>8</sup> Implementation science approaches are highly recommended to collect and analyze “real-world” data in the rapidly evolving COVID-19 context.<sup>80</sup> Examples include the collection of quality improvement data for implementation of virtual care within clinical programs or use of rapid, iterative research evaluation designs, such as the mHealth agile development and evaluation lifecycle model.<sup>60</sup> Specific frameworks also exist to guide evaluation of virtual care.<sup>15,29</sup>

This review is limited by the quantity and quality of existing evidence to guide virtual care implementation for youth with chronic pain. Because of the rapid nature of the review, the scope of the search strategy was restricted by date range and English language alone. It is possible that studies were also missed that focused on other dimensions or sources of chronic pain that were not included. Unfortunately, there are no existing best practice guidelines or evidence-based recommendations for the use of virtual care in this unique population, and therefore a rigorous assessment of guideline quality (ie, using the AGREE II tool as planned) was not possible. Furthermore, although this review examined youth with existing chronic pain complaints, emerging research indicates the potential for new onset chronic pain among youth.<sup>48</sup> As such, it does not adequately address best practices for virtual care for the prevention of new onset chronic pain.

In light of the current COVID-19 pandemic, the chronic pain crisis, and the rapid shift to the use of virtual care,<sup>1,2</sup> it is essential that existing evidence-based virtual care recommendations are identified to guide practice. The results of this systematic review should be used to inform ongoing decision making by health professional, decision makers, and policymakers regarding best practices for virtual delivery of chronic pain care for youth and their families.

## Disclosures

The authors have no conflicts of interest to declare.

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## Appendix A. Supplemental digital content

Supplemental digital content associated with this article can be found online at <http://links.lww.com/PR9/A108>.

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