

# Is caregiver refusal of analgesics a barrier to pediatric emergency pain management? A cross-sectional study in two Canadian centres

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## CLINICIAN'S CAPSULE

### What is known about the topic?

Children's pain in the emergency department (ED) continues to be under-recognized and sub-optimally managed.

### What did this study ask?

We sought to evaluate the frequency of caregiver/child acceptance of analgesia offered in the ED.

### What did this study find?

Of the 743 children who presented to the ED with a painful condition, 408 (54.9%) were offered analgesia. If offered in the ED, analgesia was accepted by 91% (373/408) of the caregivers/children.

### Why does this study matter to clinicians?

This study suggests that caregiver/child refusal of analgesia is not a major barrier to optimal pain management and highlights the importance of ED personnel in encouraging adequate analgesia.

response rate was 73% (743/1018). In the 24 hours preceding ED arrival, the median (IQR) maximal pain score rated by children and caregivers was 8/10 (4) and 5/10 (2), respectively, and 30.4% (226/743) of caregivers offered analgesia. In the ED, children reported a median (IQR) pain score of 8/10 (2) and 54.9% (408/743) were offered analgesia. When offered in the ED, analgesia was accepted by 91% (373/408). Overall, 55.7% (414/743) of children received some form of analgesia. **Conclusions:** Most caregivers/children accept analgesia when offered by ED personnel, suggesting refusal is not a major barrier to optimal management of children's pain and highlighting the importance of ED personnel in encouraging adequate analgesia. A large proportion of children in pain are not offered analgesia by caregivers or ED personnel. Educational strategies for recognizing and treating pain should be directed at children, caregivers, and ED personnel.

## RÉSUMÉ

**Objectif:** L'offre insuffisante d'analgésiques aux enfants dans les services des urgences (SU) est un problème bien décrit dans la documentation. Toutefois, ce qui l'est moins est le refus d'analgésiques par les aidants ou par les enfants eux-mêmes. Aussi l'étude visait-elle à évaluer la fréquence de l'acceptation de l'offre d'analgésiques par les aidants ou par les enfants eux-mêmes au SU.

**Méthode:** Une étude transversale a été menée dans deux centres hospitaliers, à l'aide d'un questionnaire d'enquête et d'un examen de dossiers médicaux, parmi 743 aidants d'enfants âgés de 4 à 17 ans, qui ont consulté au service des urgences pédiatriques pour des affections très douloureuses. Le principal critère d'évaluation consistait en la proportion d'enfants ou d'aidants ayant accepté l'offre d'analgésiques au SU.

## ABSTRACT

**Objectives:** The suboptimal provision of analgesia to children in the emergency department (ED) is well-described. A yet unexplored barrier is caregiver or child refusal of analgesia. We sought to evaluate the frequency of caregiver/child acceptance of analgesia offered in the ED.

**Methods:** We conducted a two-centre cross-sectional study of 743 caregivers of children 4–17 years presenting to the pediatric ED with an acutely painful condition using a survey and medical record review. The primary outcome was the proportion of children/caregiver pairs who accepted analgesia in the ED.

**Results:** The median (IQR) age of children was 11 (7) years, and 339/743 (45.6%) were female. The overall survey

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**Résultats:** L'âge médian (écart interquartile [EIQ]) des enfants était de 11 (7) ans, et 339 enfants sur 743 (45,6 %) étaient des filles. Le taux général de réponse à l'enquête a atteint 73 % (743/1018). Le score maximal médian de l'intensité de la douleur noté par les enfants et les aidants, au cours des 24 heures précédant l'arrivée au SU s'élevait respectivement à 8/10 (4) et à 5/10 (2), et 30,4 % (226/743) des aidants ont offert des analgésiques. Quant au score médian (EIQ) de l'intensité de la douleur noté par les enfants au SU, il était de 8/10 (2), et 54,9 % (408/743) des enfants se sont vu offrir des analgésiques. L'offre d'analgésiques au SU a été acceptée dans 91 % (373/408) des cas. Dans l'ensemble, 55,7 % (414/743) des enfants ont reçu une forme quelconque d'analgésie.

**Conclusions:** Les résultats de l'étude démontrent que la plupart des aidants ou des enfants acceptent l'offre d'analgésiques

faite par le personnel au SU, ce qui donne à penser que les refus ne constituent pas un obstacle important à la prise en charge optimale de la douleur chez les enfants et ce qui met en relief l'importance de l'offre d'une analgésie adéquate par le personnel au SU. En effet, une bonne proportion des enfants qui ressentent de la douleur ne se voient pas offrir des analgésiques par les aidants ou par le personnel au SU. Aussi faudrait-il élaborer des interventions de formation sur la reconnaissance et le traitement de la douleur, spécialement conçues à l'intention des enfants, des aidants et du personnel au SU.

**Keywords:** opioïds, pain, parent, pediatric emergency department

## INTRODUCTION

Despite the passing of a Decade of Pain Control and Research (2001–2010),<sup>1</sup> there remains abundant evidence that children's pain is sub-optimally managed in the emergency department (ED),<sup>2–6</sup> even in conditions associated with moderate to severe pain.<sup>4,7,8</sup> The World Health Organization has stipulated that adequate pain management is a fundamental human right,<sup>9</sup> and the American Academy of Pediatrics reaffirmed its position that adequate analgesia should be provided for children in health care settings.<sup>10</sup>

Given recent public fears surrounding analgesia, and particularly opioïds,<sup>11,12</sup> a possible barrier to the optimal provision of analgesia in the ED is caregiver or patient refusal. Although this has not been explored to date, current evidence suggests that caregivers harbour concerns surrounding harm,<sup>13</sup> as well as the addictive potential<sup>11,14</sup> of analgesics. In addition, a discrepancy exists between survey data on the high clinician-reported use of analgesia<sup>15,16</sup> and institutional audits of practice patterns that suggest otherwise.<sup>17,18</sup> If the refusal of analgesia were identified as a barrier to adequate pain management for children, it would provide a compelling rationale for the development of educational strategies directed at dispelling misconceptions and encouraging acceptance of analgesia offered in the ED. Alternatively, if the offering of analgesia by health care providers were shown to be the rate-limiting step, then efforts to improve this should be undertaken. Our primary objective was to determine the proportion of caregivers/children who accepted analgesia in the ED. We also sought to determine the proportion of caregivers who were offered analgesia before ED arrival,

caregiver perceptions of analgesia, confidence with managing pain at home, and satisfaction with ED care.

## METHODS

### Study design and setting

This was a two-centre cross-sectional study involving a survey and medical record review (MRR). Participants were recruited over a pre-specified 16-week period from the EDs of two Canadian pediatric centres from October 13, 2015, to February 2, 2016. Because of differences in the availability of research assistants (RAs), participants were recruited consecutively for three or five days per week, between 1800 and 2300 hours. Each ED has an average annual census of 40,000 and 58,000 visits. Ethics approval was obtained from the institutional ethics review board at each site.

### Population

We included caregivers in attendance of children aged 4–17 years presenting to the pediatric ED from home with a primary complaint of either headache, otalgia, sore throat, abdominal pain, or musculoskeletal (MSK) injury within 24 hours of arrival and maximal pain rated by the child of >2/10 on the Faces Pain Scale–Revised (FPS-R).<sup>19</sup> We excluded children with a history of fever or vomiting in the previous 24 hours, chronic pain conditions, hypersensitivity to acetaminophen or ibuprofen, cognitive impairments precluding comprehension of study-related tasks, inability to tolerate oral

medication, suspected non-accidental injury, not in attendance with a caregiver, and pregnancy. Potential participants were identified by an RA using the electronic tracking system in the ED. The RA performed eligibility screening and informed consent immediately after the bedside nursing assessment. Participants and RAs were unaware of the study hypothesis. Caregivers and patients were told that they were being surveyed to assess their opinions as to how pain should be managed prior to arrival and in the ED. RAs were told that the study was to explore the pain management practices of children at home and in the ED. They were not blinded to the survey questions but were unable to modify answers entered by participants.

### Survey

The 27-item survey was developed using the approach outlined by Burns et al.<sup>20</sup> in a *de novo* fashion without the use of an existing survey to guide question stems or responses. Item reduction was performed using the Delphi process.<sup>21</sup> Following a nurse and physician assessment, we administered the first 19 questions. Immediately before discharge, we administered the final eight questions (see the Appendix). The survey was self-administered by the participant in anonymity using an iPad and hosted on the Research Electronic Data Capture (REDCap) platform.<sup>22</sup> The caregivers completed surveys without any input from the child. Except for the child's discharge pain score, caregivers and children were blinded to each other's pain scores.

### Medical record review

The MRR was limited to the physician and nursing charts and ambulance call report for the index visit. Two RAs performed the data extraction using a standardized data collection form, accompanied by a coding manual. Data were entered into a study-specific Excel spreadsheet (v. 14.3.8; Microsoft, Redmond, WA). Parameters related to the primary outcome were abstracted in duplicate, and data were double-checked for accuracy. From the MRR, we collected demographic data and type of analgesia accepted from emergency medical services (EMS) and ED personnel. It is standard practice at both sites to record medication in the medical chart, including those brought from home or used before arrival. All other outcomes were obtained from the survey.

### Outcomes

The primary outcome was the proportion of children and caregivers who accepted analgesia in the ED. Secondary outcomes included: the proportion of caregivers who offered analgesia prior to ED arrival; proportion of children offered analgesia in the ED; reasons for not offering analgesia prior to arrival and refusal in the ED; beliefs regarding harm and the addictive potential of analgesia; caregiver perception of their child's pain using a 0–10 numerical rating scale (NRS); caregiver confidence in managing pain and satisfaction with care using novel five-item Likert scales (as no validated measures for these outcomes exist); children's rating of their maximal pain in the 24 hours preceding arrival to the ED, immediately following the nursing assessment, and discharge using the FPS-R; and recollection of the reassessment of pain in the ED and discharge teaching on pain management. The NRS was chosen because it is frequently used and extensively validated in both adults<sup>23</sup> and children.<sup>24</sup> Importantly, the NRS correlates highly with the FPS-R.<sup>25,26</sup> The FPS-R is preferred by children,<sup>27</sup> has been validated in children as young as four years of age,<sup>19</sup> and is also believed to be clinically useful in older children.<sup>28</sup> The FPS-R is scored from zero (no pain) to ten (maximal pain).<sup>19</sup> The FPS-R and NRS were administered by the RA once the patient and caregiver had arrived into a bed.

### Data analysis

Demographic, medical record, and survey data were summarized using means and standard deviations, medians and interquartile ranges (IQRs), or percentages and frequencies, as appropriate. A bivariate analysis was conducted to examine the effect of the following *a priori* independent variables on the offering of analgesia in the ED: site, chief complaint, sex, child age, and pain score in the ED. If more than one variable was statistically significant, a multivariate analysis was performed using a stepwise logistic regression. A post hoc analysis was conducted to explore the relationship regarding the final MSK diagnosis (soft tissue injury, fracture, or dislocation) and offering analgesia in the ED. Estimates are presented as odds ratios and *p*-values with 95% confidence intervals. Data were analyzed using the SPSS statistical software package (v. 24, IBM SPSS, Armonk, New York). *P*-values less than 0.05 were considered statistically significant.

**RESULTS**

**Demographics**

The proportion of participants who completed the survey was 743/1018 (72.9%); 248 were recruited at Site 1, and 495 were recruited at Site 2 (Figure 1). The demographic features of the caregivers and their children can be found in Table 1.

**Analgesia before ED arrival**

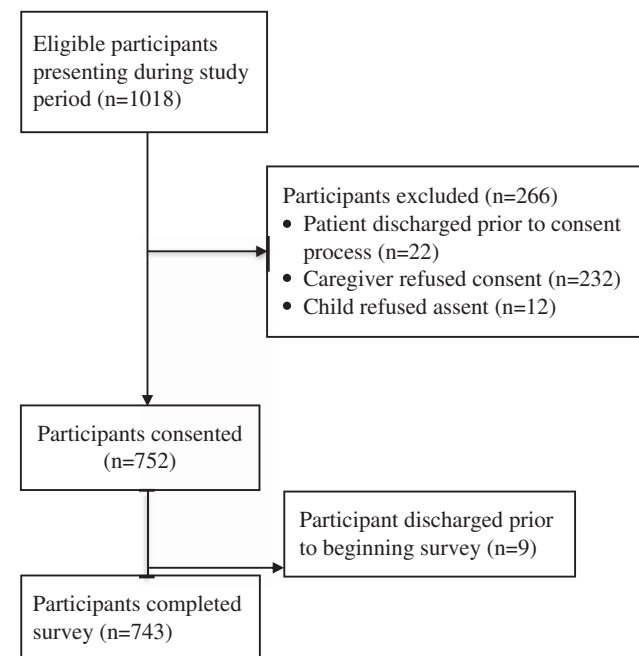
In the 24 hours preceding ED arrival, the median (IQR) maximal pain rated by the children and caregivers was 8/10 (4) and 5/10 (2), respectively. Overall, 226/743 (30.4%) of the caregivers were offered some form of analgesia before arrival (site 1: 68/248, 27.4%; site 2: 158/495, 31.9%). In all cases, it was accepted by their child. Table 2 describes reasons provided by the caregivers for not offering analgesia before arrival.

Of the 60 children who arrived by EMS, none were offered analgesia by their caregivers. EMS personnel offered analgesia to 11/60 (18.3%) of the children, and analgesia was accepted by all but one case.

**Analgesia in the ED**

In the ED, the median (IQR) pain score reported by children immediately following the nursing assessment

was 8/10 (2). Analgesia was offered by the nurse (330/743, 44.4%) or physician (78/743, 10.5%), or it was not offered at all (335/743, 45.1%). If offered, analgesia was accepted by 373/408 (91.4%) of the caregivers and children. The median (IQR) time between the completion of the triage assessment to receiving analgesia was 24 (74) minutes. Analgesia included ibuprofen (207/373, 55.5%), other non-steroidal



**Figure 1.** A flow diagram of participants.

**Table 1. Demographic features of caregivers and children**

Survey parameter	Number (%) N= 743
<b>Caregivers</b>	
Age category (years)	
41 or older	372 (50.1)
36–40	208 (28)
31–35	111 (15)
14–30	52 (7)
Mothers	539 (72.5)
Highest education level completed	
Postgraduate	111 (15)
University/college	416 (56)
Vocational	67 (9)
Elementary/high school	149 (20.1)
Current or past employment in a health care field	180 (24.2)
Current or past long-standing condition associated with pain	171 (23)
Previously treated their child’s pain with any form of analgesia (unrelated to the index visit)	632 (85.1)
<b>Prior Treatment Modality*</b>	
Acetaminophen	431 (58)
Ibuprofen	453 (61)
Naproxen	15 (2)
Opioid (morphine/oxycodone/hydromorphone)	22 (3)
Non-pharmacologic (ice, splinting, or compress)	7 (0.9)
Reported ability to tell when their child is in pain	
“Very easily (all of the time)”	334 (45)
“Somewhat easily (most of the time)”	343 (46.2)
“About half the time”	44 (5.9)
“Not that easily (only some of the time)”	22 (3)
“Not easily at all (none of the time)”	0 (0)
<b>Children</b>	
Median (IQR) age and range (years)	11 (7) Range: 4, 17
Female sex (n [%])	339 (45.6)
Proportion hospitalized (n [%])	7 (0.9)
Duration of pain prior to ED arrival (median [IQR] in hours)	4 (6)
Maximum FPS-R pain score in the 24 hours preceding ED visit (median [IQR] in hours)	8 (2)

ED = emergency department; FPS-R = Faces Pain Scale–Revised; IQR = interquartile range.  
\*Participant could choose more than one option.

**Table 2. Reasons given by caregiver for not offering analgesia prior to ED arrival or accepting analgesia that was offered in the ED**

Reason*	Not offering analgesia prior to ED arrival Number (%) (N=517)	Not accepting analgesia in the ED Number (%) (N=35)
"There was no time to give medication"	214 (41.4)	N/A
"I was worried that it would make it hard for the doctors to figure out what's going on"	98 (18.9)	3 (9)
"I do not have pain medication at home or in the car"	95 (18.4)	N/A
"I was worried that it would mask how serious my child's complaint was"	93 (17.9)	1 (3)
"I didn't think that my child was in enough pain"	87 (16.8)	3 (9)
"I believed that this was the job of the doctors and nurses in the emergency department or paramedics"	65 (12.6)	N/A
"My child does not like taking medication"	31 (6)	9 (26)
"I was concerned about side effects"	20 (3.9)	3 (9)
"I thought my child should tough it out"	9 (1.7)	0
"I don't believe that medication is all that helpful"	9 (1.7)	1 (3)
"It did not occur to me to manage pain"	8 (2)	N/A
"I was concerned that my child might get addicted to the pain medicine"	5 (1)	1 (3)
"I thought my child should have nothing by mouth"	5 (1)	N/A
"My child refused medication"	2 (0.4)	23 (66)
"My child has high pain tolerance"	0	8 (23)
"I don't normally give my child pain medication for this condition"	0	1 (3)

N/A = not applicable.  
\*Caregiver could choose more than one option.

anti-inflammatories (NSAIDs; 60/373, 16.1%), acetaminophen (35/373, 9.4%), opioids (29/373, 7.8%), or non-pharmacologic therapies alone (42/373, 11.3%). The latter included ice alone (21/373, 8.3%), splinting alone (5/373, 1.3%), ice with splinting (10/373, 2.7%), and distraction with ice (6/373, 7.8%). Reasons for not accepting analgesia in the ED are detailed in Table 2. Overall, 414/743 (55.7%) of the children were offered some type of analgesia by caregivers, EMS, or ED personnel. In a bivariate analysis, variables with a  $p$ -value of  $\leq 0.05$  were included in a multivariate analysis (child age, pain score in the ED, and chief complaint). In the multivariate analysis, the overall model including chief complaint, child age, and pain score in the ED was significant ( $p < 0.001$ ). The odds of being offered analgesia in the ED was significantly greater if the child was older (OR 1.1, 95% CI 1.1–1.2,  $p = 0.04$ ), reported more severe pain in the ED (OR 1.1, 95% CI 1.1–1.3,  $p = 0.04$ ), or was diagnosed with a fracture (OR 2.1, 95% CI 1.3–3.4,  $p = 0.003$ ). However, the odds of being offered analgesia in the ED was significantly lower if the child presented with abdominal pain (OR 0.6, 95% CI 0.4–0.9,  $p = 0.02$ )

(Table 3). Caregiver perceptions of analgesia are shown in Table 4.

### **Confidence managing pain and satisfaction with ED care**

Of the 714 families discharged from the ED, 392 (55%) recalled receiving education from the nurse or physician on pain management at home. The median (IQR) pain score on the FPS-R at discharge was 6/10 (4). In terms of managing their child's pain at home, caregivers reported their confidence as "very" in 493/742 (66%), "somewhat" in 196/742 (26%), "neutral" in 26/742 (4%), "somewhat unsure" in 24/742 (3%), or "very unsure" in 3/742 (1%). Caregivers rated their child's pain management in the ED as "very well" in 405/722 (56%), "somewhat well" in 98/722 (14%), "neutral" in 167/722 (23%), not "as well as it could have been" in 39/722 (5%), or "not well at all" in 13/722 (2%). Caregivers rated their satisfaction with the overall care as "very satisfied" in 525/738 (71%), "somewhat satisfied" in 143/738 (19%), "neither satisfied nor unsatisfied" in 49/738 (7%), "somewhat unsatisfied" in 16/738 (2%), or "very unsatisfied" in 5/738 (1%).

**Table 3. Offering analgesia in the ED**

	Analgesia offered in ED			Bivariate Analysis	
	Yes	No	Total	OR (95% CI)	<i>p</i> -value
Site, <i>n</i> (%) <sup>*</sup>					
Site 2	262 (52.9)	233 (47.1)	495	Reference	0.11
Site 1	146 (58.9)	102 (41.1)	248	1.3 (0.9, 1.8)	
Total	408 (54.9)	335 (45.1)	743		
Chief complaint, <i>n</i> (%) <sup>*</sup>					
Musculoskeletal injury	301 (57.9)	219 (42.1)	520	0.6 (0.2, 2.3)	
Sprain/strain			334	Reference	
Fracture			122	2.1 (1.3, 3.3)	0.002
Dislocation			64	0.5 (0.3, 0.9)	0.02
Abdominal pain	51 (43.6)	66 (56.4)	117	0.4 (0.1, 0.9)	0.04
Headache	40 (52.6)	36 (47.4)	76	0.5 (0.1, 2)	0.64
Otalgia	9 (45)	11 (55)	20	0.4 (0.1, 1.8)	0.33
Throat pain	7 (70)	3 (30)	10	2.7 (0.6, 13.2)	0.22
Total	408 (54.9)	335 (45.1)	743		
Sex, <i>n</i> (%) <sup>*</sup>					
Male	212 (52.5)	192 (47.5)	404	Reference	
Female	196 (57.8)	143 (42.2)	339	1.3 (0.9, 1.7)	0.14
Total	408 (54.9)	335 (45.1)	743		
Child age (median [IQR]) in years	11 (6)	10 (7)	11 (7)	1.1 (1.1, 1.2)	0.03
ED FPS-R pain score (median [IQR])	10 (2)	8 (4)	8 (2)	1.1 (1.1, 1.3)	0.05

ED = emergency department; FPS-R = Faces Pain Scale-Revised; IQR = interquartile range; OR = odds ratio.  
<sup>\*</sup>Represents percentage of the total for each row.

**Table 4. Caregiver perceptions of analgesia (N = 743)**

	Yes <i>n</i> (%)	Sometimes <i>n</i> (%)	No <i>n</i> (%)	Unsure <i>n</i> (%)
"Do you believe that your child can possibly become addicted to opioid medication (morphine, Percocet®, or Dilaudid®) if used for a short time (less than five doses) in the correct dose?"	44 (6)	91 (12)	460 (62)	148 (20)
"Do you believe that your child can become possibly addicted to ibuprofen (Advil® or Motrin®) if used for a short time (less than five doses) in the correct dose?"	7 (1)	21 (3)	687 (92)	28 (4)
"Do you believe that your child can become possibly addicted to acetaminophen (Tylenol® or Tempra®) if used for a short time (less than five doses) in the correct dose?"	8 (1)	22 (3)	691 (93)	22 (3)
"Do you believe that opioid medication (morphine, Percocet®, or Dilaudid®) can possibly cause serious harm to your child if used for a short time (less than five doses) in the correct dose?"	50 (7)	129 (17)	382 (52)	182 (24)
"Do you believe that ibuprofen (Advil® or Motrin®) can possibly cause serious harm to your child if used for a short time (less than five doses) in the correct dose?"	11 (2)	33 (4)	644 (87)	55 (7)
"Do you believe that acetaminophen (Tylenol® or Tempra®) can possibly cause serious harm to your child if used for a short time (less than five doses) in the correct dose?"	24 (3)	37 (5)	642 (87)	40 (5)

## DISCUSSION

Our results suggest that caregiver/child refusal of analgesia is likely not a major barrier to pain management in the pediatric ED. Importantly, however, the frequency of caregivers and ED personnel offering analgesia is suboptimal. Our findings underscore the need for strategies to educate children, caregivers, and ED personnel on the importance of accurate measurement and adequate

management of pain both before and during acute medical care.

A large proportion of caregivers who did not offer analgesia before arrival accepted it once in the ED. This implies that caregivers look to ED providers for guidance on whether pain should be treated. For clinicians, this finding highlights the importance of offering analgesia and providing appropriate caregiver education. Refusal of analgesia has been described in a greater

proportion (49%) of adult ED patients, most commonly because of possible obscuration of the diagnosis.<sup>29</sup> However, we found that children's unwillingness to take medication was the main reason for refusal. A survey of Greek school-aged children found that most believe "strongly in the therapeutic power of medicine" and obtain information from physicians, parents, and reading.<sup>30</sup> This suggests that caregivers and clinicians are in a position to substantially influence children's perceptions on medication and educate them on the importance of expressing pain.

The proportion of caregivers offering any type of analgesia before arrival was low, even across sites, suggesting that this problem is not centre specific. Our findings are consistent with a report that only 26%–37% of children with MSK injuries received prehospital pharmacologic analgesia.<sup>31</sup> This was concerning because the median FPS-R score of 8/10 would be considered severe<sup>32</sup> and consistent with a child's perceived need for medication.<sup>28</sup> The most common reason for not offering analgesia at home, a lack of time (41%), was surprising given that the median duration of pain before ED arrival was four hours, possibly reflecting a social desirability bias. The prevalence of caregiver concerns regarding masking the diagnosis (19%) and the severity of the condition (18%) are consistent with previous findings in the context of children's MSK pain.<sup>31</sup> Most caregivers (91%) reported being able to tell if their child was in pain and 85% reported giving their child analgesia in the past. These findings and the fact that caregivers rated their child's pain as 5/10 on the NRS (moderate pain),<sup>33</sup> suggests that caregivers may have underestimated their child's pain. This finding must be interpreted cautiously, as there have been no studies that have explored the degree of correlation between the NRS and FPS-R for preschool children. Nevertheless, a poor correlation between parental and children's pain scores has been described<sup>34–36</sup> and raises the possibility that caregivers may not be able to assess the degree of their child's pain accurately. Caregivers are most often the gatekeepers to providing analgesia to children and their fears surrounding medication, particularly, opioids are prevalent, and may influence their decision-making.<sup>12</sup> Our findings emphasize the need for strategies to educate caregivers on the importance and accurate measurement of acute pain in children so rational, evidence-informed analgesic choices can be made.

Our finding of the infrequent provision of analgesia (18%) by EMS providers should be interpreted with

caution because of regional differences in care directives. Nevertheless, previous studies have also described the suboptimal provision of analgesia to children by EMS providers.<sup>4,37,38</sup> A significant barrier identified by EMS personnel is an inability to assess children's pain accurately,<sup>39</sup> and this should be a focus of educational initiatives.

Forty-five percent of children were not offered analgesia in the ED, consistent with a large pre-existing body of evidence.<sup>2,13,40–43</sup> Dong et al. also reported that 59% of children with isolated long bone fractures received no analgesia within the first hour of arrival,<sup>8</sup> and Kircher et al. reported that 62% of children with MSK injuries received no analgesia.<sup>4</sup> In our sample, the median pain score following a nursing assessment was 8/10, highlighting the possibilities that pain was either not reassessed, reassessed but misinterpreted, or underestimated altogether. Kircher et al. also found that just over one-quarter of patients in a pediatric ED had a reassessment of pain scores documented.<sup>4</sup> Our finding that analgesia was significantly more likely to be offered if the child was older and in more severe pain is supported by robust evidence that younger children are significantly less likely to receive analgesia.<sup>5,7,18,44,45</sup> Possible explanations include uncertainty with medication dosing, fear of adverse effects, and the inability of young children to verbalize their needs.<sup>5,44</sup> Offering analgesia in the ED was also positively related to more severe pain. To our knowledge, this association has not been previously described and emphasizes the importance of a pain assessment upon arrival to the ED. ED staff interventions such as audit and feedback for accurate interpretation of pain scores and the importance of reassessment are important steps toward timely, effective, and consistent pain management. Not surprisingly, children presenting with abdominal pain were less likely to be offered analgesia in the ED. This is consistent with previous findings<sup>46–48</sup> and possibly linked to a historical misconception that analgesia may mask the signs of surgical pathology.<sup>49,50</sup> However, recent evidence has contested this belief.<sup>51</sup>

Almost one-fifth of caregivers believed opioids to be harmful and addictive, consistent with emerging literature highlighting caregiver fears surrounding analgesia, particularly opioids.<sup>11,12,14</sup> Interestingly, a large proportion of caregivers was unsure regarding the potential for addiction (20%) and harm (24%) associated with opioids. These findings further emphasize the need for comprehensive caregiver education on indications for opioids and associated risks and benefits. The recent Centers for Disease Control and Prevention recommendations for opioids

in chronic pain<sup>52</sup> and evidence that prescription opioid use in childhood is associated with misuse as adults,<sup>53</sup> suggesting that even clinicians need more clarity and direction on the long-term effects of short-term opioid use.

Pain severity at discharge is not predictive of caregiver satisfaction.<sup>54,55</sup> Therefore, we assessed both global satisfaction with care and satisfaction specific to pain management. Global judgments of satisfaction with treatment is a core outcome domain outlined by the Pediatric Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials (Ped-IMMPACT) consensus.<sup>56</sup> The majority of caregivers (90%) reported being either very or somewhat satisfied with their child's care despite ongoing pain at discharge. Importantly, a smaller proportion believed that their child's pain was managed either somewhat or very well (70%), and almost one-quarter reported it as neutral (23%). Although the median value of pain at discharge was 6/10, constituting a clinically meaningful change from the beginning of the ED visit,<sup>57</sup> it represents moderate pain<sup>32</sup> and a perceived need for pharmacologic intervention.<sup>9,28</sup> Pain relief in the ED is associated with an intent to comply with the discharge instructions,<sup>58</sup> and caregiver satisfaction with pain management is highly correlated with pain relief in their child.<sup>59</sup> Leaving the ED with inadequate treatment of pain is associated with sub-optimal management of pain at home.<sup>59</sup> Our findings highlight that there is room for improvement in how ED personnel manage children's pain and influence postdischarge care. This may be accomplished through previously described successful knowledge translation initiatives that incorporate education, reminders, audit, and feedback.<sup>60</sup> Our results can likely be extrapolated across Canada because the delivery of care and structure of ED health care delivery across provinces is fairly homogenous. However, our results may not be readily generalizable to other countries where allied health personnel have different responsibilities.

### **LIMITATIONS**

The FPS-R and NRS have not been validated for retrospective assessments and may be subject to recall bias.<sup>61</sup> Reporting past pain may serve to convey what the individual has "endured or how they coped,"<sup>62</sup> possibly inflating the severity of the actual experience. However, this approach was the single best available strategy for the assessment of pre-arrival pain. It is possible that differences between parental perception of

pain and pain reported by a child could have been because of different scales, but it is unlikely given the high correlation between the NRS and FPS-R.<sup>25,26</sup> Retrospective pain assessments in children are commonly used,<sup>54,62</sup> and although evidence specific to pain is lacking, the ability to accurately recall states such as hunger appear to be present from age four onwards.<sup>63</sup> There is also good agreement between the pain questionnaires with a short recall interval (14 days) and prospective pain diaries.<sup>64</sup> Global measures of confidence managing pain and satisfaction with ED care were likely dependent on factors not directly measured, such as previous experience with health care and wait time. Although others have used similar scales to measure caregiver perceptions in the context of pain,<sup>54</sup> the results of these outcomes should be interpreted cautiously. Second, we did not record whether pain scores were documented at triage. However, no association has been found between pain score documentation at triage or the severity of pain scores and provision of analgesia to children.<sup>43</sup> Third, our results may not reflect an actual practice setting as willing study participants might have been more motivated to manage their child's pain, and participant recruitment before physician assessment might have heightened caregiver sensitivity toward pain management. These factors may have inflated the proportion of caregivers who accepted analgesia in the ED. Finally, we were unable to determine if ED personnel reassessed pain reliably. Although this has been cited as a pervasive issue for children in the ED,<sup>3</sup> reassessments might not have been documented. The fact that the median pain score at discharge was in the moderate range suggested that even if pain reassessments were performed, accurate information might not have been obtained or interpreted correctly.

### **CONCLUSIONS**

Caregiver/child refusal of analgesia in the ED is infrequent and unlikely to be a major reason for the well-described suboptimal management of children's pain. However, given the possible biases associated with this study design, our estimate of the acceptance of analgesia may not apply to a practice setting outside the context of this study. Given that over 90% of caregivers accepted an offer of analgesia, ED physicians likely exert a significant influence on the pain management of children. A large proportion of children in severe pain



are not offered analgesia by ED personnel or their caregivers. This emphasizes the need for educational interventions targeting children, caregivers, and ED personnel on the importance of adequate reporting, assessment, reassessment, and interpretation of pain scores to provide timely, effective, and universal management of pain from its onset to resolution.

**Competing interests:** This work was previously presented at the Canadian Association of Emergency Physicians Annual Meeting June 2016, Quebec City, QC; and American Academy of Pediatrics Annual Meeting October 2016, San Francisco, CA, USA. This study was unfunded.

### **SUPPLEMENTARY MATERIAL**

To view supplementary material for this article, please visit <https://doi.org/10.1017/cem.2018.11>

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