

## Physicians' knowledge, attitudes, and practices regarding opioid use in Canadian pediatric emergency departments

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**Short title:** Pediatric Emergency Opioid Survey

**Funding source:** This study was supported by the Women and Children's Health Research Institute (WCHRI) Resident Grant, secured by Dr. Megan Fowler and Dr. Samina Ali in 2017.

**Financial disclosure:** All the above authors have no financial relationships related to this article to disclose.

**Conflict of interest:** All the above authors have no potential conflict of interest to disclose.

**Word Count:** 2500 (max 2500)

## Abstract

**BACKGROUND:** In the midst of the opioid crisis, physicians are caught between balancing children's optimal pain management and the risks of opioid therapy. This study described pediatric emergency physicians' willingness to prescribe, knowledge/attitudes regarding, and perceived barriers/facilitators to prescribing opioids.

**METHODS:** A novel survey tool was created using published methodology guidelines, and distributed to all physicians from Pediatric Emergency Research Canada using Dillman's Tailored Design method for mixed-mode surveys (October to December 2017).

**RESULTS:** Response rate was 56% (136/242); 54% (60/111) were female, mean age was 43.5 (SD 8.7) years, and 54% (74/136) had subspecialty training. For moderate and severe musculoskeletal injury scenarios, intranasal fentanyl was the most commonly selected opioid for first line treatment [34.6% (47/136) and 60.3% (82/136), respectively]. Using a 100-point scale, physicians' reported degree of concern for physical dependence was 13.1 (SD 19.1), addiction 16.3 (SD 19.5), and diversion of opioids 33.3 SD (26.5) when prescribing opioids. The reported degree of influence the 'opioid crisis' has on physicians' willingness to prescribe opioids was 29.1 (SD 25.9). The top three reported barriers to prescribing opioids were parental reluctance (41.9%; 57/136), lack of guidelines for pediatric opioid use (25.7%; 35/136) and concern about side effects (24.3%: 33/136).

**INTERPRETATION:** Physicians appear minimally concerned regarding physical dependence, addiction risk, and the current opioid crisis when prescribing opioids to children. There is an urgent need for robust evaluation of physical dependence and addiction risk for children receiving opioids in order to inform physicians' practice and guide patient counseling and consent discussions.

Word count: 250 (max 250)

## Introduction

Pain is one of the most common reasons for visiting the emergency department (ED) and accounts for up to 80% of visits in North America.<sup>1-4</sup> Surprisingly, inadequate analgesia remains a worldwide problem for children.<sup>5-7</sup> The World Health Organization (WHO) and the American Academy of Pediatrics (AAP) have long recommended the addition of opioids for children's moderate to severe pain that does not respond to acetaminophen and/or non-steroidal anti-inflammatory drugs (NSAIDs).<sup>8,9</sup> With the current international opioid crisis and lack of clear national guidelines, physicians are caught between providing effective pain management and the risks of opioid therapy such as development of an opioid use disorder or physical dependence.<sup>10,11</sup> This is especially relevant in the ED, as this practice setting has been implicated in the current crisis.<sup>12,13</sup> Currently, there is insufficient evidence to conclude whether or not opioid use for children's acute pain is definitively associated with the subsequent development of an opioid use disorder.<sup>14,15</sup>

There is a paucity of studies describing physicians' knowledge, attitudes, and barriers to prescribing opioids to children in the ED. In order to optimize and influence pain management strategies in the context of an increasing number of deaths related to opioid use, we need to understand physicians' perspectives, knowledge and attitudes towards opioid use in children. The objectives of this study were to describe pediatric emergency medicine physicians' willingness to prescribe opioids to children in the ED and at discharge, their knowledge and attitudes regarding opioid use in children, and their perceived facilitators and barriers to prescribing opioids and to relate these findings to their demographic characteristics.

## Methods

### *Study design*

This study was a descriptive, cross-sectional survey of pediatric emergency physicians across Canada. This study received ethics approval from the University of Alberta's Health Research Ethics Board.

### *Participants*

Physician members of the Pediatric Emergency Research Canada (PERC) database in 2017 comprised the study population. At the time of study, this database included 242 physicians, representing all pediatric hospitals across Canada.

### *Survey tool*

A novel survey tool was developed, following published guidelines for self-administered clinician surveys.<sup>16</sup> An expert panel (representing pediatric emergency medicine, pain management, toxicology, addiction medicine and survey methodology) informed tool development. After item generation, item reduction, and pre-testing, the survey was pilot tested and reviewed for sensibility by five pediatric emergency physicians to ensure readability, and face and content validity.

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5 This closed survey included 30 questions regarding physicians' demographic  
6 characteristics (e.g. age, sex, training), knowledge and attitudes regarding potential risks  
7 and safe practice with opioid use (e.g. physical dependence, addiction), current personal  
8 practice via hypothetical scenarios, and perceived barriers and facilitators to prescribing  
9 opioids. Physicians were presented with three hypothetical musculoskeletal injury (MSK-  
10 I) case scenarios to determine analgesic preference in the ED and at discharge. The cases  
11 represented mild (3/10), moderate (6/10), and severe (9/10) pain, as defined by the  
12 WHO's pain ladder.<sup>8</sup> For each scenario, the participants were asked which medication(s)  
13 they would typically use for first and second-line pain management in the ED, as well as  
14 recommendations for at-home pain management (Appendix 1).  
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### 18 ***Survey Implementation***

19 Participants were contacted from October to December 2017. Dillman's Tailored Design  
20 Method for mixed-mode surveys was used to distribute the surveys.<sup>17</sup> A pre-notification  
21 email was sent on day 0, followed by the electronic survey link on days 7 and 21. Email  
22 address and IP address was temporarily stored, in order to track non-respondents.  
23 However, this information was not available to the study investigators. Emails indicated  
24 that consent was implied in completion of the survey, and length of survey was 10-15  
25 minutes (Appendix 2).  
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28 Non-responders to the electronic survey were mailed a paper survey on day 35. Study  
29 data were collected and managed using the REDCap electronic data capture tool hosted  
30 by the Women and Children's Health Research Institute (Edmonton).<sup>18</sup> Response validity  
31 and data checks were built into the REDCap database to avoid data entry errors, and  
32 participants were permitted to review and change their answers.  
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35 The survey was offered in English and French. An arms-length research coordinator was  
36 responsible for distribution of the survey, tracking participants' response status, mailing  
37 paper surveys, data entry, and secure storage. The study team was blinded to the identity  
38 of the respondents and non-respondents.  
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### 43 ***Data Analysis Plan***

44 Categorical data (e.g. sex, institution) were summarized with frequency distributions and  
45 continuous data (e.g. age, level of comfort scales) were reported using univariable  
46 summaries (means, medians, standard deviations, ranges). Bivariable binomial logistic  
47 regressions were performed to ascertain the effects of clinically significant variables  
48 (eg: training, age, sex, degree of worry for severe adverse events, opioid physical  
49 dependence and opioid use disorder/addiction) on use of opioids in the ED as a first line  
50 treatment in moderate pain and prescription of opioids for moderate/severe pain for at  
51 home use. All p-values of <0.05 were considered statistically significant. All statistical  
52 analyses were performed using SAS Ver. 9.4 (SAS Institute Inc., Cary, NC, USA).  
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## Results

### *Demographic Characteristics*

Of 242 physicians, 136 completed the survey, resulting in a response rate of 56.2%. Participants were permitted to skip questions and therefore response rates vary for each question. See Table 1.

### *Willingness to Prescribe Opioids and Other Analgesic Agents*

Physicians' willingness to prescribe opioids for moderate to severe pain in the ED and at discharge are presented in Table 2. The most commonly selected analgesics for use in the ED and for home management for mild, moderate and severe pain are presented in Figures 1A, B, and C, respectively. Ibuprofen was the most commonly selected analgesic for first line ED management and home management for all three categories of pain. Intranasal fentanyl and oral morphine were the most commonly selected opioids for first line ED use and home use, respectively, for both moderate and severe pain. When asked to select their preferred opioids used in the ED and recommended at discharge, based on patient age, intravenous morphine and oral morphine were the top overall selected opioids, respectively. See Figures 2A and B.

### *Knowledge*

Using a 100-point scale (0= extremely poor, 100= extremely good), physicians' self-reported knowledge regarding safe opioid use was a mean of 69.83 (SD 19.5) in the ED and 60.57 (SD 23.69) for discharge recommendations. When asked what the best mode to deliver education regarding safe opioid use in children, physicians selected: web-based independent study (49/127; 38.6%), specific training session/course (29/127; 22.8%), conference/medical events (18/127; 14.2%), and video education sessions (17/127; 13.4%). A total of 48.1% (62/129) of physicians reported having an opioid-specific protocol or policy in their ED and 10.9% (14/129) reported having a protocol for discharge advice. 74% (91/123) of physicians reported that having an opioid protocol in their ED would be helpful, specifically for morphine, fentanyl and hydromorphone. Physicians reported wanting more knowledge in the following areas: efficacy of various opioids (6/25; 24.0%), opioid dosing, indications, contraindications and duration of treatment (6/25; 24.0%), risk of opioid dependence, addiction and diversion (4/25; 16.0%), and opioid side effects (3/25; 8.0%).

### *Attitudes*

Using a 100-point scale (0= not worried, 100= extremely worried), physicians' mean degree of worry regarding children developing physical dependence was 13.09 (SD 19.05), opioid use disorder/addiction was 16.31 (SD 19.47), and diversion of opioid prescriptions to family/parents/friends was 33.34 (SD 26.50) when prescribing opioids.

Physician's mean degree of worry about severe adverse reactions at therapeutic doses was reported for the following: apnea (21.67 SD 19.43 in the ED; 22.09 SD 23.5 at home), hypotension (19.86 SD 16.83 in the ED; 14.06 SD 16.43 at home), and cardiac arrest (7.5 SD 10.11 in the ED; 8.83 SD 13.5 at home).

On a 100-point scale (0= none, 100= extremely), physicians reported their degree of influence opioid side effects (39.85 SD 25.5) and Canada's opioid crisis (29.08 SD 25.9) has on their willingness to prescribe opioids to children.

Table 3 presents physicians' self-reported frequency of counseling regarding safe opioid use.

### ***Barriers & Facilitators***

Table 4 presents perceived barriers and facilitators to opioid use in the ED. Physicians reported more education for physicians, nurses and caregivers (28/52; 53.8%), research on safe opioid use in children (8/52; 15.4%), opioid guidelines (7/52; 13.5%) and protocols (4/52; 7.7%) as ways to remove barriers to prescribing opioids to children in the ED.

### ***Additional analyses***

Table 5 presents binomial logistic regression analysis of potential physician demographics, perceptions and clinical factors that may have influenced the selection of opioids for first line moderate pain management in the ED and for moderate/severe pain for at-home use.

## **Interpretation**

Ibuprofen was the most commonly selected analgesic for first-line ED and at-home management for all pain categories. Intranasal fentanyl was the most commonly selected first-line opioid for moderate and severe pain. In general, opioids (morphine and fentanyl) were most commonly selected for second-line moderate and severe pain management in the ED. Physicians appear minimally concerned about physical dependence, addiction, diversion of opioids, and the opioid crisis when prescribing opioids in the ED. Few physicians reported completing a screening risk assessment prior to prescribing opioids. The top three reported barriers to prescribing opioids were parental reluctance, lack of clear guidelines for opioid use in children, and concern about opioid side effects.

Intranasal medications have become a popular route of delivering medications, as they can be administered quickly and without intravenous insertion.<sup>19</sup> It is interesting to note that the reported intranasal fentanyl use was so high (60% for first line severe pain) given the lack of definitive evidence demonstrating its efficacy. A 2014 Cochrane review

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3 evaluating intranasal fentanyl was unable to draw any conclusions comparing its efficacy  
4 to parenteral morphine.<sup>19</sup> Subsequent modest-sized trials of intranasal fentanyl have  
5 shown it to be comparable to intranasal ketamine for suspected fractures.<sup>20,21</sup> However,  
6 large scale, multi-centre trials are urgently needed to definitively determine its efficacy.  
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9 Ibuprofen's commonly reported use is in keeping with the current evidence based on  
10 safety and efficacy for managing acute MSK-I-related pain in children.<sup>22</sup> Opioids were  
11 most commonly selected for second line moderate and severe pain management in the  
12 ED, which is congruent with the WHO and AAP recommendations.<sup>8,9</sup> Until recently,  
13 codeine was the most commonly prescribed oral opioid for children with MSK-I pain.<sup>23</sup>  
14 In 2013, Health Canada advised no codeine use in children less than 12 years;<sup>24</sup> this  
15 advisory challenged physicians to change their practice patterns and search for an  
16 alternative oral opioid. There have been three recent trials studying oral morphine for  
17 MSK-I.<sup>25,26,27</sup> Two trials comparing oral morphine to ibuprofen, alone and in  
18 combination, found no significant difference in efficacy. In addition, all three trials  
19 reported significantly more adverse effects in the morphine group. Interestingly, and in  
20 contrast with this evidence, physicians in our study reported that oral morphine was their  
21 preferred opioid for moderate and severe MSK-I pain at discharge. It is possible that  
22 knowledge translation of these recent studies has not yet occurred.  
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26 Physicians appear to be minimally concerned about opioid dependence, addiction risk,  
27 and the opioid crisis when prescribing opioids to children. The risk of opioid addiction  
28 and misuse in children is not clearly understood and there is conflicting evidence from  
29 two recent American studies.<sup>14,15</sup> McCabe et al followed participants from high school to  
30 age 35 and found that legitimate use of prescription opioids in adolescence was not  
31 associated with the development of a substance use disorder, however a positive history  
32 of non-medical use of prescription opioids (NMUPO) in adolescence was associated with  
33 increased odds of substance use disorder at age 35.<sup>15</sup> Miech et al followed participants  
34 from grade 12 to age 23 and concluded that prescribing opioids to adolescents was  
35 independently associated with a 33% increase in risk of future opioid misuse.  
36 Interestingly, Miech et al also reported no associated risk for future opioid misuse among  
37 adolescents with reported use of alcohol and illegal drugs.<sup>14</sup> With the current lack of  
38 strong guiding evidence regarding risk of future misuse after medical use of opioids in  
39 childhood, it is difficult to conclude how worried physicians 'should' be about this risk.  
40 There is an urgent need for more robust evidence examining the risk of opioid addiction  
41 and/or physical dependence following short-term opioid use in children.  
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46 In our study, few physicians reported performing a screening risk assessment prior to  
47 prescribing opioids or counseling families about how to properly dispose of leftover  
48 medication. Clinicians need a quick, reliable, validated screening tool for identifying  
49 children at higher risk for complications related to opioid use in the ED. Further,  
50 knowing that most individuals with NMUPO obtain opioids from family members or  
51 friends,<sup>28,29</sup> physicians must counsel patients about proper disposal of leftover  
52 medications.  
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3 Physicians have indicated they want more research, education, opioid specific protocols  
4 and guidelines for children's pain management. After parental reluctance, lack of clear  
5 guidelines and concern for side effects were the top reported barriers to prescribing  
6 opioids in the ED. A recent survey study of pediatric inpatient healthcare providers  
7 reported that the most common barriers to pain management included fear of adverse  
8 drug reactions, opioid dependence and tolerance, and lack of knowledge or  
9 understanding.<sup>30</sup> In order to develop opioid guidelines and provide evidence-informed  
10 care, we need rigorous trials examining the effectiveness and safety of opioids in  
11 children.  
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15 Over the past 10 years, there has been a 53% increase in hospitalizations for opioid  
16 poisonings in Canada.<sup>31</sup> Individuals aged 15-24 years have the fastest growing rates of  
17 hospitalizations and intentional poisonings were the most prevalent for this age group,  
18 accounting for 44% of these hospitalizations.<sup>31</sup> These numbers are alarming and in  
19 response to the opioid crisis, the Government of Canada developed a Joint Statement of  
20 Action to Address the Opioid Crisis.<sup>32,33</sup> In the United States, the Centers for Disease  
21 Control and Prevention produced the 2016 Guidelines for Prescribing Opioids for  
22 Chronic Pain.<sup>34</sup> These guidelines fail to address the pediatric population and there is  
23 worry that these guidelines are being inappropriately extrapolated to children.<sup>35</sup>  
24 Healthcare leaders and policy-makers must examine the evidence and with the help of  
25 experts in pediatric pain management develop national guidelines regarding the  
26 indication for opioids, recommended dosing, duration of treatment and safety concerns  
27 for opioid use in children.<sup>35</sup> Until then, physicians are left without clear guidance on how  
28 to responsibly and adequately prescribe opioids to children.  
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### 33 **Limitations**

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35 Our study has several limitations. We had a modest response rate of 56% and a higher  
36 response rate may have led to more robust and generalizable results. We created a novel  
37 survey tool which has not been validated. Inherent to any survey study, the answers  
38 provided may have been influenced by respondent and recall bias. The PERC database  
39 includes physicians who primarily practice at pediatric tertiary care centers, therefore, our  
40 results may not be generalizable to community physicians. Despite these limitations, this  
41 study has identified some key areas for improving education, knowledge translation and  
42 future research for Canadian practice.  
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### 49 **Conclusion and future direction**

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51 Physicians appear to be minimally concerned regarding opioid dependence, addiction  
52 risk, and the current opioid crisis when prescribing opioids to children. There is an urgent  
53 need for robust evaluation of opioid dependence and addiction risk for children receiving  
54 opioids in order to inform physicians' patient counseling practices. Development of  
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3 opioid-specific guidelines and protocols would likely improve physicians' ability to  
4 responsibly and adequately manage pain for children.  
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### 8 **Acknowledgements**

9 Funding for this study was provided by the Women and Children's Health Research  
10 Institute Resident Grant, secured by Dr. Megan Fowler and Dr. Samina Ali (2017-2018).  
11 We thank Pediatric Emergency Research Canada (PERC) for their support and access to  
12 their physician database. We would like to acknowledge Manasi Rajagopal for project  
13 coordination and administrative support. We would like to thank our expert panel for  
14 help with survey tool development: Dr. Sylvie LeMay, Dr. Garth Meckler, Dr. Sarah  
15 Curtis, Dr. Shazma Mithani, Dr. Michael Reider. We would also like to thank the  
16 physicians who helped with pilot and clinical sensibility testing and all those who  
17 participated in our survey.  
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40 2016;170(5):425-426.

**Table 1. Demographic Characteristics of Physician Respondents**

<b>Province of Practice, n (%)</b>	n=111
British Columbia	10 (9.0)
Alberta	23 (20.7)
Saskatchewan	2 (1.8)
Manitoba	4 (3.6)
Ontario	33 (29.7)
Quebec	27 (24.3)
Newfoundland and Labrador	5 (4.5)
Nova Scotia	7 (6.3)
<b>Training Background, n (%)</b>	n= 136
Pediatric Emergency Fellowship	74 (54.4)
FRCP/CCFP-EM Emergency Medicine*	19 (13.9)
General Pediatrics training	18 (13.2)
Currently in fellowship/training	4 (2.9)
Other training	4 (2.9)
<b>Sex, n (%)</b>	n=111
Female	60 (54.0)
<b>Age (mean years, SD) (n= 105)</b>	43.5 SD 8.7
<b>Years in clinical practice (mean years, SD) (n= 109)</b>	13.0 SD 8.4
<b>% Pediatric patients (mean %, SD) (n = 110)</b>	92.0 SD 21.0
<b>History of personal prescription opioid use, n (%) (n=110)</b>	54 (49.1)
<b>History of a family member with prescription opioid use, n (%) (n=110)</b>	65 (59.1)

\*FRCP: Fellow of the Royal College of Physicians & Surgeons; CCFP-EM: Canadian College of Family Physicians: Emergency Medicine

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**Table 2. Reported opioid use for moderate and severe MSK-I pain scenarios. (n=136)**

<b>MSK-I pain scenarios</b>	<b>Moderate pain scenario n (%)</b>	<b>Severe pain scenario n (%)</b>
Opioids as 1 <sup>st</sup> line in ED	62 (45.6)	127 (93.4)
Opioids as 2 <sup>nd</sup> line in ED	118 (86.8)	128 (94.1)
Opioids for at-home use	29 (21.3)	73 (53.7)
<b>Total opioid use for either ED and/or home</b>	<b>122 (89.7)</b>	<b>132 (97.1)</b>

ED=emergency department  
MSK-I = musculoskeletal injury

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**Table 3. PEP's Self-Reported Frequency of Providing Counseling Regarding Safe Opioid Use (n=129)**

<b>Statement</b>	<b>"Often/Always" n (%)</b>
When deciding whether or not to prescribe opioids, I perform a screening risk assessment (Ex. History of opioid use disorder)	18 (14.0)
When prescribing opioids, I counsel patients and parents about potential risks and side effects of opioids	105 (81.4)
When prescribing opioids, I counsel patients and parents about how to safely secure the medication away from the patient and other family members	43 (33.3)
When prescribing opioids, I counsel patients and parents about how to properly dispose of leftover medication	21 (16.3)

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**Table 4. Perceived barriers and facilitators to opioid use in the ED (n=136)** (multiple responses permitted)

<b>Barriers</b>	<b>n (%)</b>
Parental reluctance	57 (41.9)
Lack of clear guidelines for opioid use in children	35 (25.7)
Concern about side effects	33 (24.3)
I have no barriers	33 (24.3)
Concern about serious adverse events	30 (22.1)
Regulation of prescribing opioids (Ex. Triplicate prescription needed)	29 (21.3)
Assessing pain in younger children is difficult	27 (19.9)
Lack of comfort with medication dosing	21 (15.4)
Policy regarding nursing/monitoring of patients that receive opioids	21 (15.4)
Concern for opioid use disorders and addiction	18 (13.2)
Lack of adequate research to guide your practice	17 (12.5)
Consultant preference	16 (11.8)
Concern for opioid dependence	13 (9.6)
Fear that opioids can mask symptoms and lead to missed diagnoses	3 (2.2)
Other	5 (3.7)
<b>Facilitators</b>	<b>n (%)</b>
Personal clinical experience with opioid use in children	108 (79.4)
Opportunity to monitor patients in the ED	90 (66.2)
Parental approval and understanding of benefits/side effects of opioids	60 (44.1)
Good research available on opioid use in children	51 (37.5)
Documented pain scores	51 (37.5)
Opioid specific protocols in your institution/ED	47 (34.6)
Patients known to be not opioid naive and safely used opioids in the past	35 (25.7)
Other	2 (1.5)



**Table 5.** Variables potentially affecting use of opioids for 1<sup>st</sup> line moderate pain management in the ED and for moderate and severe pain at home use.

Variables	Opioids for moderate 1 <sup>st</sup> line in ED			Opioids for moderate/severe at home use		
	Odds ratio	95% CI for odds ratio	p-value	Odds ratio	95% CI for odds ratio	p-value
PEM training (yes vs no)	1.03	0.52-2.04	0.93	0.92	0.47-1.81	0.80
Age	1.03	0.98-1.08	0.24	1.01	0.96-1.05	0.84
Sex *(female vs male)	0.71	0.33-1.52	0.38	0.77	0.36-1.65	0.51
Years in practice	1.04	0.99-1.09	0.13	1.03	0.99-1.08	0.20
% Pediatric patients in practice	1.02	1.00-1.04	0.10	0.99	0.96-1.01	0.17
Personal history of medical opioid use*	0.95	0.44-2.06	0.90	0.57	0.26-1.22	0.15
Family history of medical opioid use*	1.18	0.54-2.60	0.68	1.52	0.69-3.39	0.31
Reported knowledge for safe opioid use in children in ED	0.99	0.97-1.01	0.19	0.99	0.98-1.01	0.65
Degree of worry for opioid severe adverse events	0.99	0.98-1.01	0.35	0.99	0.98-1.01	0.41
Degree of worry for opioid dependence	0.99	0.98-1.01	0.52	1.00	0.98-1.02	0.95
Degree of worry for opioid addiction	0.99	0.97-1.01	0.27	0.99	0.98-1.01	0.45
<b>ED opioid protocol</b>			0.23			0.07
<b>I don't know vs Yes</b>	0.66	0.16-2.51	0.95	0.14	0.02-0.66	0.05
<b>No vs Yes</b>	0.41	0.12-1.27	0.09	0.18	0.03-0.72	0.13

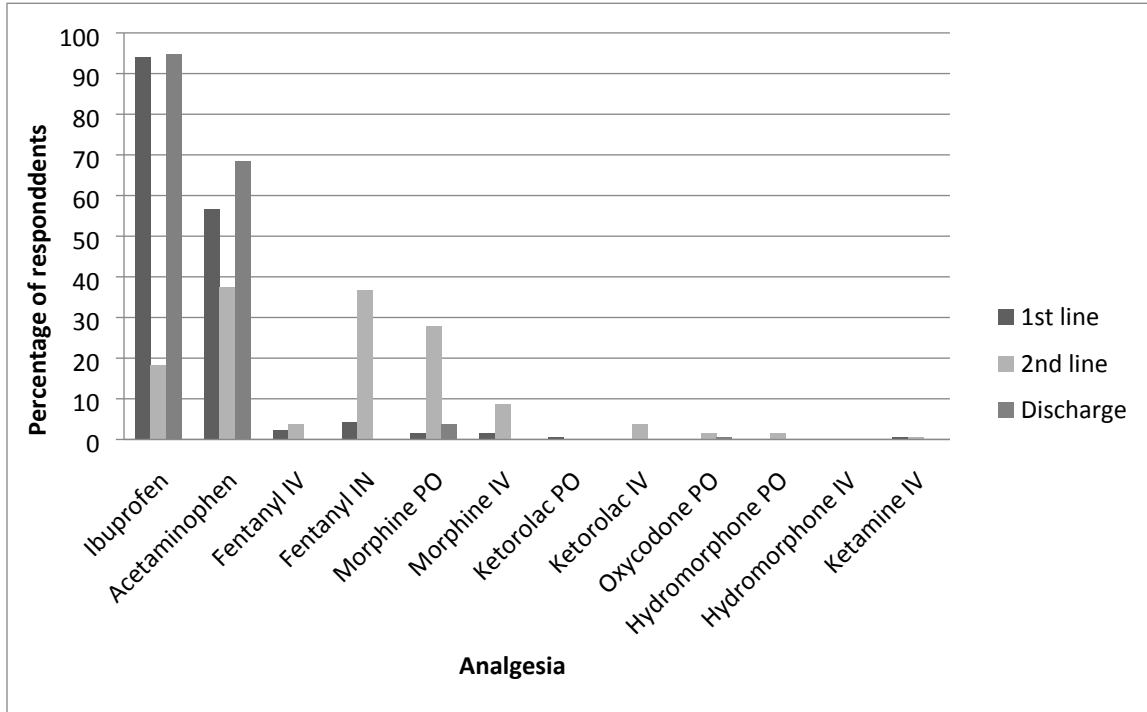
ED: Emergency Department

PEM: Pediatric Emergency Medicine

\* Category "decline to answer" was removed from variable due to very low count  
p<0.05 was considered statistically significant

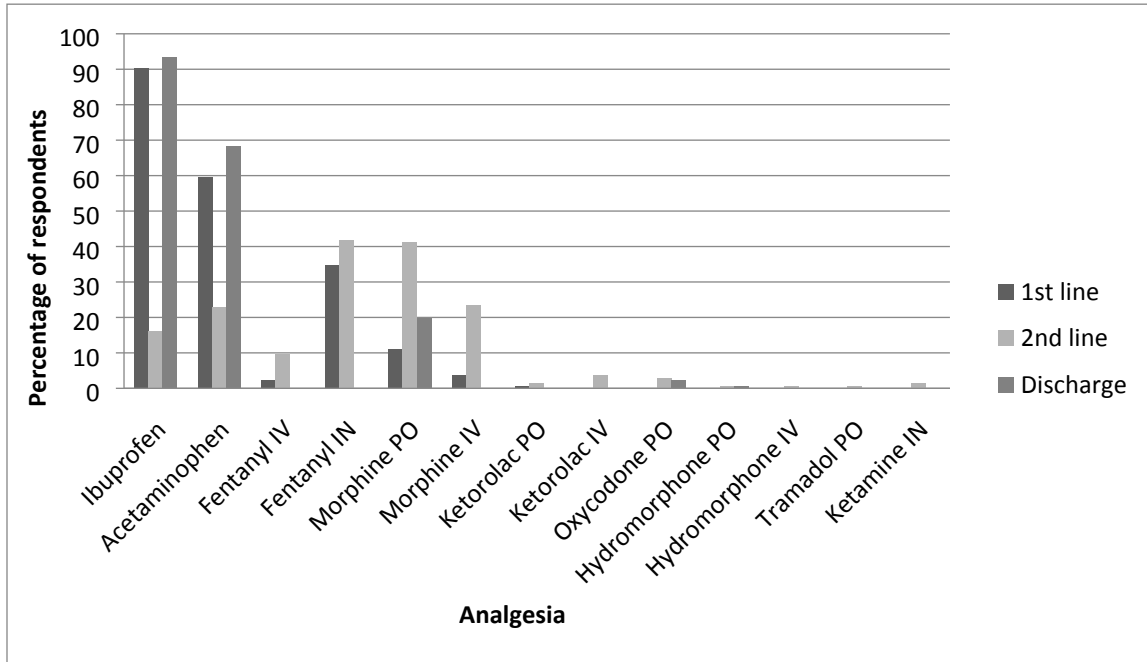
**Figure 1 Physician Reported Pain Management in the ED and at Discharge**

**1A: Mild pain scenario (3/10), first and second line pain management in the ED and at discharge.** (Respondents were asked to select medication(s) they might use in combination or as monotherapy) (n=136)



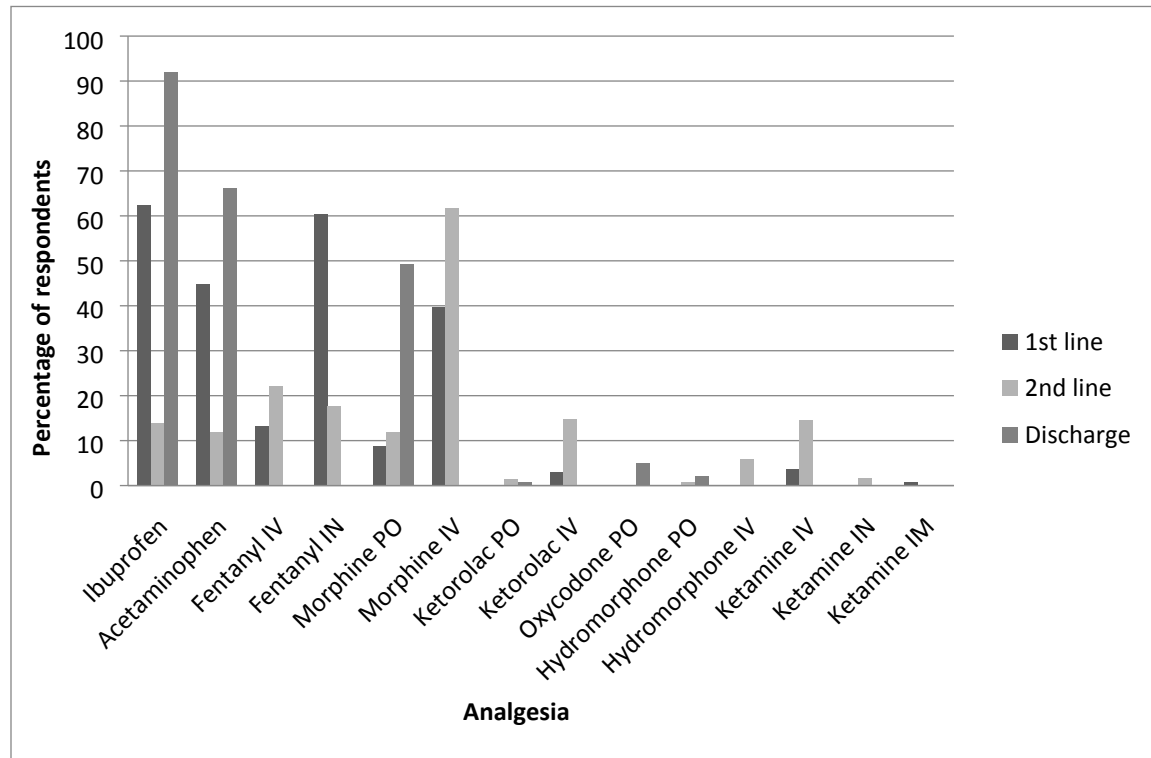
Abbreviations: PO= per os (oral); IV= intravenous

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3 **1B: Moderate pain scenario (6/10), first line and second line pain management in the ED and at**  
4 **discharge. (Respondents were asked to select medication(s) they might use in combination or as monotherapy) (n=136)**  
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Abbreviations: PO= per os (oral); IV= intravenous

**1C: Severe pain scenario (9/10), first line and second line pain management in the ED and at discharge.** (Respondents were asked to select medication(s) they might use in combination or as monotherapy) (n=136)



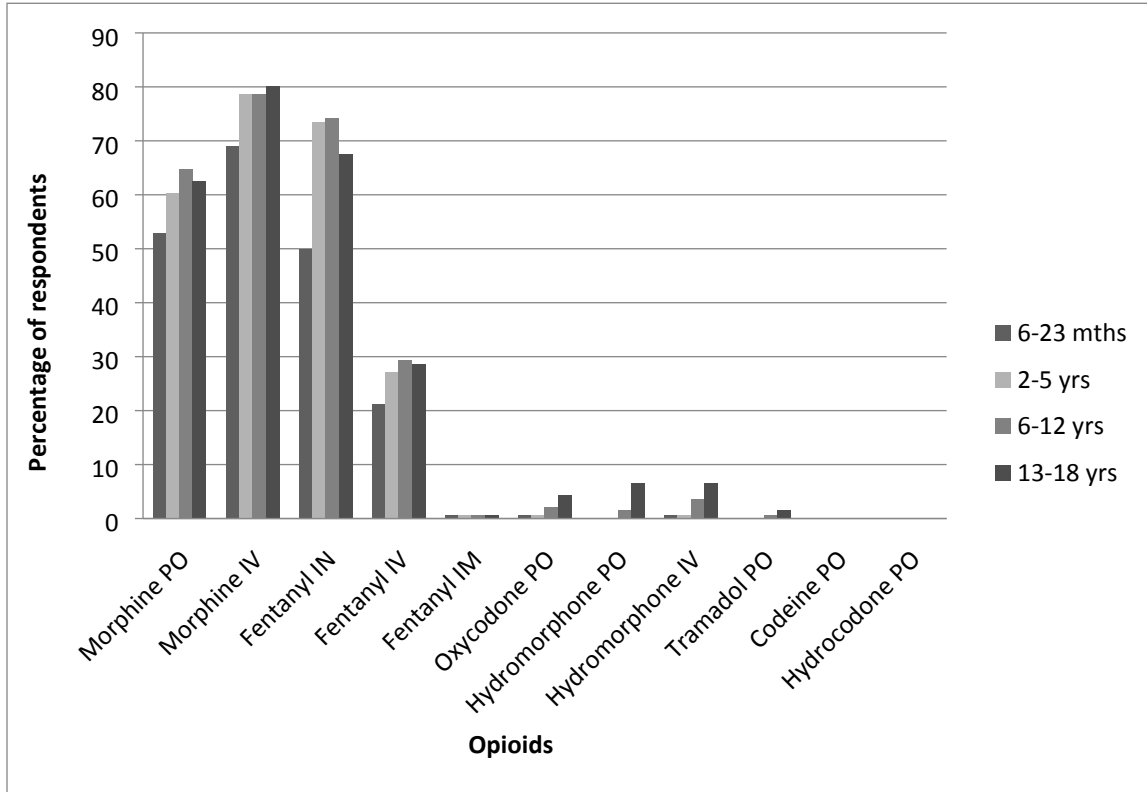
Abbreviations: PO= per os (oral); IV= intravenous

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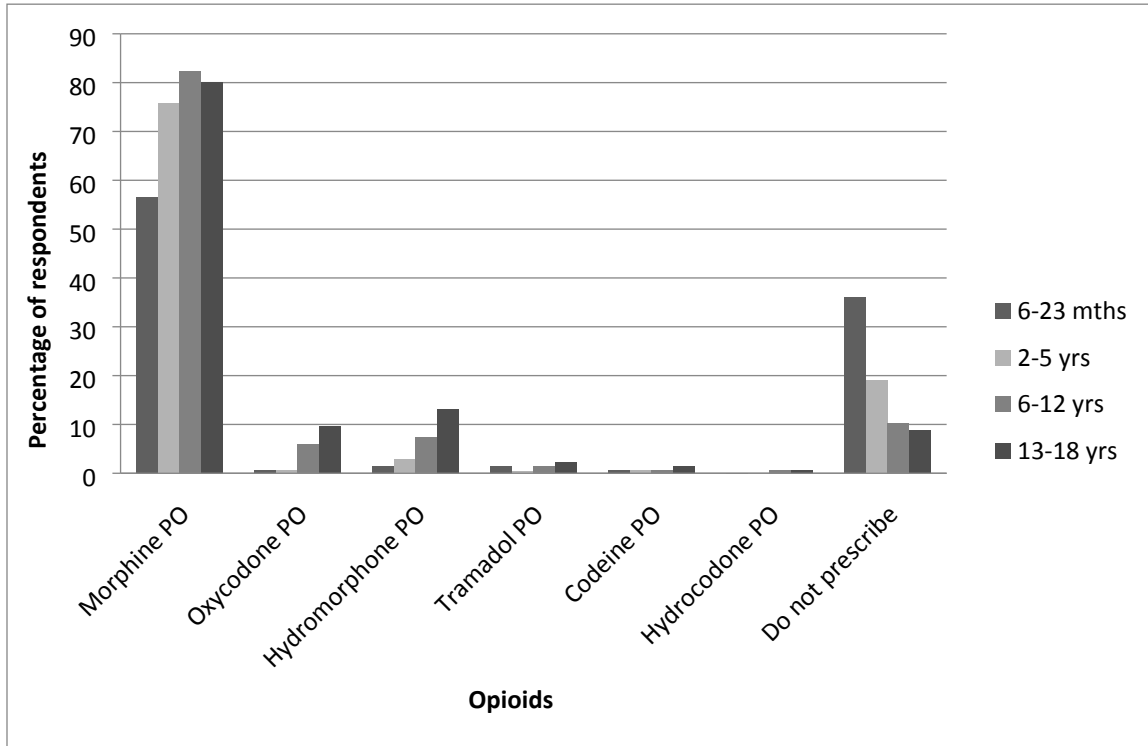
**Figure 2. Physician Reported Opioid Use in the ED and at Discharge**

**2A. Most frequently reported opioids in the ED for moderate-severe pain, based on patient age.** (Respondents were asked to select up to 3 agents for each age group.) (n=136)



Abbreviations: PO= per os (oral); IV= intravenous

**2B:** Most frequent opioids used at discharge for moderate-severe pain, based on patient age. Respondents were asked to select up to 3 agents for each age group. (n=136)



Abbreviations: PO, per os (oral); IV, intravenous

# Physicians' Knowledge, Attitudes, and Practices Regarding Opioid Use in the Pediatric Emergency Department

Thank you for taking the time to complete this questionnaire. You have been asked to complete this survey as a health care provider who cares for children in the Emergency Department setting. All responses will be managed confidentially, and only aggregate, non-identified data will be shared with the research team and used for publication.

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## Practices

Please use the following scenario to answer Questions 1a, b, and c.

1. A 10 year old previously healthy male presents to your Emergency Department (ED) with a right radial buckle fracture. His pain is reported as 3/10 (mild discomfort).

a) Which of the following medication(s), in combination or as monotherapy, would you typically use as first line pain management for this patient in the ED? (Choose as many as apply)

- Morphine PO
- Morphine IV
- Oxycodone PO
- Codeine PO
- Hydromorphone (Dilaudid) PO
- Hydromorphone (Dilaudid) IV
- Tramadol PO
- Hydrocodone PO
- Ketorolac (Toradol) PO
- Ketorolac (Toradol) IV
- Fentanyl IV
- Fentanyl IN
- Fentanyl IM
- Ketamine IV
- Ketamine IN
- Ketamine IM
- Ibuprofen PO
- Acetaminophen PO
- Other

Other, please specify \_\_\_\_\_

b) If your first line medication(s) were inadequate despite appropriate dosing, which of the following medication(s), in combination or as monotherapy, would you typically use as second line pain management for this patient in the ED? (Choose as many as apply)

- Morphine PO
- Morphine IV
- Oxycodone PO
- Codeine PO
- Hydromorphone (Dilaudid) PO
- Hydromorphone (Dilaudid) IV
- Tramadol PO
- Hydrocodone PO
- Ketorolac (Toradol) PO
- Ketorolac (Toradol) IV
- Fentanyl IV
- Fentanyl IN
- Fentanyl IM
- Ketamine IV
- Ketamine IN
- Ketamine IM
- Ibuprofen PO
- Acetaminophen PO
- Other

Other, please specify \_\_\_\_\_



1) Which of the following medication(s), in combination  
2 or as monotherapy, would you typically prescribe for  
3 pain management at home for this patient? (Choose as  
4 many as apply)

- Morphine PO
- Oxycodone PO
- Codeine PO
- Hydromorphone (Dilaudid) PO
- Tramadol PO
- Hydrocodone PO
- Ketorolac (Toradol) PO
- Ibuprofen PO
- Acetaminophen PO
- Other

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Other, please specify \_\_\_\_\_

Confidential

Please use the following scenario to answer Questions 2a, b, and c.

2. A 10 year old, previously healthy male presents to your Emergency Department (ED) with a minimally displaced left radius/ulnar fracture (does not require reduction). His pain is reported as 6/10 (moderate discomfort).

a) Which of the following medication(s), in combination or as monotherapy, would you typically use as first line pain management for this patient in the ED? (Choose as many as apply)

- Morphine PO
- Morphine IV
- Oxycodone PO
- Codeine PO
- Hydromorphone (Dilaudid) PO
- Hydromorphone (Dilaudid) IV
- Tramadol PO
- Hydrocodone PO
- Ketorolac (Toradol) PO
- Ketorolac (Toradol) IV
- Fentanyl IV
- Fentanyl IN
- Fentanyl IM
- Ketamine IV
- Ketamine IN
- Ketamine IM
- Ibuprofen PO
- Acetaminophen PO
- Other

Other, please specify

b) If your first line medication(s) were inadequate despite appropriate dosing, which of the following medication(s), in combination or as monotherapy, would you typically use as second line pain management for this patient in the ED? (Choose as many as apply)

- Morphine PO
- Morphine IV
- Oxycodone PO
- Codeine PO
- Hydromorphone (Dilaudid) PO
- Hydromorphone (Dilaudid) IV
- Tramadol PO
- Hydrocodone PO
- Ketorolac (Toradol) PO
- Ketorolac (Toradol) IV
- Fentanyl IV
- Fentanyl IN
- Fentanyl IM
- Ketamine IV
- Ketamine IN
- Ketamine IM
- Ibuprofen PO
- Acetaminophen PO
- Other

Other, please specify

c) Which of the following medication(s), in combination or as monotherapy, would you typically prescribe for pain management at home for this patient? (Choose as many as apply)

- Morphine PO
- Oxycodone PO
- Codeine PO
- Hydromorphone (Dilaudid) PO
- Tramadol PO
- Hydrocodone PO
- Ketorolac (Toradol) PO
- Ibuprofen PO
- Acetaminophen PO
- Other

Other, please specify

Please use the following scenario to answer Questions 3a, b, and c.

3. A 10 year old previously healthy male presents to your Emergency Department (ED) with a displaced mid-shaft radius/ulnar fracture that requires closed reduction. His pain is reported as 9/10 (severe discomfort).

a) Which of the following medication(s), in combination or as monotherapy, would you typically use as first line pain management for this patient in the ED? (Choose as many as apply)

- Morphine PO
- Morphine IV
- Oxycodone PO
- Codeine PO
- Hydromorphone (Dilaudid) PO
- Hydromorphone (Dilaudid) IV
- Tramadol PO
- Hydrocodone PO
- Ketorolac (Toradol) PO
- Ketorolac (Toradol) IV
- Fentanyl IV
- Fentanyl IN
- Fentanyl IM
- Ketamine IV
- Ketamine IN
- Ketamine IM
- Ibuprofen PO
- Acetaminophen PO
- Other

Other, please specify

b) If your first line medication(s) were inadequate despite appropriate dosing, which of the following medication(s), in combination or as monotherapy, would you typically use as second line pain management for this patient in the ED? (Choose as many as apply)

- Morphine PO
- Morphine IV
- Oxycodone PO
- Codeine PO
- Hydromorphone (Dilaudid) PO
- Hydromorphone (Dilaudid) IV
- Tramadol PO
- Hydrocodone PO
- Ketorolac (Toradol) PO
- Ketorolac (Toradol) IV
- Fentanyl IV
- Fentanyl IN
- Fentanyl IM
- Ketamine IV
- Ketamine IN
- Ketamine IM
- Ibuprofen PO
- Acetaminophen PO
- Other

Other, please specify

c) Which of the following medication(s), in combination or as monotherapy, would you typically prescribe for pain management at home for this patient? (Choose as many as apply)

- Morphine PO
- Oxycodone PO
- Codeine PO
- Hydromorphone (Dilaudid) PO
- Tramadol PO
- Hydrocodone PO
- Ketorolac (Toradol) PO
- Ibuprofen PO
- Acetaminophen PO
- Other

Other, please specify

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Which opioids do you most frequently prescribe/use in the ED for moderate-severe pain? Please select up to 3 agents for each age group.

	6-23 Months	2-5 Years	6-12 Years	13-18 Years
Morphine PO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oxycodone PO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Codeine PO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hydromorphone PO (Dilaudid)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tramadol PO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hydrocodone PO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fentanyl IV	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fentanyl IN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fentanyl IM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Morphine IV	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hydromorphone IV (Dilaudid)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I do not prescribe opioids to this age group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If other (6-23months), please list \_\_\_\_\_  
If other (2-5 years), please list \_\_\_\_\_  
If other (6-12 years), please list \_\_\_\_\_  
If other (13-18 years), please list \_\_\_\_\_

Which oral opioids do you most frequently prescribe/recommend for moderate - severe pain at home? Please select up to 3 agents for each age group.

	6-23 Months	2-5 Years	6-12 Years	13-18 Years
Morphine PO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oxycodone PO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Codeine PO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hydromorphone PO (Dilaudid)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tramadol PO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hydrocodone PO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I do not prescribe opioids to this age group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

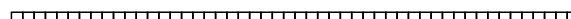
If other (6-23months), please list \_\_\_\_\_  
If other (2-5 years), please list \_\_\_\_\_  
If other (6-12 years), please list \_\_\_\_\_  
If other (13-18 years), please list \_\_\_\_\_

**Attitudes**

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4. How much do you worry about children developing  
5 physical dependence when opioids are used to treat  
6 acute pain? (0= Not worried at all; 100 = Extremely  
7 worried)

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9 (Definition: Physical dependence is defined as when  
10 the user needs the drug to function normally and has  
11 negative symptoms of withdrawal when the user stops  
12 or decreases use of the drug.)

0 100

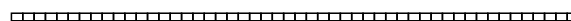


(Place a mark on the scale above)

15  
16 How much do you worry that children could develop an  
17 opioid use disorder or addiction, after short-term  
18 use of opioids for the treatment of acute pain? (0=  
19 Not worried at all; 100 = Extremely worried)

20 (Definition: Addiction is when someone regularly uses  
21 a drug despite negative consequences. Addiction  
22 involves psychological dependence and may or may not  
23 also include physical dependence).

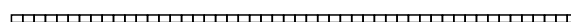
0 100



(Place a mark on the scale above)

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27 How much do you worry about an opioid prescription  
28 that you write for a child being diverted to family,  
29 parents or friends, leading to misuse of opioids?  
30 (0= Not worried at all; 100 = Extremely worried)

0 100



(Place a mark on the scale above)

33  
34 Please rate your agreement with the following statements:

35 1 = Never 2 = Rarely 3 = Sometimes 4 = Often 5 = Always

36 a) When deciding whether or not  
37 to prescribe opioids, I perform a  
38 screening risk assessment (Ex.  
39 history of opioid use disorder)

41 b) When prescribing opioids, I  
42 counsel patients and parents  
43 about the potential risks and  
44 side effects of opioids

46 c) When prescribing opioids, I  
47 counsel patients and parents  
48 about how to safely secure the  
49 medication away from the  
50 patient and other family  
51 members

53 d) When prescribing opioids, I  
54 counsel patients and parents  
55 about how to properly dispose of  
56 leftover medication

59 How much do you worry about the following severe adverse reactions with opioids at therapeutic doses in the ED :  
60 (0= Not worried at all; 100 = Extremely worried)

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5 a) Apnea 0 100  
6  
7 (Place a mark on the scale above)  
8 b) Hypotension 0 100  
9  
10 (Place a mark on the scale above)  
11 c) Cardiac Arrest 0 100  
12  
13 (Place a mark on the scale above)  
14 Other (please describe): \_\_\_\_\_

15 How much do you worry about the following severe adverse reactions with opioids at therapeutic doses at home :  
16 (0= Not worried at all; 100 = Extremely worried)  
17 a) Apnea 0 100  
18  
19 (Place a mark on the scale above)  
20 b) Hypotension 0 100  
21  
22 (Place a mark on the scale above)  
23 c) Cardiac Arrest 0 100  
24  
25 (Place a mark on the scale above)  
26 Other (please describe): \_\_\_\_\_

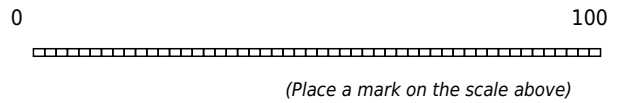
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30 How much do opioid side effects/ less severe adverse  
31 events influence your decisions to prescribe  
32 opioids? (ie. pruritus, nausea, vomiting,  
33 somnolence, constipation). 0 <i>(None) </i> 100  
<i>(Extremely) </i>  
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34  
35 (Place a mark on the scale above)

36  
37 To what degree do you think Canada's opioid crisis is  
38 affecting your willingness to prescribe opioids in  
39 children with acute moderate-severe pain? 0 <i>(None) </i> 100  
<i>(Extremely) </i>  
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40  
41 (Place a mark on the scale above)

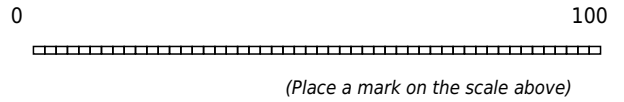
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**Knowledge**

1. How would you rate your personal knowledge regarding safe opioid use in children in the ED?  
(0= Extremely poor; 100 = Extremely good)



2. How would you rate your personal knowledge regarding safe opioid use in children at home, after discharge?  
(0= Extremely poor; 100 = Extremely good)



A) Does your ED have a protocol or policy for prescribing opioids to children for moderate - severe acute pain while in the ED?

- Yes
- No
- I don't know

If Yes, please describe

\_\_\_\_\_

B) Does your ED have a protocol or policy for prescribing opioids to children for moderate - severe acute pain at discharge?

- Yes
- No
- I don't know

If Yes, please describe

\_\_\_\_\_

Would an ED protocol for opioid use (ex. various opioids, route, doses, titrating doses) be helpful in your Emergency Department?

- Yes
- No

If Yes, what opioids would you want a protocol for?

\_\_\_\_\_

What is the best mode to deliver education to PEM/ED Physicians about safe opioid use in children?

- Web-based independent study
- Conference, medical events
- Specific training session/course
- Video based information session
- Other (please describe)

Other, please describe

\_\_\_\_\_

What additional information / specific knowledge regarding opioid use would be most helpful to you?

\_\_\_\_\_

**Barriers**

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3  
4. What do you think are your personal barriers to  
5 opioid use in children in the ED? Please choose all  
6 that apply.

- Lack of comfort with medication dosing
- Concern about serious adverse effects with opioid use in children
- Concern about side effects with opioid use in children
- Assessing pain in younger children is difficult
- Concern for opioid dependence
- Concern for opioid use disorders and addiction
- Lack of clear guidelines for opioid use in children
- Regulation of prescribing opioids (Ex. Triplicate prescription needed to prescribe opioids)
- Fear that opioids can mask acute symptoms and lead to missed diagnoses
- Parental reluctance
- Lack of adequate research to guide your practice
- Consultant preference (eg surgeon request not to administer opioids prior to their exam of the patient)
- Policy regarding nursing/monitoring of patients that receive opioids
- I have no barriers
- Other

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25  
26 Other, please describe

\_\_\_\_\_

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29  
30 How can these barriers be removed?

\_\_\_\_\_

31  
32  
33 What do you think are your personal facilitators to  
34 opioid use in children in the ED?

- Your clinical experience with opioid use in children
- Opportunity to monitor patients in the ED
- Opioid specific protocols in your institution/ED
- Documented pain scores
- Parental approval and understanding of benefits and side effects of opioids
- Patients known to be not opioid naive and have safely used opioids in the past
- Good research available on opioid use in children
- Other (please describe any facilitators)

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45 If other, please describe

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**Demographics**

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4. What province do you practice in?  
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17

- British Columbia
- Alberta
- Saskatchewan
- Manitoba
- Ontario
- Quebec
- New Brunswick
- Newfoundland and Labrador
- Nova Scotia
- Prince Edward Island
- Northwest Territories
- Nunavut
- Yukon
- Other

18 If Other, please specify  
19  
20  
21

22 Which of the following options best describes your  
23 training?  
24  
25  
26  
27

- General Pediatrics training
- Royal College/CCFP Emergency Medicine training
- Pediatric Emergency training
- Currently in fellowship/training
- Other training

28 If Other, please specify  
29  
30

31 What is your sex?  
32  
33  
34

- Male
- Female
- Decline to answer

35 What is your age?  
36  
37

\_\_\_\_\_  
(years)

38 How many years have you worked in clinical practice?  
39  
40

\_\_\_\_\_  
(years)

41 What percentage of patients in your practice are  
42 under the age of 18 years?  
43

\_\_\_\_\_  
(percentage)

44 Have you ever personally taken prescription opioids  
45 for medical purposes?  
46  
47

- Yes
- No
- Decline to answer

48 Have you ever had a close family member(s) who taken  
49 prescription opioids for medical purposes?  
50  
51  
52  
53  
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56  
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60

- Yes
- No
- Decline to answer



## Physicians' Knowledge, Attitudes, and Practices Regarding Opioid Use in the Pediatric Emergency Department

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### Purpose and Procedure:

As a member of Pediatric Emergency Research Canada (PERC), you are being invited to participate in a PERC-endorsed survey. The purpose of this survey is to try to understand Pediatric Emergency Medicine Physicians' opioid prescribing practices for children with musculoskeletal injury-related pain in the emergency department (ED), and at discharge. You will be asked questions regarding your demographics, knowledge of potential risks and benefits of short-term opioid use in children, pain management practices for hypothetical scenarios and perceived barriers and facilitators to prescribing opioids. The results of this study will be used to help guide development of educational forums, research and protocols for pain management in pediatric EDs.

### Voluntary Participation:

This survey has been piloted and should take no more than 10-15 minutes of your time. Your participation is voluntary and you are free to decline to answer any questions on the survey. If, at any time, you decide you no longer wish to participate, simply close your browser without submitting the survey. Identifying data will be stored separately from the survey answers and will not be available to the study investigators. This study has been approved by the Research Ethics Board (REB) of the University of Alberta.

### Benefits & Risks:

There are no anticipated risks or benefits to you related to participating in this study.

### Confidentiality:

- Your information will not be shared with anyone outside of the research team.
- All data will be kept for a minimum of five years in accordance with University of Alberta policy.
- Your email and IP address will be temporarily stored, in order to track non-respondents for follow-up emails. However, this information will not be made available to the study investigators.



- Your name will not be attached to your information.
- Your name will never be used in any presentations or publications of the study results.

Consent will be implied by submission of the survey. If you have any questions or concerns regarding your rights as a participant, or how this study is being conducted, you may contact the University of Alberta's Research Ethics Office at 780-407-6041. This office has no affiliation with the study investigators. If you have any other questions regarding this study, please contact:

Dr. Megan Fowler	780-248-5575	mafowler@ualberta.ca
Dr. Samina Ali	780-248-5574	sali@ualberta.ca

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