

Introduction to special issue on innovations in pediatric pain research and care

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When I first began my career in pediatric pain research 25 years ago, I could fit every published article in the area in one cardboard file box. Since then, the field of pediatric pain research and care has made tremendous progress. In the 1970s and 80s, it was widely believed that babies, especially premature babies, were not able to feel pain, and that it was too risky to use anaesthetics with them. We have come a long way. The field of pediatric pain research is now a robust research area, fueled by early studies demonstrating significant under medication of children's pain relative to adults^{5,9} and research showing higher mortality and morbidity in children whose pain was not properly managed.¹ A recent bibliometric analysis of research articles on pediatric pain published during the period from 1975 to 2010 showed exponential growth in the field with an increasingly multidisciplinary approach, and the most popular areas of focus being characterization, intervention, and assessment of pain.⁷ It is now well-established that pain in children is a serious and prevalent health problem,¹⁵ resulting in unnecessary suffering on the part of children and their families, and a host of short- and long-term negative health outcomes,^{3,18,20} including delayed healing, altered brain development, pain sensitization, increased risk of chronic pain in adulthood, and health care avoidance.

Although advances in research have contributed to an improved understanding of the nature of pediatric pain, including its assessment and management, there are still many gaps in our current knowledge and in our application of this knowledge to improve clinical care for children in pain and their families. Despite the growth of scientific knowledge in the area, inadequate pain

management continues to be reported for children experiencing painful procedures, after surgery, and in the context of chronic pain.^{6,8,19}

This special issue brings together a collection of cutting edge research articles that highlight current innovations in pediatric pain research and care, including identification of factors associated with the development of pain, use of new research methods to study pain including new tasks and culturally sensitive research approaches, development of theoretical models, and implementation of scientific evidence to improve care and patient outcomes.

In terms of research to identify factors associated with the development of pain, the article by Becker et al.² advances the field by helping to better understand the events that precede the onset of pain, while the article by Beveridge et al.⁴ offers important insights into the role of child and parent mental health, in particular post-traumatic stress disorder, in influencing outcomes in children with chronic pain. The results of this kind of research are critical in improving our ability to prevent and offer early intervention to those children most at-risk for pain.

The articles by Navarro et al.,¹⁷ Gruszka et al.,¹² and Latimer et al.¹⁶ showcase innovative research methods and approaches in pediatric pain. Navarro et al.¹⁷ capitalize on the use of qualitative methods to analyze communication among parents of children with chronic pain, whereas the article by Gruszka et al.¹² describes the development of 2 novel paradigms to increase understanding of how bodily sensations are triggered and responded to in children with chronic pain. The article by Latimer et al.¹⁶ offers description of a careful, culturally sensitive research approach to better understand and to treat pain in indigenous children. The study used a community-based participatory action methodology to understand how these children express pain, using narratives and art-based methods. This important work highlights the value of applying culturally sensitive research methods to collaboratively address pain in a vulnerable population. To continue to expand our knowledge in the area of pediatric pain, we need to learn from and further explore innovative research methods and approaches such as these.

Developing and refining theoretical frameworks is also of importance to advance the field of pediatric pain research. The article by Wakefield et al.²¹ offers a literature review and findings from focus groups to inform a pain-related stigma framework for children with chronic pain, whereas the article by Jordan et al.¹⁴ uses a qualitative approach to further the understanding of how

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children with chronic pain make sense of their development. These kinds of careful delineations of factors that relate to pain lay important groundwork for future research.

Research will only benefit children and families if efforts are made to apply findings in practice.⁸ The article by Friedrichsdorf et al.¹⁰ provides a comprehensive evaluation of a hospital-wide initiative to eliminate or reduce needle pain in children using lean methodology. This research is innovative because it focuses on implementation of research evidence in pediatric pain and provides a comprehensive evaluation of the impact of this implementation. The article by Higgins et al.¹³ (handled by an independent editor) offers the results of a review and survey on the availability of researcher-led eHealth tools for pain assessment and management. Results showed that few pediatric pain eHealth tools developed for research purposes with significant grant funding are available to end users, diminishing their potential contribution. The article offers several recommendations, such as the need to engage end users in the development of eHealth tools and system-level changes to promote better mechanisms for researchers to support them in making tools available. These types of real-world applications and reflections on the role of scientific knowledge and how it is disseminated and implemented are critical to ensure that research is used in practice to the benefit of patients.⁸

Finally, the special issue concludes with a collection of abstracts from the meeting “Pediatric Pain Management: State of the Art and Science” held in Boston, MA, from September 10 to 11, 2018, just before the International Association for the Study of Pain (IASP) World Congress on Pain.¹¹ Again, the collection of abstracts from presenters highlights a full range of innovations in pediatric pain research and care, including pediatric chronic pain and rehabilitation, pain in children with developmental disabilities, opioid use and misuse, pain and fear related to procedural pain in children, and pain as a consequence of critical illness.

As the articles in this special issue illustrate, there are clearly many advancements to be proud of in the area of pediatric pain research and care, but there is still much more work to do. Groups such as the IASP’s Special Interest Group (SIG) on Pain in Childhood will continue to serve as an important hub to promote education, research, and advocacy about pain in children. However, we all must work hard to push ourselves to adopt new approaches, work with different colleagues, share new ideas, and continue to work together in synergistic ways to address the problem of poorly managed pediatric pain and ensure that all children and their families receive the pain care they deserve.

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References

- [1] Anand K, Sippell W, Aynsley-Green A. Randomised trial of fentanyl anaesthesia in preterm babies undergoing surgery: effects on the stress response. *Lancet* 1987;329:62–6.
- [2] Becker AJ, Heathcote LC, Timmers I, Simons LE. Precipitating events in child and adolescent chronic musculoskeletal pain. *PAIN Rep* 2018;3:e665.
- [3] Beggs S, Currie G, Salter M, Fitzgerald M, Walker S. Priming of adult pain responses by neonatal pain experience: maintenance by central neuroimmune activity. *Brain* 2012;135:404–17.
- [4] Beveridge JK, Neville A, Wilson AC, Noel M. An intergenerational examination of pain and PTSD symptoms among youth with chronic pain and their parents. *PAIN Rep* 2018;3:e667.
- [5] Beyer JE, DeGood DE, Ashley LC, Russell GA. Patterns of postoperative analgesic use with adults and children following cardiac surgery. *PAIN* 1983;17:71–81.
- [6] Birnie KA, Chambers CT, Fernandez CV, Forgeron PA, Latimer MA, McGrath PJ, Cummings EA, Finley GAA. Hospitalized children continue to report undertreated and preventable pain. *Pain Res Manag* 2014;19:198–204.
- [7] Caes L, Boerner KE, Chambers CT, Campbell-Yeo M, Stinson J, Birnie KA, Parker JA, Huguet A, Jordan A, MacLaren Chorney J, Schinkel M, Dol J. A comprehensive categorical and bibliometric analysis of published research articles on pediatric pain from 1975 to 2010. *PAIN* 2016;157:302–13.
- [8] Chambers CT. From evidence to influence: dissemination and implementation of scientific knowledge for improved pain research and care. *PAIN* 2018;159:S56–S64.
- [9] Eland JM, Anderson JE. The experience of pain in children. In: Jacox A, editor. *Pain: a source book for nurses and other health care professionals*. Boston: Little Brown & Co, 1977. p. 453–78.
- [10] Friedrichsdorf SJ, Eull D, Weidner C, Postier A. A hospital-wide initiative to eliminate or reduce needle pain in children using lean methodology. *PAIN Rep* 2018;3:e671.
- [11] Greco C. Summary of the Pediatric Pain Management Symposium 2018 in Boston, MA. *PAIN Rep* 2018;3:e683.
- [12] Gruszka P, Schaan L, Adolph D, Pané-Farré CA, Benke C, Schneider S, Hechler T. Defence response mobilization in response to provocation or imagery of interoceptive sensations in adolescents with chronic pain: a study protocol. *PAIN rep* 2018;3:e680.
- [13] Higgins KS, Tutelman PR, Chambers CT, Wittman HO, Barwick M, Corkum P, Grant D, Stinson JN, Lalloo C, Robins S, Orji R, Jordan I. Researcher-led eHealth tools for pain assessment and management: Do they really benefit end users or contribute to research waste? *PAIN Rep* 2018;3:e686.
- [14] Jordan A, Noel M, Caes L, Connell H, Gauntlett-Gilbert J. A developmental arrest? Interruption and identity in adolescent chronic pain. *PAIN Rep* 2018;3:e678.
- [15] King S, Chambers CT, Huguet A, MacNevin RCRC, McGrath PJ, Parker L, MacDonald A. The epidemiology of chronic pain in children and adolescents revisited: a systematic review. *PAIN* 2011;152:2729–38.
- [16] Latimer M, Sylliboy J, MacLeod E, Rudderham S, Francis J, Hutt-MacLeod D, Harman K, Finley GA. Creating a safe space for First Nations youth to share their pain. *PAIN Rep* 2018;3:e682.
- [17] Navarro K, Wainwright E, Rodham K, Jordan A. Parenting young people with complex regional pain syndrome: an analysis of the process of parental online communication. *PAIN Rep* 2018;3:e681.
- [18] Schwaller F, Fitzgerald M. The consequences of pain in early life: injury-induced plasticity in developing pain pathways. *Eur J Neurosci* 2014;39:344–52.
- [19] Stevens BJ, Abbott LK, Yamada J, Harrison D, Stinson J, Taddio A, Barwick M, Latimer M, Scott SD, Rashotte J, Campbell F, Finley GA. Epidemiology and management of painful procedures in children in Canadian hospitals. *Can Med Assoc J* 2011;183:E403–10.
- [20] Taddio A, Katz J, Ilersich AL, Koren G. Effect of neonatal circumcision on pain response during subsequent routine vaccination. *Lancet* 1997;349:599–603.
- [21] Wakefield EO, Zempsky WT, Puhl RM, Litt MD. Conceptualizing pain-related stigma in adolescent chronic pain: a literature review and preliminary focus group findings. *PAIN Rep* 2018;3:e679.