Special Interest Group on Pain in Childhood
INTERNATIONAL ASSOCIATION FOR THE STUDY OF PAIN

Pediatric Pain Letter
Commentaries on pain in infants, children, and adolescents

October 2016 Vol. 18 No. 3 www.childpain.org/ppl

Editor: Deirdre E. Logan, PhD, deirdre.logan@childrens.harvard.edu

Commentary

Impact of an interdisciplinary and international research training initiative: the Pain in Child Health program

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Introduction

The field of pediatric pain has grown substantially since its inception in the early 1980s, which is reflected in an increasing number of publications, key textbooks, international meetings and training programs. We recently published a review summarizing meta-trend and bibliometric characteristics of the pediatric pain literature between 1975 and 2010, which confirmed a continuous, substantial increase in published research on pain processes in children between 0 and 18 years. The majority of the literature investigated pain characterization, intervention or assessment techniques in clinical samples of children between 6 and 18 years (Caes et al., 2016). A strength of our comprehensive review is the freely available dataset, which allows for more in-depth analyses that go beyond the general conclusions drawn in the paper.

Training and mentor opportunities in pain science have flourished over the past years (e.g. local, university-dependent workshops; trainee receptions and mentor lunches at conferences), which may have contributed to the growth in the literature. The Pain in Child Health (PICH) Strategic Training Program (http://paininchildhealth.dal.ca/) is an internationally known and widely respected transdisciplinary training initiative focused on supporting research trainees in the field of pediatric pain. Funded by the Canadian Institutes of Health Research from 2002 to 2015 for Canadian trainees and the Mayday Fund for international trainees, PICH links national and international, basic and clinical researchers and trainees with an interest in understanding childhood pain experiences, prevention and management. Some of the key trainee-focused activities organized by PICH include intensive annual 2- to 3-day training institutes, monthly webinars, mentorship opportunities and funding of lab visits and conference attendance (von Baeyer et al., 2014).

Using administrative records and yearly reports, von Baeyer and colleagues (2014) evaluated the impact of the PICH program and revealed a steady increase in the annual number of peer-reviewed publications by PICH trainees from 21 in 2003 to 60 in 2013 with a steady 0.75 articles per trainee per year. A substantial proportion of these articles represented collaborations amongst PICH trainees nationally and internationally. The cumulative number of affiliated trainees also grew from 22 in 2002 to 218 by 2013. Additionally, PICH is currently represented by 9 principal investigators (of which 2 are former PICH trainees), 14 Canadian co-investigators and 28 Canadian and international collaborators. These membership and leadership characteristics highlight the success of PICH in meeting its research training objectives (von Baeyer et al., 2014).

However, these findings do not account for the general growth in the pediatric pain literature. Using the dataset from the larger categorical and bibliometric meta-trend analysis (Caes et al., 2016) and building on the findings by von Baeyer and colleagues (2014), we were interested in evaluating

the relative contribution of the PICH training program to the growth in pediatric pain literature.

Original methodology

Following a rigorous 4-step selection protocol, the original categorical and bibliometric meta-trend analysis included 4,256 articles, retrieved from Web of Science. English-language original research articles and reviews reporting on pain in children (0-18 years) or animal models to evaluate pediatric pain process, published in peer-reviewed journals from 1975 to 2010, were included. Case studies, book chapters, dissertations, letters, comments, and conference abstracts were excluded (Caes et al., 2016). For the purpose of the current analyses, only the identified articles between 2003 and 2010 were considered (N = 2288) to evaluate the contributions of PICH, which was initiated in 2002.

Of particular interest for the current secondary analyses, the following aspects were noted for each article: 1) affiliation of the first author at the time of publication, 2) whether the first author was a PICH trainee, principal investigator or co-investigator, and 3) the number of citations the article received by December 1, 2014.

Characteristics of PICH-affiliated publications

Since the inception of PICH, 8.61% (N = 197) of all identified pediatric pain articles published between 2003 and 2010 (N = 2288) were by a first author affiliated with PICH (referred to here as PICH-affiliated articles). While the majority of the PICH-affiliated articles were by a first author based in Canada (N = 121, 61%), there was a strong international contribution (N = 76, 39%). Most of the international PICH-affiliated articles were led by USA-based authors (N = 36). Other PICH-affiliated articles from international members came from Australia (N = 10), Belgium (N = 10), The Netherlands (N = 6), Finland (N = 6), United Kingdom (N = 3), Spain (N = 2), Brazil (N = 2), and Norway (N = 1). The majority of the PICH-affiliated articles were by first authors affiliated with a psychology department (N = 53, 29.90%), followed by authors with a multidisciplinary (N = 48, 24.37%), nursing (N = 44, 24.58%), medical (N = 26, 14.58%), pharmacology (N = 14, 7.28%), anesthesia (N = 8, 4.47%) or dentistry affiliation (N = 3, 1.68%).

With respect to the PICH status of the first author, most were by a current (i.e. still in training) or graduate (i.e. completed training) PICH trainee (N = 131, 66%). Over half of the trainee-led articles were by international trainees (N = 76 or 58% of trainee-led articles). Moreover, one PICH-affiliated publication led by a graduate trainee (Stinson et al., 2006) was ranked as the fourth most cited article on pediatric pain according to the articles' relative citation score (i.e. number of citations divided by the numbers of years since publication; Caes et al., 2016).

While the number of PICH-affiliated articles per year was relatively stable between 2003 and 2007 at 14-16 articles per year (with exception of 25 articles in 2006), a substantial increase in yearly output was observed in 2008 (N = 38), which was maintained in 2009 (N = 36) and 2010 (N = 33). This increase in articles seems to mainly represent articles by current or graduate PICH trainees (see Figure 1), which could be attributable to the increase in number of trainees over the years.

Conclusion

The findings are a preliminary indication of the success of the interdisciplinary and international PICH training program, which may be one of many factors contributing to the growth in high quality and impact publications on pediatric pain. In accordance with the PICH objectives, the increased publication output is mainly a reflection of trainee-led articles with an equal contribution by Canadian and international trainees. While disparities in available research training and grant support across countries plays an important role, it is plausible that training initiatives like PICH might be another fruitful way of stimulating high quality contributions to the literature and may have contributed to the strong place of Canada as a worldwide leader in pediatric pain research (The Expert Panel on the State of Science and Technology in Canada, 2012).

The findings reveal a potential delay in impact of training programs that could affect the scope of the findings. PICH started in 2002, but a vast increase in trainee-led publications mainly occurred

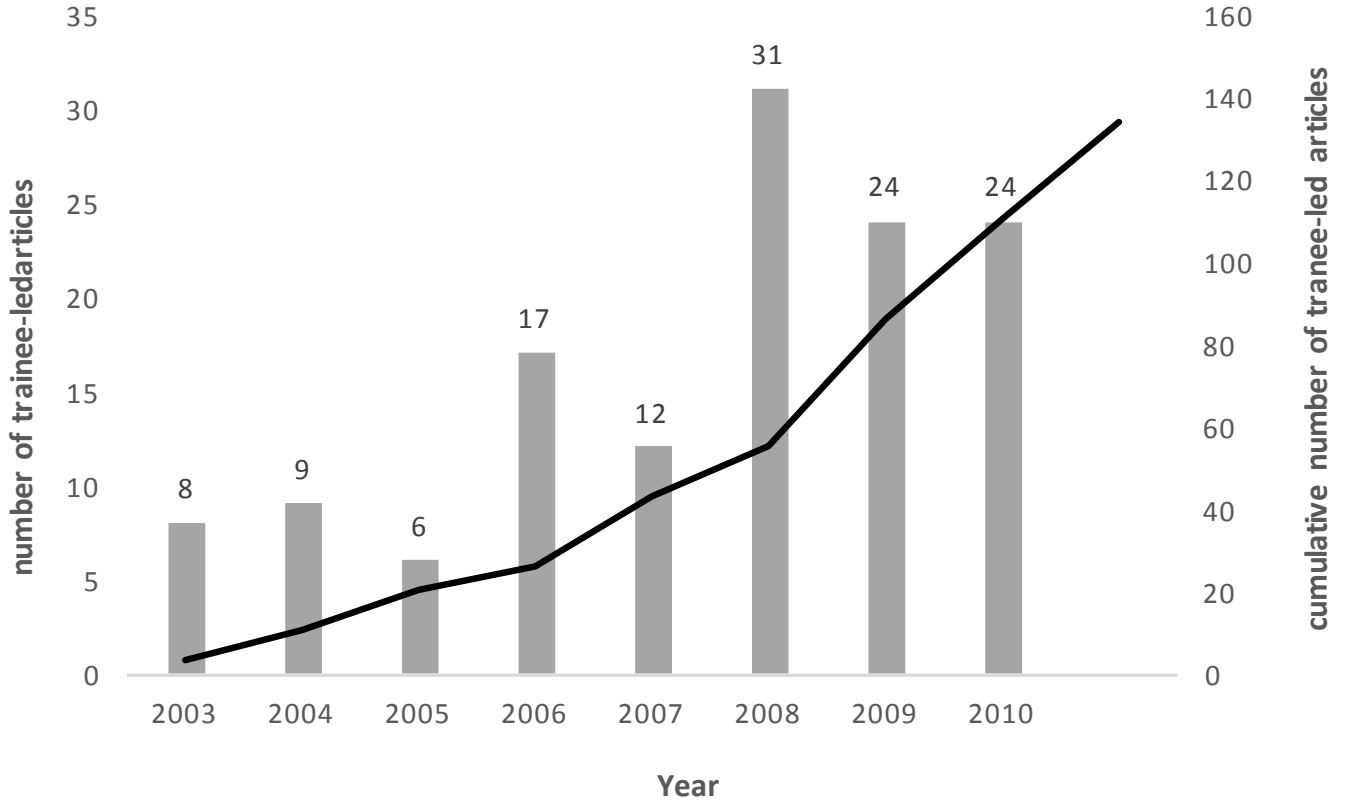

Figure 1. Overview of the number of trainee-led PICH-affiliated articles per year.

from 2008 onwards. The delay might reflect the typical publication lag from study execution to publication. However, this delay could also reflect a gradual rise in popularity and awareness of the training program and associated gradual but large increase in the cumulative number of PICH trainees. This delayed impact highlights the importance and need for further analyses beyond the current 2003 to 2010 period (that would extend with the second iteration of PICH from 2009-2017) as well as beyond the end date of training programs to provide a comprehensive perspective of the impact.

Caution is needed with the interpretation of the results as various limitations need to be considered. First, only information on the first author was available, therefore articles in which PICH-affiliated authors were involved as co-authors were not included. Second, only one particular training initiative was evaluated without the inclusion of a control group to compare differences in output with trainees not involved with PICH. Additionally, no comparison was made with other, similar training initiatives, which could reveal a more objective and comprehensive impact of various training initiatives. The comparison of the long-term impact and success across different training initiatives might be an opportunity for future research with the recent development of new pain schools (e.g. North American Pain School, University of Toronto Connaught Pain Summer School, European Pain Federation EFIC Pain Schools). The data presented, and future similar research endeavors, could potentially function as objective and important justification for funding agencies to continue to support innovative training programs.

The findings highlight the potential merit of multidisciplinary and international training initiatives in advancing a scientific field and the importance of tracking the impact of these initiatives over time.

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Acknowledgements

The authors would like to thank Katelynn E. Boerner, Marsha Campbell-Yeo, Jennifer Stinson, Kathryn A. Birnie, Jennifer A. Parker, Anna Huguet, Abbie Jordan, Jill MacLaren Chorney, Meghan Schinkel, Justine Dol and Jessica MacIntyre for their help with coding and data-input for the original bibliometric analysis: Caes L, Boerner KE, Chambers CT, Campbell-Yeo M, Stinson J, Birnie KA, et al. A comprehensive categorical and bibliometric analysis of published research articles on pediatric pain from 1975 to 2010. Pain 2016;157:302-313. www.pubmed.gov/26529270

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