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Commentary

Training health researchers: Challenges, systemic changes, and a model solution

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Improving a nation's health through evidence-based practice requires basic and applied health research and translating the resulting knowledge into clinical practice and policy (Sung et al., 2003). These endeavors require highly trained researchers, but concerns about the declining numbers of all researchers, and clinical researchers (traditionally physician-scientists¹) in particular, have permeated the health literature for decades (Wyngaarden, 1979; Canadian Institutes of Health Research - CIHR, 2002). The objectives of this commentary are: (1) to highlight challenges in the health research pipeline (i.e. recruiting, training, and retaining researchers); (2) to describe an innovative training program addressing the problem in pediatric pain (*Pain in Child Health*; PICH); and (3) to encourage researchers to build training networks in their own area of expertise. Since some of the challenges faced by clinical researchers are also experienced by scientists in general, both difficulties unique to health researchers as well as more general issues will be discussed.

Challenges in the recruitment, training, and retention of health researchers and systemic solutions

Challenges to the research process begin at the level of recruitment and training. There is a lack of knowledge translation (KT) in maintaining the pipeline of health researchers as, for example, mentoring is neither compensated nor time-

protected in the current university system (Lenfant, 2000). While traditional supervision of students emphasizing productivity and publication is valued by universities, mentoring is broader than this process and includes both a personal and professional relationship which evolves over time (National Academy of Sciences, National Academy of Engineering, Institute of Medicine, 1997). Lack of mentoring has an adverse effect on scientific careers in general but may be particularly problematic for clinical researchers who must struggle to effectively balance research and practice.

Trainees and new researchers should be prepared for the broad range of challenges confronting them during their training and at the outset of their careers. The challenges facing new researchers include deficiencies in infrastructure, training in KT, mentoring, multidisciplinary research experience, as well as difficulty maintaining multiple roles. New investigators begin their careers with little administrative and research staff support as well as a lack of financial and environmental infrastructure yet are expected to demonstrate immediate, independent grant success (CIHR, 2002). In addition, unless holding a prestigious research award, new researchers may not have protected research time and must attempt to balance their work (e.g. teaching, administration, clinical demands) and family life while struggling to 'publish or perish' (CIHR, 2002).

New investigators may also become caught in the increasing divide between new directions taken by funding agencies and the traditional tenure process at universities. For example, in addition to knowledge creation, funding agencies are currently increasing their emphasis on KT activities to address the well-known knowledge-practice gap in health research. Unfortunately, KT and related activities are not explicitly valued by the tenure system (Gray & Armstrong, 2003); reaching the target audience may not involve publishing in high impact journals or even publishing for a scientific audience at all. In addition, the ability to work in multidisciplinary teams is imperative for future innovation and research success (Lenfant, 2000; Gray & Armstrong, 2003). Although granting agencies increasingly require grant proposals involving diverse disciplines, the current academic environment does not highly value multidisciplinary collaboration (Gray & Armstrong, 2003; Murillo et al., 2006) as this work may involve being one of many authors (e.g. fourth out of five authors) and/or publication in journals outside of one's area of expertise with lower impact factors. Thus, new investigators may feel unable to prioritize gaining multidisciplinary team experience until they have proven their research independence.

The multifaceted challenges to the health research pipeline require systemic change whereby compartmentalized groups of researchers transform into integrated, collaborative research communities (Lenfant, 2000; Gray & Armstrong, 2003). In order to increase the number of health researchers, we must engage in earlier outreach (e.g. early high school students) and ongoing mentorship (Lenfant, 2000; Gray & Armstrong, 2003). Mentoring must be considered a professional activity valued by and protected within the university tenure process in addition to individual effort and publication (Lenfant, 2000; Murillo et al., 2006). Given the staggering amount of debt students can accrue from research training, funding solutions are needed (Gray & Armstrong, 2003; Murillo et al., 2006). Continued increases in research dollars allocated to clinical and health services investigations² are advisable (Murillo et al., 2006). In order to be successful, all stakeholders, including the public, researchers, clinicians, universities, hospitals, industry, and the

government must embrace the suggested systemic changes (Murillo et al., 2006).

Pain in Child Health (PICH)

In addition to systemic change, innovative training programs can address a number of the barriers outlined above. PICH is a Strategic Training Initiative in Health Research funded by CIHR (www.paininchildhealth.dal.ca)³. PICH was initiated in 2002 in five research centers across Canada with the goal of developing a community of new investigators in pediatric pain. The program is open to trainees (undergraduates to post-doctoral fellows from any discipline) who are committed to studying pediatric pain. Consistent with recommendations in the literature (Murillo et al., 2006), PICH has engaged both the community (e.g. there are patient and parent representatives on the Program Advisory Committee) and industry (e.g. the group has received a donation from Janssen-Ortho Inc.) in its development and ongoing activities.

Connections among trainees and senior researchers, across sites and across disciplines, are fostered through annual training institutes, international web-based lab meetings, an international speaker series, and web-based courses on pediatric pain. Trainees can also apply for funding to visit research centers at partner institutions to gain specialized skills and research experience with other teams; they share what they have learned through articles in a newsletter. Trainees are also eligible to apply for stipends from PICH but the majority of trainees (80%) are successful in gaining external funding.

The multidisciplinary composition of the group (currently 60 trainees from psychology, nursing, pharmacology, anthropology, medicine, and other disciplines)⁴ allows the exchange of different research paradigms and the development of innovative research projects. In training to become independent investigators (Lenfant, 2000; Murillo et al., 2006), PICH trainees gain core skills in basic and applied research, advanced skills in particular areas of expertise, knowledge of evidence-based practice, and a research approach transcending traditional disciplinary boundaries.

Annual training institutes are usually held immediately before a national or international confer-

ence in pain which trainees are funded to attend. Themes have included developing research proposals, clinical research trials, grant writing, funding, mentoring, work/life balance, and KT. These workshops are an exciting occasion for trainees to engage with the core faculty and other experts in basic and clinical pain research. Trainees also present and discuss their research projects with program members around the globe in monthly web-based conferences through Wimba software (www.wimba.com). A listserv allows trainees to keep in contact with the entire group while a newsletter highlights activities and events.

Mentoring is one solution to the leaking pipeline of health researchers (Lenfant, 2000; Khadaroo & Rotstein, 2002). Mentoring is strongly emphasized by PICH and occurs both via peer-mentoring as well as between faculty and trainees. Effective networking also improves the recruitment and retention of new investigators (Lenfant, 2000). PICH has created a community in which, through both face-to-face contact and technology, trainees can engage in inter- and intra-disciplinary networking that transverse geographical boundaries, levels of expertise, and areas of specialization. One in four trainees comes from outside Canada, which is supported by the Mayday Fund⁵. For these trainees, who may work in isolation in their own countries, PICH is a unique opportunity not only to be part of a multidisciplinary and international scientific community, but also to disseminate strategies for research network building in their home countries.

In summary, PICH provides a successful model for research training and international collaborations. Measured outcomes of PICH have demonstrated that since the program's inception in 2002, trainees have been authors on over 400 peer-reviewed publications and given over 600 presentations at scientific meetings and to professional audiences. PICH has developed a global community of trainees and researchers who actively learn from each other and from faculty, taking advantage of cost-effective technology in the advancement of multidisciplinary research in pediatric pain.

This commentary is directed at researchers because "the real players are you – the members of the scientific community who develop research and training programs, forge collaborations, establish

new scientific competencies, support and reward mentors, serve as role models, review the training applications of your peers, and reach out to promising young students in your communities" (Lenfant, 2000, p. 370). It is time to do your part to improve the training and retention of current researchers and recruitment of the next generation of investigators.

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Endnotes

- ¹ The discussion of the differing definitions (and recent expansions) of the terms clinical researchers/scientists/practitioners is beyond the scope of this commentary. The reader is referred to “The clinician scientist: yesterday, today, and tomorrow” (CIHR, 2002). The present commentary focuses on health researchers, who include clinical researchers, and face similar challenges.
- ² In Canada, the increase in funds allocated to clinical (3 fold increase), health systems and services (20 fold increase), and population and public health (10 fold increase) research have proceeded at a higher rate than biomedical research (2 fold increase; http://www.cihr-irsc.gc.ca/e/30240.html#slide9_e). However, since its inception in 1999, CIHR has spent approximately \$1.8 billion more on biomedical research than on their other three pillars combined (Clinical, Health Systems and Services, Population and Public Health; <http://webapps.cihr-irsc.gc.ca/funding>).
- ³ PICH is also supported by the Nova Scotia Health Research Foundation and involves the following partner universities: Dalhousie University, McGill University, the University of British Columbia, the University of Saskatchewan, and the University of Toronto.
- ⁴ Ideally, the composition of PICH would represent a greater number of different disciplines as a large majority of the trainees (2002-2007) are from psychology and nursing.
- ⁵ The Mayday Fund is a private US foundation based in New York that provides funding for work addressing the alleviation of human pain (www.painandhealth.org).

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