

LETTER TO THE EDITOR**TO THE EDITOR****Launch of the Canadian Neurosurgery Research Collaborative**

Keywords: Clinical trial methodology, clinical neurosciences, neurosurgery, outcomes research, patient safety, quality of care, residency training

Evidence-based medicine is at the core of modern clinical decision making. Neurosurgery faces a unique combination of challenges in generating strong clinical evidence, including the rarity and heterogeneity of neurosurgical disease, the complexity of neurosurgical procedures, the high cost involved and difficulty in measuring clinically meaningful outcomes, and the relative lack of long-term outcome assessment. As a result, while Canadian neurosurgical research compares favourably with international efforts,¹ neurosurgery as a field lags behind most other medical specialties in the number of published high-quality randomized controlled trials.²

Many research networks have been established to facilitate multicentre neurosurgical studies, and they have demonstrated the feasibility and utility of collaboration. These include the International Gamma Knife Research Foundation, the Canadian Spine Outcomes and Research Network, the Spine Oncology Study Group, the Hydrocephalus Clinical Research Network, the Rick Hansen Spinal Cord Injury Registry and the Canadian Critical Care Trials Group. These subspecialty-focused networks provide the infrastructure for a variety of study designs (e.g., retrospective, prospective, observational and interventional), aiming to answer important research questions relevant to their fields.

Canadian neurosurgery residents are highly interested in research. A recent survey performed by our group showed that 75% would like to incorporate research as part of their future practice and that 78% would like to work in an academic centre.³ Moreover, 58% plan on completing an additional research degree (M.Sc. or Ph.D.) during training.³ Therefore, most Canadian neurosurgery residents retain a significant interest in research and the search for opportunities to build their research portfolio.

In the United Kingdom (UK), trainee-led research collaboratives have been established to tackle this problem.⁴ The West Midlands Research Collaborative (WMRC) was the first of its kind in the UK to successfully complete and publish a clinical trial of 760 patients recruited from 21 centres looking at the impact of wound edge protection devices on surgical site infection after laparotomy.⁵ To date, at least 27 collaboratives have been established in the UK, with the evidence suggesting that these geographically distant groups working in collaboration not only facilitate the completion of large-scale research studies but also enhance the research skills of their participants.⁶

Given the evidence favouring the role of trainee-led research collaboratives in facilitating high-quality multicentre studies, we launched the Canadian Neurosurgery Research Collaborative (CNRC)⁷ in December of 2015 (www.neuronetwork.ca). The objectives of the CNRC are as follows:

- To facilitate the design of multicentre studies.

- To facilitate the implementation of multicentre studies by:
 - ensuring the membership of least one resident per Canadian neurosurgical residency program who can act as a site coordinator for CNRC studies;
 - providing a centralized data-collection and management infrastructure.
- To facilitate recruitment of large numbers of study participants by providing a stable, coordinated network of multiple high-volume academic centres across Canada.
- To foster a culture of collaboration in research among Canadian neurosurgical trainees.

The CNRC steering committee consists of neurosurgery residents representing each of the Canadian neurosurgery residency programs in addition to attending neurosurgeons as faculty advisors. Recruitment of residents forming the steering committee was based on references from program directors or neurosurgery attendings, with 13 neurosurgery residency programs currently represented in the CNRC. Future representatives will be elected by their peers. Executive positions on the steering committee include a president, vice-president and secretary, who are elected for one-year terms by committee members. The steering committee meets quarterly and oversees all CNRC activities, including study selection, protocol development, trial implementation, study conduct, analysis and reporting, as well as infrastructure development and funding.

The CNRC has developed a process for research protocol development, review and production. Research protocols submitted to the CNRC are reviewed by the steering committee within two weeks and assessed for feasibility, quality and relevance to the field. Thereafter, the steering committee conducts a meeting to anonymously vote for and confirm interest in a study protocol. A project manager is assigned by the steering committee and charged with the task of overseeing development of the research protocol, submitting the final version to the steering committee for approval prior to submission to the local research ethics board. Once the study is approved, the protocol is disseminated to ethics boards from all the participating centres.

The CNRC steering committee has developed authorship guidelines in order to clarify the attribution of “author” and “contributor” credentials. Three criteria are prerequisites for authorship:

- substantial contributions to conception and design of the work, or the acquisition, analysis and interpretation of data;
- drafting the work or revising it critically for important intellectual content or final approval of the manuscript before its publication;
- statistical analysis, obtaining funding or logistic and technical support or supervision.

Authors are determined by consensus and ordered based on the amount of time invested in the study. All papers benefiting from the CNRC infrastructure should list the CNRC as the last author. Individuals who contributed to the work but do not meet all three criteria are acknowledged. This policy is in accordance with the “Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals,” published by the International Committee of Medical Journal Editors (www.icmje.org).

Since its launch, eight research protocol abstracts have been reviewed by the steering committee, and two studies have been conducted:

- A cross-sectional study of the Canadian neurosurgery operative demographic landscape has been completed, and the manuscript is currently being drafted.⁸
- A Canadian neurosurgery resident survey aiming to evaluate the educational and academic experience of neurosurgery residents across the country, where the study is completed, and the manuscript is being drafted.³

Currently, the CNRC is preparing to conduct a multicentre prospective study entitled “A Nationwide Prospective Observational Study of External Ventricular Drainage Catheter Complications and Assessment of Their Potential Risk Factors,” with its research protocol being submitted to local research ethics boards.

Trainee-led research networks have been shown to be successful. The CNRC aims to facilitate multicentre neurosurgical research and cultivate a culture of collaboration among Canadian residents. We encourage trainees in other surgical subspecialties to follow suit in order to facilitate collaboration and provide the ability to ask and possibly answer controversial surgical questions to ensure a bright future for Canadian evidence-based surgical practice.

DISCLOSURES

Ayoub Dakson, Michael K. Tso, Christian Iorio-Morin, Syed Uzair Ahmed, Mark Bigder, Cameron Elliot, Daipayan Guha, Michelle Kameda-Smith, Pascal Lavergne, Serge Makarenko, Michael Taccone, Bill Wang, Alexander Winkler-Schwartz, Tejas Sankar, Sean Christie and the Canadian Neurosurgery Research Collaborative hereby declare that they have no conflicts of interest to disclose.

STATEMENT OF AUTHORSHIP

AY, MT and CIM wrote the manuscript. All authors contributed significantly to the foundation of the CNRC and critically reviewed the manuscript.

Ayoub Dakson
 Division of Neurosurgery
 Dalhousie University
 Halifax Infirmary 1976 Summer Street
 Room 3814, Halifax, Nova Scotia B3H 3A7, Canada
 Email: a.dakson@dal.ca

Michael K. Tso
 Division of Neurosurgery
 University of Calgary Calgary
 Alberta, Canada

Syed Uzair Ahmed
 Division of Neurosurgery
 University of Saskatchewan Saskatoon
 Saskatchewan, Canada

Mark Bigder
 Division of Neurosurgery
 University of Manitoba Winnipeg
 Manitoba, Canada

Cameron Elliott
 Division of Neurosurgery
 University of Alberta Edmonton
 Alberta, Canada

Daipayan Guha
 Division of Neurosurgery
 University of Toronto Toronto
 Ontario, Canada

Pascal Lavergne
 Division of Neurosurgery
 Université Laval
 Québec City Québec, Canada

Serge Makarenko
 Division of Neurosurgery
 University of British Columbia Vancouver
 British Columbia, Canada

Christian Iorio-Morin
 Division of Neurosurgery
 Université de Sherbrooke Sherbrooke
 Québec, Canada

Michelle Kameda-Smith
 Division of Neurosurgery
 McMaster University Hamilton
 Ontario, Canada

Michael S. Taccone
 Division of Neurosurgery
 University of Ottawa Ottawa
 Ontario, Canada

Bill Hao Wang
 Division of Neurosurgery
 University of Western Ontario London
 Ontario, Canada

Alexander Winkler-Schwartz
 Division of Neurosurgery
 McGill University Montréal
 Quebec, Canada

Tejas Sankar
Division of Neurosurgery
University of Alberta Edmonton
Alberta, Canada

Sean D. Christie
University of Dalhousie
Division of Neurosurgery Halifax
Nova Scotia, Canada

The Canadian Neurosurgery Research Collaborative

REFERENCES

1. Lozano CS, Tam J, Kulkarni AV, Lozano AM. The academic productivity and impact of the University of Toronto Neurosurgery Program as assessed by manuscripts published and their number of citations. *J Neurosurg.* 2015;123(3):561-70; Epub ahead of print Jun 26. Available at: <http://thejns.org/doi/pdf/10.3171/2014.12.JNS142553>.
2. Mansouri A, Cooper B, Shin SM, Kondziolka D. Randomized controlled trials and neurosurgery: the ideal fit or should alternative methodologies be considered? *J Neurosurg.* 2015; 124(2):1-11; Epub ahead of print Aug 28.
3. Winkler-Schwartz A, Bigder M, Dakson A, Elliott C, Guha D, Kameda-Smith M, et al. Demographics of Canadian neurosurgery residents: a national cross-sectional study from the Canadian Neurosurgery Research Collaborative. *Can J Neurol Sci.* 2016; 43(Suppl 2):S25.
4. Kolas AG, Cowie CJ, Tamaris A, Hutchinson PJ, Brennan PM. Ensuring a bright future for clinical research in surgery with trainee-led research networks. *BMJ.* 2013;347:f5225.
5. Pinkney TD, Calvert M, Bartlett DC, Gheorghe A, Redman V, Dowswell G, et al. Impact of wound edge protection devices on surgical site infection after laparotomy: multicentre randomised controlled trial (ROSSINI Trial). *BMJ.* 2013;347:f4305 Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3805488/>.
6. Dowswell G, Bartlett DC, Futaba K, Whisker L, Pinkney TD. How to set up and manage a trainee-led research collaborative. *BMC Med Educ.* 2014;14:94 Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4229745/pdf/1472-6920-14-94.pdf>.
7. Dakson A, Bigder M, Elliott CA, Guha D, Iorio-Morin C, Kameda-Smith M, et al. The Canadian Neurosurgery Research Collaborative (CNRC): a novel, trainee-led, nationwide multicentre research network. *Can J Neurol Sci.* 2016;43(Suppl 2):S23-4.
8. Tso MK, Bigder M, Dakson A, Elliott CA, Guha D, Iorio-Morin C, et al. Canadian neurosurgery operative landscape. *Can J Neurol Sci.* 2016;43(Suppl 2):S12.