Canadian Cardiovascular Outcomes Research Team: Lessons Learned

Jack V. Tu MD

About the Author
Jack Tu is a member of the Department of Medicine, Sunnybrook Health Sciences Centre, University of Toronto, and is program leader of the Cardiovascular and Diagnostic Imaging Research Program at the Institute for Clinical Evaluative Sciences, in Toronto, Ontario. Correspondence may be directed to tu@ices.on.ca.

Background
The Canadian Cardiovascular Outcomes Research Team (CCORT) was created in 2001 through a $4.6 million 5-year Canadian Institutes of Health Research (CIHR) Interdisciplinary Health Research Teams grant and a $1 million grant from the Heart and Stroke Foundation of Canada. Funding was renewed in 2006 for an additional 5 years (2006–2011) through a $4.2 million CIHR Team Grant in Cardiovascular Outcomes Research. CCORT involves over 30 investigators from six Canadian provinces (Nova Scotia, New Brunswick, Quebec, Ontario, Alberta, and British Columbia) working together, over the past decade, on research aimed at measuring and improving the quality of cardiac care. CCORT has generated over 155 peer-reviewed publications.

Rationale for Team-Based Research
Historically, medical research involved small studies conducted by solitary scientists or small teams working in isolation in a local laboratory. Today’s complex research questions, in contrast, often involve large-scale, multi-site studies and require multidisciplinary research teams with diverse professional and technical skill sets. These teams, enabled by technology, collaborate across time and space, as they address local as well as global health issues.

The creation of CIHR was motivated, in part, by a vision of health research to improve the health of Canadians as well as the quality and sustainability of the Canadian health care system. An additional mandate of CIHR’s programs was the development of a national CV atlas and the completion of two cluster randomized trials on the effectiveness of health care report cards, providing little guidance was provided in terms of the types of activities that were expected. Even today, the science of KT remains in its infancy; few proven strategies exist for effective translation and the timely incorporation of clinical evidence within routine care. Despite this, we made a concerted effort to embed KT within all CCORT research activities. For the CCORT Atlas, in particular, we created a comprehensive “report card” on the patterns of CV health and care delivery in Canada. Building on prior work completed in Ontario, the CCORT Atlas project, launched in 2002, addressed topics ranging from geographical variations in the burden of cardiac risk factors and disease to variations in survival rates following acute myocardial infarction (AMI) and cardiac surgery. Published as a series of 24 peer-reviewed articles in the Canadian Journal of Cardiology from 2003 to 2005, the atlas was compiled as a book in 2006, and freely distributed, in print form and electronically, via CCORT’s website where it has been downloaded over 50,000 times.

The CCORT Atlas proved to be an ideal team-based project as it required a large group of clinician researchers with expertise spanning the spectrum of CV medicine, from primary care to acute hospital-based care to chronic and end-of-life care for heart failure. It also leveraged the combined knowledge of the team, engaging investigators with different skill sets and insights to address CV-related issues facing Canadians. With in-depth knowledge of their local systems and data, investigators were also able to identify and interpret findings relevant to their respective regions and the country as a whole. Some 50 authors contributed to the CCORT Atlas, coordinated by an editorial team composed of me (University of Toronto), Louise Pilote (McGill), William Ghali (University of Calgary), all members of the Canadian Society of Internal Medicine (CSIM), and Susan Brien, a senior research coordinator at ICES. The group managed to overcome many barriers (from gaining access to provincial data sets and ensuring consistency of variables and algorithms, to meeting publication deadlines along with clinical and other professional commitments) during this mammoth project. The findings from the Atlas project have been used by many organizations throughout Canada to improve the quality of health care delivery.

Lessons Learned
A key lesson learned from the CCORT Atlas project involves selecting the “right” types of research projects, that is, those that address an important, novel question that are of appropriate scale and complexity to warrant a team-based approach. The CCORT Atlas was an excellent team project due to its size, scope, and complexity. It required the combined efforts of the entire team, and actually helped the team members to “gel” as they worked together to plan the articles, assemble data sets, conduct analyses, and put pen to paper. It also provided all team investigators with an opportunity to lead an important area of study, as part of a first-ever project, resulting in many peer-reviewed publications.

As noted, KT is part of CIHR’s mandate; however, at the beginning of CCORT, little guidance was provided in terms of the types of activities that were expected. Even today, the science of KT remains in its infancy; few proven strategies exist for effective translation and the timely incorporation of clinical evidence within routine care. Despite this, we made a concerted effort to embed KT within all CCORT research activities. For the CCORT Atlas, in particular,
we established a process of preparing media releases, sharing PowerPoint slide collections and, eventually, the complete set of articles via our website, and conducting multiple presentations and workshops at local and national meetings, all of which helped increase awareness and maximize the impact of the Atlas project.

**Lessons Learned**

AFFECT and EFFECT, both landmark studies, demonstrated that it is possible to study important health policy questions using scientifically rigorous designs. As well, the EFFECT study reflected the benefits of a multi-disciplinary team engaged in KT research alongside with key stakeholders in the health care system, including the Canadian Cardiovascular Society (involved in the design and endorsement of the AMI/CHF quality indicators), CIHR and the Heart and Stroke Foundation of Canada (involved in organizing and co-hosting the EFFECT press conference), and the Ontario Heart and Stroke Foundation (a key partner in disseminating the results to participating hospitals before and after the press conference).

The EFFECT study demonstrated, for researchers, the benefits of working with larger, more established organizations to translate research into practice. We were able to disseminate our research findings much more effectively by working with larger well-established organizations as opposed to trying to disseminate our research by ourselves alone. The CCORT website (www.ccort.ca) has also proven to be a very effective KT vehicle as it allows us to publish additional supplementary material (hospital record cards, quality indicator measurement guides, interactive web-based maps, CHF mortality risk model, PowerPoint slides, etc.) to complement material published in traditional peer-reviewed journals. The website received more than 17,000 unique visitors this past year alone.

**Conclusion**

In summary, CCORT effectively used a team-based research model, incorporating KT, to improve the quality of cardiac care in Canada through innovative health systems and population health research. In recognition of its impact, CCORT was chosen as the recipient of the 2005 CIHR National Knowledge Translation Award, and the EFFECT study paper, published in *Journal of the American Medical Association*, was chosen as the 2010 Article of the Year by the CIHR Institute of Health Services and Policy Research.

**Acknowledgements**

We would like to thank CIHR for its support of CCORT over the past decade, and the Heart and Stroke Foundation of Canada, which provided initial support for CCORT. Dr. Tu is supported by a Tier 1 Canada Research Chair in Health Services Research and a Career Investigator Award from the Heart and Stroke Foundation of Ontario. Dr. Tu would also like to thank all of the CCORT investigators, students, research staff, participating clinicians, hospitals, and partner organizations across Canada who contributed to the success of this initiative over the past decade.

**References**