Developing Knowledge Translation Capacity in 
Public Health
The Role of the National Collaborating Centres

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ABSTRACT

This paper outlines the history and rationale of the six National Collaborating Centres for Public Health program, established by the Public Health Agency of Canada in 2004. The Centres are not focused on primary research, but rather on synthesizing the global scientific evidence relevant to public health policies, programs and practices – and its translation into useful “knowledge products” for public health professionals, policy-makers and community groups to inform public health decision-making. The broad principles of knowledge synthesis and translation/exchange (KSTE) for public health applications are reviewed, as are recent publications and websites describing international projects in this burgeoning field. Finally, some best practices for public-health-oriented KSTE derived from experiences in Canada and elsewhere are described.

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In May 2004, the Government of Canada announced the establishment of six regionally-based National Collaborating Centres (NCC) for Public Health. These Centres are designed as a key response to the renewal of our national system of public health infrastructure, as highlighted in the authoritative Naylor Report (2003) and other recent enquiries. The textbox lists the six Centres’ substantive themes, which were negotiated prior to the official announcement of the launch of the program in May 2004, as well as the six local host agencies across Canada.

The overarching mission for these Centres is to:
...build on existing strengths and create and foster linkages among researchers, the public health community and other stakeholders to ensure the efficiency and effectiveness of Canada's public health system. The National Collaborating Centres will facilitate the sharing of knowledge and help put it into practice at all levels of the public health system across Canada.

The initially stated goals for the Centres were:
• Generating knowledge that can improve the effectiveness of policies, reduce disparities in health status;
• Producing a better understanding of the factors that affect Canadians' health;
• Producing information on infectious and chronic diseases and possible measures for their prevention and control;
• Contributing to the training and mentoring of future public health researchers and practitioners;
• Championing best public health practices across the country; and,
• Fostering collaboration among governments, researchers, the public health community and other stakeholders.

Clearly, very ambitious goals have been set for the Centres – spanning professional and research training; multidisciplinary knowledge creation; knowledge synthesis (e.g., secondary research such as structured reviews of the scientific evidence base to inform public health programs, policies and practices); and knowledge exchange with front-line public health workers and other relevant stakeholders, across 13 provinces and territories, and more than 100 public health agencies across the country. While the Centres’ mandate originally included the generation of knowledge, their emphasis is clearly not on primary research.
The Six National Collaborating Centres for Public Health

The National Collaborating Centre for Determinants of Health is located in Atlantic Canada and studies the role the various determinants of health – such as physical and cultural isolation, income/socio-economic status, employment, immigration status and mental illness – play on health.

The National Collaborating Centre for Healthy Public Policy in Quebec looks at the impact of public policy on the health and well-being of Canadians. It looks at healthy public policies and is interested in policies that facilitate the reduction of health risks related to physical, social and economic environments.

The National Collaborating Centre for Public Health Methods and Tools in Ontario focuses on knowledge synthesis and the translation of concepts, information, systems, and tools that will facilitate better use of, and access to, information and facilitate the decision-making capacity of public health stakeholders involved in policy-making, program decision-making, practice and research.

The National Collaborating Centre for Infectious Diseases, located in Manitoba, focuses on addressing the present and future risks of emerging and re-emerging infectious diseases. The NCC works to complement and build on ongoing research into emerging diseases such as SARS, West Nile Virus and BSE, and will be responsible for training the next generation of emerging infectious disease specialists.

The National Collaborating Centre for Environmental Health in British Columbia examines how changes in the environment – including climate, shelter, water, food and air quality – affect the health of Canadians. This NCC also looks at the role that radiation, biological and chemical agents play in human health.

The National Collaborating Centre for Aboriginal Health is in British Columbia, and works closely with Aboriginal groups to look at various means and strategies to improve the health status of Canada’s Aboriginal citizens.

This paper is intended to introduce the collective mandate for the Centres and review promising approaches to its achievement. It further serves to update the public health community on the Centres’ progress to date, by:

• Briefly reviewing what is currently known about knowledge synthesis and translation,* for public health decision-making, within the Canadian context;
• Presenting some considerations to inform the selection of initial “priority” topics for knowledge synthesis; and,
• Reviewing some “best practices” – and avoidable pitfalls – in performing knowledge syntheses for public health applications.

Current Understanding of Knowledge Synthesis and Translation for Public Health Decision-making

A 2005 publication by Kiefer et al.† provides useful guidance for the NCC program. This paper describes the need for a Canadian "Population and Public Health (PPH) Evidence Centre", together with an associated network. The NCC program constitutes a geographically distributed approach to the Centre and the network concepts.

This paper also calls for the development of a "PPH Evidence Research Network"† complementary to the Evidence Centre. By Network, the authors mean a broadly-based consortium engaging relevant stakeholders involved in "knowledge production" (i.e., research, as well as rigorous evaluations of programs, policies and practices), synthesis, and translation activities. In fact, the proposed network closely resembles the range of stakeholders with whom NCCs are now collectively consulting and building relationships. Many stakeholders are formally represented on the local NCC Advisory Boards.

Thus, the paper’s vision of a strong and sustainable partnership between Centres and a related policy and practice network is of direct relevance to NCC program development.

A Suggested Conceptual Framework

Kiefer et al. also lay out a conceptual framework (see Figure 1), which has broad applicability to the NCC program. There is "no single best starting point" in the circular schema for knowledge synthesis and translation in this depiction, although what is often needed is a "scan" of what the key stakeholders need/will likely use, and what evidence syntheses are already available. These "environmental scans" are providing a preliminary snapshot of each Centre’s respective community’s views, and identifying "who is doing (or planning to do) what" in each of their subject areas.

As such, the NCCs are entering the cycle at Steps 2 through 4. Whatever the starting point, one must consider both:

1. the topics for which users need accessible, high-quality, comprehensive and up-to-date evidence; and,
2. what any new structured review of the evidence (including the most recent studies in the field) can usefully add to the existing best summaries of the evidence.

The evidence base for some topics of interest, for which stakeholders currently report no useful decision aids (in terms of summaries of scientific or “best practice” evidence), may actually be quite well summarized by existing websites, databases, unpublished reports or hard-to-locate published documents, that are just not well known to the Canadian public health community. Consequently, a central role for Centres would be to function as a "knowledge broker," making these existing resources accessible to these knowledge users.

It is acknowledged throughout this paper that synthesis of "scientific knowledge" per se may be too narrow a description of the activities that some NCCs will have to undertake. In the field of Aboriginal Health, for example, the communities themselves can be expected to call for syntheses of "best practices" of "what works" (e.g., community development approaches, mental health services, nutritional programs, renewal of traditional healing practices, etc.), based on expert opinion and community consensus. “Best practices” is also used to broaden the scope of the sorts of knowledge to be reviewed by an NCC, above and beyond that obtained.

* By “knowledge translation for public health decision-making”, we mean in this context the exchange and use (note that Kiefer et al. (ref.7, pp 114-115; 135-136 en français) prefer the term “knowledge exchange and utilization”) of relevant, global research evidence for decision-making by front-line public health professionals, program administrators, community-based organization leaders, and public/non-profit sector policy-makers at all levels. Many authors include knowledge synthesis activities within a knowledge translation framework. In this paper, we have placed the emphasis on syntheses and kept those activities separate in order to underscore the NCCs’ initial focus on syntheses.

† The use of the term “Network” in the document by Kiefer et al. should be distinguished from the official use of the term: “The Pan-Canadian Public Health Network” is a more formal structure, with participation from 13 provincial/territorial governments and the federal government. It reports to the Conference of Deputy Ministers, and derives its decision-making authority from governments.
Several functions must be accomplished in an environment of sustainable funding:

1. Active collection, annotation and registration of existing and in-progress research
2. Solicitation and identification of evidence gaps
3. Prioritization, coordination and generation of new research evidence
4a. Dissemination of existing and new research (“producer push” and “user pull”)
4b. Evaluation and redesign of knowledge exchange and dissemination strategies
4c. Capacity-building and training of users to facilitate uptake and use of research evidence.
5. Uptake and utilization of research evidence
6. Iterative cycle of problem identification, policy/program development and/or decision-making, implementation, evaluation and redesign.

**Figure 1.** Conceptual model of a successful, sustainable PPH knowledge exchange and uptake process

by traditional scientific methods. A crucial function of such a broker role is to also document and analyze the reactions of these users to such resources. If these evidence summaries are not in accessible format or language for public health decision-makers or community leaders, are viewed as not credible, or are inadequately adapted or relevant to the Canadian context, then the broker has a clear rationale for undertaking a new synthesis and/or adaptation.

The Centres can therefore score some “early wins” in their first year or two of operations, by helping those who utilize evidence to assess the “match” between existing syntheses and their needs. This is necessary to help identify those topics where a new structured review of the global evidence is not required, especially given the plethora of relevant international synthesis activities now underway – particularly of public health policy and program effectiveness.3-17

On the other hand, there will be topics for which careful searching by the Centres reveals that nothing is currently available to meet Canadian decision-maker needs. Only a small number of such onerous “start-from-scratch” structured reviews can probably be undertaken in the first few years of NCC operations. This may be particularly true for inherently interdisciplinary topics for which one must draw upon unpublished “grey literature”.

There are new major, high-quality structured reviews of the effectiveness of public health interventions internationally.2,4 The six NCCs, working through a joint steering committee, are planning to collaboratively catalog and annotate the key features of at least the major relevant English and French websites and printed materials, as well as the key organizations working in this field globally.

**Some Considerations in Selecting Initial Priority Topics for Knowledge Synthesis**

For topics that lack suitable recent, high-quality reviews, the NCCs need a principled approach to prioritization of such topics that could meet Canadian decision-maker requirements.

National consultations by both the CIHR Institute of Health Services and Policy Research (and partners such as the Canadian Health Services Research Foundation, and the CIHR-Institute of Population and Public Health (with the Canadian Population Health Initiative (CPHI) at the Canadian Institute for Health Information) provide some insight into the sorts of structured, participatory processes useful for selecting research priority topics.10-14

CPHI has invested in reviews of the existing evidence concerning the “best policy and program interventions” to tackle some of the basic determinants of health: income; income inequality; obesity; early childhood education; and Aboriginal Health.10-11 These reviews provide NCCs with a useful starting point in selected fields of importance, although some updating and/or application of a different policy lens may be required to respond to stakeholders’ needs.

The key distinction between criteria for selecting knowledge synthesis and translation priorities, versus primary research priorities, is that the former should inform the latter. In other words, deciding what research topics to fund – at least for most applied research – should take into account whether potential users of evidence appear to actually need more primary research (e.g., in instances when existing studies are not conclusive, not of adequate quality, or are not relevant to context/setting nor to the level at which decisions are actually made).

The key question for selecting knowledge synthesis and translation priorities is rather different from that for prioritizing research topics: “Is the application of existing knowledge, especially that which is relatively unknown, conflicting and complex (and therefore difficult to apply) – by knowledge users in key decision-making roles – likely to result in significant improvements to population/community health status?”

A second, more pragmatic argument for prioritizing a given synthesis topic would be that an application of such knowledge may not improve health status per se, but it might result in increased efficiencies in the public health system and related services and programs (discussed below).

**The Role of “Scoping Reviews” and “Red Flags”**

One useful approach to deciding whether to undertake a full, costly and time-consuming structured review – leading, as is commonly the case, to the identification of many thousands of relevant publications for just one topic – is to perform a smaller,
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The likelihood that other sorts of “evidence” – such as strongly held professional opinion – will generally trump the low-quality, inconclusive or conflicting studies that are currently available, unless these other sorts of evidence (such as traditional indigenous, professional and/or community knowledge) can be explicitly factored into the review in a credible way – e.g., in a “best available evidence” approach.25

This is not to say that some such “difficult” topics, if important to stakeholders, should be abandoned as foci for full review, simply because they have one or more of the above features. What may be needed is a much broader approach to “synthesis,” involving careful polling of public opinion, interviews to tap traditional cultural wisdom where appropriate, and carefully-sampled expert opinion, all leading to the generation of well-documented (and scientifically reasonable) “best practices.” Fostering the identification and synthesis of best practices in previously neglected topic areas may also be required. The NCCs are well positioned to respond to these challenges by engaging potential users early and often in the identification of gaps and review processes. This may be especially useful where there are no conclusive effectiveness studies that meet rigorous scientific criteria for quality, but public health organizations and community leaders must regularly make policy, program and practice decisions anyway, on the basis of the best available knowledge.16

The Role of “Mixed Evidence” for Intervention Effectiveness

Finally, before embarking on a full synthesis of intervention effectiveness, there is at times a clear indication that the evidence is unlikely to be conclusive. Nevertheless, a full review might still be warranted to achieve a reduction in the utilization of scarce resources, for “routinely used” but costly interventions that are deemed of uncertain worth through the review, pending the completion of more conclusive research. One such example would be unvalidated screening programs to detect and treat early disease, which may actually do more harm than good to the persons screened, beyond merely wasting scarce resources.26 A “mixed” synthesis finding can also identify a “research priority” for consideration by CIHR and other research funding agencies working with NCCs and their stakeholders.

Some Best Practices in Public Health Knowledge Synthesis

Let us suppose that a given public health intervention’s effectiveness is: 1) clearly of interest to Canadian decision-makers, in that a well-done synthesis is likely to be used by them;27 2) not well synthesized by any suitable, readily accessible review already conducted; and 3) feasible to accomplish within the financial, human, library/informatics, and time constraints facing an NCC. What then are some “pearls” from the experience of previous projects in this field?

Early Canadian Experience: The CHIM/PG Project

Over a decade ago, Canada was the site for the Community Health Intervention Monograph/Practice Guidelines (CHIM/PG) project.27-31 The CHIM/PG project was not funded by Health Canada beyond the series of reviews/guidelines published in the CJPH in 1994. But some useful and arguably timeless lessons were learned:

• More time was needed to determine the best way to assess the quality of studies of intervention effectiveness for community-level programs, which were understandably rarely ever randomized controlled trials. Fortunately, much of this basic methodological spadework has now been done by international projects such as the Campbell Collaboration15 and the U.S. Community Preventive Services Project.3 These efforts have recently been complemented by the Health Development Agency in its publication, “Grading Evidence and Recommendations for Public Health Interventions: Developing and Piloting a Framework.”16

However, not much is uniformly agreed upon in this area – especially across contrasting disciplinary traditions, such as sociology and epidemiology. The NCCs will need to review previous methodological analyses rather than developing a common approach de novo. Thereafter, it should be possible to rapidly distill the best

One of the most useful parts of this new UK publication is its updated and very comprehensive list of all the international organizations, including many readily accessible websites, currently conducting syntheses for public health applications - Appendix 1, page 15 of that document.
available knowledge into consensus-based guidelines for conducting syntheses that all the NCCs can then apply to their projects.

As Dobbins et al. have noted,27 most users of evidence, especially in front-line public health positions, have neither the time nor the critical appraisal skills to closely review which methodological criteria were utilized by a review process, in order to judge the precise quality of each study reviewed. They just want to read the results and be secure in the knowledge that the process has followed internationally respected guidelines for research synthesis and was competently conducted by credible authors. In the longer run, however, the NCCs themselves may choose to specifically address the need to strengthen front-line public health capacity to understand the methodological underpinnings. Contributing to this training and mentoring gap may also further increase receptivity by the public health system to such syntheses done on their behalf by NCCs.

- The CHIM/PG project was inadequate, and lacked perceived ownership by public health decision-makers, for actual dissemination to and uptake of its output by front-line public health professionals and agencies across Canada.

A Lesson from the Cochrane18 and Campbell15 Collaborations

A second lesson can be learned from the Cochrane and Campbell Collaborations – the former aimed largely at structured reviews of the effectiveness of clinically applicable interventions, and the latter at educational and social programs and policies. According to Andy Oxman, a Canadian with an international reputation in this field,

“Although this work is shared by thousands of people around the world, this represents more of a workload for some than for others and there are signs of exhaustion from many people with heavy workloads within the [Cochrane] collaboration.”

Oxman, in Egger et al., 2001, pp.464-65,32

An advantage of the NCCs, as currently funded, is that they can decide what reviews they should do, in what order, and at a pre-planned pace that they can afford to maintain with foreseeable resources.

Scientific Oversight of the NCCs’ Activities

Previous syntheses efforts have demonstrated that the complex process of knowledge synthesis and translation, particularly when undertaken by such geographically and institutionally dispersed centres, requires senior, expert oversight. To this end, an Advisory Council of experts in public health practice, policy, programs, research and knowledge synthesis and exchange was established in mid-2005. This Council of nominated individuals advises the Public Health Agency of Canada on the quality of NCC work plans, the progress of each NCC in relation to stated goals and targets, and the evaluation of the resultant “deliverables.” The latter may determine whether they are “knowledge products” such as practice guidelines, or more complex processes, such as consensus workshops or deliberative dialogues, where the evidence is sparse or conflicting. That evaluation must of course eventually include “arm’s length” assessment of the extent to which NCC products and services are actually used by and influence the decision-making of public health professionals, program managers, policy-makers, and civil society organizations across Canada.

In conclusion, the stage is set for Canada’s public health infrastructure to receive larger investments than in the past, which are long overdue. The NCC program arrives at an opportune time, offers considerable scope in undertaking innovative knowledge synthesis, translation and exchange activities, and fosters meaningful engagement and response to the diverse needs of public health decision-makers in the Canadian context. Arguably, the program’s breadth and complexity present some formidable challenges respecting what constitutes relevant evidence, appropriate methodologies for its synthesis and its use given political, educational, instrumental and other dimensions, as well as how to best measure its successful application and uptake. Centres recognize these challenges and the need to address them individually and collectively in the coming years.

Never before has there been so much international activity in knowledge synthesis and translation for public health applications. As a result, there are many national and international resources now available that can greatly increase our chances of reaching our overarching goal: the provision of accessible, accurate, comprehensive, up-to-date, and relevant knowledge products for Canadian public health decision-makers. But this will only translate into more effective public health interventions and better health for Canadians if high-quality, relevant, up-to-date synthesized evidence is made readily available and effectively translated into policies, programs and practices. The NCCs are poised to tap into the wealth of current international activity in knowledge synthesis and translation, and make a uniquely Canadian contribution to the field, as an important step in strengthening our public health system.

REFERENCES


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