INDIGENOUS KNOWLEDGE AND KNOWLEDGE SYNTHESIS, TRANSLATION AND EXCHANGE (KSTE)

Carmen Ellison, PhD, University of Alberta

Citation: Ellison, C. (2014). *Indigenous Knowledge and Knowledge Synthesis Translation and Exchange (KTSE)*. Prince George, BC: National Collaborating Centre for Aboriginal Health.
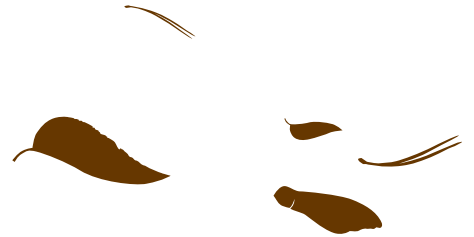
For further information or to obtain additional copies, please contact:

National Collaborating Centre for Aboriginal Health
3333 University Way
Prince George, BC, V2N 4Z9
Tel: 250 960 5250
Fax: 250 960 5644
Email: nccah@unbc.ca
www.nccah-ccnsa.ca

CONTENTS

1. INTRODUCTION

This paper is the first in a series of three papers on knowledge synthesis, translation, and exchange (KSTE) to improve the health of Indigenous people in Canada. The purpose of this paper is to provide background for discussion on KSTE within the context of Indigenous knowledge, particularly in the field of public health. The paper provides an overview of the literature on KSTE and Indigenous knowledge. As Cochran et al. (2008) suggest, a large amount of health research has been completed in and about Indigenous populations, but it has not had a large impact on overall well-being. The reasons for this are multi-faceted, but one key issue is certainly that of epistemology – of differences in knowledge systems and a need for improved interface between what Estey, Reading, and Kmetic (2006) term the "three communities": Aboriginal communities, researchers, and policy makers.

After exploring key concepts, this discussion paper will examine the theory and practice of KSTE within public health generally. This includes a discussion of evidence-informed public health (EIPH), the methods and processes employed to review health evidence and move it from research to implementation, and the ways in which evidence is categorized and assessed within EIPH. The paper will then move to a discussion of the key issues emerging from the literature on Indigenous knowledge and KSTE. Incorporating Indigenous knowledge into KSTE has the potential to create new knowledge, policies and practices to address health issues in communities. The paper concludes with a final set of reflections on the issues raised in this paper.

2. KTSE IN PUBLIC HEALTH

The purpose of this section of the paper is to examine the theory and practice of KSTE within public health. This includes an exploration of the definition of KSTE, the background to evidence-informed public health (EIPH), the methods and processes employed to review health evidence and thereby move it from research to implementation, and the ways in which 'evidence' itself – is assessed within EIPH. The latter discussion will conclude by reflecting on how Indigenous knowledge manifests as evidence within these systems – as a step towards exploring the role of Indigenous knowledge within public health. Overall, this section discusses the landscape of KSTE in public health in order to provide the background to understanding the ways in which Indigenous knowledge can work within existing methods and theories, but also the ways in which Indigenous knowledge requires its own evidentiary and KSTE processes.

2.1 Knowledge Translation, Synthesis and Exchange (KSTE)

There are varying definitions of the frameworks and practices of knowledge translation, synthesis, and exchange (Tetroe et al., 2008). In some conceptions of knowledge translation, the knowledge to be translated moves unidirectionally, from researchers to research-users in clinical and policy-making and programming settings. The key difference between researchers and research-users is, traditionally, one of specific technological or clinical training. As Choi (2005) points out, this is an important area for undertaking knowledge translation

because the volume and complexity of health research is not easily understood by those working outside of siloed academic disciplines. Choi suggests that "integration" (of a body of research into one resource, such as a systematic review or inventory of best practices) and "simplification" (by ensuring research findings can be clearly understood and effectively used) are key principles for knowledge translation. However, Choi's model is not a comprehensive one in the context of First Nations, Inuit, and Métis public health insofar as it has knowledge moving in one direction – from researchers to users, without an apparatus for considering knowledge as moving through more complex processes between different parties, or between parties with differing worldviews – and not just a separation in technological or clinical training.

Other models of knowledge translation have worked to encompass this movement of knowledge. The Canadian Institutes for Health Research (2009) define knowledge translation in terms of its activities, stakeholders, premises, and outcomes, as:

> *a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically-sound application of knowledge to improve the health of Canadians, provide more effective health services and products and strengthen the health care system. This process takes place within a complex system of interactions between researchers and knowledge users which may vary in intensity, complexity and level of engagement depending on the nature of the research and the findings as well as the needs of the particular knowledge user (n.p.).*

Indigenous organizations and researchers have sought to refocus this concept of knowledge translation, which, although it addresses itself to the activities and agents involved in knowledge translation, does not specifically define the field in relation to some pertinent issues for First Nations, Inuit, and Métis peoples. Allard (n.d.) examines knowledge translation, under the auspices of the Métis Centre of the National Aboriginal Health Organization (NAHO), as involving the:

> *systematic examination of the origin of the research; the assumptions underpinning the research process; the degree to which the research is perceived to have resulted in changes to policy, practice and health outcomes for organizations and Métis/First Nations/Inuit communities; and the perceptions of factors which impeded or supported the translation of the research into improved health outcomes and health status for Métis, First Nations and Inuit communities. (p. 3)*

Although the CIHR definition acknowledges the need for "ethically-sound application of knowledge," Allard's description of knowledge translation's specific relationship to First Nations, Inuit, and Métis communities is crucial, for knowledge should, of course, be ethically applied. However, the origin, assumptions, knowledge translation processes, and outcomes of research are central to thinking through knowledge

translation in Indigenous terms. As with Choi's (2005) understanding of knowledge translation discussed above, the CIHR definition is premised upon a shared worldview amongst all players, whereas the NAHO exploration of knowledge translation focuses on health outcomes.

Other definitions of knowledge translation have emerged in Indigenous contexts. Chandler and Lalonde (2004), for example, argue that knowledge translation is also lateral – issuing from First Nations, Inuit, and Métis communities that hold knowledge that can support improved health and well-being in other communities. However, differing worldviews are inherent to the current world of knowledge translation, wherein, as Ermine (n.d.) suggests, Western and Indigenous knowledge systems are each whole – with their own logic, scientific methods, philosophical underpinnings, and epistemology.

2.2 Evidence-Informed Public Health

The National Collaborating Centres for Public Health (n.d.) define Evidence-Informed Public Health (EIPH) as "the process of distilling and disseminating the best available evidence (whether from research, practice or experience) and using that evidence to inform and improve public health policy and practice" (p. 1). This section provides an overview of EIPH, as well as information on some of the commonly used types of evidence reviews and evidence-based processes being employed in public health (scoping study, environmental scan, systematic review, realist review, argument catalogue, deliberative process, and implementation science more generally).

EIPH finds its roots in the Evidence-Based Medicine (EBM) movement (which developed criteria for appraising evidence used to support clinical decisions)

and in Evidence-Based Public Health (EBPH) (Ciliska, Thomas, & Buffett, 2008) which brought the concepts of EBM to the field of public health (Kohatsu, Robinson, & Torner, 2004). However, whereas EBM and EBPH are, as their stated terms suggest, "based" in "evidence," EIPH conceives itself as being "informed" by evidence. The change in terms is an attempt to accommodate the contexts of policy and practice decisions; evidence alone does not provide the only information required for making decisions in public health practices or policy. The EIPH model envisioned by Ciliska et al. (2008) positions public health expertise at the intersection of four domains that form the context for decision-making:

1. community health issues, local context;
2. community and political preferences and actions;
3. research evidence; and
4. public health resources. (p. 7)

In this model, evidence is but one form of decision-making; as Ciliska et al. put it, EIPH "is a complex, multi-disciplinary process that occurs within dynamic and ever-changing communities and encompasses different sectors of society" (p. 7). Public health, they argue, involves "multidimensional issues" and a need to adequately incorporate community perspectives and values. They suggest, however, that evaluating research evidence is a domain of EIPH for which decision makers require support. Indeed, Ciliska et al. provide the following rubric (illustrated in Table 1), which focuses on the evidential process in EIPH.

Brownson, Gurney, and Land (1999) suggest that evidence-based public health – the development, implementation, and evaluation of public health programs resulting from scientific findings – uses five key analytic tools and processes for evaluating evidence: meta-analyses (quantitative, systematic integration of research findings), risk assessments

(characterizing risks to individuals and populations), economic evaluations (assessing appropriateness of public health programs and policies), public health surveillance (collection, analysis, and interpretation of outcome data, and dissemination to appropriate parties), and expert panels and consensus conferences (peer review of evidence underlying public health recommendations, regulations, and policy decisions). Brownson et al. also describe two types of evidence important to the overall process of evidence-based public health: analytic data that delineates an intervention (e.g., a risk factor or health condition), and evidence pertaining to the effectiveness of specific interventions. Effective processes – i.e., those that are the "impetus for action" (p. 90) – are more likely to involve consistent findings among high-quality studies from wide-ranging sources that include social, cultural, economic, and political considerations.

Table 1: Stages of Evidence-Informed Public Health	
Stage in EIPH	Description
1. Define	Clearly define the issue or problem.
2. Search	Efficiently search for the research evidence.
3. Appraise	Critically and efficiently appraise the information sources.
4. Synthesize	Interpret information and/or form recommendations for practice based on the relevant literature found.
5. Adapt	Adapt the information to local context.
6. Implement	Make a decision about implementing the adapted evidence in practice, program- or policy-development, or decision-making.
7. Evaluate	Evaluate the effectiveness of the implementation efforts.

Source: Ciliska, Thomas & Buffett, 2008, p. 6.

Brownson et al. (1999) identify a number of barriers to evidence-based public health processes, which range from challenges with data pertaining to the effectiveness of an intervention or program, especially for target populations, to lack of leadership, insufficient time horizons for implementation/evaluation, external pressures that deprioritize the evidence base, inadequate public health training, and lack of time to robustly review evidence (p. 94). Strategies for overcoming these barriers include the use of causal frameworks and formative evaluations (i.e., program logic models and process/implementation evaluation); enhancements to skills in review/analysis of evidence base, to dissemination of training programs, and to public health research funding; wider dissemination of training programs; the use of a systematic communication/dissemination strategy; and overall commitment to evidence-based public health by leaders (p. 95).

In terms of creating a successful process for implementing evidence-based public health, Brownson et al. (1999) suggest a six-stage process:

1. Develop an initial, concise, operational statement of the issue.
2. Determine what is known through the scientific literature.
3. Quantify the issue.
4. Develop program or policy options.
5. Develop an action plan for the program or policy.
6. Evaluate the program or policy. (p. 95)

The authors suggest that it is in the fourth stage that input from stakeholders is most effective – and that stakeholders might usefully be engaged on the timing of initiatives, framing of issues, sponsor-identification, and methods for gaining support from the general public.

2.3 Evidence Reviews

Central to EIPH is, as Brownson et al. (1999) put it, "determin[ing] what is known" within the existing evidence (p. 95). A range of methods have been developed to make these determinations. This subsection provides an overview of some of the most commonly used types of evidence reviews and evidence-based processes being used in public health, including:

· scoping study,
· environmental scan,
· systematic review,
· realist review,
· argument catalogue, and
· deliberative process.

2.3.1 Scoping study

Scoping studies, also called scoping reviews, provide a method for quickly identifying the key concepts of a research area, along with the main research sources and types of available evidence. Arksey and O'Malley (2005) identify a wide range of purposes for scoping studies, including examining the extent, range, and nature of evidence available; determining the value and feasibility of pursuing a full systematic review; as one part of a systematic review; summarizing and disseminating research findings; and identifying gaps in existing literature. They describe five stages in the completion of a scoping study:

1. identifying a research question,
2. identifying relevant studies,
3. study selection,
4. charting data, and
5. collating, summarizing, and reporting results. (p. 22)

Scoping studies do not appraise the quality of evidence, nor do they address themselves to synthesizing the work described in the study. Their purpose is to, as their name suggests, assess the scope of current evidence. Because scoping studies can be (relatively) quickly produced but are also iterative in their method (i.e., steps can be repeated, as appropriate, to broaden or narrow the inquiry), they have the potential for some flexibility in terms of the types of knowledge they address.

Arksey and O'Malley suggest that their initial model for the scoping study could be refined in future and more recent literature on the methodology of scoping studies supports increased consistency in how they are completed and the ways in which results are communicated (Lavac, Colquhoun & O'Brien, 2010; Davis, Drey & Gould, 2009). However, the original method for undertaking scoping reviews (i.e., Arksey and O'Malley) is still widely employed (see, for example, Kenny, Hyett, Sawtell, Dickson-Swift, Farmer, & O'Meara, 2013).

2.3.2 Environmental scan

Environmental scans tend to function as internal organizational documents, providing intelligence to those working within a particular field in order to inform effective planning for future work (Albright 2004). Environmental scans can also reach beyond a particular organization and form the basis of informed decision-making within a particular field (see, for example, Légaré et al., 2012).

Albright (2004) notes that environmental scans strive to identify emergent issues and situations in a field, while noting any potential pitfalls to be avoided. The process of undertaking a formal environmental scan involves five main steps:

· Identify the environmental scanning needs of the organization.
· Gather the information.
· Analyze the information.
· Communicate the results.
· Make informed decisions. (pp. 42-43)

The work of an environmental scan involves the exploration of up to six external factors: industry/market, technology, regulatory guidelines/laws, economics, society, and politics. Key challenges associated with environmental scanning involve appropriate management of what may well be a large volume of information; information sources that scanners may not be aware of; quality and timeliness of existing information; and interpretation of information sources (Albright, 2004). Environmental scanning is part of long-term planning and aims to support the development of an organization's responsiveness to change.

2.3.3 Systematic review

Systematic reviews have become a commonplace method for providing reliable information to research users – from clinicians and health promotion professionals to government and health system decision makers. The logic behind systematic review method is the premise that making policy or practice decisions based upon a single research study – no matter how solid its internal logic or findings – is less effective than basing decisions upon a series of studies representing the full range of research evidence available. Often completed using a statistical meta-analysis of related research studies, systematic reviews have the objective of providing research users with a comprehensive and reliable overview of a particular intervention or research question. In systematic review, the gold standard is the high-quality double-blind random controlled trial.

In addition to confirming that systematic review grounds discussion of an intervention's appropriateness in the synthesis of a group of studies rather than the specifics of a lone study, Lavis, Lomas, Hamid, and Sewankambo (2006) outline further advantages to the systematic review: bias is reduced because the likelihood of taking action on misleading results is more limited; confidence in the use of an intervention is increased; and time is used more efficiently because

the systematic review process has been undertaken with rigour and transparency. Dobbins, DeCroby, and Twiddy (2004) point to this latter advantage as well as suggesting that rigorous systematic reviews can function to mitigate "[t]he most significant barriers to incorporating research evidence into public health decisions" (p. 121), namely limited time, expertise, and resources required to identify, retrieve, read, synthesize, and translate evidence to practice.

A number of entities currently produce systematic reviews across a range of disciplines, from education to preventative medicine, including the Cochrane Collaboration, the Centre for Reviews and Dissemination, the Evidence for Policy and Practice Information and Coordinating Centre (EPPI-Centre), the Campbell Collaboration, the Effective Public Health Practice Project, Centre for Reviews and Dissemination (UK), US Task Force on Preventive Services (USA), and the What Works Clearinghouse (USA).

Systematic reviews have received a great deal of methodological attention in the last number of years, especially with respect to ensuring consistency in quality, rigour, and reporting standards – each of which have an important effect on review users. The PRISMA Statement (Moher, Liberati, Tetzlaff, & Altman, 2009), a set of systematic review reporting standards, and the GRADE Guidelines (Guyatt et al., 2008a, 2008b, 2008c, 2008d; Schünemann et al., 2008; Jaeschke et al.,2008), a system for classifying quality of evidence and strength of recommendations arising from systematic review, are two key examples of these methodological considerations.[1] Although such guidelines improve decision makers' ability to understand the lay of the land when it comes to questions of efficacy, these assessment systems are not uniformly understood and do not

address the complexities of complex health system implementation of interventions (Lewin et al., 2012).

2.3.4 Realist review
Realist reviews, often figured as a type of or alternative to systematic review, are designed to meet the challenges of what Pawson, Greenhalgh, Harvey, and Walsh (2005) call "complex social interventions" – those health and other public services where program effects are "crucially dependent on context and implementation" (p. 21). Realist reviews, therefore, aim to delineate what about a program or intervention works for which populations, the circumstances or contexts in which the program intervention does or does not prove effective, as well as what aspects of the program do or do not work and how precisely they do or do not work. In short, realist reviews do not aim to answer the question "What works?" but rather to ask, as Pawson et al. put it, "What is it about this programme that works for whom in what circumstances?" (p. 22). Rather than employing an experimental or quasi-experimental approach to evaluating effectiveness, realist reviews focus on the mechanism of an intervention, that mechanism's relationship to the intervention context, and the outcomes observed (Wong et al., 2013). Realist reviews cannot be completed using strict, reproducible protocols, making them somewhat subjective (Pawson et al., 2005; Wong, Greenhalgh, & Pawson, 2010). To support transparency with respect to the rigour and quality of realist reviews, publication standards have been developed to help readers understand these aspects of reviews more easily; these standards arise from the work of the RAMESES (Realist and Meta-Narrative Evidence Syntheses: Evolving Standards) project (Wong, Greenhalgh, Westhorp, Buckingham, & Pawson, 2013).

Realist reviews might take four different approaches:

1. reviewing in order to identify integrity of the programme theory,
2. reviewing in order to adjudicate between different (or "rival") programme theories,
3. reviewing one theory in more than one setting (i.e., within different contexts), and
4. reviewing "official expectations" vis-a-vis on-the-ground practice. (Pawson et al., 2005, p. 25)

Pawson et al. (2005) identify five key steps in performing a systematic review using a realist approach (Table 2), and emphasize that the realist approach demands overlap between different tasks and should be understood as iterative – change in one area of the process can, and indeed *should*, cause revision or refinement to other areas of the review.

2.3.5 Argument catalogue
In recognition that systematic reviews are structured to take into account empirical evidence gathered from primary research studies, Abrami, Bernard, and Wade (2006) describe efforts to adjust systematic review structure to take into account other types of evidence, including print media, policy and practitioner documents, and other compilations or reviews, but with the rigour of a systematic review's statistical analysis. There are seven stages in the completion of an argument catalogue:

1. formulating the purpose and research question(s),
2. locating and retrieving documents,
3. including and excluding documents,
4. creating an argument catalogue codebook,
5. coding documents,
6. analyzing and interpreting the data, and
7. disseminating the results. (p. 417)

[1] Updates to the original GRADE Guidelines can be found in Andrews et al., 2013; Balshem et al., 2011; Guyatt et al., 2010, 2011a, 2011b, 2011c, 2011d, 2011e, 2011f, 2011g, 2011h, 2012a, 2012b, & 2013.

Table 2: Key Steps in Realist Review

Step 1: Clarify Scope

A:	· Identify the review question · Nature and content of the intervention	· Circumstances or context for its use · Policy intentions or objectives
B:	· Refine the purpose of the review · Theory integrity – does the intervention work as predicted? · Theory adjudication – which theories fit best?	· Comparison – how does the intervention work in different settings, for different groups? · Reality testing – how does the policy intent of the intervention translate into practice?
C:	· Articulate key theories to be explored · Draw up a 'long list' of relevant programme theories by exploratory searching (see Step 2)	· Group, categorize or synthesize theories · Design a theoretically based evaluative framework to be 'populated' with evidence

Step 2: Search for Evidence

A:	Exploratory background search to 'get a feel' for the literature
B:	Progressive focusing to identify key programme theories, refining inclusion criteria in the light of emerging data
C:	Purposive sampling to test a defined subset of these theories with additional 'snowball' sampling to explore new hypotheses as they emerge
D:	Final search for additional studies when review near completion

Step 3: Appraise Primary Studies and Extract Data

A:	· Use judgement to supplement formal critical appraisal checklists, and consider 'fitness for purpose' · Relevance – does the research address the theory under test? · Rigour – does the research support the conclusions drawn from it by the researchers or the reviewers?
B:	Develop 'bespoke' set of data extraction forms and notation devices
C:	Extract different data from different studies to populate evaluative framework with evidence

Step 4: Synthesize Evidence and Draw Conclusions

A:	Synthesize data to achieve refinement of programme theory – that is, to determine what works for whom, how and under what circumstances
B:	Allow purpose of review (see Step 1b) to drive the synthesis process
C:	Use 'contradictory' evidence to generate insights about the influence of context
D:	Present conclusions as a series of contextualized decision points of the general format 'If A, then B' or 'In the case of C, D is unlikely to work'

Step 5: Disseminate, Implement and Evaluate

A:	Draft and test out recommendations and conclusions with key stakeholders, focusing especially on levers that can be pulled in here-and-now policy contexts
B:	Work with practitioners and policy makers to apply recommendations in particular contexts
C:	Evaluate in terms of extent to which programmes are adjusted to take account of contextual influences revealed by the review: the 'same' programme might be expanded in one setting, modified in another and abandoned in another

Source: Pawson, Greenhalgh, Harvey, and Walsh, 2005, p. 24.

The argument catalogue may have a number of functions, including identifying consistencies and inconsistencies that exist between research and public policy; offering a clearer picture of how to utilize knowledge to impact policy and practice; development of a comprehensive understanding of impacts, applications, and effectiveness/efficiency factors; identifying gaps in current understanding and literature on a topic; formulating questions for a systematic or other type of review (or as a supplement to that review); and improving credibility of the review process through use of a more inclusive set of materials.

The argument catalogue is still a relatively new method, but it seems to have received fewer uptakes amongst researchers than the similarly youthful realist review. Uptake has been limited to education-related research, where the method originated, and has not extended to health-related research (Hartman, 2008, 2011; Abrami, Bernard, and Wade, 2006).

2.3.6 Deliberative process

A deliberative process is a method for undertaking decision-making by taking into account a wide range of evidence before making decisions. In its nomenclature, deliberative process echoes the concept of "deliberative democracy," wherein citizens move beyond voting to take a more active role in creating the rule of law. With its lineage in ideals of active citizenship rights and responsibilities, the health decision-making deliberative process sets itself apart from other evidentiary processes by its participatory focus. A deliberative process, therefore, "has clear objectives; is inclusive and transparent; challenges science; promotes dialogue between all parties; promotes a consensus about the potential decision; and directly impacts on the decision itself" (Petts, 2004, as cited in Lomas, Culyer, McCutcheon, & Law, 2005, p. 17). A deliberative process involves setting

of a topic or question, engaging and assessing evidence, and working to achieve consensus among a group of panelists drawn from government, professional groups, civil service, and research communities. Lomas et al. (2005) suggest that an effective deliberative process should aim for "a balanced consensus, obtained by careful consideration of all relevant evidence, and involving a good range of those best qualified to assess it and those most likely to be affected by the outcome" (p. 24).

The Canadian Health Services Research Foundation (CHRF) (2006) conducted a workshop on evidence in health guidance in which it assessed both the advantages and shortcomings of deliberative processes. While it was felt by some participants that public and transparent deliberative processes, in which public opinion is welcomed, are more likely to produce results supported by politicians and perceived as credible, others expressed some reservations about deliberative processes that are open to the public including that misinterpretation and bias that might result from the expression of strong views, and that both reluctance to share views and entrenchment in particular views might compromise the process. Additionally, deliberative processes are resource and time intensive and it was felt that they could not be used for all decision-making. Lomas et al. (2005) note that heterogenous panel groups can engender conflict and that complete transparency may impact the ability of a deliberative process panel to discuss issues freely. Brehaut and Juzwishin (2005) suggest that public processes are more likely to employ formal research evidence, and Lomas et al. (2005) argue that some openness in processes is, overall, desirable.

2.4 Implementation Science

Implementation science has become an increasingly important part of KSTE processes in health, providing an umbrella for bringing together all aspects of research-to-action processes. As the US National Institutes of Health Fogarty International Center defines it, implementation science is "the study of methods to promote the integration of research findings and evidence into healthcare policy and practice" (Fogarty International Center, 2010, para. 4). While implementation science encompasses the translation of research evidence for use in policy and practice settings, it expands beyond questions of what particular interventions researchers have found to be appropriate and seeks to address how such interventions are most likely to be effective in "real-world public health and clinical service systems" (Fogarty International Center, 2010, para. 2).

In the Fogarty International Center's overview materials on implementation science, ways of thinking about scientific evidence emerge strongly, and raise important questions for the consideration of non-Western epistemological contributions to the scientific knowledge base. For example, one of the major intents of implementation science is to "investigate and address major bottlenecks (e.g., social, behavioral, economic, management) that impede effective implementation" (para. 5). This is perhaps all well and good, since historical and current inequalities like those experienced by First Nations, Inuit, and Métis peoples in Canada would appear to be addressed by this field of study. Finding methods to effectively implement proven clinical and public health knowledge for a range of populations is an important, laudable, and ambitious objective.

However, there remains a gap that haunts much of the literature on KSTE: at its very heart, implementation science questions the route knowledge takes to reach individuals and populations for whom a benefit is sought, but not how that knowledge is generated. Fogarty Center materials do steadfastly encourage the "[r]ethinking [of] scientific rigor" to find more value qualitative methods as well as "less tightly controlled real-world settings" (Fogarty International Center, 2010, para. 13). This 'rethinking' of evidence is being addressed by a range of scholars. Davidoff (2009), for example, examines the ways in which clinical trials' suppression of participant heterogeneity remains crucial in order to establish intervention efficacy. At the same time, ignoring heterogeneity is the source of a key drawback, a "dearth of reliable, nuanced information on outcome variation across risk subgroups," which, as Davidoff puts it, "contribute[s] importantly to the well-documented difficulty of translating hard clinical evidence into practice" (p. 2584). Davidoff instead proposes hybrid methodologies that combine the strengths of quantitative and qualitative methods while mitigating their biases.

While certainly the field of implementation science provides a venue for rethinking what constitutes good evidence in public health, this rethinking provides little ground for considering Indigenous knowledge about health, especially if we understand this knowledge as inveterately local and emerging from a worldview that privileges knowledge production and sharing mechanisms (i.e., KSTE) that handle questions of bias, objectivity, and the transmission of knowledge differently than Western post-enlightenment rationalism.

2.5 Evidence – How Does Indigenous Knowledge 'Count'?

The question of what counts as evidence in decision-making processes remains a key issue for considerations of Indigenous knowledge. The Canadian Health Services Research Foundation's (2006) report, *Weighing up the evidence: Making evidence-informed guidance accurate, achievable, and acceptable*, provides an overview of discussions held at a workshop exploring the roles of different types of research in evidence-base decision-making. The report outlines three key types of evidence: "context free," "context sensitive," and "colloquial" evidence. Culyer and Lomas (2006) provide the definitions of these terms, which are currently widely employed in deliberative processes (Lomas et al., 2005):

· **Context free evidence** is based on scientific principles – testable formal theory or hypotheses, replicable and recognizable methods of design, data collection, and analysis and interpretation. Context free evidence furthermore possesses a high degree of certainty when it comes to attributing outcomes to a particular trial rather than to confounding variables. In other words, reliable context free evidence is *internally valid*.

· **Context sensitive evidence** is, on the other hand, *externally valid*. This type of evidence, while employing scientific principles similar to those in context free evidence, focuses instead on whether causal relationships are generalizable to settings that move beyond the particularities of one study.

· **Colloquial evidence** can be drawn from multiple sources, is often a complicated mix of sources, and generally brings together information that is "locally idiosyncratic" and "scientifically general" (p. 360). Colloquial evidence can be used in the absence of scientific evidence, or to provide context to context free evidence.

Put in slightly different terms, Lomas et al. (2005) suggest that context free evidence marks out ideals, context sensitive evidence accounts for the circumstances of application, and colloquial evidence is based upon local relevance. Culyer and Lomas (2006) emphasize that context free and context sensitive evidence must be more highly valued than colloquial evidence. Participants in the *Weighing up the evidence* workshop agreed, suggesting that scientific evidence falling into these two categories should be accorded a preferential position in processes designed to provide health guidance (Canadian Health Services Research Foundation, 2006). The position of colloquial evidence in this system is important as well; however, workshop participants concluded that there are many types of information used by decision makers, that this information is crucial but because it is less formal than context free and context sensitive evidence, it is "entirely different in nature" and should be used in deliberative processes as a method for informing scientific evidence.

The emphasis on context free and context sensitive evidence as inhabiting the top of the evidential hierarchy is of key importance to considerations of Indigenous knowledge, for within this evidence system, Indigenous knowledge will always (or almost always) be relegated to the category of colloquial evidence. As many researchers in First Nations, Inuit, and Métis health have noted, Indigenous knowledge is inherently local (Blackstock & Greenwood, 2007, Burhansstipanov, Bradley, & Dignan, 2003, Ermine, 2005b, Estey et al., 2006, Hanson & Smylie, 2006, Smylie, Martin, Kaplan-Myrth, Steele, Tait, & Hogg, 2003). However, evidence-informed public health decision-making processes may view what is local as "local context" (Ciliska et al., 2008, p. 7) rather than as a potential part of the evidence base.

Despite its democratic underpinnings, deliberative processes are designed to "ensure scientific forms of evidence take priority over colloquial evidence" (Canadian Health Services Research Foundation, 2006, p. 8). When these processes employ a method that separates what is scientific from what is local – seeing scientifically proven interventions as requiring "adapt[ation]" in order to suit "local context" (Ciliska et al., 2008) – they may, regardless of positive intentions, create barriers for taking into account Indigenous knowledge on its own terms.

Furthermore, colloquial evidence produced by lobbyists and pressure groups can be considered as biased and therefore be regarded with a higher degree of suspicion by some (Canadian Health Services Research Foundation, 2006). For Aboriginal[2] peoples in Canada, this presents a further barrier to accessing the higher echelons of perceived reliability in deliberative or other evidentiary processes; representative organizations of First Nations, Inuit, and Métis peoples in Canada often serve their constituents through multiple roles – lobbying and applying pressure on the one hand and funding, producing, and/or partnering in research on the other. The perception that lobbying and pressure group organizations are more biased than other sources of knowledge could mean a risk of either inequitably downgrading the quality of evidence produced under the auspices of such organizations or missing important sources of information that are not available in any other form. As Davidoff (2009) shows, the most rigorous randomized control trials are increasingly understood as having their own bias; in quieting a test population's heterogeneity in order to establish efficacy, its implementation efficacy across heterogeneous populations remains quiet too.

While decision makers may have a duty to consider all evidence available, the process involved in weighing the importance of each piece of evidence may have negative consequences for research that deals specifically with Indigenous knowledge and does not use a western scientific model. However, as Lomas et al. (2005) suggest, all types of evidence – context free, context sensitive, and colloquial – require some level of interpretation and there is, therefore, some room to improve deliberative processes in order to make them more accountable to Indigenous knowledge on the grounds that interpretation of evidence is crucial to the deliberative process generally. To be clear, the issue at stake is not whether or not deliberative processes should be sound (for certainly there is consensus on this as desirable), but rather that the current model may currently be underutilizing Indigenous knowledge that could contribute to decisions that are more – and not less – sound.

---

[2] The term "Aboriginal" refers to individuals who identify with at least one Aboriginal group, i.e. First Nations (North American Indian), Métis or Inuit, and/or those who report being a Treaty Indian or a Registered Indian as defined by the Indian Act of Canada and/or who are members of an Indian Band or First Nation. Aboriginal peoples of Canada are defined in the Constitution Act, 1982, Section 35(2) as including the Indian, Inuit and Métis peoples of Canada (Statistics Canada, 2013).

3. INDIGENOUS KNOWLEDGE AND KSTE

This section examines key issues emerging from the literature on Indigenous knowledge and knowledge synthesis, translation, and exchange (KSTE). Mainstream KSTE methods are not necessarily able to improve the health of First Nations, Inuit, and Métis populations because they tend not to include Indigenous understandings of health and well-being and tend to separate – rather than integrate or instantiate – issues of culture from the transfer, dissemination, and integration of knowledge into practice (Estey et al., 2006). Overall, this section emphasizes the importance of thinking beyond the 'inclusion' of Indigenous knowledge in mainstream KSTE. Qualitative data collection methods designed to address cultural differences, for example, do not speak to what Cochran et al. (2008) call "the root issue of how we go about knowing" (p. 24).

One group of Indigenous researchers, including those working in public health, indicated that there are misgivings about the appropriateness of mainstream systematic review methods, and that vigilance and further work are certainly required in order to ensure reviews of evidence to address the needs (including population variability) of Indigenous populations, as well as to consider the underpinning methodology of systematic review (McDonald, Priest, Doyle, Bailie, Anderson, & Waters, 2010).

The most important things that can be said about Indigenous knowledge are that it does not have just one definition and that the diverse knowledge systems of First Nations, Inuit, and Métis peoples have both important differences and crucial similarities to Western, post-Enlightenment rationality. As

Durie (2004) argues, the diverse, global Indigenous populations share common histories of colonization and socioeconomic disadvantage, but neither of these related histories should necessarily be understood as definitive of a people's epistemology. A wide range of thinkers have sought to define Indigenous knowledge. Commonly, Indigenous knowledge is figured as rational and observational (tying it to Western thought), but – importantly – relational, participatory, interconnected/ intergenerational, and holistic/unifying in its vision (Durie, 2004; Ermine, 2005a; Kaplan-Myrth & Smylie, 2006; Koebel, 2005; Smylie et al., 2003). Those who think and write about Indigenous knowledge further emphasize that it is as fundamentally local as it is systematic and empirical; that is, it is based on rational observation and grounded in the locale of this experience (Brant Castellano, n.d.; Kuptana, 2005; Smylie et al., 2003).

As much as thinkers in the field of Indigenous knowledge have sought to find common terms to describe Indigenous epistemologies globally, there

is nonetheless a clear understanding that knowledge is local – different nations, communities, and peoples have their own methodologies for understanding the sources, storage, translation, sharing, and uses of knowledge (see, for example Hanson & Smylie, 2006; Burhansstipanov et al., 2003; Ermine, 2005b). Blackstock and Greenwood's (2007) emphasis on respecting diversity underlines the importance of an epistemological system that recognizes knowledge as inherently local: "[p]an-Aboriginal research approaches often fail to capture differences in experience and can lead to misinformed health policies and practices" (n.p.).

Therefore, knowledge translation in First Nations, Inuit, and Métis communities encompasses a wide range of activities, from informal family discussions and translation of materials into community languages to research processes that implement findings and involve communities (Kaplan-Myrth & Smylie, 2006). This is something it shares in common with other knowledge systems. However, strong Indigenous KSTE has important potential to create new

knowledge, policies and practices, and to address health issues in communities (Canadian Institutes of Health Research, Institute of Aboriginal Peoples' Health, 2007). This section examines research ethics and participatory research, and Indigenous KSTE systems.

3.1 Research Ethics and Participatory KSTE

Blackstock and Greenwood (2007) emphasize that strong ethics and values are crucial in Aboriginal health research (as well as cultural competence) because of the history of misuse of research in First Nations, Inuit, and Métis communities. This is a point echoed in Morris (1999) and Indigenous Peoples' Health Research Centre (2005), which report concerns that Indigenous knowledge, Elders, and traditional healers will not be appropriately respected (in line with the respect accorded doctors, scientists, and academics), that knowledge will be taken out of context (its holistic nature being lost), or that community members could be manipulated in the

research process. Cochran et al. (2008) further contextualize the issues of ethics and values, explaining that research in Indigenous communities "has often served to advance the 'politics of colonial control,'" which led to "significant distrust of researchers" in the past (p. 22). More recently, they suggest, that trust has not necessarily been mended because of "culturally insensitive research designs and methodologies" (p. 22). One of the key impacts of these research processes is the continued circulation "of the myth that indigenous people represent a 'problem' to be solved and that they are passive 'objects' that require assistance from external experts" (p. 22).

In building research designs and methodologies that reject these models, a number of strategies have been suggested, most of which explicitly or implicitly involve knowledge translation strategies. Ensuring that research benefits the community is of importance (Hanson & Smylie, 2006), and identifying community benefit necessarily involves engaging the community from planning stages through to dissemination of findings. Distribution of benefits, even in the context of formalized research partnerships, can present challenges; researchers are beholden to university tenure and promotion requirements that may conflict with community benefits, including the protection of Indigenous knowledge (Cochran et al., 2008). Elias and O'Neil (2006) echo this concern. For organizations that effectively support decision-making in First Nations, Inuit, and Métis communities, demand for their support services can outstrip supply and there can be conflicts for those working within a university milieu. Cochran et al. highlight that: "[r]esearchers, particularly in a young organization, are also mindful of the realities of advancement in the university, where traditional academic progress is rewarded over community-oriented activities" (p. 48).

Participatory research methods have emerged as one effective methodological model for conducting research in such settings. Allard (n.d.) points to positive changes in terms of population health and research professionals engaging more effectively with target populations; thereby creating research projects and programs that come *from* communities rather than being hierarchically directed to communities. Estey et al. (2006) also support the concept of community-based research which places decision-making within the community, formalizes equal and full partnership in research, and functions along principles of "collaborative, participatory, empowering, systematic, and transformative approach[es] to health research" (n.p.). However, Cochran et al. (2008) caution against participatory research as a panacea, noting that although it engages communities at all stages of the research process, it "does not prevent the risk that indigenous ways of knowing are marginalized by the scientific and academic community" (p. 22). In order for participatory processes to work well, they argue, 'participation' cannot be limited simply to 'engagement' processes that maintain the primacy of western scientific methodologies. On the contrary, Indigenous methods need to be considered at the level of research design, as well as throughout the research process. As Durie (2004) reports, these methods

may be relatively small in their scope (e.g., the implementation of appropriate cultural ceremonies in laboratory processes) or much larger in nature (e.g., the use of Indigenous-designed outcome measures). A number of these sentiments are echoed by Potvin, Cargo, McComber, Delormier, and Macaulay (2002) who emphasize the importance of equal partnerships at all stages, integration of intervention and evaluation research, flexibility and responsiveness, and the creation of learning opportunities in the course of research. Blackstock and Greenwood (2007) also support the use of Indigenous research methods and purposes on the grounds that western knowledge validation techniques may not maintain cross-cultural integrity. Additionally, Indigenous researchers have an important role to play because they already work at the interface of western scientific and Indigenous knowledges (Durie, 2004). Effective participatory research and KSTE puts as a first principle the importance of the local – in everything from understandings of social and health indicators (what each community or people understand as the evidence of well-being) to the way in which knowledge is a co-creation – generative, iterative, and moving between generations (Marks, Cargo, & Daniel, 2007; Ball & Simpkins, 2004). In summary, considerations of Indigenous knowledge in the design and execution of research processes emphasize the need for Indigenous knowledge to be foundational throughout, rather than functioning at the level of community engagement or the use of qualitative rather than quantitative data.

Finally, maintaining community control of Indigenous knowledge is a widespread concern, and the literature on Indigenous knowledge tends to support Ownership, Control, Access, and Possession (OCAP) principles (First Nations Centre, 2007; Blackstock & Greenwood, 2007; Elias &

O'Neil, 2006; Allard, n.d.; Wiebe, 2005), as well as specific discussion of knowledge use in community knowledge translation strategies (Hanson & Smylie, 2006). Elias and O'Neil (2006) point to a number of specific OCAP challenges to be addressed for optimal knowledge translation, including that:

> [r]eaching agreement around OCAP principles ... can delay and even curtail research and KT activities. In particular, 'possession' of databases generated by provincial or federal data stewards is highly problematic, given confidentiality and privacy legislation. Data generated by researchers must also be protected for the privacy of research participants. Balance is required to avoid exclusionary approaches by either partner, which can foster distrust, lack of participation and conflict. The principles of mutual respect, the privacy and confidentiality of information at the individual and sub-group level and mechanisms for conflict resolution should therefore form an integral part of research agreements. (p. 48)

Beyond simply the need to protect Indigenous knowledge – itself a key issue – Elias and O'Neil identify relationships built on mutual respect as important to effective stewardship of knowledge.

3.2 Indigenous KSTE Systems

Concepts of interconnectedness are recurrent in definitions of Indigenous knowledge. For example, Koebel's (2005) examination of *Aboriginal Youth and Traditional Knowledge* maintains that Indigenous knowledge is ever-evolving through intergenerational connections that make knowledge old and new at the same time. Kaplan-Myrth and Smylie (2006) report that Elders emphasize relationships to the land as one key aspect of Indigenous knowledge, while Kuptana (2005) mentions a holistic, interconnected

worldview as a guiding principle for integrating new knowledge.

Augmenting the concept of interconnectedness in Indigenous knowledge, Durie (2004) adds the idea of Indigenous knowledge as "dynamic," underlining that while the traditional aspects of Indigenous knowledge are often highly valued, *creation*, *invention*, and *synthesis* are also foundational to systems of knowledge. Ermine (2005a) suggests further that Indigenous epistemology is "based on participatory consciousness and personal experiences with human, natural, and supernatural relationships found in Indigenous learning traditions" (p. 6). Kuptana (2005) describes Indigenous knowledge as community-based, empirical, and dynamic, and Kaplan-Myrth and Smylie (2006) emphasize everyday experience and practicality as additional aspects of knowledge. Drawing from a range of readings, both inside and outside of the field of health,[3] Smylie, et al. (2003) echo these definitions, suggesting that "[m]ethods of Indigenous knowledge generation and application are participatory, communal and experiential, and reflective of local geography" as well as "ecologic, holistic, relational, pluralistic, ... timeless, infinite, ... oral and narrative-based" (p. 141). Finally, Blackstock and Greenwood (2007) forward the view that Indigenous and western scientific knowledge differ in terms of "scope of time, interconnection, and an emphasis on ancestral knowledge" (p. 6).

Theorizations of Indigenous knowledge have augmented these types of definitions of knowledge's qualities by thinking through interconnected domains or processes. Estey et al. (2006), for example, describe four key domains that constitute Indigenous knowledge's specific differences from western scientific knowledge:

---

[3] See Battiste (2000), Couture (2000), Battiste & Youngblood Henderson (2000), Brant Castellano (2000), and Dion Stout and Kipling (2001).

- **Organizing principles:** holistics, physical and metaphysical are linked to a moral code, and emphasis is on practical application;
- **Habits of mind:** trust for inherited wisdom, respect for all things;
- **Skills and procedures:** practical experimentation, qualitative oral record, local verification, communication of metaphor and story connected to life, values, and proper behavior; and
- **Knowledge:** integrated and applied to daily living and traditional subsistence practices. (n.p.)

In this rubric for defining Indigenous knowledge, Estey et al. add a number of significant nuances to more general definitions that focus on relationships and processes. This conceptualization also identifies a number of other issues as key to theorizations of knowledge: morality, practicality, trust, respect, orality, locality, narrative, values, behaviour, daily living, and traditional subsistence.

Hanson and Smylie (2006) propose a "knowledge circle" as another effective method for thinking through Indigenous knowledge. This formulation focuses on the origins, uses, storage, translation, and sharing of knowledge – positioning knowledge as process rather than product, as the movement of concepts and ideas in time, and through people, texts, narratives, places, institutions, and situations. In breaking out the four dimensions of the "knowledge circle," which repeat when knowledge comes into use and thereby create new knowledge, the "knowledge circle" proposes a wide range of possibilities for thinking through Indigenous knowledge. Table 3 describes Hanson and Smylie's points of departure for these considerations (i.e., their list is by no means exhaustive, but is meant as a starting point for further discussion on knowledge translation). In this formulation, Indigenous knowledge is process-oriented and contextual, and methods for consideration of knowledge

Table 3: The Knowledge Circle

How does knowledge come to us?	How is knowledge stored?	How is knowledge translated and shared?	How is knowldge used?
· Emergence from the non-physical to the physical world · Intuition, inspiration, and spiritual seeking · Dreams, visions, symbols · Nature – trees, plants, animals, rocks, land · Ancestors · Life experience, individually and collectively · Elders, family members, community members, leaders · Good thinking and contemplation · Talking and working with others · Asking good questions and seeking answers · Problem solving · Apprenticeships – traditional knowledge processes for passing on knowledge · New connections between existing knowledge · Traditional knowledge research · Scientific research · Research – formal and informal – quantitative (numbers) and qualitative (thoughts, words, and feelings) · Others	· Told stories and legends · Drawings and graphics · Art, song, and ceremony · Embedded in daily life · Oral traditions, protocols, and traditional roles · Written form – written stories and legends, articles, reports, books, etc. · Educational curriculum and approaches · Videos, movies, websites · Published and distributed graphics and art · Others	· Story circles and story telling · Lessons embedded in stories and sharing circles · Art, song, and ceremony · Teaching and healing circles · Elders and traditional knowledge keepers · Around a table with tea and food · Development of multiple literacies – oral, written, human development process, spiritual, emotional, and others · Dialogue and discussion in person, using technology, or sharing of written documents · Educational processes in formal institutions · Document synthesis and other research and writing projects · Meetings, conferences, and other gatherings · Published and unpublished documents · Others	· Daily life – using information to "be a good person, live a good life, in a good way" · To inform relationships – teachings of respect, communication, community and peace, for example · To restore and renew culture · To provide data/information/ evidence (scientific and lived experience) · To support learning and community capacity development (capacity for doing research, developing and implementing policy, designing and delivering programs, managing programs, people and resources, developing partnerships/ collaboration and governance, etc.) · To solve more problems · To improve research processes · To support personal and organizational decision-making · To support the design, delivery, and evaluation of programs and services (including clinical practices) · To inform design and evaluation of health services delivery systems · To inform policy development structures, processes, and content within the Indigenous communities and outside · Others

Source: Hanson and Smylie, 2006, pp. 12-13.

are based in dialogue – in asking and answering questions that may have different answers for different individuals, communities, and peoples.

In terms of translating knowledge into effective policy for improved First Nations, Inuit, and Métis health, Indigenous knowledge has an important role to play. Smylie et al. (2003) point out that although there has been a positive shift towards health policy makers increasingly being found within communities, health researchers are still largely external figures – making the level of Indigenous knowledge among policy makers better, but widening the gap between researchers and those who develop policy and implement programming. Smylie et al. argue that an additional benefit of framing research within Indigenous worldviews and of working meaningfully with Aboriginal academics and communities will be that

beneficial research will more easily make its way into policy. Hanson and Smylie (2006) note that language and cultural relevance can be an issue for knowledge brought into the community from a government source – translation may be required. Decision makers within Aboriginal communities also have a high level need for high-quality information (Elias & O'Neil, 2006).

Ermine (2005a) outlines four models of research translation in order to identify the most promising routes for transferring knowledge among all of the groups involved in Indigenous health. The first two models, the mono-culture and the colonial model, are based in western scientific epistemes, and Ermine represents them as follows:

- **A: Mono-Culture** (Western) Research → Synthesis → Policy → Application (Masses)

- **B: Colonial Model** (Western Knowledge) Research → Synthesis → Policy → Application (to Indigenous community) i.e. translate knowledge → transfer (pp. 5-6)

In these two models of knowledge translation, Indigenous knowledge does not figure. In the "Mono-Culture" model, western scientific research moves unidirectionally from research results through knowledge synthesis, policy development, and finally application to a mass (homogeneous) population. For Ermine, this type of model ignores any need for cross-cultural practices. In the colonial model, knowledge is similarly unidirectional but is applied to Indigenous peoples. The consequences of this model include "disposess[ion] of Indigenous communities' ownership and self-determination of their own health" and "disrupt[ion of] Indigenous systems of health knowledge" (p. 6). In Ermine's

third model of knowledge translation, Indigenous knowledge is employed but in an "opportunistic" way.

· C: Appropriation Model (Indigenous knowledge) Research → Synthesis → Policy → Application (into Western system) i.e. translate → transfer (into Western system) (p. 6)

In this model, appropriation is the operative term, and Indigenous knowledge is treated with inappropriate ethics and exploitation. Indigenous peoples are, under this model, "constructed under pathological lenses" and their knowledge makes its way, poorly, into western paradigms (p. 6). None of these three models, Ermine argues, is either productive or ethical.

In response to the inadequacies of the first three models for knowledge translation, Ermine has developed a fourth, more promising, framework:

· D: Indigenous Framework (Indigenous based development of knowledge/institutions) → Research → Synthesis → Policy → Application (Within Indigenous communities) (pp. 6-7)

Ermine's Indigenous Framework looks to a structure in which Indigenous health knowledge and institutions – "reclaim[ed]" and "rebuil[t]" in a decolonized setting – become part of an Indigenous-run research program. For Ermine, this model is the ideal, but it requires that "the playing field [be] somewhat leveled" (p. 7).

Allard (n.d.) highlights both research transfer and knowledge brokerage as key to knowledge synthesis, translation, and exchange. In the context of research transfer, Allard suggests that Indigenous knowledge must intervene at an early stage of research transfer processes and continue throughout the transfer process.

Indigenous knowledge, she argues, "must be created with an Indigenous perspective to translate data to information, and finally into new Indigenous knowledge" (p. 9). *Allard's Knowledge Translation Toolkit for Communities Working with Researchers* (n.d.) provides one template, comprised of ten questions, that communities can use to begin the work of developing a systematic decision-making process and/or set of policies for participation in research. These ten questions are identified as:

1. What is this project trying to achieve?
2. Who are the potential users of the outcomes or knowledge from the project?
3. How does this project relate to other current research work or trends in policy and practice?
4. How can you try to ensure your project achieves an impact?
5. What are the risks or obstacles to successful research transfer for this project?
6. What are the opportunities which exist around this project to facilitate knowledge translation?
7. Can capacity development be an outcome of this project?
8. What are the dissemination and publication requirements for this project?
9. How have/will you provide feedback to community organizations or members who participated in the research?
10. How much will a KT process cost? (n.p.)

Similarly, Elias and O'Neill (2006) find that a degree of control or ownership over the research process forms the basis of their knowledge translation model. While Elias and O'Neill engage research users across the board (not just those in communities), their key knowledge translation 'product' in one successful initiative was a First Nations Applied Population Health Research Summer

Institute, which sought to "build 'receptor' capacity in the First Nations health planning community" – including within First Nations communities. Building this type of capacity within communities is one method of working toward improved ownership and control over health research and planning.

Rikhy, Jack, Campbell, and Tough (2007) outline seven principles for knowledge exchange within communities: cultural appropriateness, inclusion of Elders, awareness of historical antecedents (e.g., residential schools), empowerment (e.g., non-hierarchical, equal partnerships), respect for Indigenous knowledge, cross-cultural communication, and long-term commitment. Knowledge exchange strategies suggested by Rikhy et al. are mindful of Indigenous knowledge. They echo others' views that participatory research is one important method for effective knowledge translation, but suggest further that visual strategies, the use of varied forms of media, community gatherings, talking circles, and storytelling are useful methods for health knowledge translation.

Evidence-based medicine presents barriers for Aboriginal communities, from the beginning of the process up to the implementation of interventions. First Nations, Inuit, and Métis peoples tend not to be the subject of studies included in systematic reviews – the most highly valued evidence – and randomized control trials rarely include Aboriginal peoples in sufficient numbers to guarantee applicability (Atkinson, 2007). Furthermore, evidence-based interventions tend not to consider the social determinants of health; issues like unemployment, colonial legacies, addictions, food insecurity, and access to hospitals among others are not accounted for in these types of studies (Atkinson, 2006). When evidence-based interventions do make their way to Aboriginal populations,

there are remaining barriers to ensuring their applicability. The diversity of communities, along with issues like language, identity, land, and Indigenous knowledge, all have potential impacts on the effectiveness of an intervention (Atkinson, 2006).

While promising work has been completed in employing community-based outcome measures in Indigenous community settings, Durie (2004) reports that clinicians are not necessarily able to view outcomes holistically. He explores a case in which clinicians remain unconvinced of measuring mental health intervention outcomes by looking at physical or spiritual health, although the interconnectedness of concepts of Indigenous health are well-established in the literature. Blackstock and Greenwood (2007) identify a need to assist professional associations and non-governmental organizations in the development of educational programs for health professionals who require improved knowledge in this area.

4. CONCLUSION

Indigenous knowledge is global insofar as Indigenous peoples share common histories and concepts; however, each community has specific methods for knowledge synthesis, translation, and exchange. Indigenous knowledge is, therefore, local. The localization and specificity of Indigenous knowledge presents both challenges and opportunities. On one hand, because each community has its own culture and history, knowledge of one community's successes does not necessarily translate to an appropriate public health program in another. On the other hand, the differences between communities means a wealth of promising practices are being used and there is much for Indigenous communities to learn from each other. Continued work to enhance lateral knowledge translation is required, as are the tools needed to do so effectively and ethically.

As this discussion paper has shown, developing tools for understanding Indigenous knowledge as evidence should not require Indigenous communities, individuals, or organizations to compromise. Finding a way to integrate Indigenous knowledge into pre-existing (if somewhat fluid methodologically) western scientific models presents significant difficulties with respect to ownership, control, access, and possession (OCAP) issues (First Nations Centre, 2007), but also with respect to the stakes involved in quantifying and integrating Indigenous knowledge into western scientific evidence-based processes. This quantification of knowledge could be a repetition of colonial strategies – the assimilation of knowledge into the credible terms of western science, rather than highly valuing Indigenous knowledge on its own terms entirely. Decisions to translate Indigenous knowledge into information legible to those habituated to a western scientific epistemology will need to ensure that the knowledge does not lose its meaning, value, or specificities in the act of translation.

REFERENCES

Abrami, P.C., Bernard, R.M., & Wade, C.A. (2006). *Affecting policy and practice: Issues involved in developing an argument catalogue*. Montreal, QC: Canadian Network for Knowledge Utilization, Centre for the Study of Learning and Performance, Concordia University.

Albright, K.S. (2004). Environmental scanning: Radar for success. *The Information Management Journal*, May/June: 38-45.

Allard, Y. (n.d.). Knowledge translation toolkit – Questions to be addressed regarding KT in research projects. Ottawa, ON: Powerpoint presentation, Métis Centre of the National Aboriginal Health Organization.

Andrews, J., Guyatt, G., Oxman, A.D., Alderson, P., Dahm, P., Falck-Ytter, Y., Nasser, M. et al. (2013). GRADE guidelines: 15. Going from evidence to recommendations: The significance and presentation of recommendations. *Journal of Clinical Epidemiology*, doi: 10.1016/j.jclinepi.2012.03.013

Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology*, 8(1): 19-32.

Atkinson, D. (2006). A brief overview of knowledge translation – key definitions. Prince George, BC: National Collaborating Centre for Aboriginal Health (NCCAH).

Atkinson, D. (2007). KT Dialogue Circle notes – February 8, 2007, St-Wet-Tan Longhouse, UBC. Prince George, BC: NCCAH.

Ball, J., & Simpkins, M.A. (2004). The community within the child: Integration of Indigenous Knowledge into First Nations childcare process and practice. *The American Indian Quarterly*, 28(3&4): 480-98. doi: 10.1353/aiq.2004.0091

Balshem, H., Helfand, M., Schunemann, H.J., Oxman, A.D., Kunz, R., Brozek, J., Vist, G.E. et al. (2011). GRADE guidelines 3: rating the quality of evidence - introduction. *Journal of Clinical Epidemiology*, 64(4):401-6. doi: 10.1016/j.jclinepi.2010.07.015

Battiste, M.A. (ed.). (2000). *Reclaiming Indigenous voice and vision*. Vancouver, BC: UBC Press.

Battiste, M., & Youngblood Henderson, J. (2000). *Protecting Indigenous knowledge and heritage: A global challenge*. Saskatoon, SK: Purich Press.

Blackstock, C., & Greenwood, M. (2007). *Scientific vision NCCAH*. Prince George, BC: NCCAH.

Brant Castellano, M. (n.d.). *Bridging worldviews: An approach to ethical research with Aboriginal peoples*. The Native Peoples Technical Assistance Office, Native American Research Lecture Series. Retrieved March 28, 2013 from http://www.nptao.arizona.edu/research/docs/CastellanoSummary.pdf

Brant Castellano, M. (2000). Updating Aboriginal traditions of knowledge. In *Indigenous knowledges in global contexts: Multiple readings of our world*, B.L. Hall, G.J. Sefa Dei, & D. Goldin Rosenberg (eds.), pp. 21-36. Toronto, On: University of Toronto Press.

Brehaut J.D., & Juzwishin D. (2005). *Bridging the gap: The use of research evidence in policy development*. Edmonton, AB: Alberta Heritage Foundation for Medical Research, HTA Initiative, no. 18. Retrieved October 29, 2013 from http://www.ihe.ca/documents/HTA-FR18.pdf

Brownson, R.C., Gurney, J.G., & Land, G.H. (1999). Evidence-based decision making in public health. *Journal of Public Health Management Practice*, 5(5): 86-97.

Burhansstipanov, L., Bradley, A., & Dignan, M.B. (2003). Lessons learned while developing "clinical trials education for native Americans" curriculum. *Cancer Control*, 10(5): 29-5.

Canadian Health Services Research Foundation. (2006). *Weighing up the evidence: Making evidence-informed guidance accurate, achievable, and acceptable. A summary of the workshop held on September 29, 2005*. Ottawa, ON: Canadian Health Services Research Foundation.

Canadian Institutes of Health Research (CIHR), Institute of Aboriginal Peoples' Health (IAPH). (2007). *Draft strategic plan for knowledge translation of health research results*. Victoria, BC: CIHR-IAPH.

Canadian Institutes of Health Research. (2009). *About knowledge translation*. Ottawa, ON: CIHR. Retrieved March 28, 2013 from http://www.cihr-irsc.gc.ca/e/29418.html

Chandler, M.J., & Lalonde, C.E. (2004). Transferring whose knowledge? Exchanging whose best practices?: On knowing about Indigenous knowledge and Aboriginal suicide. In *Aboriginal policy research: Setting the agenda for change, Vol. II*, J. White, P. Maxim, & D. Beavon (eds.), pp. 111-123. Toronto, ON: Thompson Educational Publishing.

Choi, B.C.K. (2005). Understanding the basic principles of knowledge translation. *Journal of Epidemiology and Community Health*, 59: 92-93.

Ciliska, D., Thomas, H., & Buffett, C. (2008). *An introduction to evidence-informed public health and a compendium of critical appraisal tools for public health practice*. Hamilton, ON: National Collaborating Centre for Methods and Tools, McMaster University.

Cochran, P.A.L., Marshall, C.A., Gracia-Downing, C., Kendall, E., Cook, D., McCubbin, L., & Gover, R.M. (2008). Indigenous ways of knowing: Implications for participatory research and community. *Health Policy and Ethics*, 98(1): 22-27.

Couture, J. (2000). Native studies and the academy. In *Indigenous knowledge in global contexts*, G. Sefa Dei, B. Hall, & D.G. Rosenburg (eds.), pp. 1-14. Toronto, ON: University of Toronto Press.

Culyer, A.J., & Lomas, J. (2006). Deliberative processes and evidence-informed decision making in healthcare: Do they work and how might we know? *Evidence & Policy*, 2(3): 357-71.

Davidoff, F. (2009). Heterogeneity is not always noise. *Journal of the American Medical Association*, 302(23): 2580-2586.

Davis, K., Drey, N., & Gould, D. (2009). What are scoping studies? A review of the nursing literature. *International Journal of Nursing Studies*, 46(10): 1386-1400.

Dion Stout, M., & Kipling, G. (2001). *Establishing a leading knowledge based organization*. Ottawa, ON: National Aboriginal Health Organization.

Dobbins, M., DeCorby, K., & Twiddy, T. (2004). A knowledge transfer strategy for public health decision makers. *Worldviews on Evidence-based Nursing*, 2nd quarter: 120-28.

Durie, M. (2004). Understanding health and illness: Research at the interface between science and indigenous knowledge. *International Journal of Epidemiology*, 33: 1138-1143.

Elias, B., & O'Neil, J. (2006). The Manitoba First Nations Centre for Aboriginal Health Research: Knowledge translation with Indigenous communities. *Healthcare Policy*, 1(4): 44-49.

Ermine, W. (n.d.). *Conceptual framework*. Ottawa, ON: Institute of Aboriginal Peoples Health.

Ermine, W. (2005a). Conceptual mapping of knowledge translation and transfer. In *Indigenous Peoples' Health Research Centre, knowledge translation and Indigenous knowledge symposium and consultation sessions (Final Report)*, pp. 4-7. Regina, SK: Indigenous Peoples Health Research Centre.

Ermine, W. (2005b). *Ethical space: Transforming relations*. Rankin Inlet, NU: National Gathering on Indigenous Knowledge Discussion Paper, May 3-5.

Estey, L., Reading, J., & Kmetic, A. (2006). Developing an Indigenous knowledge translation framework. Powerpoint presentation at the National Indigenous Knowledge Translation Summit, March.

First Nations Centre. (2007). *OCAP: Ownership, control, access and possession*. Ottawa, ON: National Aboriginal Health Organization, Sanctioned by the First Nations Information Governance Committee, Assembly of First Nations.

Fogarty International Center, National Institutes of Health. (2010). Frequently asked questions about implementation science. Bethesda, MD: Author. Retrieved March 10, 2013 from http://www.fic.nih.gov/News/Events/implementation-science/Pages/faqs.aspx

Guyatt, G., Oxman, A.D., Akl, E., Kunz, R., Vist, G., Brozek, J., Norris, S. et al. (2011a). GRADE guidelines 1. Introduction-GRADE evidence profiles and summary of findings tables. *Journal of Clinical Epidemiology*, 64(4): 383-94. doi: 10.1016/j.jclinepi.2010.04.026

Guyatt, G.H., Oxman, A.D., Kunz, R., Atkins, D., Brozek, J., Vist, G., Alderson, P. et al. (2011b). GRADE guidelines 2. Framing the question and deciding on important outcomes. *Journal of Clinical Epidemiology*, 64(4): 395-400. doi: 10.1016/j.jclinepi.2010.09.012

Guyatt, G., Oxman, A.D., Kunz, R., Brozek, J., Alonso-Coello, P., Rind, D., Devereaux, P.J. et al. (2011e). GRADE guidelines 6. Rating the quality of evidence - imprecision. *Journal of Clinical Epidemiology*, 64(12): 1283-93. doi: 10.1016/j.jclinepi.2011.01.012

Guyatt, G.H., Oxman, A.D., Kunz, R., Falck-Ytter, Y., Vist, G.E., Liberati, A., & Schünemann, H.J. (2008b). Rating quality of evidence and strength of recommendations: Going from evidence to recommendations. *British Medical Journal*, 336: 1049-51.

Guyatt, G.H., Oxman, A.D., Kunz, R., Jaeschke, R., Helfand, M., Liberati, A., Vist, G.E. et al. (2008c). Rating quality of evidence and strength of recommendations: Incorporating considerations of resources use into grading recommendations. *British Medical Journal*, 336: 1170-1173.

Guyatt, G.H., Oxman, A.D., Kunz, R., Woodcock, J., Brozek, J., Helfand, M., Alonso-Coello, P. et al. (2011f). GRADE guidelines: 7. Rating the quality of evidence - inconsistency. *Journal of Clinical Epidemiology*, 64(12): 1294-302. doi: 10.1016/j.jclinepi.2011.03.017

Guyatt, G.H., Oxman, A.D., Kunz, R., Woodcock, J., Brozek, J., Helfand, M., Alonso-Coello, P. et al. (2011g). GRADE guidelines: 8. Rating the quality of evidence - indirectness. *Journal of Clinical Epidemiology*, 64(12): 1303-10. doi: 10.1016/j.jclinepi.2011.04.014

Guyatt, G.H., Oxman, A.D., Kunz, R., Vist, G.E., Falck-Ytter, Y., & Schünemann, H.J. (2008d). Rating quality of evidence and strength of recommendations: What is "quality of evidence" and why is it important to clinicians? *British Medical Journal*, 336: 995-8.

Guyatt, G.H., Oxman, A.D., Montori, V., Vist, G., Kunz, R., Brozek, J., Alonso-Coello, P. et al., (2011d). GRADE guidelines 5: rating the quality of evidence - publication bias. *Journal of Clinical Epidemiology*, 64(12): 1277-82. doi: 10.1016/j.jclinepi.2011.01.011

Guyatt, G.H., Oxman, A.D., Santesso, N., Helfand, M., Vist, G., Kunz, R., Brozek, J. et al. (2012b). GRADE guidelines 12. Preparing Summary of Findings tables-binary outcomes. *Journal of Clinical Epidemiology*, 66(2): 158-72. doi: 10.1016/j.jclinepi.2012.01.012

Guyatt, G., Oxman, A.D., Sultan, S., Brozek, J., Glasziou, P., Alonso-Coello, P., Atkins, D. et al. (2012a). GRADE guidelines: 11. Making an overall rating of confidence in effect estimates for a single outcome and for all outcomes. *Journal of Clinical Epidemiology*, 66(2):151-7. doi: 10.1016/j.jclinepi.2012.01.006

Guyatt, G.H., Oxman, A.D., Sultan, S., Glasziou, P., Akl, E.A., Alonso-Coello, P., Atkins, D. et al. (2011h). GRADE guidelines: 9. Rating up the quality of evidence. *Journal of Clinical Epidemiology*, 64(12): 1311-6. doi: 10.1016/j.jclinepi.2011.06.004

Guyatt, G.H., Oxman, A.D., Schünemann, H.J., Tugwell, P., & Knotterus, A. (2010). GRADE guidelines: A new series of articles in the Journal of Clinical Epidemiology. *Journal of Clinical Epidemiology*, 4(4): 380-2. doi: 10.1016/j.jclinepi.2010.09.011

Guyatt, G.H., Oxman, A.D., Vist, G., Kunz, R., Brozek, J., Alonso-Coello, P., Montori, V. et al., (2011c). GRADE guidelines 4: rating the quality of evidence – study limitations (risk of bias). *Journal of Clinical Epidemiology*, 64(4): 407-15. doi: 10.1016/j.jclinepi.2010.07.017

Guyatt, G.H., Oxman, A.D., Vist, G., Kunz, R., Falck-Ytter, Y., Alonso-Coello, P., & Schünemann, H.J. (2008a). Rating quality of evidence and strength of recommendations GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. *British Medical Journal*, 336: 924-926.

Guyatt, G.H.,Thorlund, K., Oxman, A.D., Walter, S.D., Patrick, D., Furukawa, T.A., Johnston, B.C. et al. (2013). GRADE guidelines 13. Preparing Summary of Findings tables-continuous outcomes. *Journal of Clinical Epidemiology*, 66(2): 173-83.

Hanson, P.G., & Smylie, J. (2006). *Knowledge translation for Indigenous communities – A policy making toolkit*. Indigenous KT Summit Steering Committee. Retrieved October 29, 2013 from http://www.nccah-ccnsa.ca/docs/setting%20the%20context/KT_Policy_Toolkit_Sept26%5B1%5D.pdf

Hartman D. (2008). Towards new approaches to reviewing literature in gender education. *International Journal of Learning*, 15(5): 109-118.

Hartman D. (2011). Crossing divides: An argument catalogue of submissions to the 2000 Australian Government inquiry into the education of boys. *Thymos: Journal of Boyhood Studies*, 5(1): 81-98.

Indigenous Peoples' Health Research Centre. (2005). *Knowledge translation and Indigenous knowledge symposium and consultation sessions: Final report*. Regina, SK: Indigenous Peoples' Health Research Centre.

Jaeschke, R., Guyatt, G.H., Dellinger, P., Schünemann, H., Levy, M.M., Kunz, R., Norris, S. et al. (2008). Use of GRADE grid to reach decisions on clinical practice guidelines when consensus is elusive. *British Medical Journal*, 337: a744.

Kaplan-Myrth, N. & Smylie, J. (2006). *Sharing what we know about living a good life – Summit report: Indigenous Knowledge Translation Summit*. Regina, SK: First Nations University of Canada.

Kenny, A., Hyett, N., Sawtell, J., Dickson-Swift, V., Farmer, J., & O'Meara, P. (2013). Community participation in rural health: A scoping review. *BMC Health Services Research*, 13: 64. doi: 10.1186/1472-6963-13-64

Koebel, J. (2005). *Aboriginal youth and traditional knowledge: Honouring the past and acknowledging the future*. Rankin Inlet, NU: National Gathering on Indigenous Knowledge Discussion Paper, May 3-5.

Kohatsu, N.D., Robinson, J.G., & Torner, J.C. (2004). Evidence-based public health: An evolving concept. *American Journal of Preventative Medicine*, 27(5): 417: 421.

Kuptana, R. (2005). *Relationship between traditional knowledge and intellectual cultural properties: An Inuit perspective*. Rankin Inlet, NU: National Gathering on Indigenous Knowledge Discussion Paper, May 3-5.

Lavac, D., Colquhoun, H., & O'Brien, K.K. (2010). Scoping studies: Advancing the methodology. *Implementation Science*, 5(69). doi: 10.1186/1748-5908-5-69

Lavis, J.N., Lomas, J., Hamid, M., & Sewankambo, N. (2006). Assessing country-level efforts to link research to action. *Bulletin of the World Health Organization*, 84(8): 620-628.

Légaré, F., Politi, M.C., Drolet, R., Desroches, S., Stacey, D., Bekker, H. & the SDM-CPD team. (2012). Training health professionals in shared decision-making: An international environmental scan. *Patient Education and Counselling*, 88(2): 159-169.

Lewin, S., Bosch-Capblanch, X., Oliver, S., Akl, E.A., Vist, G.E., Lavis, J.N., Ghersi, D. et al. (2012). Guidance for evidence-informed policies about health systems: Assessing how much confidence to place in the research evidence. *PLoS Medicine*, 9(3): e1001187. doi:10.1371/journal.pmed.1001187

Lomas, J., Culyer, T., McCutcheon, C., McAuley, L, & Law, S., for Canadian Health Services Research Foundation. (2005). *Conceptualizing and combining evidence for health system guidance*. Ottawa, ON: Canadian Health Services Research Foundation.

Marks, E., Cargo, M.D., & Daniel, M. (2007). Constructing a health and social indicator framework for Indigenous community health research. *Social Indicators Research*, 82(1): 93-110.

McDonald, E., Priest, N., Doyle, J., Bailie, R., Anderson, I., & Waters, E. (2010). Issues and challenges for systematic reviews in indigenous health. *Journal of Epidemiology and Community Health*, 64: 643-644. doi: 10.1136/jech.2008.077503

Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G., for the PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *British Medical Journal*, 339: b2535. doi: http://dx.doi.org/10.1136/bmj.b2535

Morris, P.S. (1999). Randomised controlled trials addressing Australian Aboriginal health needs: A systematic review of the literature. *Journal of Paediatric Child Health*, 35: 130-135.

National Collaborating Centres for Public Health. (n.d.). *Fact sheet: What is evidence informed public health?* Antigonish, NS: National Collaborating Centres for Public Health Leads Secretariat.

Pawson, R., Greenhalgh, T., Harvey, G., & Walshe, K. (2005). Realist review – a new method of systematic review designed for complex policy interventions. *Journal of Health Services Research & Policy*, 10 (Suppl. 1): 21-34.

Petts, J. (2004). Barriers to participation and deliberation in risk decisions: Evidence from waste management. *Journal of Risk Research*, 7(2): 115–33.

Potvin, L., Cargo, M., McComber, A.M., Delormier, T., & Macaulay, A.C. (2002). Implementing participatory intervention and research in communities: Lessons from the Kahnawake Schools Diabetes Prevention Project in Canada. *Social Science & Medicine*, 56: 1295-1305.

Rikhy, S., Jack, M., Campbell, L., & Tough, S. (2007). Knowledge exchange as a vehicle to improve the health of Aboriginal communities. *Pimatisiwin: A Journal of Aboriginal and Indigenous Community Health*, 5(2): 107-123.

Schünemann, H.J., Oxman, A.D., Brozek, J., Glasziou, P., Jaeschke, R., Vist, G.E., Williams, J.W. Jr. et al. (2008). Grading quality of evidence and strength of recommendations for diagnostic tests and strategies. *British Medical Journal*, 336: 1106-1110.

Smylie, J., Martin, C.M., Kaplan-Myrth, N., Steele, L., Tait, C., & Hogg, W. (2003). Knowledge translation and indigenous knowledge. *International Journal of Circumpolar Health*, 63(2): 139-143.

Statistics Canada. (2013). Aboriginal identity. Ottawa, ON: Statistics Canada. Retrieved June 18, 2013 from http://www.statcan.gc.ca/concepts/definitions/aboriginal-autochtone2-eng.htm

Tetroe, J.M., Graham, I.D., Foy, R., Robinson, N., Eccles, M.P., Ward, J.E. et al. (2008). Health research agencies' support and promotion of knowledge translation: An international study. *The Milbank Quarterly*, 86(1): 125-155.

Wong, G., Greenhalgh, T., & Pawson, R. (2010). Internet-based medical education: A realist review of what works, for whom and in what circumstances. *BMC Medical Education*, 10: 12.

Wong, G., Greenhalgh, T., Westhorp, G., Buckingham, J., & Pawson, R. (2013). RAMESES publication standards: Realist syntheses. *BMC Medicine*, 11: 21. doi: 10.1186/1741-7015-11-21

Wiebe, C. (2005). *Customary law and cultural & intellectual properties*. Rankin Inlet, NU: National Gathering on Indigenous Knowledge Discussion Paper, May 3-5.

sharing knowledge · making a difference

partager les connaissances · faire une différence

ᖃᐅᔭᖅᑲᐃᖃᑎᒌᓂᖅ · ᐱᕚᓪᓕᖅᑎᑦᑎᓂᖅ