IHE Report

Effective Dissemination of Findings from Research

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EFFECTIVE DISSEMINATION OF FINDINGS FROM RESEARCH – A COMPILATION OF ESSAYS

Foreword

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Foreword

The essays presented in this book have grown out of a workshop on effective dissemination of findings from research organized by the Institute of Health Economics (IHE), that was held two years ago at the University of Alberta. The publication includes some of the material presented at that workshop. It is intended as one of the many available resources on dissemination of research findings for those interested in the subject.

This book is published in line with IHE's interest in effective dissemination, knowledge transfer, and impact on health policy and practice. IHE makes use of a number of means to distribute, disseminate, and increase the impact of its own work. These include traditional approaches such as publications in scientific journals, conference presentations, information via the Internet, press releases, workshops, seminars, and other educational activities. In addition, the IHE publishes its findings in a series of books and booklets which are widely distributed to decision makers in health policy and practice all over Canada. The Institute also produces books in a new series of issues in health, published by Wiley Verlag, starting with three volumes in 2008.

As part of IHE's dissemination activities, the IHE has also started an Ambassador Program for knowledge transfer in Alberta, as described in Chapter 5 of this book. That program's initial focus is on chronic pain; however, the intention is to broaden it to many more topics. The IHE's program was originally inspired by the Swedish Ambassador Program, which is described in Chapter 4.

The IHE is also running a series of Consensus Development Conferences to disseminate findings from research. This type of conference has a unique format, much like that of court hearings, which generates a statement that can quickly be put into health policy and practice. The policy impact of knowledge transfer through this type of conference has been assessed in several aspects and seems, overall, to be strong.

More information on the dissemination activities of IHE can be found at www.ihe.ca.

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Chapter 1. Overview

David Hailey

The effective dissemination of findings from health-related research – implying consideration of these findings by clinicians, policy makers, and consumers in reaching decisions – poses many challenges. In health care, there has been increasing recognition of the need to facilitate the transfer of research evidence into clinical practice and policy development. Considerable sums are spent on research, but concern continues that relevant findings are too often not appreciated or taken up by those who might benefit.

Dissemination, also referred to in this publication as Knowledge Transfer (KT) and Knowledge Transfer and Exchange (KTE), is a process that goes far beyond just distributing accounts and results of research. Distribution of findings is an important issue and vehicles for distribution (such as reports, journals, and the Internet) will need consideration as they vary in their coverage, timeliness, and cost. However, the essence of effective dissemination is that it is an interactive exchange between researchers and those they are intending to influence. In the field of health technology assessment (HTA), a study undertaken by EUR-ASSESS distinguished between diffusion – a passive process by which information is spread; dissemination – an active process of spreading a message to defined target groups; and implementation – a more active process which includes interventions to reduce or remove barriers to change, and activities to promote change (Granados et al., 1987).

A major intent of research dissemination is to provide and use information as input to decisions or policies that might require a change in behaviour or attitude on behalf of the target audience. This indicates the need for active promotion of the desired message. Approaches taken will depend on the target audience as well as the specifics of the research. One of the challenges may be matching the research findings to the wider perspectives or requirements of the groups who are being addressed.

Influencing clinical practice will need to take account of possible implications of the research findings for practice patterns and whether there are likely to be significant economic costs to practitioners. Clinicians may well wish to consider how persuasive the evidence may be in terms of influence on outcomes of their patients, and whether further research results may be needed before change is warranted. As discussed in later chapters, involvement of opinion leaders – those regarded by their peers as trusted sources of information – has been seen as an important component of the dissemination process.

Approaches to influencing consumers – patients, carers, and the general public – will need to take account of attitudes related to lifestyle, budgets, and culture. Interaction with consumer and patient organizations has been seen by the Cochrane Collaborative Research Groups (CRG) as a practical approach to involving the consumer in medical research. Such organizations can act as a focus for consumer interest, knowledge, and opinion (Ghersi, 2002). Lay synopses of Cochrane reviews have been used by some CRGs as a basis for articles in consumer organization newsletters. However, consumer organizations will not necessarily be representative of all patient groups and do not exist in some areas. A survey of HTA agencies that provide advice to decision makers in the public sector indicated that dissemination of findings to patients and carers is still in an early stage of development. Fewer than half the agencies provided summaries of their reports for consumers and only a third involved consumers in dissemination activities (Hailey and Nordwall, 2005).

Dissemination of research findings to policy makers and health care managers can help inform decisions on programs for funding, reimbursement and licensing of health care. In situations where research findings are used to inform decisions within a well defined administrative framework, dissemination can be well defined for facilitating input to policy decisions. An example is the use of HTA to inform coverage decisions for drugs, other technologies and medical services through some Australian programs, an approach similar to that of the National Institute for Health and Clinical Excellence in the UK (Jackson, 2007).

However, typically there will be many influences and inputs to policy making, including political influences. A study by Ross (1995) gave an indication of what sort of factors are seen as useful by Australian health care decision makers. Evaluation-related input, including economic information, was seen as influential on decisions for allocation of resources. However, more important factors were considered to be political views (including government philosophy), existing policies, administrative feasibility, timing, and equity.

Another hurdle for researchers in disseminating their findings is the volatility of policy areas, with rapid turnover of staff and reshaping of administrative structures. Decision makers will move on and their successors will need educating. Such changes to personnel strengthen the need for decision makers to be provided with clear descriptions of health services and technologies that are the subject of the research findings.

Decision makers may also benefit from guidance on options for action in response to research findings that are equivocal or not clearly related to the current policy question. For example, conditional support for a health service or technology may be appropriate, linked to further collection of outcomes data or restriction to a sub-population of potential clients. Such decisions should be linked to active management which takes account of additional significant research findings as they emerge. This presents a further challenge to the dissemination process. Research findings will often have limited currency and there may be uncertainties on when an update will be needed and how readily the target audiences will respond.

There are also difficulties associated with the process and evaluation of dissemination. Implementing effective dissemination of research findings requires significant resources, particularly if it is to be sustainable across many projects and areas of research. Various approaches to dissemination have been used, but these are not necessarily generalizable to other settings. Judgment is needed as to what might work in dissemination for particular research findings and target audiences. There are also uncertainties about how to define and measure the impact of research on subsequent decision making processes and the effectiveness of particular dissemination approaches.

These and other issues on dissemination are addressed in the following chapters which present material made available at the seminar. The authors have all had involvement in the practicalities of disseminating research findings and the material includes both appraisal of the literature on KT and descriptions of individual projects.

The chapters in this report

Jeremy Grimshaw and Martin Eccles discuss current concepts and evidence to guide KT activities, addressing the set of questions identified by Lavis et al. (2003).

They suggest that the basic unit of knowledge translation should be systematic reviews or other syntheses of evidence, rather than individual studies. Individual studies are subject to bias or random findings and need to be interpreted within the context of global evidence.

The relative importance of knowledge translation to different target audiences will vary by the type and results of research. Important steps in planning for KT include identifying barriers to the process (such as volume of research evidence and limited available time) and choosing interventions. However, standard approaches are not yet available and those involved with KT activities will need to use judgment as to the approaches that they take.

Grimshaw and Eccles give a summary of findings by the Cochrane Effective Practice and Organisation of Care (EPOC) group on systematic reviews of professional behaviour change strategies. They give details, including effect sizes, for a number of approaches, including use of printed educational materials, educational meetings, educational outreach, local opinion leaders, audit and feedback, reminders, and multifaceted interventions. Limitations of the strategies and of the available evidence are discussed.

Systematic reviews related to KT focusing on patients that have been identified by the Cochrane Consumers and Communication Review Group are then discussed. Approaches used include patient decision aids, personalised risk communication, interactive health communication applications (computer-based), and interventions to enhance medication adherence.

Finally, KT strategies focusing on policy makers and health service managers are discussed. The evidence base for this area is weaker than those for professional and patient groups. Information is provided on commonly reported facilitators and barriers and on generalizations on the interactions between policy making and research evidence. Several KT approaches targeting policy makers and senior managers are referred to. It is concluded that there are a profusion of innovative approaches but that the benefits, harms, and costs of these need further evaluation.

Craig Mitton and colleagues give an overview with a more specific focus. They present findings from a systematic review of the KTE literature and from interviews with persons who had interests related in KTE or in depression in the province of Alberta. They then outline how information from the review and interviews was used to develop a KTE strategy for the Alberta Depression Initiative (ADI), a collaboration that funds research aimed at improving the detection and treatment of depression in the Alberta population.

The focus of the systematic review was on studies of KTE which had potential for impact on health care at the policy level. Non-implementation studies identified fell into four groups. Organizing frameworks for applying KTE strategies are identified and details of one of these outlined. Information is given on barriers and facilitators to KTE; frequently-reported facilitators included personal contact between researchers and policy makers, clear summaries of findings with recommendations for action, and inclusion of key individuals. Approaches to measuring the impact of research studies are discussed, noting that the need to consider whether process or intermediate outcome measures should be used, and the degree to which policy or other decisions were informed. A smaller group of articles addressed stakeholder group perspectives in KTE. Some important dissemination activities were identified but there was limited evidence on how strategies should be applied for different stakeholder groups.

Considerable detail is given for 18 implementation studies on specific KTE mechanisms. Topics, context, and quality of the studies varied and there was limited evaluation of the strategies used. An ‘off the shelf” evidence base for developing and implementing KTE approaches was not available.

The qualitative research findings from the informant interviews provided useful perspectives on several issues related to the definition of KTE. The chapter includes excerpts from the interviews which point to the need for information exchange as opposed to transfer or translation; competing priorities for policy makers; limited KTE resources; challenges of changing individual behaviour; attitudes when there is no clear indication of what a policy maker should do; importance of champions; and the need to customize KTE approaches.

The plan for a three phased intervention for KTE in the Alberta program was based on findings from the review and informant interviews. In the first phase, stakeholders would be identified, given a short briefing note on the topic at hand and interviewed, get responses, and identify challenges as input to a workshop. The second phase would be a two day facilitated workshop to include those who participated in phase one. Objectives would include fostering a high level of interaction between stakeholders, addressing research findings in order to develop potential policy changes and new areas of research, and to launch a network for ongoing interaction. The final phase would involve a one year follow up of stakeholders, and then a second set of interviews to gauge the impact of the KTE strategy. A network could then facilitate ongoing interaction, providing a launching point for longer term relationship building and sustainable change.

In conclusion, Mitton and colleagues urge consultation with relevant stakeholders in specific contexts and development of an evidence based toolkit of KTE strategies based on primary research, rather then seeing KTE as an 'add-on' to other projects.

Leif Rentzhog gives an overview of the Ambassador Program developed by the Swedish Council on Technology Assessment in Health Care (SBU), with some emphasis on its application in Northern Sweden. The Ambassador Program is intended to help initiate changes in clinical practice that are supported by the findings of SBU reports. It makes use of local opinion leaders, often physicians in clinical practice, in each of the Swedish counties. These ambassadors are appointed by their own County Councils. In influencing clinical practice, they serve as representatives of the councils in addition to disseminating findings from SBU's reports. Their role is to promote various initiatives that will help implement changes in practice, rather than undertaking implementation themselves.

Emphasis is placed on communication with local politicians and other decision makers in facilitating their interaction with health care professionals. The ambassadors try to exert influence within their counties well ahead of the release of an SBU report so as to ensure that programs and educational initiatives are planned in a timely manner. They also plan for follow up of HTA reports after their release.

Rentzhog describes operation of the program run by the SBU North Regional Committee, which covers the four most northerly counties in Sweden. The Committee includes administrators, physicians, and a university representative, as well as the SBU ambassadors. The committee develops a strategy for implementing findings of each new SBU report. Approaches have included both large regional conferences and small groups of regional experts to discuss options for implementation. The SBU ambassadors also arrange local workshops.

Historically, the ambassadors devoted a great deal of time to seeking out and visiting neighborhood health centres. They now often link up with other partners, such as drug and therapeutic committees, which have physicians and pharmacists who regularly visit such centres.

Rentzhog mentions that it is difficult to be specific on the usefulness of the Ambassador Program, as various other factors will also influence changes in clinical practice. However, information on the success of the program has been obtained by some counties. In many counties, administrative organizations are now taking over the ambassadors' role, reflecting the increased cooperation of SBU with the Swedish National Board of Health and Welfare and the Medical Products Agency.

Paul Taenzer and colleagues describe a project undertaken in Alberta on KT in the management of chronic, non-cancer pain, which adapted the approach used in the SBU Ambassadors Program. This work followed a conference on chronic pain managements, organized by Alberta Health and Wellness. Experts at the conference had recommended that more effort needed to be directed towards education of primary care healthcare providers. The project was intended to serve as a prototype for KT, increase clinician knowledge about best evidence in chronic pain management, and encourage clinicians to incorporate research evidence into their management of chronic pain patients.

The authors describe the formation of an advisory committee that included all relevant stakeholder groups and the development of a workshop format to present research evidence to local clinicians. Workshops were designed for participants from many disciplines (reflecting the interdisciplinary nature of chronic pain management). Interaction between participants was encouraged. Discussion on 18 primary care treatments was facilitated by one page documents developed by the ambassador research team and statements of how the research evidence could be incorporated into clinical practice.

Taenzer and colleagues refer to the evaluation of eleven workshops held in eight of the provincial health regions. Reactions from the workshop participants were positive and follow up action had included sharing written material with colleagues and making changes to practice based on information that had been presented. Feedback from the participants included suggestions of topics in pain management and other areas that might be addressed through the ambassador approach.

Follow up activities have included updates to the available research evidence and continuing contact by workshop participants for evidence in brief summaries and requests for further workshops and information.

The authors conclude by raising some unanswered questions – whether participants permanently changed their clinical practices; if so, what the impacts were on patient outcomes and the extent to which the approach taken was generalizable. They also note the requirement for a strategy to achieve sustainability for this sort of program and for resources if ambassador programs were to be part of a comprehensive KT strategy.

Finally, **Lynda Jobin** outlines some of the practicalities involved in operating more broadly-based, continuous KTE through his description of the Liaison Program run by the Canadian Agency for Drugs and Technologies in Health (CADTH). Liaison officers, based in different Canadian jurisdictions, are used to link CADTH and local decision makers. These include persons in health ministries and authorities, hospitals, professional associations, and schools of medicine, nursing, and pharmacy.

The liaison officers support both the CADTH HTA program and the Canadian Optimal Medication Prescribing and Utilization Service and are assisted by knowledge transfer officers and other staff at the agency. They help to disseminate CADTH products, act as information brokers for other sources of evidence based information, and assist with educational workshops. This chapter gives an illustration of the organization and resources that are needed to support dissemination activities on a national scale.

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Chapter 2. Knowledge Translation of Research Findings

Jeremy Grimshaw and Martin P Eccles

Introduction

Globally we spend billions of dollars each year in both the public and private sectors on biomedical and health services research, undergraduate health care professional training and continuing professional development, quality improvement, patient safety, and risk management. Despite this, health care systems and health care professionals fail to provide the level of care that they aspire to. One of the most consistent findings from health services research is the failure to translate research into practice and policy. For example, McGlynn and colleagues (McGlynn 2003) observed that patients in the USA received 55% of recommended care and that quality varied by medical condition ranging from 79% of recommended care for senile cataract to 11% of recommended care for alcohol dependence. Similar findings have been reported globally in both developed and developing settings, in both primary care and specialty provided care, and in care provided by all disciplines (Grol 2001). As a result of these evidence-practice gaps, patients fail to benefit optimally from advances in health care resulting in poorer quality of life and loss of productivity both personally and at the societal level.

In addition to the limited use of effective treatments, there is also evidence that around 20-30% of patients may get care that is not needed or care that could be potentially harmful (Schuster 2005). Because of these evidence-practice gaps, patients are exposed to unnecessary risks of iatrogenic harms and health care systems are exposed to unnecessary expenditure resulting in significant opportunity costs.

Over the last decade, there has been increasing international policy and research attention on how to reduce the evidence-practice and policy gap. Across different health care systems, different terms have been used to describe these efforts including quality assurance, quality improvement, knowledge translation, implementation research, and research utilisation. These different terms often cover related and overlapping constructs. Commenting on the terminology of quality assurance in 1982, Donabedian noted that 'we have used these words in so many different ways that we no longer clearly understand each other when we say them' (Donabedian 1982). Throughout this chapter, we use the term '**knowledge translation**', which has gained currency in Canada and globally over the last five years.

We define knowledge translation as ensuring that stakeholders are aware of and use research evidence to inform their health and health care decision-making. This definition recognizes that there are a wide range of stakeholders or target audiences for knowledge translation, including policy makers, professionals, patients, researchers, and industry.

In this chapter, we summarise the current concepts and evidence to guide knowledge translation activities. We are guided by five key questions identified by Lavis and colleagues (Lavis et al. 2003):

- What should be transferred?
- To whom should research knowledge be transferred?
- By whom should research knowledge be transferred?
- How should research knowledge be transferred?
- With what effect should research knowledge be transferred?

What should be transferred?

The increased focus on knowledge translation has frequently emphasized individual studies as the unit for knowledge translation. While this may be appropriate when the targets for knowledge translation are other researchers or research funders (who need to be aware of primary research results), we argue that this is inappropriate when the targets for knowledge translation are patients, health care professionals, and policy makers, because individual studies rarely, by themselves, provide sufficient evidence for policy or practice changes. In fact, individual studies may be misleading due to bias in their conduct or random variations in findings.

Ioannidis and colleagues have undertaken a series of landmark studies of research exploring the evolution of evidence in health care (summarized in Ioannidis 2006). In both basic and clinical sciences, they observed the 'Proteus phenomenon' – that the first published study on a scientific question may find the most extravagant effect size and that as further evidence is gathered, effect sizes tend to diminish (Ioannidis 2006). They observed that thousands of observations are required before estimates of gene disease association became stable (Ioannidis 2001). They noted that the results of even highly cited clinical research studies published in major medical and specialty journals were likely to be contraindicated or found to be exaggerated with further accumulation of evidence (Ioannidis 2005). As a result, Ioannidis (2006) argued that replication and evidence synthesis was needed before knowledge translation.

We suggest that the results of individual studies need to be interpreted within the context of global evidence before deciding whether it is ready for knowledge translation. In other words, the basic unit of knowledge translation should be systematic reviews or other syntheses of the global evidence base. Greater emphasis on the results of systematic reviews would increase the 'noise to signal' of knowledge translation activities and may increase the likelihood of their success.

Over the last twenty years, health care research funders and healthcare systems have made considerable investments in knowledge synthesis, especially those targeting the needs to healthcare practitioners and patients. Examples include the substantial number of publicly funded national guideline and health technology programs, The Cochrane Collaboration (Grimshaw 2006b), and the US funded Evidence Based Practice Centers.

The question ‘*What should be transferred?* also challenges knowledge translators to identify the key messages for different target audiences and to fashion these in language and knowledge translation products that are easily assimilated by different audiences. Over the past decade, a variety of different products have been developed targeting different audiences (for example, patient decision aids for patients, clinical practice guidelines for health care professionals, or actionable messages for policy makers).

To whom should knowledge be transferred and with what effect?

The relative importance of knowledge translation to different target audiences will vary by the type of research. For example, primary target audiences for knowledge translation of the results of basic science include other researchers and industry; whereas primary target audiences for knowledge translation of the results of population health research include other researchers, administrators, and policy makers (Figure 1).

Figure 1: Stakeholders for different types of research

Potential stakeholder	Type of research			
	Basic	Clinical	Health Services	Population Health
Patients		+++	+++	
Professionals		+++	+++	
Local Administrators		+	+++	+++
National Policy Makers		+++	+++	+++
Regulatory Bodies	+++	+++	++	++
Industry	+++	+++	++	+
Research Funder	+++	+++	+++	+++
Researchers	+++	+++	+++	+++

The relative importance of different target audiences will also vary by the results of research (Mowatt 1998). For example, the primary target audiences for clinical research demonstrating lack of benefit or harms from a drug sufficient to warrant its withdrawal might be national policy makers, regulatory bodies, and industry. Whereas the primary target audiences for clinical research demonstrating benefits from a drug to suggest its widespread use might be patients, health care providers, local administrators as well as national policy makers, regulatory bodies, and industry (Figure 2).

Figure 2: Potential target audiences for clinical research about a drug (adapted from Mowatt et al., 1998)

	Patients	Health Care Professionals	Administrators	National Policy Makers	Regulatory Body	Industry	Research Funders	Researchers
Stop use	S	S	S	P	P	P		
Stop use, promote research	S	S	S	P	P	P	P	P
Promote use for limited indications	P	P	P	P	P	P		
Promote use for new indication	S	P	P	P	P	P		
Promote widespread use	P	P	P	P	P	P		

With what effect should knowledge be transferred?

Appropriate endpoints of knowledge translation may vary across different stakeholder groups. For example, knowledge translation targeting policy makers and patients should ensure that consideration of research evidence is a key component of their decision making but recognizes that there are other legitimate factors (for example, the policy context for policy makers, values, and preferences of individual patients) that need to be considered. Thus, the resulting decision may not be particularly evidence based. However, knowledge translation targeting professionals should result in practice that is more evidence based and will likely be observable as changes in professional behaviours and quality indicators.

How should research knowledge be transferred?

Planning for knowledge translation

There are a large number of planned knowledge translation models, derived from different disciplinary and contextual viewpoints (Grol 2003, Graham 2006). Most of these suggest that planned knowledge translation is more likely to be successful if the choice of knowledge translation strategy is informed by an assessment of the likely barriers and facilitators. In this section, we briefly discuss types of barriers, potential approaches for identifying barriers, and factors influencing the choice of intervention.

Identifying barriers to knowledge translation

Common barriers across target groups include issues relating to knowledge management (the sheer volume of research evidence currently produced, access to research evidence sources, time to read evidence sources, and skills to appraise and understand research evidence). Over the past twenty years, there has been substantial investment in many health care systems to address these knowledge management barriers. For example, the conduct of systematic reviews and clinical practice guidelines to reduce the volume of research evidence and the time needed to read evidence sources; investment in electronic libraries of health and public access evidence sources to improve access to research evidence; development of critical appraisal skills tools; and training to improve research literacy skills.

However, while better knowledge management is necessary, it is unlikely by itself to be sufficient to ensure knowledge translation because of barriers working at different levels of health care systems, many of which operate at levels beyond the control of an individual practitioner. For instance, barriers may operate at other levels of a health care system including: structural barriers (e.g. financial disincentives), organizational barriers (e.g. inappropriate skill mix, lack of facilities or equipment), peer group barriers (e.g. local standards of care not in line with desired practice), the professional (e.g. knowledge, attitudes, and skills), and professional-patient interaction barriers (e.g. communication and information processing issues).

There are diverse methods for identifying potential barriers including qualitative approaches (individual interviews, focus groups) and surveys and direct observation (Grol 2004). However, there are no standard approaches available yet. As a result, those involved with knowledge translation activities need to use their judgement about how best to elicit barriers, given their understanding of the context and potential barriers and resources available to them.

Choosing interventions

Unfortunately, our evidence on the likely effectiveness of different strategies to overcome specific barriers remains incomplete. Those involved in knowledge translation need to: identify modifiable and non-modifiable barriers relating to behaviour ; identify potential adopters and practice environments; and prioritise which barriers to target based upon consideration of 'mission critical' barriers. Furthermore, the potential for addressing these barriers through knowledge translation activities (based upon consideration of the likely mechanisms of action of interventions) and the resources available for knowledge translation activities needs to also be addressed.

Effectiveness of professional behaviour change strategies

The Cochrane Effective Practice and Organisation of Care (EPOC) group supports reviews of interventions to improve health care systems and health care delivery (Bero 2007). It has identified over 5,000 randomised and quasi-experimental studies and conducted 38 systematic reviews of professional, organisational, financial and regulatory interventions within its scope.

EPOC has prepared two overviews of systematic reviews (Bero 1998, Grimshaw 2001) and is currently updating these. It has identified over 150 systematic reviews of professional behaviour change strategies. In this section, we summarise the results of key reviews selected because they were of high quality and the most up-to-date. We provide a definition of each intervention, the likely mechanism of action of the intervention, the results of the key review(s), and additional comments relating to the practical delivery of the intervention (including resources required). Interventions were considered generally effective, if two thirds or more identified studies demonstrated improvements; mixed effects, if between one third and two thirds of identified studies demonstrated improvements; and generally ineffective, if less than one third of identified interventions demonstrated improvements. Wherever possible, we describe the range of effect sizes observed within reviews.

Printed educational materials

EPOC defines printed educational materials as the 'Distribution of published or printed recommendations for clinical care, including clinical practice guidelines, audio-visual materials, and electronic publications. The materials may have been delivered personally or through mass mailings'. In general, printed educational materials target knowledge and potentially skill gaps on individual health care professionals.

Farmer and colleagues (2007) identified 21 studies of the effectiveness of printed educational materials including six cluster randomised trials. Based upon the cluster randomized trials, printed educational materials appear generally effective resulting in a median absolute improvement of care of 4.9% across studies. Printed educational materials are commonly used, have a relatively low cost and are generally feasible in most settings.

Educational meetings

EPOC defines educational meetings as the 'participation of health care providers in conferences, lectures, workshops or traineeships'. An important distinction is between didactic meetings (that largely target knowledge barriers at individual health care professional/peer group level) and interactive workshops (that can target knowledge, attitudes and skills at the individual health care professional/peer group level).

O'Brien and colleagues (2001) identified 32 randomised trials of educational meetings. Interactive or mixed/interactive educational meetings were generally effective resulting in moderate effects (between 11-20% absolute improvements in care). In contrast, didactic meetings were largely ineffective. Educational meetings are commonly used, with the main cost related to the release time for health care professionals, and are generally feasible in most settings.

Educational outreach

EPOC defines educational outreach or academic detailing as 'Use of a trained person who met with providers in their practice settings to give information with the intent of changing the provider's practice. The information given may have included feedback on the performance of the provider(s)'. Soumerai and Avorn (1990) suggest that it derives from social marketing approaches that target individuals' knowledge and attitudes. Typically the detailer aims to get a maximum of three messages across during a 10-15 minute meeting with a health care professional. The detailer will tailor their approach to the characteristics of the individual health care provider and typically use additional provider behaviour change strategies to reinforce their message. Most studies of educational outreach have focused on changing relatively simple behaviours in the control of individual physician; for example, the choice of drug to prescribe.

Grimshaw (2004) identified 13 cluster randomised trials of multifaceted interventions to implement clinical practice guidelines. Educational outreach was generally effective resulting in a median absolute improvement of care of 4.9% across studies. Educational outreach programs have been used across a wide range of health care settings, especially to target prescribing behaviours. The effects of educational outreach for changing more complex behaviours are less certain. Educational outreach requires considerable resources including the costs of detailers and preparation of materials. Nevertheless, Mason (2001) observed that educational outreach may still be efficient to change prescribing patterns.

Local opinion leaders

EPOC defines local opinion leaders as 'Use of providers nominated by their colleagues as educationally influential. The investigators must have explicitly stated that their colleagues identified the opinion leaders'. Opinion leadership is the degree to which an individual is able to influence other individuals' attitudes or overt behaviour informally in a desired way with relative frequency. This informal leadership is not a function of the individual's formal position or status in the system – it is earned and maintained by the individual's technical competence, social accessibility, and conformity to the systems norms. When compared to their peers, opinion leaders tend to be more exposed to all forms of external communication, have somewhat higher social status, and need to be more innovative. However, the most striking feature of opinion leaders is their unique and influential position in their system's communication structure – they are at the centre of interpersonal communication networks (interconnected individuals who are linked by patterned flows of information). Opinion leaders target the knowledge, attitudes, and social norms of their peer group.

Doumit (2007) identified 12 randomised trials of opinion leaders. Opinion leaders were generally effective for improving appropriate care resulting in a median absolute improvement of care of 10.0% across studies. The majority of studies used an instrument derived by Hiss (1978) to identify opinion leaders – this seeks to identify individuals who are up-to-date, good communicators, and humanistic. The potential success of opinion leaders is dependent upon the existence of intact social networks within professional communities. Grimshaw and colleagues (2006a) observed that the existence of such networks varied across communities and settings within the UK. They also observed that opinion leaders were condition specific; in other words colleagues identified different opinion leaders for different clinical problems. Doumit (2006) also observed that opinion leaders were not stable over time. The resources required for opinion leaders include costs of the identification method, training of opinion leaders, and additional service costs. Given some of the feasibility issues identified above, local opinion leaders have rarely been used in service settings.

Audit and feedback

EPOC defines audit and feedback as 'Any summary of clinical performance of health care over a specified period of time. The summary may also have included recommendations for clinical action. The information may have been obtained from medical records, computerised databases, or observations from patients'. Adams and colleagues (1999) observed that health care professionals often overestimated their performance by around 20-30%. Audit and feedback target health care provider/peer groups' perceptions of current performance levels and is useful to create cognitive dissonance within health care professionals as a stimulus for behaviour change.

Jamtvedt (2006) identified 118 randomised trials of audit and feedback. Audit and feedback alone, audit and feedback with educational meetings, and audit and feedback as part of multifaceted interventions was generally effective resulting in a median absolute improvement of care of 5.0%. In general, larger effects were seen if baseline compliance was low. The resources required to deliver audit and feedback include data abstraction and analysis costs and dissemination costs. The feasibility of audit and feedback may depend on the availability of meaningful routine administrative data for feedback.

Reminders

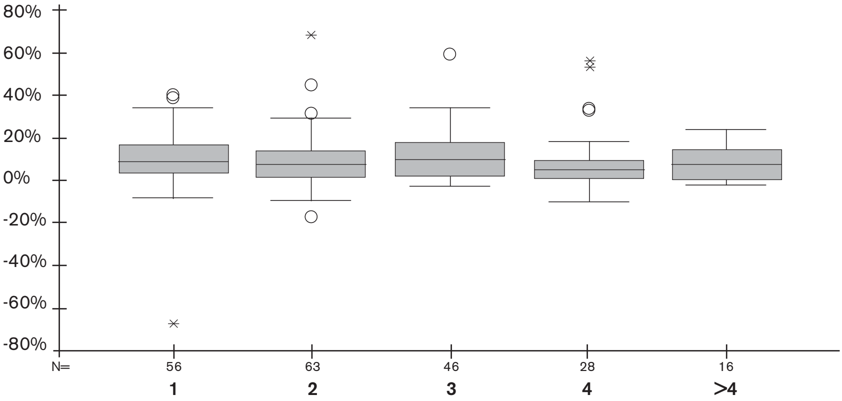
EPOC defines reminders as 'Patient or encounter-specific information, provided verbally, on paper, or on a computer screen, which is designed or intended to prompt a health professional to recall information. This would usually be encountered through their general education; in the medical records, or through interactions with peers, and so remind them to perform or avoid some action to aid individual patient care. Computer aided decision support and drugs dosage are included'. Reminders prompt professionals to remember to do important items during professional-patient interactions (McDonald 1976).

Grimshaw (2004) identified 14 cluster randomized trials of reminders to implement clinical practice guidelines. This review found that reminders were generally effective resulting in a median absolute improvement of care of 14.1%. The majority of studies have been undertaken in highly computerized US academic health science centres (Chaudry 2006) and their generalisability to other settings is less certain. Most studies have examined the effects of relatively simple reminders; the results of more complex decision support systems, especially for chronic disease management, have been less successful. The resources required vary across the delivery mechanism and there is insufficient knowledge about how to prioritise and optimize reminders.

Multifaceted interventions

EPOC defines multifaceted interventions as 'Any intervention including two or more components'. Multifaceted interventions potentially target different barriers in the system. Grimshaw (2004) explored whether there was a dose response curve for multifaceted interventions and observed that effect sizes did not necessarily increase with increasing number of components (Figure 3). They observed that 'Few studies provided any explicit rationale or theoretical base for the choice of intervention. As a result, it was unclear whether researchers had an a priori rationale for the choice of components in multifaceted interventions based upon possible causal mechanisms or whether the choice was based on a 'kitchen sink' approach. It is plausible that multifaceted interventions built upon a careful assessment of barriers and coherent theoretical base may be more effective than single interventions'. Multifaceted interventions are likely to be more costly than single interventions. When planning multifaceted interventions, it is important to carefully consider how components are likely to interact to maximise benefits.

Figure 3: Effect sizes of multifaceted interventions by number of interventions



Source: Grimshaw (2004)

Effectiveness of knowledge translation strategies focusing on patients

The Cochrane Consumers and Communication Review Group supports systematic reviews of the effects of interventions (particularly those which focus on information and communication) which affect consumers' interactions with health care professionals, health care services, and health care researchers. Outcomes of interest include effects on people's knowledge and decision-making, health care use, experience of health care, and health and wellbeing. It has identified over 6,700 randomised studies and conducted 20 systematic reviews of interventions within its scope (Edwards 2007).

In this section, we highlight the results of selected systematic reviews relevant to knowledge translation.

Patient decision aids

Patient decision aids are interventions designed to help people make specific and deliberative choices about their health care by providing (at the minimum) information on the options and outcomes relevant to a person's health status. O'Connor (2003) identified 34 randomised trials evaluating 31 patient decision aids. Provision of decision aids to patients (compared to 'usual care') were associated with better patient knowledge, more realistic expectations, lower decisional conflict related to feeling informed, increased proportion of patients active in decision making, and a reduced proportion of patients who remained undecided post intervention. Decision aids had a variable effect on which healthcare options were selected. O'Connor and colleagues have created a website on decision aids including an inventory of decision aids, criteria for assessing decision aids and other resources (http://decisionaid.ohri.ca/index.html – accessed 8th March 2007).

Personalised risk communication

Edwards and colleagues (2006) undertook a review of the effects of providing personalized risk communication to patients on their uptake of screening tests. They included 22 studies. There was weak evidence, consistent with a small effect, that personalised risk communication (whether written, spoken or visually presented) increases uptake of screening tests.

Interactive Health Communication Applications

Interactive Health Communication Applications (IHCAs) are computer-based, usually web-based, information packages for patients that combine health information with at least one of social support, decision support, or behaviour change support. Murray and colleagues (2005) undertook a review on the effects of IHCAs on people with chronic diseases. They identified 24 randomized controlled trials (RCTs) involving 3,739 participants, which were included in the review. IHCAs had a significant positive effect on knowledge, social support, and clinical outcomes.

Interventions to enhance medication adherence

Haynes and colleagues (2005) identified a wide range of interventions to enhance medication adherence (instruction, counseling, automated telephone monitoring and counseling, manual telephone follow-up, family intervention, increasing the convenience of care, simplified dosing, self-monitoring, reminders, special 'reminder' pill packaging, dose-dispensing units and medication charts, appointment and prescription refill reminders, reinforcement/rewards, medication formulations, crisis intervention, direct observation of treatments, lay health mentoring, comprehensive pharmaceutical care services, and psychological therapy) evaluated in 57 randomised trials. They observed mixed effects for increases in short term and long term medication adherence. The majority of effective interventions in short-term treatments were simple (e.g. counseling, written information, and personal phone calls). The majority of effective interventions in long-term treatments were complex multifaceted interventions.

Effectiveness of knowledge translation strategies focusing on policy makers and senior health service managers

In contrast to the substantial evidence base on the effectiveness of knowledge translation strategies targeting health care professionals and patients, we are not aware of any experimental studies evaluating the effects of knowledge translation research that focused on policy makers or senior health service managers. Innvær and colleagues (2002) systematically reviewed the literature on health policymakers' perceptions of factors promoting or inhibiting their use of evidence. Most studies focused on hypothetical scenarios or retrospective perception of the use of evidence in relation to specific cases. From 24 studies reporting a total of 2,041 interviews, they identified commonly reported facilitators and barriers. The three most commonly reported facilitators were personal contact (13/24 studies), timely relevance (13/24), and the inclusion of summaries with recommendations (11/24) while the four most commonly reported barriers were absence of personal contact (11/24), lack of timeliness or relevance of research (9/24), mutual mistrust (8/24), and power and budget struggles (7/24).

Fox and Oxman (2001) identified a number of generalizations from a series of six case studies of the inter-relationship between policy and research evidence including:

- Since both research and policymaking are complex activities and very different from each other, mutual understanding requires conscious effort. To inform policymaking more effectively, researchers need better systematic understanding of political culture.
- Policymakers can help achieve mutual understanding by respecting researchers' knowledge, competence, and needs.

- Policymakers and researchers must learn to accommodate differences in the time-frames within which they operate.
- Collaboration builds on good experiences for both researchers and policymakers. To achieve good experiences, a policymaker said, the "rules of engagement must include appropriate expectations and appropriate definitions of success."
- Effective collaboration between researchers and policymakers is likely to be enhanced if both groups continue to work together after the policymaking process to evaluate the results of implementing the policy.
- Trust between individuals is built up over years. The process of making health policy should create and maintain opportunities for long-term collaboration between policymakers and researchers when this is possible.

These and other findings have led to the development of a number of knowledge translation approaches targeting policy makers and senior health services managers (Lavis 2006, Lomas 2007).

Push activities focus on the activities of researchers to disseminate their research findings to a broad audience above and beyond traditional routes of dissemination, such as publication in peer reviewed journals (Lavis 2003). Examples of push activities include: increased emphasis on knowledge syntheses as the unit for knowledge translation; actionable messages; graded entry formats to allow the research user to access the level of detail that they require (for example the Canadian Health Services Research Foundation requires research reports to have one page of main messages, a three page executive summary, and then no more than 25 pages for the complete project); using multiple communication channels tailored to the target audience; targeted electronic push of information relevant to the specific needs of research users (examples include the Contacts, Help, Advice and Information Network (C.H.A.I.N.) (Evans 2006, http://chain.ulcc.ac.uk/chain/accessed 18th March 2007) and E-watch bulletin on Innovation in Health Services (http://kuuc.chair.ulaval.ca/english/master.php?url=bulletin.php accessed 18th March 2007)); workshops and seminars with target audiences; and development of tools to help research users apply research findings in their own settings.

Pull activities focus on the needs of users to creating an appetite for research results (Lavis 2003). Pull activities include various training activities to improve policy makers and senior managers' research literacy and interest. For example, the Canadian Health Services Research Foundation provides the EXTRA program to train senior health care executives in research application (http://www.chsrf.ca/extra/index_e.php accessed 18th March 2007) and SEARCH Canada has trained over 100 middle and senior managers in research use within Alberta over the last decade (http://www.searchca.net/users/folder.asp accessed 18th March 2007).

Linkage & exchange activities focus on building and maintaining new relationships between researchers and policy makers and senior managers to exchange knowledge and ideas (Canadian Health Services Research Foundation 1999, Lomas 2000). For example, several research funding programs require active participation of decision makers (sometimes including co-funding by healthcare organisations) in research teams. The rationale is that decision makers are more likely to consider research findings if they are actively involved in the research conducted in their settings to answer specific contextualized questions. These approaches legitimately focus on local knowledge translation of individual studies. However, the results of these studies should still be incorporated into systematic reviews to judge whether additional knowledge translation activities should be undertaken outside the context and relationships of the original study. Other linkage and exchange approaches have included the development of knowledge brokers to act as 'human intermediaries between the world of research and action (Lomas 1997, Lomas 2007).

The profusion of approaches to improving knowledge translation to policy makers and senior health care managers highlights the increased recognition of the failure of traditional diffusion approaches to knowledge translation for this target group (for example, Lomas 1997). Most of these approaches have a strong theoretical basis and face validity. However, it will be important to evaluate their benefits, harms, and costs fully.

Summary

In this chapter, we have attempted to briefly summarise some of the key concepts and evidence about the effectiveness of knowledge translation activities targeting different stakeholder groups. We particularly recommend the five key questions developed by Lavis and colleagues (2003) as an aide for researchers and others involved in knowledge translation when developing knowledge translation activities. There is a substantial (if incomplete) evidence base to guide choice of knowledge translation activities targeting health care professionals and patients. The evidence base on the effects of different knowledge translation approaches targeting health care policy makers and senior managers is much weaker but there are a profusion of innovative approaches that warrant further evaluation.

Grol (1997) observed that many current knowledge translation activities are based on participants' beliefs rather than evidence about the likely effectiveness of different approaches. He challenged healthcare systems to develop and use a robust evidence base to support the choice of knowledge translation strategies, arguing, "evidence based medicine should be complemented by evidence based implementation". While we are some way from achieving this goal, there are grounds for optimism. Over the past 25 years, health care systems have invested heavily in knowledge synthesis activities that facilitate timely access of evidence. Further, it is possible to achieve clinically important practice changes by health care professionals and improved patient decision making with current knowledge translation activities.

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Chapter 3. Knowledge Transfer and Exchange (KTE): A Systematic Review, Key Informant Interviews and Design of a KTE Strategy

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Introduction

Knowledge transfer and exchange (KTE) has been defined as an interactive process involving the interchange of knowledge between research users and researcher producers (Kiefer et al. 2005). The primary purpose of KTE is to increase the likelihood that evidence will be used in policy and practice decisions and to enable researchers to identify practice and policy relevant research questions. Importantly, while many strategies for KTE exist, at present it is not clear what strategies should be used in what contexts (Lavis et al. 2003a). Until recently, the complete literature on KTE as it pertains to the level of policy making had not been reviewed in a systematic manner and, as such, a summary of the evidence on KTE strategy effectiveness was not available.

In this chapter, following the Background, we highlight results from a systematic review of the KTE literature and then present findings from a set of key informant interviews that provided further insight on several key issues related to KTE in a specific context – the Alberta Depression Initiative (ADI). Following this, we present some key points which may guide KTE strategy development and implementation. Finally, we outline how information from our literature review and interviews was used to develop a custom KTE strategy for the ADI, including a plan for its evaluation.

In our view, formal evaluation of KTE initiatives is critical to build the knowledge base in this field. Lack of evidence on the effectiveness of KTE is a major concern at this stage in the literature as resources are increasingly dedicated to these activities to ensure that generated knowledge is used by policy makers, and, similarly, that researchers receive meaningful feedback and input from knowledge users.

Background

With the growing demands on health care resources and a general culture of accountability, greater emphasis is being placed on generating knowledge that can have a practical impact on the health system (Lomas 1997). To this end, 'knowledge transfer' emerged in the 1990s as a process by which research messages were 'pushed' by research producers to research users (Lavis et al. 2003b). More recently the idea of 'knowledge exchange' has emerged, as a result of a growing impression that successful uptake of knowledge requires more than one-way communication, instead requiring interaction among researchers, decision-makers and other stakeholders (Lavis et al. 2003b).

While the notion of the value of and need for KTE has received wide support, it has also been acknowledged that both researchers and decision makers are driven by demands that may not be conducive to successful KTE. For researchers, these demands include challenges such as adapting the research cycle to fit real-world timelines, establishing relationships with decision makers, and justifying activities which fit poorly with traditional academic performance expectations (Canadian Health Services Research Foundation 1999). For decision makers, a perceived lack of knowledge of the research process, the traditional academic format of communication, and a lack of timely results are frequently cited barriers to using research findings (Canadian Health Services Research Foundation 1999). Both parties also frequently lament the lack of time and resources to participate in KTE.

Noting these challenges, a variety of mechanisms to facilitate KTE have been proposed including joint researcher-decision maker workshops, inclusion of decision makers in the research process as inter-disciplinary research teams, collaborative definition of research questions, and the use of intermediaries that understand both roles known as "knowledge brokers" (CHSRF 1999). Inter-personal contact between researchers and decision makers is an often cited fundamental ingredient in successful KTE initiatives (Thompson et al. 2006). However, to date, "gold standard" approaches to KTE seem to be more based on experience and even rhetoric than rigorous evidence. Our primary aim for the literature review and key informant interviews described herein was to examine and summarize the current evidence base for KTE strategies and to apply this evidence to the design of a KTE approach in the specific context of depression research in Alberta.

Methods

Systematic review

There were four major steps in the systematic literature review: (i) searching for abstracts; (ii) selecting articles for inclusion through a relevancy rating process; (iii) classifying and rating the selected articles for quality; and (iv) synthesis and validation. The goals were to initially ensure broad capture of a relatively new and poorly defined field and then to identify a final set of the highest quality and most relevant articles through consensus screening of abstracts and selection of articles.

Eight databases were used to search for abstracts: Medline, EMBASE, CINAHL, PsycINFO, EconLit, the Cochrane Database of Systematic Reviews, Sociological Abstracts, and the Social Sciences Abstracts. We limited searches to English language abstracts from 1997 to 2005. Search terms used were: knowledge generation, knowledge translation, knowledge transfer, knowledge uptake, knowledge exchange, knowledge broker, knowledge mobilization, and close variants of these. Alternate terms for "knowledge" used were evidence, information, and data. We also manually reviewed reference lists in the identified papers and reports and reviewed publication lists of Canadian and international research centers and researchers known to us to have an interest in KTE. The grey literature was also reviewed, but is not further discussed here.

Our focus in the review was on studies of KTE which had potential for either impact or implications for health care at the policy level. This necessitated screening out the many studies of clinical level knowledge transfer such as clinical practice guideline adoption. We also attempted to keep the diffusion of innovation literature separate (e.g., Greenhalgh et al. 2004; Rogers 1995), although we found some overlap in these two literatures. Our strategy resulted in minimal overlap with 'implementation research' (e.g., Fixsen et al.). The steps of the review are detailed in Appendix A.

The literature search resulted in retrieval of 169 full articles which were subsequently reviewed for relevancy, resulting in 81 studies that were sorted into two categories: non-implementation papers/reports (i.e., reviews, commentaries and surveys of relevant stakeholders) and implementation studies (i.e., actual implementation of KTE approaches). Each study was then quality rated, using a 10 point scale for non-implementation papers and a 15 point scale for implementation studies (which were adapted from Adair et al. 2003). Of the 81 papers that were quality rated, 63 were classified as non-implementation studies and 18 as implementation studies. Overall, 34 (54%) non-implementation studies scored 7/10 or greater and 10 (56%) implementation studies scored 10/15 or better.

Stakeholder interviews

We also held one-on-one interviews with researchers, decision makers, and clinicians whose interests and/or responsibilities were related to KTE generally or depression in Alberta specifically. The respondents' insights reflected the thinking about KTE of a broad group of health system stakeholders and informed the development of a KTE strategy for a collaboration known as the Alberta Depression Initiative (ADI). Rather than providing details about the ADI, in this chapter we instead focus on KTE strategy development based on our literature review and key informant interview findings.

The investigative team developed a list of 53 potential informants representing various levels of the health system (e.g., Alberta Health and Wellness, the Alberta Mental Health Board, Regional Health Authorities, community agencies, researchers, research funders, and practitioners). The intent was to reach a heterogeneous sample of experiential experts from a wide range of backgrounds and interests (Patton 1990). Fifteen one-on-one semi-structured interviews were conducted by telephone or in-person. Interview questions were, in part, based on findings from our literature review. They covered respondents' experiences with and understanding of KTE more broadly, as well as specific issues of KTE in relation to depression in Alberta.

All interviews were audio-taped, transcribed verbatim, and imported into NVivo, a qualitative analysis software package for coding and analysis.

The data were coded inductively with a coding scheme that evolved using the analytic constant comparison method (Glaser and Strauss 1967). The first step involved labeling 'free nodes', which are basic, not yet categorized themes. Development at the level of free nodes was followed by organization into 'tree nodes', tree structures of category and subcategory. NVivo expedited the process of categorization into themes (i.e., organizational issues) and sub-themes (i.e., resource availability).

Results

Literature review

Non-implementation studies

Non-implementation studies grouped naturally into four major headings according to the content of the articles: (i) organizing frameworks for applying KTE strategies; (ii) barriers and facilitators to KTE; (iii) measuring the impact of research studies; and (iv) perspectives of stakeholder groups on what works and what does not work in KTE.

Organizing frameworks

Jacobson et al. (2003) developed an organizing framework to increase researcher and knowledge disseminator familiarity with intended user groups and context. The authors developed the framework based on a review and analysis of the KT literature, as well as their experience with knowledge user groups. The framework aids researchers in identification of users' information needs for a given research project. The five domains in the framework are **the user group, issue, research, knowledge transfer relationship**, and **dissemination strategies**. Focus is placed on the formal or informal structures in which the user may be set, the political climate, and the users' accountabilities. Questions to be addressed regarding the researcher-user relationship include those related to the level of trust and rapport, the history of working together, and user group staff turnover. Considerations related to dissemination strategies include the mode of interaction (i.e. written, oral, formal or informal) and the level of detail.

In another framework, Lavis et al. (2003a) recommend five elements to consider when organizing KTE: **message; target audience; messenger; knowledge transfer process** and **support system**; and the **evaluation strategy**. First, the messages for decision-makers should be 'actionable' and, in contrast with Jacobson et al. above, be from a body of research knowledge, not the results of a single study (Lavis et al. 2006). Second, audience-specific messages are needed which take into consideration the types of decisions users make and the environments in which they work. Third, the credibility of the messenger is important to the success of the KTE initiative. Fourth, and critically, interactive engagement between researchers and decision-makers during multiple stages is recommended. Finally, performance measures of knowledge transfer must be suitable to the target audience and the objectives. The Lavis framework is outlined in Table 1.

Barriers and facilitators

The barriers and facilitators for KTE are well recognized and dozens of studies have focused on this topic. These factors can be classified on individual and organizational levels and pertain to relationships between researchers and decision-makers, modes of communication, time and timing, and context. A summary of the identified factors is presented in Table 2. In Norway, Innvaer et al. (2002) conducted a systematic review based on 24 surveys about facilitators and barriers to the use of research evidence by health policy-makers. The most frequently reported facilitators included personal contact between researchers and policy makers, clear summaries of findings with recommendations for action, good quality research, and research that included effectiveness data. Other studies have also supported the use of face-to-face encounters as being key to KTE strategies (Stocking 1985; Greer 1988; Soumerai and Avorn 1990; Roos and Shapiro 1999; Lomas 2000; Jacobson et al. 2003).

Another frequently recommended facilitator is the inclusion of key individuals, either decision-makers or opinion leaders, in the research planning and design stages (DeRoeck, 2004; Lomas 2000; Ross et al. 2003; Vingilis et al. 2003; Whitehead et al. 2004; Willison and MacLeod, 1999). Timeliness and the relevance of research are also key (Dobbins et al. 2001; Frenk 1992; Hemsley-Brown 2004; Hennink and Stephenson 2005; Jacobson et al. 2005; Mubyazi and Gonzalez-Block 2005; Stewart et al. 2005; Trostle et al. 1999). Since researchers tend to have longer time horizons, Willison and MacLeod (1999) suggest that shorter-term objectives should be included to satisfy policy makers. UK researchers note the potential for a 'sleeper effect', when evidence is stored and not used until a more encouraging political climate develops (Whitehead et al. 2004).

Table 1: Components of Lavis et al. KTE organizing framework

a. Identify the unit of KTE (i.e., the what?)	What are the relevant research findings
	What 'actionable messages' can be derived from the findings
b. Identify the target audience (i.e., to whom?)	What are the relevant groups, organizations and individuals that need to receive the message
c. Identify a knowledge broker or other 'message communicator' (i.e., by whom?)	Individual who is known to and understands both the researcher and decision maker communities and can employ specific tools for KTE

Table 1: Components of Lavis et al. KTE organizing framework (continued)

d. Identify a set of tools for KTE (i.e., the how?)	Method of transfer depends on the audience, as indicated in the literature (e.g., for politicians and bureaucrats, face to face meetings, brief memos and press releases; for managers and administrators at the program, hospital and health authority level, meetings with perceived 'champions', summary reports and seminars; for clinical practitioners, interaction through rounds and seminars as well as action-syntheses)
	Formal feedback from the policy makers on the usefulness of the information provided from the research findings, and elicit directions for future researcher-led activities
e. Develop evaluation plan for KTE (i.e., does it work?)	Qualitative interviews can be conducted with key informants following implementation to examine each of the above components of the KTE strategy and identify relevant longer term outcomes (e.g., policy impacts)

Table 2: Main KTE barriers and facilitators

Barriers	Facilitators
Individual-level	Individual-level
Lack of experience and capacity for assessing evidence Mutual mistrust Negative attitude toward change	Ongoing collaboration Values research Networks Building of trust Clear roles and responsibilities
Organizational-level	Organizational-level
Unsupportive culture Competing interests Researcher incentive system Frequent staff turnover	Provision of support and training (capacity building) Sufficient resources (money, technology) Authority to implement changes Readiness for change Collaborative research partnerships
Related to Communication	Related to Communication
Poor choice of messenger Information overload Traditional, academic language No actionable messages (information on what needs to be done and the implications)	Face-to-face exchanges Involvement of decision makers in research planning and design Clear summaries with policy recommendations Tailored to specific audience Relevance of research Knowledge brokers Opinion leader or champion (expert, credible sources)

Table 2: Main KTE barriers and facilitators (continued)

Barriers	Facilitators
Related to Time or Timing	Related to Time or Timing
Differences in decision maker and researcher timeframes Limited time to make decisions	Sufficient time to make decisions Inclusion of short-term objectives to satisfy decision-makers

Impact of research studies

Moving to the third major topic found in the non-implementation studies, research organizations and funders are increasingly recognizing the importance of measuring the policy and practice impact of health research. Documentary analysis, in-depth interviews, and questionnaires have been used in the assessment of the impacts and outcomes of research knowledge. Several researchers have attempted to examine the impact of research in public policy development. Lavis et al. (2003b) developed an assessment tool for funders and research organizations to measure the impact of research.

The authors describe the following stages: (i) identify target audiences for research knowledge; (ii) select the measure category; (iii) select measures given resources and constraints; and (iv) identify the data sources and/or collect new data, analyze the data, identify areas for improvement, and feed back information to involved individuals. If limited resources exist, process measures are recommended. However, intermediate outcome measures are preferred if sufficient resources are available to conduct case studies that can assess whether knowledge was used in context of competing influences on decision-making.

Clearly, an evaluation component is essential in any KTE exercise to determine whether the strategies used and products delivered were successful (Pyra 2003). For example, it may be more beneficial to do an evaluation based on the degree to which policy was informed, rather than simply the extent to which research was used (Eager et al. 2003; Lavis et al. 2003a). If there is to be demonstrable impact, researchers must learn about the challenges and environment in which decision makers operate and determine how to present the information in a manner which fits with the real-world environment (Aaserud et al. 2005).

Stakeholder perspectives

Finally, a smaller group of articles addressed stakeholder group perspectives in KTE. Goering et al. (2003) described an organization-level linkage and exchange initiative between the mental health policy branch of the Ontario Provincial Government and the Centre for Addiction and Mental Health research unit. The authors conceptualize four tiers of linkage and exchange in research-based policy development: (i) **inter-organizational relationship**;

(ii) **interactive research projects**; (iii) **dissemination**; and (iv) **policy formation**. The building of trust between stakeholders was identified as key in the first tier. Partnership-building was fostered during regular meetings under a protected time arrangement, with attendance a priority. Emphasis was placed on the establishment of an advisory committee and the associated development of clear terms of reference, roles, and responsibilities in the second tier. An arm's length relationship was necessary for research to impact policy. The third and fourth tiers involved a policy forum lead by trained facilitators to disseminate research regarding mental health system integration.

Bogenschneider et al. (2003) suggest that seminar series with different stakeholder groups be used to facilitate exchange. The EUR-ASSESS project concluded that personal contact with policy staff is more effective than printed material (Granados et al. 1997). This coincides with a recent review by Grimshaw et al. (2001), which examined interventions used to influence the uptake of knowledge to change clinical practice. Educational outreach visits and interactive meetings were generally effective, while printed material and didactic meetings were least effective. Although this review outlines important dissemination activities, on the surface there appears to be limited evidence regarding how, specifically, strategies should be applied for different stakeholder groups.

Implementation studies

The systematic review resulted in identification of 18 relevant implementation studies, of which ten were quality rated at 10/15 or higher. Details of these studies are given in Appendix B. Implementation studies were those in which a specific KTE mechanism was employed or implemented. As highlighted in Table 3, numerous approaches to KTE were identified. The focus of many of these interventions is on generating two-way communication, which is not surprising given the emphasis on this in the non-implementation literature. The notion of a phased intervention with relationship building followed by facilitated meetings also arose.

Table 3: Key KTE strategies identified in the literature

- Face-to-face exchange (consultation, regular meetings)
- Training and retreats
- Networks and communities of practice
- Facilitated meetings
- Interactive, multidisciplinary workshops
- Capacity building
- Web-based information, electronic communications
- Steering committees (to integrate views of local experts into design, conduct, and interpretation of research)

The identified implementation studies varied in topic area and context (see Appendix B). Five focused on health promotion and prevention and in two the focus was workplace health safety. Message communicators included researchers, decision makers, and knowledge brokers; in three studies, a specific communicator was not specified. Across these studies, the amount of information available to enable assessment of the given KTE strategy also varied. In most cases, where specific evaluation was reported, such evaluation did not appear to be based on a rigorous study design. That is, while some studies reported observations or reflections on the impact of the KTE strategy, these observations often were not based on a formal evaluation including a research study design with *a priori* identified outcome measures.

That said, several studies did use more rigorous designs and/or based their assessment on pre-defined outcome measures. For example, Kothari et al. (2005) utilized a quasi-experimental study design (i.e., one which had a comparison group) and appropriate qualitative methods in assessing the KTE strategy. In addition, Kramer and Cole (2003) had a multiple case study design and used qualitative methods to assess KTE impact based on a set of pre-defined outcome measures. In this study, the mode of communication was a plain-language booklet called the "Participative Ergonomic Blueprint". The Blueprint was a facilitator's guide to implementing a successful participative ergonomics program as part of an organization's health and safety program. Finally, the work by Robinson et al. (2005) also included a wide range of outcome measures. The challenge here, though, is with so many linking activities and outcomes used, it is difficult for the reader to discern the individual impact of any one KTE strategy. The remaining studies were a mix of post-test studies, case studies and case reports.

Based on this review we did not find an 'off the shelf' evidence-base for developing and implementing KTE efforts. This difficulty is due in part to the limited reporting of the implementation of KTE strategies across fields in health care and, as well, due to even less evaluation of these strategies. Overall, from information reported in the ten implementation studies, only five seemed to have intended to formally evaluate their KTE strategies in advance and an even small set had clearly defined outcome measures. It is also notable that not a single randomized controlled study of KTE was identified. Of course, the focus of these studies was not necessarily on evaluating the KTE activity; in most cases, the emphasis was on the transfer and exchange of information itself. However, with the lack of rigorous evaluation, one must proceed with caution in transferring the findings from these studies to other contexts.

Stakeholder interviews

Five primary themes arose from the key informant interviews and are summarized in this section, along with supporting quotes. First, informants had varied perspectives on **the definition of** KTE, depending upon past and present roles and responsibilities and their organizational affiliation. There was, however, widespread emphasis on the 'exchange' aspect of KTE and the importance of having appropriate receptors for knowledge. One informant emphasized the importance of moving beyond the more traditional 'producer-push' model of knowledge transfer:

> "Basically, you need to talk about exchange, as opposed to transfer or translation. Because exchange implies sort of a two-way traffic of information. And I think that's a very important notion to keep in mind. Because if you talk about transfer, for a lot of people, that means it goes from research to decision makers and that's it. And that may be when we get into the challenges. One of the challenges to basically not make this be one-way traffic, if you will."

In addition, an informant with many years of experience as a mental health researcher, clinician, and policy-maker referred to the behaviour change that is required in addition to simply affecting peoples' information base: "I mean it is much easier to change knowledge than it is to change attitudes or behaviours and what we really want to change is the attitudes or behaviours".

The second main theme identified by the informants was related to KTE **and the organization**. Comments related to this theme emphasized that policy makers have many competing priorities, resulting in inadequate attention to KTE. Another related issue was a lack of resources (both funding and manpower) for KTE. Informants spoke of the need for funding KTE activities in each and every project, as well as for dedicated personnel:

> "There must be resources for this. That would be something that would make it easier for this and that must be set aside from the beginning. It should be compulsory in every project."

Several informants reported that they work within complex systems and that navigating to ensure appropriate connections with suitable individuals was described as extremely challenging. And finally, a lack of incentives in organizations for researchers and decision makers to participate in KTE was described at length.

Informants also commented on **individual issues related to** KTE **as a third major theme**. In this case, sub-themes included a lack of personal time, the need to form longer term relationships, ensuring stakeholder buy-in and inclusivity, and the challenges of changing individual behaviour . On this latter point, affecting change was seen as a lofty goal. As described by one clinician, it is not only about the message and the messenger, but also the level of receptivity in the listener:

> "Well, I do a fair bit of speaking, I guess to clinicians and one of the realizations I had a long time ago is that no matter how impressive my presentation was, it can only – it has limited ability to affect change.

> It depends on so many other factors, and I think the same goes with the conferences and the congress. You know it really matters as to who the audience is, what their own personal barriers and opportunities are, their own personalities are to affect these changes. So, you know you could have the world's leading expert and the most influential person give a presentation on a topic, but if the people who are going to enact what's recommended, are not ready to do that, then that individual's work is really moot. It has made no change."

The fourth theme had to do with **two very distinct cultures** in play when it comes to KTE and the acknowledgement that understanding across this perceived divide can be limited. As one informant stated:

> "I think in general people in the field of research have very little understanding of the kind of environment that health policy makers are working in. And health care policy makers in general find scientific evidence not very helpful, because it is often… there is more or less an obligatory sentence at the end that says 'More research is needed", and there is no definite answer to "What shall I do?" I cannot sit and wait for more research because I know that when this more research is coming it will say "More research is needed" to answer the question. It always ends up with this and policy-makers need something to act on now… They need to be informed about what to say to policy-makers. There is always something to say even if more research is needed on what you already have."

Finally, informants discussed doing KTE in relation to **general principles and specific approaches**. For example, there was a clearly articulated need for researchers to use plain language and short briefs as opposed to traditional academic forms of reporting. As well, the perceived importance of knowledge brokers or champions to facilitate KTE was described by one informant:

> "One of the things that we are spending a lot of time evaluating is the role of knowledge brokering and we kind of think of that as two forms of brokering… the first and clearest message we've gotten from our evaluation work is: putting a single individual into an organization does no good at all, they have to become a magnet and focal point for some new processes and even new structures in the environment if they are going to be effective at doing the knowledge transfer and exchange function."
>
> "It's all well and good to do all the research we like and all the evaluation we like, but when you actually look at what the common denominator is across a whole heterogeneous mix of KTE… a successful KTE initiative it is very often focused around a single person… who had been charismatic, taken leadership, done championing, so on. So finding those people,

> identifying champions and leaders for this kind of activity and then being able to resource them, may in fact be the single most effective thing you could do in all of this."

On the one hand, these two perspectives could be viewed as contradictory, but on the other hand it is likely that both strong leadership by individuals **and** organizational structural change are important for successful KTE. One informant articulated the critical point that any KTE strategy must be customized. To expect a ready made off the shelf approach to be implanted into a given context is unrealistic when so many variables can impact a genuine interchange of information.

> "I mean basically, the issue here is that I don't think there is one solution that fits every situation... There hasn't been enough research on knowledge exchange and strategies for knowledge exchange to tell you that in this particular case, this strategy will be the most efficient or not. So again, we're still seeing people sort of try different things and see what does work, what doesn't work. And go from there, and adapt as they move forward with different types of research."

Discussion

Summary of findings

The majority of papers included in the systematic review (n=63 out of 81) were classified as 'non-implementation' studies. That is, they were opinion pieces, reviews, or surveys of stakeholders about KTE issues. Conversely, just over 20% (n=18) of the studies report on a real-world application of a KTE strategy. About 70% of the studies were published from 2003-2005 with the remaining being published from 1997-2003, suggesting that the field is growing in interest and importance. Of those articles that met our quality threshold (n=44), the lead author was located in Canada in 55% (n=25) of the studies. The study originated from the UK or Europe in 23% (n=10) of the cases, while 11% (n=5) were from the United States and four studies were from elsewhere.

Overall, the KTE applications that have been reported have undergone limited evaluation and, even in cases where some form of evaluation has occurred, generalizing findings to other contexts is extremely difficult. The major finding of the review was that, despite the rhetoric and growing perception in health services research circles of the 'value' of KTE, there is actually a very limited evidence base that can inform what KTE strategies work in, and in what, contexts. One way to conceptualize development, implementation, and evaluation of KTE strategies is to consider what is under the control of the researchers and what falls under the influence of policy makers. In addition, much more effort is needed in articulating how the transfer of knowledge from decision makers to researchers is best done and, indeed, who is responsible for ensuring that this interaction and ultimate exchange takes place.

The purpose of the key informant interviews was to understand the perspective and issues of a particular group of health care stakeholders in a specific context for KTE. Our findings both confirm several issues already found in the KTE literature and highlight some new issues for consideration both in designing a strategy as well as for future research. For example, decision makers in our study confirmed a real need for genuine exchange of information, not just a transfer from researchers to decision makers (Lavis et al. 2003a). Further, in a policy environment with many competing interests, a degree of political savvy was identified as being required to ensure the right individuals hear the right information and, more importantly, act on that information.

Involving key leaders or champions, as has been promoted in the literature (Grimshaw et al. 2001), was reiterated by our informants as an important factor for successful KTE. However, there was also a recognition of immense system complexity, suggesting that even the best intended and designed endeavors can still be subject to external, mitigating constraints. This echoes work recently reported by Belkhodja et al. (2007) examining organizational-level determinants of research utilization. The work of these authors clearly underscores the folly of conceptualizing and implementing KTE with an individual-level mindset. It is probable that the most effective KTE requires higher level organizational change, as well as new structures and institutionalized processes.

Developing a KTE strategy

The intent of a KTE strategy should be less about 'transferring research knowledge' and more about enabling genuine exchange of information among the various stakeholders. It is clear that simple acquisition of knowledge does not equate to a change in behaviour or policy (Dobbins et al. 2002). One of the first decisions to make in designing a KTE strategy is to select an organizing framework upon which the strategy will rest. For example, the framework developed by Lavis et al. (2003), described in Table 1 (see page 27), outlines five key elements to KTE. In addition, in order to design a strategy, two further aspects are likely critical: (i) knowledge of the clinical and policy environments related to the field under study; and (ii) information on the specific tools available for doing KTE, as well as methods for evaluation of KTE.

Based on the literature, several important aspects should be considered when designing the strategy itself including: two way phased communication (Robinson et al. 2005); networking opportunities and relationship building (Jacobson et al. 2003); and interactive engagement of a key set of stakeholders (Grimshaw et al. 2001). It would also seem important to set the findings of individual studies within the larger body of research when transferring knowledge (Lavis et al. 2003b) and any information needs to be presented in a clear, actionable form (Innvaer et al. 2002, Willison and Macleod 1999, Reimer et al. 2005). However, while using these specific mechanisms, it is critically important to not focus on mere transfer of information, but rather to move all stakeholders into a place of receptivity for interaction and understanding. The given strategy should thus be focused on the building of longer term relationships and encouraging structural and organization changes to support sustainable knowledge exchange (e.g. designated responsibilities, dedicated time and resources, communities of practice).

Some specific points identified in our key informant survey that can be used in strategy development are outlined in Table 4. One generic approach would be to have a facilitated workshop of key stakeholders, but also include specific pre and post workshop activity. An important aspect is in making explicit note of what is within the scope or influence of control of the specific research teams. For example, the degree of personnel changes within a given organization and the political climate are important factors in knowledge uptake, but clearly cannot be influenced by an individual research team. As such, the focus of a KTE workshop would be on bringing together stakeholders at multiple levels of the system to dialogue, challenge, and, over time, foster change both in academic and health service delivery organizations.

Table 4: Specific survey responses incorporated into KTE strategy development

Stakeholders and messaging	identify and draw together a community of interest for a specific purpose, including community agencies
	identify the level of receptivity of stakeholders for changing behaviour
	wrap messages in a politically savvy manner using clinical champions
	have researchers provide recommendations where appropriate, using simple language and shortened reports
Moving forward	identify jointly across stakeholder groups how practices can be improved
	move forward as a network on depression change initiatives in Alberta
	have specific opportunity for decision makers to input on research questions
	continue to develop a program of research on depression which can foster researcher/ decision maker relationships over time
Methods and evaluation	evoke study designs to evaluate and inform future KTE practices

A three phased KTE 'intervention'

Building on the literature review and informant interviews, we developed a three phased intervention for KTE, as well as a means of evaluation the strategy. The first phase could take place over a six month period prior to a planned workshop. During this period, a set of stakeholders or change agents would be identified. Each individual would then be contacted and, as a starting point, given a one page jargon – free briefing note on the topic at hand. Qualitative interviews with these stakeholders could then be conducted in advance of the workshop to (i) elicit initial response to issues identified in the briefing note and identify specific challenges for change both from policy maker and academic perspectives; (ii) determine level of receptivity around behaviour changes; (iii) identify key clinical and policy issues to inform broader discussion about actionable change in phase two; and (iv) outline existing research agendas.

The second phase would be a two day facilitated workshop led by an external facilitator with in-depth knowledge of the topic area. All individuals who participated in phase one would be encouraged to attend the workshop. The objectives of this phase would be to (1) foster a high level of interaction between a key set of stakeholders in research, policy, and practice; (2) understand and grapple with specific research findings in order to jointly develop (i) potential policy changes that may affect multiple levels in the system with identified leads and set timelines and (ii) new lines of inquiry for researchers to be pursued in partnership with decision makers; and (3) launch a network or other ongoing form of dialogue and interaction, noting that information exchange should not be limited to a single KTE event.

The final phase of the KTE strategy would involve post-workshop follow-up for a period of one year, including: (1) a bi-monthly newsletter to all stakeholders reporting network developments, change action, and research program activity; (2) a consultation model with individual follow-up at regular intervals (e.g., three times over the 12 month period) and, in particular, contact with individuals with designated responsibility in the organizations where such roles had been set to provide ongoing knowledge support; and (3) a second set of interviews at the end of the 12 month period with the key stakeholders to gauge the impact of the KTE strategy on a pre-defined set of measures. While the 'formal' KTE strategy would be completed at the end of the 12 month post-workshop period, a network could then facilitate ongoing interaction, support, and information dissemination. In this sense, a specific strategy can be seen as a launching point for longer term relationship building and sustainable change.

In terms of evaluation, we would suggest interviewing two groups of individuals; those who were initially contacted in phase one and attended the workshop as well as those from phase one who did not attend the workshop.

The evaluation process would thus include a pre-post study design with a comparison group. The primary aim would be to measure change in both practice related to the ADI project findings as well as research agendas in the field of depression. Key outcome measures would include stages of change (Buckley et al. 2003), level research utilization (Bekhodja et al. 2007), and degree of organizational change (Scott et al. 2003). Finally, we would recommend that any resulting networks or other forms for ongoing interaction monitor longer term impact including changes in relevant health outcomes over time.

Conclusion

Based on the expansion of the KTE literature the last couple years, KTE as a field seems to be growing in importance. However, KTE as a whole is still in its infancy. It is not hard to find opinion pieces and anecdotal reports about how to do KTE, but a limited reporting of actual KTE implementation and even more limited formal evaluation leaves those seeking to develop their own KTE efforts at a loss for evidence based strategies.

The findings from the qualitative survey both confirm and advance previous work on KTE. These survey results were used alongside our systematic review findings in the development of what could be considered an 'evidence informed' but not quite 'evidence based' KTE strategy. Although it may not always be feasible to conduct formal interviews in developing a KTE strategy, we would strongly urge at least some consultation with relevant stakeholders in specific contexts. While no one size fits all, what is needed is an evidence based toolkit of KTE strategies across contexts to enable evidence based practice. The only way to reach this, in our view, is to conduct primary research on KTE, rather then seeing KTE as an 'add-on' to other projects.

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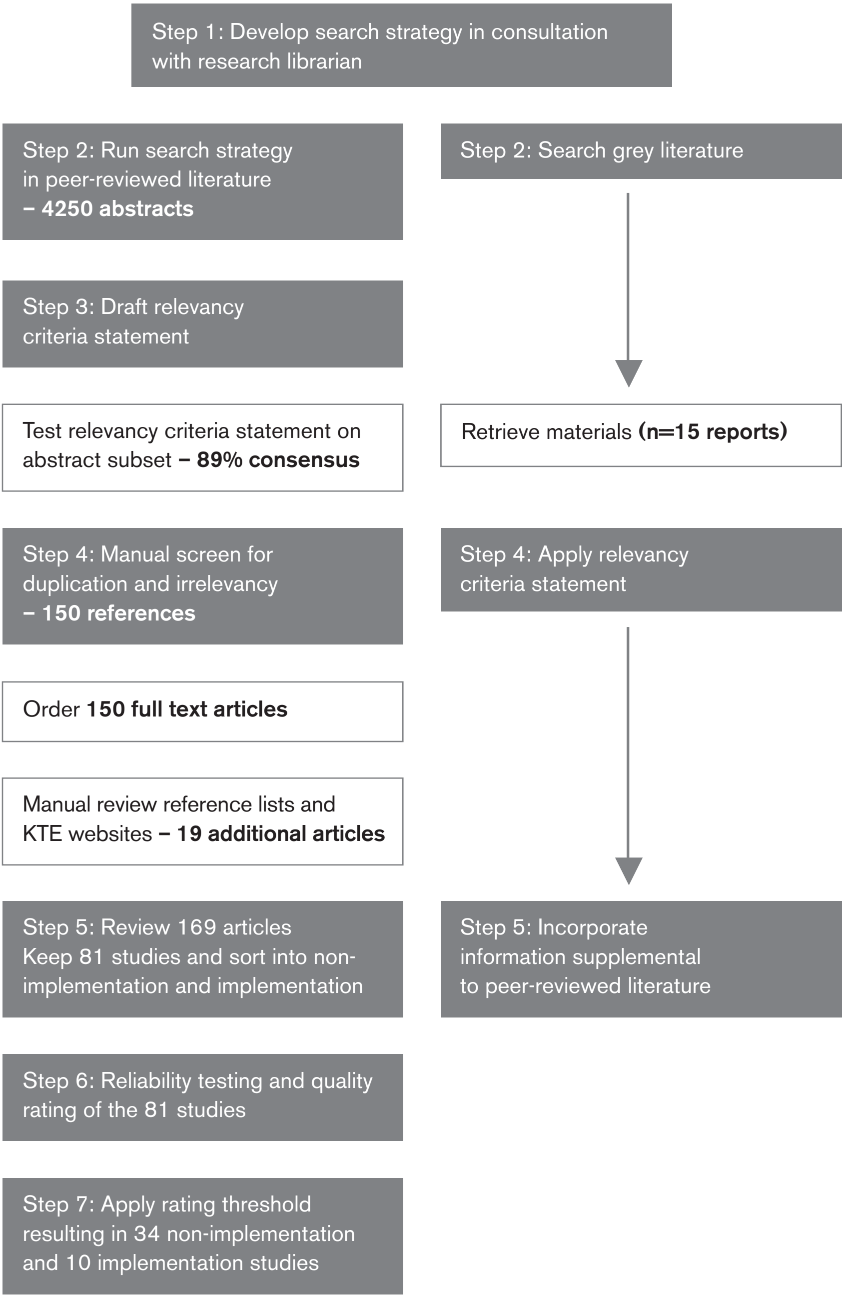
Appendix A: Steps in the systematic review



Step 1: Develop search strategy in consultation with research librarian

Step 2: Run search strategy in peer-reviewed literature **– 4250 abstracts**

Step 3: Draft relevancy criteria statement

Test relevancy criteria statement on abstract subset **– 89% consensus**

Step 4: Manual screen for duplication and irrelevancy **– 150 references**

Order **150 full text articles**

Manual review reference lists and KTE websites **– 19 additional articles**

Step 5: Review 169 articles Keep 81 studies and sort into non-implementation and implementation

Step 6: Reliability testing and quality rating of the 81 studies

Step 7: Apply rating threshold resulting in 34 non-implementation and 10 implementation studies

Step 2: Search grey literature

Retrieve materials **(n=15 reports)**

Step 4: Apply relevancy criteria statement

Step 5: Incorporate information supplemental to peer-reviewed literature

Appendix B: Summary of KTE implementation studies identified in the literature

REFERENCE	Purpose/ Objectives/ Participants	Design and Methods
Dobbins et al. (2001). Ontario, Canada Factors of the innovation, organization, environment, and individual that predict the influence five systematic reviews had on public health decisions **Rating: 14/15**	141 decision makers from 35 public health units in Ontario participated **Objective 1:** Determine extent to which systematic reviews of public health interventions influence public health decisions **Objective 2:** Examine individual's perceptions of organizational, environmental, innovation, individual characteristics that influence impact of reviews on decisions	**Single group post-test** Cross-sectional follow-up telephone survey Topics of systematic reviews chosen in collaboration with provincial advisory group to ensure relevance to current policy and program decisions Multiple logistic and linear regression analyses used to identify predictors of overall use of systematic overviews and influence of overviews on policy decisions
Jacobson et al. (2005) Ontario, Canada Consulting as a strategy for knowledge transfer **Rating: 14/15**	Consulting can be viewed as strategy for transfer of knowledge between researchers and decision makers Clients contracted for consultants' knowledge/ expertise and skills to develop policy or practice recommendations in mental health system Consultants were research associates or scientists employed by the Health Systems Research and Consulting Unit at CAMH	**Multiple case study** **1st project:** Examined psychiatry bed use at a rural inpatient facility **2nd project:** Team of consultants reviewed organization of court-based mental health services in large urban area **3rd project:** Examined province-wide regional assessment projects developed in context of Ontario's mental health system reform
Kothari et al. (2005). Ontario, Canada Interaction' and research utilization in health policies and programs: does it work? **Rating: 14/15**	**Aim:** to assess if interaction between users and producers of research is associated with greater level of adoption of research findings in design and delivery of health care programs	**Two group post-test** Responses to dissemination of a research report: all public health units received report, but only subset involved in development; three units that contributed to production compared to 3 not involved Data collection involved group interviews and document review (i.e. annual reports)

	Key results
	1. **Program planning:** % of retrieved articles read in a month; # of yrs since graduation; value organization placed on using research evidence for decision making; ongoing training in critical appraisal of research literature 2. **Program justification:** value organization placed on using research evidence for decision making; ongoing training in critical appraisal; expecting to use systematic reviews in future ; the perception that systematic reviews would overcome barrier of not having enough time to use evidence 3. **Program evaluation:** existence of mechanisms that facilitated transfer of new information into the public health unit 4. **Policy development:** value organization placed on using research evidence in decision making; access to online database searching; age 5. **Staff development:** making decisions in collaboration with other community organizations 41% of respondents perceived systematic reviews as having great deal of influence on program planning and 49% on program justification; greater perception that organization valued use of research and ongoing training in critical appraisal, greater perception of influence of systematic review
	1st project: Consultant conducted informant interviews with administrators and clinical managers, took snapshots of inpatient characteristics over a defined period of time, and compared the facility's utilization patterns with those of similar institutions; final report recommended several organizational and programmatic changes to improve effectiveness and efficiency of bed use **Evaluation:** consultant's report became 'source of authority'. Report was used to argue against bed closures, but ministry ultimately rejected this. Report was used to promote internal changes, such as the designation of several existing facility beds as holding/crisis beds, and this was adopted. **2nd project:** Consultant team reviewed organization of court-based mental health services in large urban area of Ontario; team conducted informant and focus group interviews with stakeholder groups; consultants held day-long workshop to present preliminary findings for all stakeholders. **Evaluation:** Consulting team and steering committee drew up recommendations and final report that focused on recommendations for which there had been agreement on stakeholder workshop but the consultants' recommendation that the organizations providing court-based services adopt an integrated lead agency model was rejected. **3rd project:** Meetings with groups of local stakeholders (with the facilities and programs that would be the sites for much of the data collection) to inform them about the study & to seek support **Evaluation:** Assessment project findings and recommendations were incorporated into the reports and recommendations issued by the regional task forces.
	Interacting teams had increased understanding of report's analysis and attached greater value to report; interaction not associated with increased levels of utilization in terms of application ***within the timeframe of the study*** Large difference between interacting and comparison teams regarding intent to use the research findings in future activities. Interacting teams expected to use local data in report for presentations, media communications, the development of educational materials, and for strategic and program planning. The comparison teams made little mention of future use of the report. Both interacting and comparison teams used research findings to confirm that ongoing program activities were consistent with research findings, and to compare program performance relative to other units.

Appendix B: Summary of KTE implementation studies identified in the literature (continued)

REFERENCE	Purpose/ Objectives/ Participants	Design and Methods
Kramer and Cole (2003) Ontario, Canada Sustained, intensive engagement to promote health and safety knowledge transfer to and utilization by workplaces **Rating: 14/15**	Healthy workplace constructed two key messages that were conveyed and evaluated against specific criteria including how the information was used (i.e., conceptual use, effort to use, procedural use, and structural use)	**Multiple case study** Three medium-size manufacturing companies in Southern Ontario combined knowledge broker (KB) and observer (the primary author) KT intervention had two phases: 1st focused on relationship and partnership development: one on one conversations between KB and members of workplaces; 2nd focused on more active engagement with two types (i.e., levels) of KB facilitated meetings on the thematic messages Qualitative approaches for data collection (observation, field notes, meeting notes) and analysis
Robinson et al. (2005) Ontario, Canada Using linking systems to build capacity and enhance dissemination in heart health promotion: a Canadian multiple-case study **Rating: 14/15**	Examine utility of linking systems between public health resource and user organizations for health promotion dissemination and capacity building in three Canadian provinces	**Parallel case study** Three of the eight provincial heart health projects under study in the Canadian Hearth Health Initiative (CHHI). PEI and Manitoba interactions were two-way exchange between resource and user groups; Ontario, due to large number of user groups, users NOT actively involved in evidence appraisal, program development and transfer Outcome measures of linking system: capacity enhancement and implementation of comprehensive heart health promotion Thirty provincial reports selected to reflect content related to capacity and dissemination, a range of time periods in each project, and different audiences; key informant interviews and content analysis of reports of dissemination phase

	Key results
	Conceptual use of thematic messages and increased awareness: workplace parties began to refer to concepts within thematic messages **Making effort to use thematic messages:** evidenced by self-reflection and goal-setting **Procedural use of thematic messages:** action plans, performance monitoring, job satisfaction surveys; procedural changes including daily plant walk around focusing on safety, weekly plant team meetings, discussion of team development at monthly management meeting **Structural use of thematic messages:** created a group of key personnel to investigate accidents; changed notice board with one that highlights achievements; implemented team focused safety bonus scheme Promoted knowledge utilization by being *sustained, intensive, and interactive* (not only in building trust and credibility, but in giving KB opportunity to learn language and cultures of different workplaces; informal as well as formal contacts with numerous people in order to achieve a critical mass of people who knew about thematic messages)
	PEI **System structure and linking roles:** coalition; joint community-project team linking body; Regional Health staff and volunteer co-chairs as linking agents Linking activities: regular communication; training and retreats; collaboration; co-sponsorship; networking; facilitation; informal training; advocacy; research information; volunteer development Ontario **System structure and linking roles:** provincial advisory group and recourse system; linking agents via Medical Officers of Health (MOH) and managers Linking activities: research monitoring and feedback; provincial resource centre collaboration; regular communication; research dissemination; training; technical support; networking Manitoba **System structure and linking roles:** committees as linking groups for broad communities; committee facilitators as linking agents **Linking activities:** regular communication; resource provision; modular training; collaboration; facilitation; informal training; technical support Improvements in capacity enhancement and implementation of heart health programs across all three provincial systems were observed; ***difficult to draw causal relationships*** between specific mechanisms used and outcome measures reported

Appendix B: Summary of KTE implementation studies identified in the literature (continued)

REFERENCE	Purpose/ Objectives/ Participants	Design and Methods
Kramer and Wells (2005) Ontario, Canada Achieving buy-in: building networks to facilitate knowledge transfer **Rating: 12/15**	Transfer body of knowledge on participative ergonomics to number of consultants and ergonomists within Health and Safety Prevention systems (HSAs) Goals included: i) to have HSAs adopt principles of research to individual consulting model; ii) to incorporate case studies from own sector to increase contextual specificity; iii) to have them become knowledge brokers Considered the potential users and multipliers of the research; role was to link to ***longer term audience of Ontario's workplaces***	**Case study** Consultants and ergonomists from practitioner-based associations in Ontario's HSAs acted as knowledge brokers Conceptual framework reflects *knowledge transfer and networking theory*: establish goodwill; achieve reciprocity; knowledge utilization; long term alliances Seventeen meetings with 12 HSAs (n=150 participants) held over course of a year Data were collected and analyzed from notes taken at meetings using qualitative methods
Loiselle et al. (2005) Quebec, Canada Sharing empirical knowledge to improve breastfeeding promotion and support: description of a research dissemination project **Rating: 11/15**	Dissemination of Health Canada (HC) funded research (2001) on breastfeeding in immigrant community in Montreal Capitalized on newly formed government-sponsored regional breastfeeding committee 90 participants included perinatal health care professionals, decision makers, lay feeding support volunteers, and representatives from Regional Health Board	**Case report** Multi-disciplinary workshops in eight target settings (three teaching hospitals and five regional centres) Two hour dissemination activity; 45 min. oral presentation on study findings; 30 min. discussion; 45 min. brainstorming for improving promotion of breastfeeding Communications tailored to stakeholders
Stewart et al. (2005) London, United Kingdom Exploring the evidence-practice gap: a workshop report on mixed and participatory training for HIV prevention in Southern Africa **Rating: 11/15**	Twenty-seven policy-makers, practitioners and researchers from seven southern-African countries Residential workshops for training in evidence based decision-making for HIV prevention Mixed and participatory training in accessing and appraising research	**Case report** Intensive intervention has potential to reduce the evidence-practice gap for HIV prevention in southern Africa by training non-researchers to engage with research, while providing opportunity for researchers to engage with policy-makers and practitioners Workshop facilitators were 4 researchers

	Key results
	Categories of knowledge utilization were ***conceptual, political and instrumental*** (Weiss, 1979) **Conceptual use:** HSAs receptivity to process; agreement from HSA consultants regarding compatibility of models used; commitment from executives to adopt **Political use:** consultant use of process as 'moral weight' to persuade executive to permit them to change consulting model to one more intensive **Instrumental use:** creation of specific tool that used principles; adoption of principles in documentation; adoption of more participatory approach to ergonomic practice **BARRIERS to adoption:** Confusion adopting new information; complexity of research overwhelming; intensive process prohibitively expensive
	No formal evaluation, but regional breastfeeding committee members pooled resulting priorities and formed integrated promotion and action plan Three joint priorities were selected by hospitals, community health centres, volunteer groups, and policymakers: 1. creation and implementation of common breastfeeding policy across region's hospitals and community health centres 2. development of prenatal breastfeeding education programs tailored to multiethnic population 3. enhancement of breastfeeding education and support across hospital and community-based services
	Authors reflected on changes observed: participants had increased understanding of purposes and processes of research; but for research to make a difference, research community needs to emphasize publication of research findings written for potential users Drawing on feedback and observations, workshops may have addressed the evidence-practice gap in three areas; access to research, understanding of research, and relevance of research Workshops enabled small groups of people to access relevant research in timely manner and most successful in influencing researchers to consider bridging the evidence-practice gap by producing more relevant research, applicable to policy-makers and practitioners

Appendix B: Summary of KTE implementation studies identified in the literature (continued)

REFERENCE	Purpose/ Objectives/ Participants	Design and Methods
Philip et al. (2003) Aberdeen, Scotland Practicing what we preach? A practical approach to bringing research, policy and practice together in relation to children and health inequalities. **Rating: 10/15**	User fellowship in UK Economic and Social Research Council Health Variations Program (ESRC) designed to improve understanding of the causes of socioeconomic inequalities in health	**Case report** Practitioners, researchers, decision makers involved in: production and distribution of newsletters regarding introduction to project and emerging findings/progress; short articles, presentations, posters at conferences, practitioner groups; practitioner seminar collaborative with research team; gatekeeper seminar collaborative with health education board - research reports and workshops
Rashiq et al. (2006) Alberta, Canada **Rating: 10/15**	130 participants from 14 health and administrative disciplines attended 11 workshops; test new model of Health Technology Assessment Increase awareness of chronic non-cancer pain (CNCP) management in Alberta rural practitioners and change attitudes	**Single group post-test** Experts in CNCP management and HTA specialists (Ambassadors) travel to Alberta health regions to translate systematic review findings; Ambassadors held 11 2-hour interactive sessions on CNCP Session = case study discussion in which participants proposed different treatments

Key results
Authors state that workshops were full thus suggesting dissemination was successful Difficulty experienced in reaching practitioners not already ‘networked’ Demand for seminar in rural area suggests success of targeting rural practitioners
Post-workshop survey: 99% indicated workshops useful in linking research to practice; action planning component least satisfactory – 30% respondents reported that no action plan was developed, mainly because of insufficient time in session, and 50% reported making plans to improve CNCP management in some form where none existed previously; impact of workshops on participants’ perception of knowledge of CNCP was assessed and found to rise after the workshop

Chapter 4. SBU's Ambassador Program in Northern Sweden

Leif Rentzhog

The Swedish Health Care System

Sweden a country of 9 million people with three political and administrative levels: the central government, the County Councils, and the municipalities (local authorities). Responsibility for providing health care is decentralized mainly to 21 democratically elected County Councils, which have the right to levy taxes in their respective regions. The 290 municipalities are responsible for domestic care of the elderly and people with disabilities. An important role for the central government is to establish basic principles for health care services by means of laws and ordinances.

When it comes to highly specialized care, as well as research and training, the County Councils cooperate on the basis of six different regions (Figure 1). For example, thoracic surgery and neurosurgery require larger patient bases than are provided by a single county.

The County Councils are authorized to make independent political decisions and levy taxes for health care and some other purposes. They also receive a certain amount of money from the central state budget, sometimes as result of special negotiations and aiming at special purposes. The health care within a county is generally provided by primary care physicians, usually working in health care centres with nurses and other health care personnel, and by local and central hospitals that offer internal medicine, surgery, obstetrics/gynecology, and other specialties. Patients needing highly specialized care are referred to a University Hospital in their region. These hospitals are connected with medical schools.

The universities and the medical schools are responsible for undergraduate education and research. There is no formal postgraduate education but the different medical services at the University Hospitals, or the societies for different medical specialties, may organize short courses for specialists and those who are in training to become specialists. A great deal of the postgraduate education is at least partly sponsored by pharmaceutical companies, who may also organize educational exercises themselves.

Within each local health service there is a chief administrator who may be a physician, nurse, other health professional, or a non-medical administrator. This person is responsible for running the service and has responsibility for the budget. When it comes to introducing new methods, or scrapping old methods, the chief administrator and her/his counterpart in the office of the County Council have to reach agreement, usually based on budgetary considerations. The administrative departments of the County Councils, which are political assemblies working through non-political administrators, are usually not staffed with persons having a medical education.

Figure 1: Health care regions in Sweden

The Swedish Council on Technology Assessment in Health Care

The effectiveness and cost of health care services have been important issues for health policy in Sweden over the last 30 years. The first agency to deal with such issues was established in 1972 by the federation of the County Councils and the government.

The need for a greater focus on effectiveness and cost-effectiveness of health practices became apparent in the early 1980s and in 1987 the Swedish Council on Technology Assessment in Health Care (SBU) was established for this purpose. It was funded entirely by the federal government and was given the mandate to provide evidence on both new and established medical practices and technologies to assist health policy and practice throughout the country.

SBU quickly built a high reputation internationally, but especially in Sweden. Important contributing factors to this were the support of the medical research community, thanks to the rational minds of Swedish doctors and policymakers, the strong tradition in Sweden of relying on scientific facts, political support for evidence based health services, the influence of the Cochrane Collaboration, and the high-quality of the reviews performed by the agency.

In organizing its reports and assessments, SBU makes use of multidisciplinary project groups to prioritize the participation of target groups in an expert capacity. These consist of leading experts from Sweden and abroad, representing various fields of clinical practice and scientific research. The fact that the experts are well-known specialists in their fields and come from all parts of the country contributes significantly to the acceptance that a new report usually gains.

SBU works actively on a number of levels to disseminate its assessments throughout Sweden. Among those media and forums are SBU reports, the Internet, newsletters, national conferences, trade shows, cooperation with national partners, patient reports,special reports for various caregiver groups, and discussion materials for primary care physicians.

SBU has found it useful to cooperate with several other governmental agencies, not only because it is a small organization that lacks the resources to implement measures on its own but also because it has a mandate to "provide data and disseminate knowledge at all levels of the Swedish health care system." More directly influencing clinical practice was not part of SBU's mission. But greater coordination at the national level in recent years, especially with the Swedish National Board of Health and Welfare and the Medical Products Agency, has increasingly involved SBU's reports in doing just that.

The National Board of Health and Welfare is authorized to issue national recommendations of great importance for the County Councils' decision making. The Medical Product Agency deals with approval of new drugs and rational drug use. SBU's reports are of great importance for their decisions and recommendations and, together, these three organizations collaborate at a national level to form a more effective intervention strategy than in earlier years.

SBU has also carried on extensive discussions about other ways of more actively impacting clinical practice without wavering from its primary mission or jeopardizing its reputation as an independent source of knowledge. The literature on disseminating and implementing knowledge (Grol, 2004) has suggested that intervention in small groups close to users, particularly clinical practitioners, can be a useful approach. Other implementation methods include: peer reviews (audits) and feedback, local seminars (academic detailing/educational outreach), individual training/instruction, use of local opinion leaders, economic incentives, or a combination of measures.

Most of these measures require local activities for small, select target groups. More active participation by the doctors and other caregivers whose clinical practice is to be influenced is also of vital importance.

The SBU Ambassador Program

SBU launched its Ambassador Program in an attempt to more effectively initiate changes in clinical practice. The idea was to involve well-known local opinion leaders in each county, preferably physicians in clinical practice, and offer them a fair degree of independence from SBU.

The ambassadors would be appointed by their own counties. In that way they would not only disseminate SBU's reports, but also serve as representatives of the County Council in influencing clinical practice. In addition, they would be able to propose measures even in areas for which a report has found insufficient support for an evidence based conclusion (unfortunately a far from uncommon occurrence).

The most important assistance that SBU provides to ambassadors is education in connection with each new report and advanced training in other areas, such as evidence based medicine (EBM), that support implementation efforts. The ambassadors in most counties have been given a highly independent role and achieved great credibility. SBU ambassadors must be interested in instruction and health economics, and have some kind of scientific background. Many of them have taken part in a previous SBU assessment project.

Responsibilities of politicians

SBU ambassadors place great importance on reaching out to their local politicians. The politicians are responsible for:

- Identifying needs.
- Prioritizing and allocating resources.
- Establishing objectives and strategies.
- Setting budgetary constraints.
- Getting EBM on the political agenda.
- Promoting legitimacy for the dissemination of SBU reports and the acceptance of EBM.
- Creating an arena for dialogue with the medical profession about the challenges facing the health care system and the need for new knowledge in order to implement change.

Over the last few decades the interaction between doctors on the one hand and politicians and administrators on the other has not always been positive. Doctors often feel that the poor dialogue they sometimes have with politicians is due to insufficient medical knowledge on the part of the politicians. Meanwhile, politicians may have the impression that doctors are inadequately versed in the limitations and ground rules of financing, politics, and democracy. Politicians are sometimes of the opinion that the medical profession speaks a language all its own and lacks a comprehensive view of the economy and priorities that must always be considered.

The Ambassador program has made it possible to get the different people responsible for health care to come together and to better understand their different views, especially regarding the economics of health care. Using the reports from SBU, doctors sometimes have been able to get the increase of resources that they feel is necessary. In other cases, administrators may be supported when they want to postpone the establishment of a new method for diagnosis or treatment. Thus, even if the Ambassador program did not primarily aim at increasing cooperation within the counties, this has become an important effect.

Most reports from SBU contain a chapter on health economics and local politicians and administrators are especially interested in the economic consequences of changes in the use of technologies in different specialties. Sometimes they may be too interested in economic issues. The task for the ambassador is then to get them to understand the clinical consequences of different methods.

It has also been important to spark the politicians' interest in SBU Alert, an ongoing series of brief reports about new methods that are making their way into the health care system.

Partnership with local and regional organizations

An increasingly important task for SBU ambassadors is to identify the most appropriate partners in the various counties. The formal and informal local networks that are essential to SBU's efforts vary considerably among counties and types of reports.

Drug and therapeutic committees represent a key partner in many counties. These committees exert great influence at the local level when it comes to information, training, and financing in the area of pharmaceuticals. In addition, they frequently have effective systems for monitoring the impact of an SBU report on prescription patterns.

Interventions before and after release of reports

While every county hosts a number of development efforts, including local programs and advanced training projects, they are often poorly coordinated with national events such as the release of a new SBU report. In order to be as effective as possible, a report should be published when its conclusions are most in demand. As a result, ambassadors have tried to exert influence within their counties well ahead of the release of a report so as to ensure that programs, major educational initiatives, etc. are planned in a timely manner. "Wait for the report" is an often repeated admonition.

In order to maximize the impact of an upcoming SBU report, attempts have also been made to involve target caregiver groups from the very beginning. For instance, one county arranged a major conference between key health care professionals and SBU's working group of experts a year before the report was expected to be released. One such example was the report on *Treatment of Depression* (SBU, 2004a). In addition to generating interest in the report, the idea was to give caregivers an opportunity to influence the final phase of the expert group's efforts. For example, the County Council might decide to study current clinical practice in areas that the conclusions of the upcoming report are likely to touch upon.

Attempts were also made to spur other activities - such as identifying local guidelines, planning the County Council's educational initiatives, and promoting local discussion about problems in caring for people with depression – that could set the stage for the report. Parts of the Northern Region are currently engaged in similar efforts in preparation for the release of SBU's major report on the care and treatment of people with dementia.

Particularly at the national level, a report inevitably attracts the most attention when it is published. However, clinical practice changes only gradually. Implementation is not a one-time event, but a multi-stage process.

That is one reason for the ambassadors to try to keep a report vital - incorporating it into development efforts, educational processes, and guidelines at the local level for an extended period of time. Contrary to the notion that only the latest scientific discoveries are relevant, most results of a systematic review reflect long-standing conditions. Throughout the years, older SBU reports have come to play an ever increasing role in the ongoing evolution of clinical practice. They are often used and cited in local discussions many years after their publication. SBU's current strategy of updating its major reports whenever key new conclusions emerge has contributed to their status and prestige.

Guidelines and recommendations

An important part of the SBU ambassadors' mission is to identify and influence local guidelines and recommendations so that these are based on solid facts from the reports. SBU does not produce any guidelines. However, the National Board of Health and Welfare, the government agency for supervision and monitoring of the health services, may decide about national recommendations based on SBU's reports. A wide variety of guidelines are produced at may different levels of the health care system in Sweden – from national guidelines mostly produced by the societies for the different medical specialties to local guidelines regulating agreements between a hospital and GPs.

Some County Councils like Västerbotten in the Northern Region have developed strong organizations producing comprehensive guidelines for the whole county. In Västerbotten special medical networks have been used in different specialties (medicine, surgery, and orthopedics). In these networks there are clinical experts with an over-viewing medical responsibility, but GPs are also represented. When new SBU reports are published, the medical networks produce guidelines based on the conclusions in the reports. These guidelines give a strategy for implementation and a tool kit in clinical practice to help in decisions during the meeting with the patient.

Most reports require activities from a certain medical network. The SBU report on *Back and Neck Pain* (SBU, 2000b) called for activity between GPs and specialists in orthopedics; that on *Treatment of Depression* (SBU, 2004a) recommended interaction between GPs and specialists in psychiatry. Guidelines are developed jointly from the SBU reports by GPs and specialists.

Structured questionnaires are often used together with the guidelines to further improve the possibility of influencing diagnostic and treatment quality. Also, an important part of the ambassadors' efforts is to point out methods that in the reports are shown not to be evidence based and try to influence guideline preparation so that these methods are weeded out.

The SBU North Ambassador Program

SBU North Regional Committee

The SBU North Regional Committee – the first regional organization for the SBU Ambassador Program – started in 1997 in the Northern Health Care Region. The organization is a collaborative project between SBU and the Northern County Councils Regional Federation.

The Northern County Councils Regional Federation serves as the agency and policy making body for the Northern region (Figure 2), with twelve politicians on the board representing the four northern councils in Sweden. The Federation's office also serves the SBU North Regional Committee. The Committee consists of one of the county commissioners, as chairman, two chief administrators representing the County Councils and the municipalities, a physician from each county representing the medical profession, the four SBU-Ambassadors, and a person from the University of Umeå. The committee meets every fourth month and deals with dissemination and implementation of HTA reports from SBU that are of joint interest to the County Councils.

Figure 2: Facts about the Northern Region (2004)

Four county councils – covering more than half of Sweden

1 university hospital and 12 county and district hospitals

3,000 hospital beds

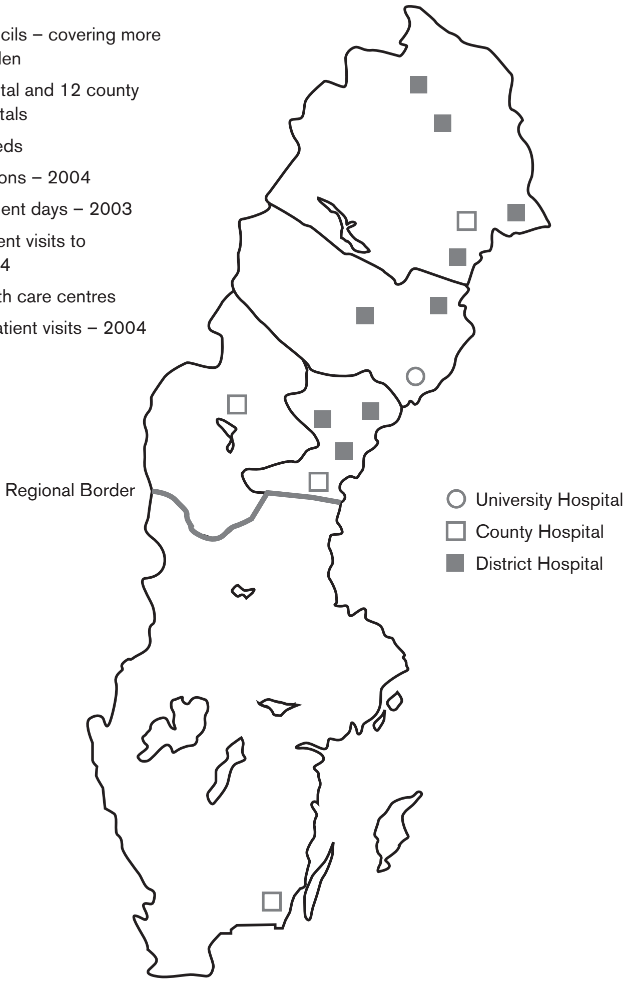
155,000 admissions – 2004

1,000,000 in-patient days – 2003

870,000 out-patient visits to physicians – 2004

130 primary health care centres

1,000,000 out-patient visits – 2004



Operation of the program

Prior to the release of each new SBU report, a strategy for implementing the report is discussed in the committee between the SBU ambassadors, representatives for the university, politicians, and chief administrators. Local experts with special knowledge of importance for the new SBU report are often asked to take part in these committee meetings. The committee identifies the various target groups, the desirable and feasible impact on local clinical practice, and the local experts and organizations that are in a position to provide implementation support. The strategy for implementing a report must be based on the particular target groups it is trying to reach. What should directly influence clinical practice? What is the significance of the report for health economics and policy administration? What is the impact on training and regional medical agreements?

To initiate debates and to bring a new SBU report in focus, the committee often arranges large regional conferences. This may be of special importance when implementation of the report needs cooperation from many different levels of the health care system; for example, HTA reports such as *Smoking Cessation Methods* (SBU, 1998), *Treating Asthma and COPD* (SBU, 2000a), and *Obesity - Problems and Interventions* (SBU, 2002). At these larger conferences, the aim has been to bring together target groups from various levels of the health care system, administrators, and politicians.

Because the region is so spread out, videoconferences are sometimes arranged to make it easier to participate. Video documentation is occasionally also used to stimulate further discussion at the local level. But although the region is making increasing use of video links for specialist assessments in individual medical cases, most Swedish doctors remain unaccustomed to acquiring information in that manner.

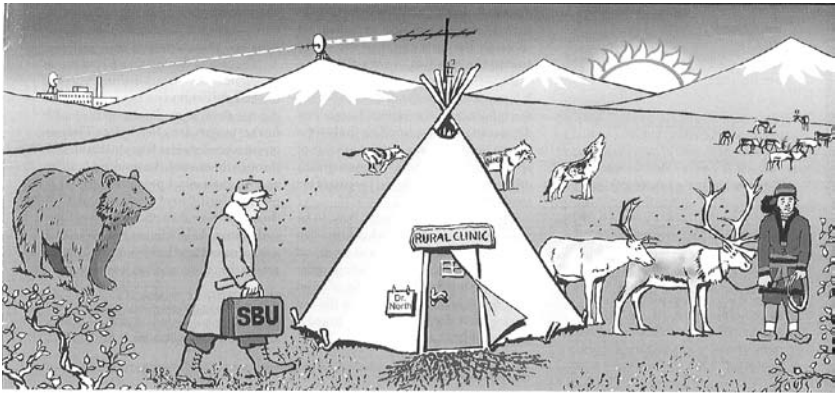
One encouraging result of the large regional conferences, as part of the SBU North Ambassador Program, has been an increased coverage by the local media, including television.

For some reports, such as *Treatment of Anxiety Disorders* (SBU, 2005), an alternative to large regional conferences has been to gather a small group of regional experts to discuss options for dissemination and implementation. The idea has then been to start this process by focusing on possible opinion leaders and the most important organizations from the different countries.

In other cases, arranging the initial conferences at the county level appears to be a more effective way of encouraging local activities concerning the report. Often these types of meetings are arranged as discussions between experts that have produced the SBU report and local experts in the counties to avoid one way communication about the report.

Influencing local clinical practice

The Ambassador Program's principal objective at the beginning was to influence clinical practice by promoting small-scale discussions of the report in accordance with the pharmaceutical industry's normal marketing approach. The ambassadors devoted a great deal of time to seeking out and visiting neighborhood health centers.



Travel over the long distances in the Northern Region is costly in terms of both time and other resources. Nevertheless, a great deal of time is still devoted to actively influencing basic clinical practice in that way. However, these days the ambassadors often link up with other partners – primarily County Council drug and therapeutic committees – which have physicians and pharmacists who regularly visit all neighborhood health centers and hospital clinics. In addition to their efforts on behalf of SBU, some of the ambassadors work for the drug and therapeutic committees in that capacity. In such cases, they can pass on information about SBU in connection with their other assignments.

The SBU ambassadors also arrange smaller local workshops within their counties; for instance in disseminating information about reports such as *Treatment of Depression* (SBU, 2004a) and *Moderately Elevated Blood Pressure* (SBU 2004b). While primary care physicians are often the main target group, nurses, physical therapists, and other caregivers are also given high priority. Either a member of the SBU Project Group or a local expert who is highly familiar with the report leads such seminars. Basing much of the discussion on case studies is often useful and highly appreciated.

An expert is not necessarily needed to lead discussions in small groups. Groups in which the other participants are actively involved can sometimes be more productive. Some parts of the region rely on primary care study groups for the purpose of identifying desirable changes of clinical practice. These study groups are self governing independent groups of colleagues working with problems based on professional development. A group of 6 to 8 physicians meet once per month. Each group chooses a leader with particular responsibility for structure, harmony and development of the work. The leader should be interested in group based learning and have the access to supervision and continuous contacts with other group leaders and education coordinators.

At each meeting the members are prepared to discuss the one topic on hand by reading and preparing in advance. Often, SBU case reports are the subject and SBU produces special study materials for these meetings. An audit is used to evaluate the group members every day performance in order to investigate and quantify the clinical reality of using a health technology or service.

This kind of study group was first developed among GPs, but the idea has spread to other groups of physicians and, also, to other categories of health care professions, such as physiotherapists and midwives.

EBM training

Local EBM training is integral to preparing for the reception of a new SBU report. Ambassadors have taken the initiative in a number of counties to make sure that new medical graduates and other caregivers obtain such training.

At the regional level, SBU North has arranged EBM training for leading politicians and administrators, as well as graduate courses in the medical curricula of our three universities. SBU North has also cooperated with Umeå University in developing EBM training for various parts of its basic medical curriculum. The university now leads the country in that crucial area.

Has the Ambassador Program served its purpose?

The usefulness of SBU's Ambassador Program is both a vital and a difficult issue to address. Much of the effort is carried out at the same time that SBU and more central organizations release information about a new report, not to mention all the interest generated by medical journals and the popular media. Even at the local level, the impact of the program on clinical practice may be difficult to distinguish from effects due to other initiatives. The role of the ambassadors is not to implement the SBU report, but to promote various projects that will assume that task.

Monitoring the total impact of efforts surrounding a new report has varied from county to county. The report entitled *Back and Neck Pain* (SBU 2000b) provides a useful illustration. The Västerbotten County Council launched a four-year project to implement the report's conclusions. At the end of the period, the council determined that costs for appointments with doctors and physical therapists had decreased by 40%, while the proportion of patients referred to emergency rooms was down from 20% to 6%. Over the same period, patients' satisfaction and expectations from the health care system increased considerably.

The purpose of the program was not primarily to decrease costs, but to make health care workers and patients aware of proper treatment of back pain. The patients and the primary care physicians realized this, giving primary care increased responsibility for this type of complaint. The decrease in cost was secondary to the changes in attitude about referring patients to hospital care.

Emerging new organization for receiving and implementing SBU reports

As mentioned above, the Swedish National Board of Health and Welfare and the Medical Products Agency are increasingly basing their initiatives on SBU's scientific evidence. As a result, the Board can work up clearer recommendations for the health care sector. Thus, SBU's basic efforts are much more likely to generate changes in clinical practice and effective implementation of its reports. Greater cooperation among these three organizations has also heightened demands for better County Council structures when it comes to receiving and implementing SBU's conclusions and the Board's recommendations. With that in mind, specific units or positions at the administrative organizations of many counties are taking over the ambassador's role. While that is a welcome development, we believe that the councils should also devote additional resources to the more independent task assumed by the original ambassadors of interacting with caregivers beyond their SBU duties.

Proceeding from a recommendation of the Federation of Swedish County Councils, the northern County Councils have adopted a program to strengthen acceptance that clinical practice should be based on solid scientific evidence. The program is based on cooperation among national, regional and local groups and individuals to build a new organization for receiving and implementing the results of medical research.

The following are the program's ten main objectives:

1. The government agencies (the Swedish National Board of Health and Welfare, SBU, and the Medical Products Agency) that are primarily concerned – along with counties, regions and municipalities – need a joint forum for strategic discussions.
2. Health care must be presented more clearly as a system of organizations that thrive on knowledge and its constant advance.
3. Counties and health care regions should work both jointly and independently to develop skills and organizational structures that facilitate and support the laying of a nationwide foundation for knowledge and priority setting in the evolution of good clinical practice.
4. Counties and regions need to employ research-based methods for carrying out systematic and sustainable change.
5. Counties and regions should improve and refine their tools for systematic follow-up and comparison of medical findings, costs, resource allocation, clinical practice, and patient benefit.
6. Key initiatives are required at the level of the health care regions.
7. Health care regions need medical networks whose task is to promote good clinical practice based on currently available knowledge.

8. Interaction must be expanded between counties and health care regions on the one hand and universities and faculties on the other.
9. Municipalities, counties, and regions must cooperate more effectively in order to strengthen EBM at the local level.
10. Counties, regions, and municipalities should forge a clearer and more coordinated dialogue with organizations of medical specialists and the Swedish Nurses' Association.

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Chapter 5. The Alberta HTA Chronic Pain Ambassador Program: An Alberta Adaptation of the SBU Clinical Ambassador Program

Paul Taenzer, Christa Harstall, Saifee Rashiq, Pamela Barton, and Don Schopflocher

Our project built on established relationships among researchers from the Health Technology Assessment (HTA) group from the Institute of Health Economics, senior clinicians from the University of Calgary and the University of Alberta and senior government officials from Alberta Health and Wellness. Since 2001 our group has been involved in developing priorities for HTA reports related to chronic pain management. In 2003, members of the health workforce group at Alberta Health and Wellness organized a provincial conference on chronic pain management where participants reflected on the scope of the problem and potential strategies to improve quality of care. The unanimous recommendation from these provincial administrative and clinical experts was that more effort needed to be directed towards education of primary care healthcare providers. A comprehensive initiative would involve undergraduate, postgraduate and continuing professional education.

The same year, the precursor organization of HTAi (ISTAHC[1]) held its annual meeting in Canmore, Alberta. Representatives of the Swedish Council on Technology Assessment in Health Care (SBU) presented work they had undertaken to address the issue of research transfer of clinically relevant HTA evidence to practicing clinicians and health-care administrators.

In the mid 1990's, SBU developed a program where senior clinicians were hired to be liaisons, or ambassadors, between the SBU and the decision makers and clinicians in each health district. The senior clinicians conducted workshops, clinical rounds, and conferences and met with clinicians and policy makers to inform them of the latest results from SBU HTA reports. The ambassadors also informed SBU of local priorities that could be considered for future HTA reports.

We adapted the Swedish ambassador program to the Alberta context with an initial focus on management of chronic, non-cancer pain.

The primary objectives of the project were to develop and test an ambassador model that would serve as a successful prototype for knowledge translation, increase clinician knowledge about best evidence in chronic pain management, and encourage clinicians to incorporate research evidence into their management of chronic pain patients. In order to develop, implement, and test the model, an advisory committee was established with representatives from all relevant

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[1] HTAi = Health Technology Assessment International
ISTAHC = International Society for Technology Assessment in Health Care

stakeholder groups in the province, including the authors, the Alberta College of Physicians and Surgeons, the Alberta Medical Association, and a representative from one of the rural Alberta health regions. Consultants with expertise in dissemination of clinical practice guidelines, continuing medical education, and adult learning complemented the advisory committee.

We developed a workshop format for the program to present research evidence on specific chronic pain interventions to local clinicians. [The following principles were used to create the workshop program.] The workshop was designed to meet the needs of multidisciplinary participants since the work of chronic pain management often involves interdisciplinary approaches to treatment. Our educational consultants advised us that learning is maximized in environments where didactic teaching is minimized and interaction amongst participants and program leaders is encouraged. To facilitate this we developed a case-based approach with flexible content. In practical terms this meant developing a case scenario reminiscent of cases of low back pain typically seen in primary care settings. The task of the program participants was to work together to resolve the case. When the participants suggested a particular treatment modality, the ambassadors would present the research findings related to that mode of treatment. To facilitate the discussion the ambassador research team developed concise printed material for each of 18 primary care treatment modalities. These one-page documents are described in more detail below. The topics covered included:

Acupuncture	Long-acting Opioids
Antidepressants	Massage Therapy
Behavioural Therapy	Muscle Relaxants
Cannabis or Cannabinoids	Multidisciplinary Pain Programs
Celecoxib for Rheumatoid Arthritis and Osteoarthritis	Non-steroidal Anti-inflammatory (NSAIDs)
COX-2 Inhibitors (etoricoxib)	Prolotherapy Injections
Epidural Steroid Injections	Spinal Manipulative Therpay
Exercise Therapy	Transcutaneous Electrical Nerve Gabapentin
	Trigger Point Injections

A team that included a clinical ambassador, who was a well-recognized provincial leader in continuing education related to pain management, and a research ambassador, who was available to explain how the evidence was derived from the research literature, conducted each workshop.

For each intervention a comprehensive search and selection process for the best research evidence was undertaken. Systematic reviews and HTA reports were rated by the HTA researchers and one-page, "evidence-in-brief" summaries of the research evidence were generated (see Figure 1). The clinical ambassadors also produced one-paragraph statements of how the research evidence could be incorporated into clinical practice. The goal therefore was to make the research "actionable."

Figure 1: Gradings for evidence in brief

Key to Evidence Gradings Used in the 'Evidence in Brief' Summaries

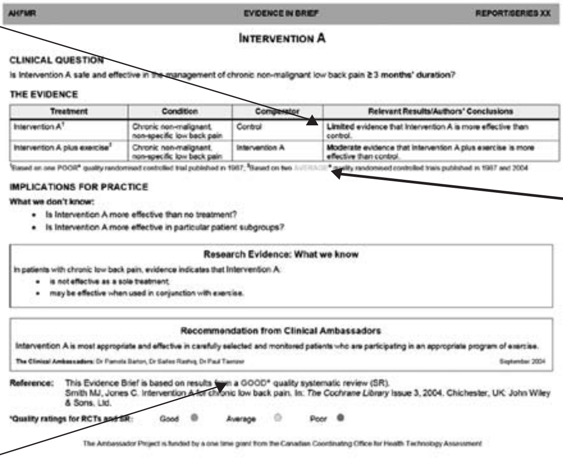
Information presented in the far right column of the **Evidence Table** in many of the 'Evidence in Brief' summaries was graded according to the following criteria (adapted from 1):

Strong – consistent findings from at least two good quality randomised controlled trials (RCTs);

Moderate – consistent findings from one good quality RCT and/or at least two average quality RCTs and/or at least two poor quality trials (RCT of controlled clinical trial (CCT)) and/or one overage and one poor quality trial (RCT or CCT);

Limited – findings from one average quality RCT or one poor quality trial (RCT or CCT);

Conflicting – inconsistent findings among multiple trials (RCT or CCT) of any quality.



AHFMR EVIDENCE IN BRIEF REPORT/SERIES XX

INTERVENTION A

CLINICAL QUESTION

Is Intervention A safe and effective in the management of chronic non-malignant low back pain ≥ 3 months' duration?

THE EVIDENCE

Treatment	Condition	Comparator	Relevant Results/Authors' Conclusions
Intervention A[1]	Chronic non-malignant, non-specific low back pain	Control	**Limited** evidence that Intervention A is more effective than control.
Intervention A plus exercise[2]	Chronic non-malignant, non-specific low back pain	Intervention A	**Moderate** evidence that Intervention A plus exercise is more effective than control.

[1] Based on one POOR* quality randomised controlled trial published in 1987; [2] Based on two AVERAGE* quality randomised controlled trials published in 1987 and 2004

IMPLICATIONS FOR PRACTICE

What we don't know:

- Is Intervention A more effective than no treatment?
- Is Intervention A more effective in particular patient subgroups?

Research Evidence: What we know

In patients with chronic low back pain, evidence indicates that Intervention A:

- is not effective as a sole treatment
- may be effective when used in conjunction with exercise.

Recommendation from Clinical Ambassadors

Intervention A is most appropriate and effective in carefully selected and monitored patients who are participating in an appropriate program of exercise.

The Clinical Ambassadors: Dr Pamela Barton, Dr Safee Rashiq, Dr Paul Taenzer September 2004

Reference: This Evidence Brief is based on results from a GOOD* quality systematic review (SR).
Smith MJ, Jones C. Intervention A for chronic low back pain. In: *The Cochrane Library* Issue 3, 2004. Chichester, UK: John Wiley & Sons, Ltd.

*Quality ratings for RCTs and SR: Good ● Average ○ Poor ●

The Ambassador Project is funded by a one time grant from the Canadian Coordinating Office for Health Technology Assessment

The RCTs were rated with respect to quality criteria as follows:

Good – at least 80% of criteria met

Average – between 50% and 80% of criteria met

Poor – ≤50% of criteria met

Quality assessment of the systematic review (SR): Published systematic reviews were rated on how well their methods excluded bias and confounding by examining the inclusion/exclusion criteria and search strategy used; how the data extraction, quality assessment of the included studies, and data analysis/synthesis were conducted; whether the conclusions of the review matched the results; and if conflicts of interest and funding sources were reported. The reviews were rated with respect to six essential quality criteria as follows:

Good – six criteria met, or five criteria met and one criterion only partially met;

Average – one criterion not met, or one criterion not met and one criterion only partially met, or two criteria only partially met;

Poor – at least two criteria not met.

1. vanTulder et al. Updated method guidelines for systematic reviews in the Cochrane Collaboration Back review Group. Spine 2003;28(12):1290-1299.

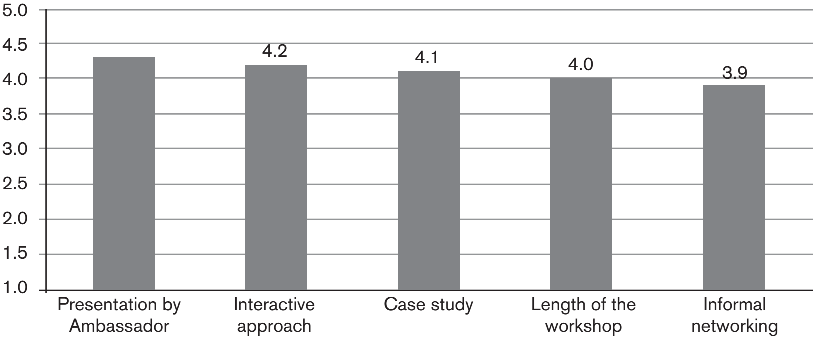
The Ambassador Project was initially funded by a one time grant from the Canadian Agency for Drugs and Technologies in Health care (May 2004 to April 2005) |(formerly the Canadian Coordinating Office for Health Technology Assessment). The Institute of Health Economics has provided funding to continue the Project.

We focused on making participation at the workshops appealing, convenient, and not too time-consuming. Workshops were held in local communities, at a convenient time of day, with participants (family physicians and pharmacists) able to obtain continuing education credits. The workshop format was flexible so that participants could direct the content to their areas of need. At the conclusion of the session, participants were asked to focus on what they had learned, on how they might apply the learnings in their practices, and on changes they would like to see in their health region's policies and practices. Printed notes on their deliberations on these topics were emailed to the participants within one week of the workshop.

Eleven workshops were conducted in eight of the nine Alberta health regions in the fall of 2004. Workshop participants were identified by medical and administrative leaders as the region's most committed pain management clinicians. One hundred and thirty health care providers participated, including nurses (27%), physicians (21%), physical and occupational therapists (18%), administrators (17%), pharmacists (9%), and psychologists, mental health, or social workers (7%).

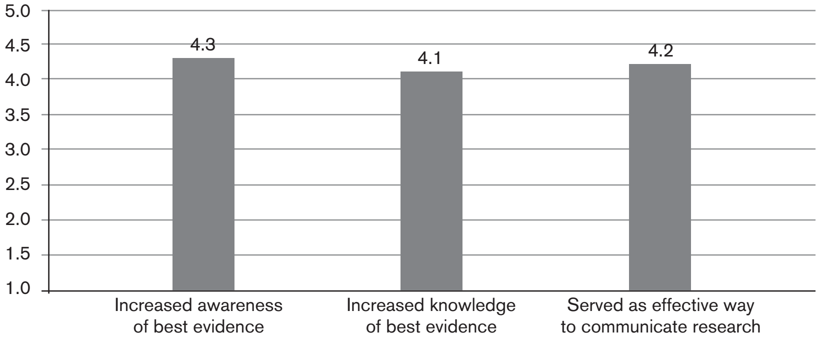
An independent evaluation of the program was conducted six weeks after each workshop. Each participant received a postal survey querying their impressions of the workshop, its impact on their practice, and their views on the potential for the ambassador-style workshop to be applied to other healthcare domains. The full report of the evaluation is available for download on the project website (Barrington Research Group Inc., 2005). Overall, the workshop participants found the ambassadors highly credible, appreciated the evidence-in-brief summaries, found the workshop format effective, and reported a significant increase in their knowledge of key treatments for chronic pain management. They had begun sharing the evidence and evidence-in-brief summaries with colleagues and with patients. One third of the participants indicated they had made changes to their practice based on what they learned at the workshop. See Figures 2 through 4.

Figure 2: Satisfaction with workshop activities



Score key: 1 – Not at all; 5 – A great deal

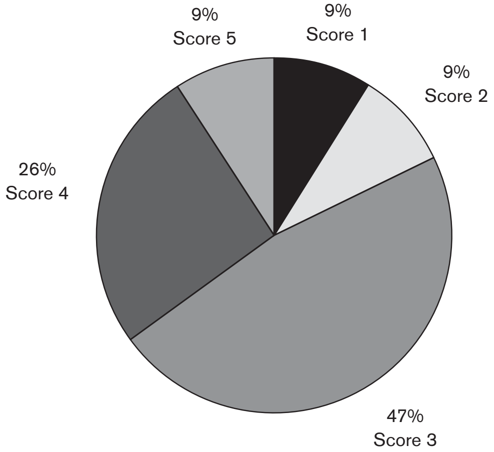
Figure 3: Short-term objectives



Score key: 1 – Not at all; 5 – A great deal

Figure 4: Intermediate-term outcomes

Changed your practice in the area of chronic pain management



Score key: 1 – Not at all; 5 – A great deal (Mean rating 3.2)

The case-based, flexible, interactive workshop format engaged multidisciplinary participants who frequently had not previously worked together. Participant post-interviews and anecdotal observations suggested that, in a number of cases, the multidisciplinary group assembled for the workshops continued to communicate, and in some cases meet, in order to facilitate the management of patients with chronic pain in their region.

The participants also suggested a variety of topics in pain management and other areas in which they thought the ambassador program could be a good mechanism for KT. These include domains where there is great variability in clinical practice, which reflects either a lack of generally recognized effective management plans or a lack of wide adoption of recent scientific advances. The topics suggested for ambassador type initiatives are listed below:

Diabetes	Mental illness
Arthritis	All chronic diseases
Heart disease	Fibromyalgia
Lifestyle changes (smoking, weight loss, exercise, etc.)	Asthma
	Wound care and treatment

Lessons learned

As a research team, one of the more important lessons we learned from this project arose from the challenge we encountered to our fundamental approach to our professional work. The research ambassadors thrive on precision and are wary of generalizations that "go beyond the data." The clinical ambassadors, however, are sensitive to the needs of clinicians in busy practices who are seeking simple solutions for what they should do in a given case. The tension between the drive for precision and the need for operational simplicity led to active debates on how to present the evidence-in-brief summaries. It also highlighted the need for all team members to appreciate and honor the professional foundations of their colleagues and to recognize the importance of judicious compromise.

After the workshops were completed, participants continued to download the evidence-in-brief summaries from the project website and made periodic requests for additional workshops and other services from the project team. Clearly a project such as the ambassador program would best serve the needs of practicing clinicians if it were an ongoing professional education service. A strategy for sustainability is a clear requirement.

A related issue is the "shelf life" of research evidence. Since launching the project, the HTA researchers have updated the literature reviews at four-month intervals. Not surprisingly, at each of these junctures new systematic reviews were identified, which required several of the evidence-in-brief summaries to be substantially updated. This clearly indicates the need for ongoing infrastructure to ensure the latest research evidence is being considered.

Conclusions and implications

We are aware of several examples of how the learnings and experiences from the ambassador program have been incorporated into regional action. The Calgary Health Region, which has an ongoing process for developing care pathways and supports for the care of patients with chronic diseases, has incorporated our evidence-in-brief summaries into the low back pain clinical pathway. In another health region, the workshops conducted through the ambassador program have provided support for efforts to create a regional, multidisciplinary chronic pain management program. In a third health region, the clinicians who were initially brought together for the ambassador workshop are continuing to meet on a regular basis to further their professional education and to develop more integrated clinical services.

While the ambassador program appears to hold significant promise as a KT approach, a number of questions remain unanswered. Chief among these are hard data on whether the participants permanently changed their clinical practices and, if so, the impacts of these practice changes on tangible patient outcomes. Another question relates to the generalizability of the approach. It could be argued that our team was ideal to conduct such a project since we had both the required breadth of skills and a long history of colleagueship. If the ambassador model is to be adopted in other jurisdictions and to other clinical foci, new teams of researchers and senior clinicians will be needed. These teams will face the challenges of resolving scientific and clinical gaps to develop consensus on how best to communicate practice-relevant research evidence and adopt a successful interactive, flexible teaching style. A longer-term commitment will also be required in order to maintain ongoing educational and support services to community-based clinicians.

A further question of interest relates to the role of ambassador style programs within a comprehensive research transfer strategy. Such strategies would include training in evidence based medicine at the undergraduate and postgraduate levels, practice supports such as academic detailing, access to specialists via case specific telephone or telehealth consultation, incorporation of practice guidelines and other point-of-care tools into daily practice, and the use of audit and feedback to elucidate provider specific clinical practice patterns. The implementation of a comprehensive KT plan will require an ongoing commitment of resources and a cultural shift amongst administrative and clinical decision-makers to value the insights available through careful study and contextualization of research evidence.

Acknowledgements

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This chapter is an adaptation of a previous chapter written by the authors in the CIHR Institute of Health Services and Policy Research publication Evidence in action, acting on evidence: A casebook of health services and policy research knowledge translation. Ottawa: Canadian Institutes of Health Research, 2006.

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Chapter 6. CADTH's Liaison Program

Lynda Jobin

> *"Successful knowledge transfer involves neither computers nor documents, but rather interactions between people."*
>
> **Davenport TH. "Think Tank: The Future of Knowledge Management"**, *CIO Magazine*, December 15, 1995.

Dissemination, or knowledge transfer, is the process of sharing information and knowledge and is an essential element of all good research practice. The National Forum on Health in Canada in 1997 (National Forum on Health 1997) identified the promotion of research transfer and uptake and evidence based decision making as two important priorities for the Canadian health care system for the new millennium. With continuing innovations in technology and mounting cost pressures, the need for evidence based information on drugs and other health technologies has never been greater. However, the capacity of decision makers to access evidence-based information and integrate it into decisions varies widely across the country and needs and circumstances differ from jurisdiction to jurisdiction. In addition, regardless of whether or not clear and convincing evidence is available, decision-makers are pressed for time and are apt not to use research evidence unless it is timely, credible, and reliable, and directly related to their particular role(s) and priorities (Dobbins et al., 2004).

The Canadian Agency for Drugs and Technologies in Health (CADTH), an independent, not-for-profit agency that provides credible, impartial advice, and evidence-based information about the effectiveness of drugs and other health technologies, is committed to increasing the capacity for effectively integrating evidence-based information into decision making in Canada.

CADTH believes that its ability to produce timely, credible, and relevant information is essential to informed decision making, but only provides half the equation. The other half is its ability to put this information – and relevant information produced by its partners – into the hands of the right people at the right time. Since its inception, the organization has engaged in a wide range of activities to facilitate interaction, collaboration, communication, and knowledge exchange between itself, Canadian health care decision makers, and partner organizations throughout the world.

CADTH defines knowledge transfer as the bridge between evidence-based research and the use of that research by those responsible for health care policy and decision making. A broad team approach to knowledge transfer is employed by the organization that draws on management, researchers, knowledge transfer officers, communications staff, and liaison officers. Liaison Officers are one of the key mechanisms for achieving CADTH's knowledge transfer objectives. They have an essential role in increasing the efficient exchange of information, knowing where to find it, and providing it to the right people. By identifying appropriate target audiences and venues for dissemination activities for each jurisdiction, CADTH can be assured of optimal delivery of its information and products.

The Liaison Program was established in 2004 to develop closer links with CADTH's key stakeholders in jurisdictions across the country, and to ensure decision makers have access to and understand how to use evidence-based information to determine which technologies should be used to achieve the best outcomes both for patient health and the health care system. Working in collaboration with individual Ministries of Health across the country, CADTH employs a network of Liaison Officers throughout Canada. These staff are primarily located off-site from CADTH's main office in Ottawa, Ontario and work in tandem with the health technology environment that exists within their jurisdiction.

In some jurisdictions there is a lack of awareness and little knowledge about health technology assessment (HTA), and in others there are HTA agencies with significant internal capability and capacity and direct links to local decision-making processes. The CADTH Liaison Program tailors its activities according to the differences and needs of each local jurisdiction. Jurisdictional members of CADTH's Board and Advisory Committees are invaluable resources in working closely with the Liaison Officers and the Liaison Program Director to establish the strategic direction, priorities, and work plan of the Liaison Officer to ensure local needs are highlighted and taken into full consideration in carrying out the mandate of CADTH in each province/territory.

Liaison Officers provide a physical presence for CADTH within the provinces/territories and act as a two-way conduit between the jurisdictions and the organization's internal corporate and program planning, priority setting processes, and product development. However, working off-site can present some challenges for the Team in keeping up-to-date on the organization's rapidly growing and changing programs and services. As a result, CADTH has put in place systems to keep Liaison Officers informed and updated on a regular basis and to provide them with opportunities for input and interaction with program staff.

Efforts are made to involve Liaison Officers in staff working groups, to coordinate social activities in conjunction with face-to-face Team meetings held at the head office, and to link Liaison Officers into full staff meetings and other corporate functions by teleconference. Three face-to-face meetings of the Team are held each year with bi-weekly teleconferences held on an ongoing basis. The purpose of these meetings is to discuss matters of general interest or concern to the program, launch new organizational initiatives, review and discuss program policies and procedures, and provide a forum for sharing information.

During these meetings there is active engagement by both the Liaison Team and CADTH program staff, presentations and updates on products and services, as well as training and education on specific subject and/or program matters that will support Liaison Officers in working with local stakeholders to incorporate evidence into their decisions. Liaison Officers are expected to be well versed about CADTH's products and services and skilled in interpreting and promoting these to key stakeholders in their local health care networks.

Integration of the Liaison Team with CADTH staff is critical to ensuring liaison activities are coordinated and aligned with the corporate strategic direction, and that those responsible for managing CADTH's programs have an appropriate level of knowledge and awareness of the needs of the end users of its products and services. One of the primary principles for effective dissemination of information is the need for providers of research information to know the users they are trying to get information to - what they need, why they need it, and how it can best be provided (Urban Harbors Institute, 2004). In this regard, Liaison Officers have focused on building networks of contacts, understanding jurisdictional decision-making processes, and identifying and communicating jurisdictional needs to CADTH. Through monthly reports, an annual environmental scan, and regular, ongoing communications, Liaison Officers keep CADTH staff informed of such things as the political environment, health policy issues, current health technology priorities, feedback on products and services, and key contacts.

To date the Liaison Team has spent considerable time and effort in establishing contacts with senior staff in the Ministries of Health, regional health authorities or equivalent, hospitals, health professional associations, provincial HTA agencies, and researchers and specialists in schools of medicine, nursing, and pharmacy. Efforts to make themselves known and available to key positions within the local health care system have positioned the Liaison Officers as integral members of their local health care networks.

Liaison Officers are seen by key stakeholders as the primary contact for accessing evidence-based information and resources. Not only do they provide access to and disseminate CADTH products, they also act as information brokers for other sources of evidence based information and resources through existing programs locally, as well as nationally and internationally. Also, as a member of the Liaison Team, each officer supports and helps facilitate the sharing of work amongst jurisdictions and builds and supports partnerships across Canada, increasing collaboration and cooperation within the health technology community.

Liaison Officers assume responsibility for a wide range of activities associated with raising awareness about CADTH and its partners, and providing information and resources to increase the use of health technology assessment, promote optimal drug prescribing, and support local decisions about health technologies generally.

Key responsibilities related to fulfilling this role include:

- Providing a direct local link for CADTH with Ministries of Health, Regional Health Authorities, health care institutions and health care professionals.
- Providing a mechanism by which CADTH receives jurisdictional input to processes, products and programs.
- Building a culture of evidence-based decision making throughout Canada and facilitating the use of evidence in health technology decisions.
- Supporting the planning, coordination, and delivery of CADTH's knowledge transfer activities.
- Supporting the delivery of new services and products developed by CADTH at the local level.

More specifically, Liaison Officers have a key role in CADTH's topic identification process for both its Health Technology Assessment Program and its Canadian Optimal Medication Prescribing and Utilization Service (COMPUS). By scanning information and meeting with key stakeholders, Liaison Officers are able to identify potential topics, work with requestors to refine assessment questions, and provide local, contextual information that supports CADTH's advisory committees in prioritizing and refining topics for full assessment.

Also, through their networks, Liaison Officers are able to identify local contacts related to specific needs and activities being undertaken by CADTH; for example, experts with subject expertise who can act as external reviewers or authors, potential speakers for workshops, and/or CADTH conferences. Through the delivery of stakeholder educational workshops, Liaison Officers are able to support jurisdictions in effectively using evidence based information to support their decision-making processes and prescribing practices. The intent of the awareness and educational initiatives is to move key stakeholders from initial awareness and understanding of evidence based information to implementing it into decisions and clinical practice.

Since the establishment of the Liaison Program in 2004, significant progress has been made in increasing jurisdictional awareness of CADTH and promoting research transfer and uptake and evidence based decision making. This has been accomplished mainly through information seminars/meetings, articles for professional association newsletters, speaking opportunities and/or exhibits at conferences and workshops, and promotional "leave behind" products.

With the foundation of the program now firmly rooted, Liaison Officers are moving towards a more concentrated and strategic approach to outreach initiatives that is tailored to jurisdiction specific issues, priorities, and needs. As the program evolves, the impact and usefulness of these initiatives will continue to be evaluated and changes made as required to meet the needs of local stakeholders, partners, and end users of CADTH's products and services. Only through clearly understanding their needs and priorities can the organization successfully support them in their efforts to address the increasingly complex health care issues and demands facing Canada's health care system.

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