

Integrated Knowledge Transfer and Exchange: An Organizational Approach for Stakeholder Engagement and Communications

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Abstract

Background Knowledge transfer and exchange (KTE) is a process of making relevant research information available and accessible for use in practice or policy. Integrated KTE, where knowledge users are engaged in the research process, is considered to better facilitate uptake and use. The objective of this article is to describe a fully integrated KTE approach developed over the past 20 years.

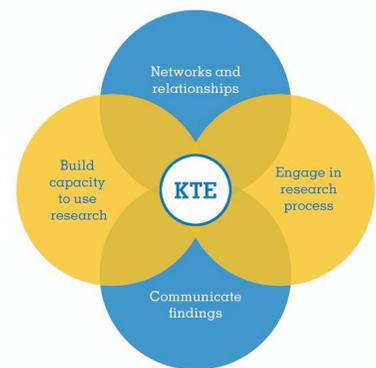
Analysis A case study approach describes knowledge user engagement, as well as the integration of communications within KTE.

Conclusion and implications The organizational KTE approach described is flexible and can be adapted to a variety of research areas.

Keywords Integrated knowledge transfer and exchange; Stakeholder engagement; Communications; Knowledge transfer and exchange practitioner

Résumé

Contexte Le transfert et l'échange de connaissances (TEC) est un processus de mise à disposition de travaux de recherche et autres informations pertinentes de manière accessible pour un usage pratique ou politique. Le TEC intégré, où les utilisateurs de connaissances sont engagés dans le processus de recherche, est considéré comme supérieur afin de faciliter l'adoption et l'utilisation des connaissances. L'objectif de cet article est de décrire une approche de TEC entièrement intégré, développée au cours des 20 dernières années.



Integrated KTE strategies and activities

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Analyse L'engagement des utilisateurs de connaissances ainsi que l'intégration des communications au sein de TEC sont décrits par des études de cas.

Conclusion et implications L'approche TEC organisationnelle est une méthode souple qui peut être adaptée à divers domaines de recherche.

Mots clés Transfert et échange de connaissances (TEC) intégré; engagement des utilisateurs de connaissances; communications; spécialiste en transfert et échange de connaissances

Introduction

Knowledge transfer and exchange (KTE) is concerned with generating, disseminating, and implementing the best available research evidence. There are a number of different terms used to describe KTE, including knowledge translation, knowledge transfer, and knowledge exchange (Graham, Logan, Harrison, Straus, Tetroe, & Caswell, 2006). Despite the different terminology, the common goal of KTE is to bring research to practice. Failing to transfer research to practice may result in the use of ineffective practice or programs, as well as wasting costly research (Colquhoun, Leeman, Michie, Lokker, Bragge, Hempel, McKibbon, Peters, Stevens, Wilson, & Grimshaw, 2014; Graham et al., 2006; Grimshaw, Eccles, Lavis, Hill, & Squires, 2012; Hudon, Gervais, & Hunt, 2015; Pierson & Rosella, 2015; Verbeek, van Dijk, Malmivaara, Hulshof, Rasanen, Kankaanpaa, & Mukala, 2002; Ward, House, & Hamer, 2009; Wilson, Petticrew, Calnan, & Nazareth, 2010a).

The concept of integrated knowledge transfer or translation has been promoted as a superior approach in the KTE literature (Brownson, Jacobs, Tabak, Hoehner, & Stamatakis, 2013; CIHR, 2012; Gagliardi, Berta, Kothari, Boyko, & Urquhart, 2016; Gagliardi, Kothari, & Graham, 2017; Kothari, Sibbald, & Wathen, 2014). The definition posed by the Canadian Institutes for Health Research (CIHR) refers to integrated knowledge translation as an approach that involves “knowledge users as equal partners alongside researchers which will lead to research that is more relevant to, and more likely to be useful to, the knowledge users” (2016a). The benefits of including stakeholders in the research process are often noted and recent articles describe integrated KTE approaches for specific research projects (Gagliardi et al., 2016; Gagliardi et al., 2017; Kothari et al., 2014; Russell, McCauley, Novak, Kolehmainen, Shikako-Thomas, D’Costa, & Gorter, 2015; Sinden & MacDermid, 2014). Some KTE approaches explicitly include co-creation (the stakeholder or end-user as a partner in the research process) as an integral aspect of KTE (Dent, Hoon, Kitson, Karnon, Newbury, Harvey, Gill, Gillis, & Beilby, 2016; Jenkins, Kothari, Bungay, Johnson, & Oliffe, 2016; Powell, Kitson, Hoon, Newbury, Wilson, & Beilby, 2013; Wehrens, 2014). Co-creation, where feasible, is an effective KTE approach and one example of integrated KTE among a continuum of stakeholder engagement options. These published examples are invaluable to KTE practitioners who wish to incorporate integrated KTE; however, there are few (if any) descriptions of organizational/institutional approaches to carrying out integrated KTE as part of their mandate. In addition, recent studies have shown that researchers from various disciplines and research organizations may not be adopting integrated KTE approaches (Brownson et al., 2013; Gholami, Ahghari, Motevalian, Yousefinejad, Moradi, Keshtkar, Alami, Mazloomzadeh, Masoud Vakili, Chaman, Salehi, Fazelzadeh, & Majdzadeh, 2013;

Larroche & Amara, 2011; Maleki, Hamadeh, Gholami, Mandil, Hamid, Ahmad Butt, Saeed, El Kheir, Saleem, Maqsoud, Safi, Abdul-Majeed, & Majdzadeh, 2014; Mosher, Anucha, Appiah, & Levesque, 2014; Wilson, Petticrew, Calnan, & Nazareth, 2010b).

This article sets out an integrated approach to knowledge transfer and exchange (KTE) developed and used by a nonprofit research organization that established a dedicated KTE team almost 20 years ago. A key aspect of the approach is the ability to fully integrate stakeholder engagement into the research process. The approach also integrates stakeholder engagement and relationship-building functions with communications activity. The integrated KTE approach described is currently used in the broad research areas related to occupational health and safety, but is flexible and could easily be adapted for other researchers and research institutions.

The objective of this article is to describe an integrated KTE approach that has been developed over the past two decades. The approach was developed and is used by the Institute for Work & Health (IWH), a nonprofit research organization located in Toronto, Canada, in the province of Ontario. The purpose of this article is not to suggest “how to,” but rather to describe, “this is how we do it” with the hope that it will be useful for other researchers and research institutions.

Context

OCCUPATIONAL HEALTH AND SAFETY

The burden of workplace injury and illness can be great. In 2014 there were approximately 240,000 accepted work-related injury and illness claims in Canada that were serious enough to require time away from work (AWCBC, 2016). The burden of occupational injury and illness falls not only on the individuals directly affected but also on the workplaces involved, as well as workers’ compensation and medical systems (Murray, Vos, & Lozano et al., 2012; Schneider & Irastorza, 2010; Silverstein & Evanoff, 2011; Vos, Flaxman, & Naghavi et al., 2012).

Interventions to prevent work injury and illness are varied and may not be based on the best available evidence. Using the best available evidence, along with practical expertise, may result in more effective interventions and programs (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). There have been calls to improve the transfer of knowledge with a goal of improving the prevention of work-related illness and injury (Chung, Williamson, & Shorrock, 2014; Franco, 2001; Schulte, 2002; 2006; Schulte, Okun, Stephenson, Colligan, Ahlers, Gjessing, Loos, Niemeier, & Sweeney, 2003; Verbeek et al., 2002; 2004; Welsh, Russell, Weinstock, & Betit, 2015; Zardo, Collie, & Livingstone, 2014).

There is a growing interest in Canada in developing evidence-based approaches to occupational health and safety (OHS) policies and practice. In the province of Ontario, this interest has been spurred in part by the 2010 report of the Expert Advisory Panel on Occupational Health and Safety.

THE INSTITUTE FOR WORK & HEALTH

The Institute for Work & Health (IWH) is a nonprofit research organization located in Toronto, Canada, in the province of Ontario. The mission of IWH is to promote, protect, and improve the safety and health of working people by conducting actionable research that is valued by employers, workers, and policy-makers.

The focus is on research that can be used in policy at the system level (e.g., by regulatory authorities and workers' compensation agencies) and by workplace parties or the organizations and professionals serving them. Accordingly, IWH is committed to providing knowledge transfer and exchange services to improve access to and the application of research evidence. The ultimate goal is improved outcomes in the prevention of work-related injury and illness and the prevention of work disability.

IWH puts particular emphasis on the use of its research in Ontario, but also connects with researchers and stakeholders in other Canadian provinces, and often collaborates with researchers in other countries. Some of its work has a global audience.

Target audiences in Ontario include the Ministry of Labour (MOL), the Workplace Safety and Insurance Board (WSIB), health and safety associations (which provide training and consulting services to workplaces), employers and employer associations, labour organizations, injured workers groups, occupational health and safety professionals, clinicians, and disability management professionals. The terms "target audiences," "stakeholders," and "knowledge users" are used interchangeably in this article.

Institute for Work & Health (IWH) research is (approximately) evenly distributed between two main areas of study:

- Preventing work-related injury and illness through studies of workplace programs and practices, prevention policies, and the health of workers at a population level; and
- Improving the health and recovery of injured workers through research on treatment, return to work, disability prevention and management, and compensation policies.

THE JURISDICTION (ONTARIO)

Ontario is a province in Canada with a working age population of approximately 9.4 million (Statistics Canada, 2015). Occupational health and safety (OHS) legislation is administered by the Ministry of Labour (MOL), which also provides core funding to six health and safety associations (HSAs) that provide OHS training and consulting services to workplaces and to four OHS research organizations (IWH and centres of research expertise in musculoskeletal disorders, occupational disease, and occupational cancer). The Workplace Safety and Insurance Board (WSIB) oversees the workers' compensation system, which covers about two-thirds of the workforce, and it also undertakes some prevention activities.

An integrated KTE approach

KTE AS DEFINED BY IWH

There is no generally agreed upon definition of KTE. Moreover, there are many terms in use that refer to a similar underlying concept or process. They include knowledge transfer, knowledge exchange, knowledge translation, and knowledge mobilization (Graham et al., 2006). Within Canada, different funding agencies use different terms. The Social Sciences and Humanities Research Council (SSHRC) uses the term knowledge mobilization: “The reciprocal and complementary flow and uptake of research knowledge between researchers, knowledge brokers and knowledge users, both within and beyond academia, in such a way that may benefit users and create positive impacts within Canada and/or internationally, and, ultimately, has the potential to enhance the profile, reach and impact of social sciences and humanities research” (2010). The Canadian Institutes of Health Research (CIHR) uses the term knowledge translation, which it defines as “a dynamic and iterative process that includes synthesis, dissemination, exchange, and ethically-sound application of knowledge to improve the health of Canadians, provide more effective health services and products and strengthen the health care system” (2016b).

At IWH, KTE is defined as a process of exchange between researchers and stakeholders/knowledge-users designed to make relevant research information available and accessible for use in practice, planning, and policy-making. The “process of exchange” refers to a two-way exchange of information between IWH and its stakeholders, both in the course of developing research ideas and proposals, and in the context of specific research projects. This process helps to ensure that IWH research is relevant by addressing issues of importance to its stakeholders. It also enhances the quality of the research by drawing on the expertise of stakeholders, and it helps IWH communicate about its findings using language that is meaningful to potential knowledge users and through channels that are easy for them to access. A Knowledge Transfer & Exchange Advisory Committee meets annually to provide advice to the Knowledge Transfer & Exchange Group at IWH. Its composition includes members with expertise in communications and in stakeholder engagement, as well as representation from key stakeholder communities.

Knowledge transfer and exchange at IWH incorporates both communications functions (e.g., website, newsletters, media releases, social media) aimed at reaching a wide audience, and stakeholder engagement (e.g., networks, outreach, one-on-one meetings, group presentations) aimed at building relationships with potential research users and integrating stakeholders in multiple stages of the research process. One aspect of organizational/institutional approaches that has been noted in the literature of late is the integration of KTE functions and communications activities. Melanie Barwick, David Phipps, Michael Johnny, Gary Myers, and Rossana Coriandoli (2014) have underlined the distinctions between knowledge translation and strategic communications. The IWH approach highlights the opportunities for synergy in bringing these functions together.

The IWH approach guides its KTE strategies and activities. It is an integrated approach on multiple levels: it is not focused only on end-of-grant dissemination but

incorporates regular and frequent interaction and exchange with various stakeholders, and it uniquely integrates communications within KTE.

AN APPROACH, NOT A MODEL

The IWH approach is deliberately not referred to as a KTE model or framework, because specific strategies and activities are tailored to the goals and contexts of different projects or initiatives. While KTE is a burgeoning practice, it is not consistently guided by theory or conceptual frameworks (Colquhoun, Leeman, Michie, Lokker, Bragger, Hempel, McKibbin, Peters, Stevens, Wilson, & Grimshaw, 2014; Field, Booth, Ilott, & Gerrish, 2014; Mitton, Adair, McKenzie, Patten, & Perry, 2007; Nilsen, 2015; Tabak, Khoong, Chambers, & Brownson, 2012; Visram, Goodall, & Steven, 2013; Wilson et al., 2010a). Carole Estabrooks, David S. Thompson, Jacque E. Lovely, and Anne Hofmeyer (2006) reported that there was no one predominant theoretical or conceptual framework for KTE in healthcare, organizational innovation, and social sciences literatures. The development of the IWH approach was informed by the work of Nathan Caplan (1979); Jonathan Lomas (2000a,b); Carol H. Weiss (1979; 1981); John N. Lavis, Dave Robertson, Jennifer Woodside, Christopher McLeod, Julia Abelson, and the Knowledge Transfer Study Group (2003); Ian D. Graham, Jo Logan, Margaret Harrison, Sharon Straus, Jacqueline Tetroe, Wenda Caswell, and Nicole Robinson (2006); Estabrooks, Thompson, Lovely, and Hofmeyer (2006); Alison Kitson, Jo Rycroft-Malone, Gill Harvey, Brendan McCormack, Kate Seers, and Angie Titchen (2008); and Carole Estabrooks, Linda Derksen, Connie Winther, John N. Lavis, Shannon D. Scott, Lars Wallin, and Joanne Profetto-McGrath (2008). The need for context and audience-dependent KTE activities continues to drive new framework development (Colquhoun et al., 2014; Estabrooks et al., 2006; Nilsen 2015). Therefore IWH monitors the literature and considers how recent frameworks, theories, and models can help to improve the Institute's approach and resulting activities. IWH also consults regularly with its stakeholders on KTE strategies (as outlined below), and their advice helps fine-tune the approach.

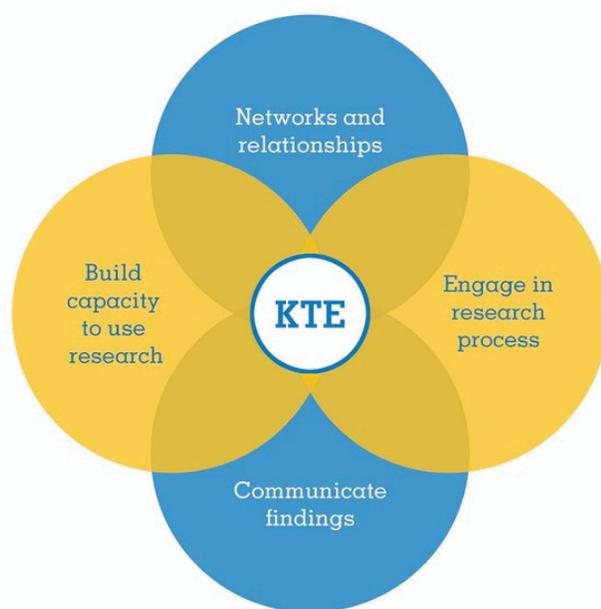
The four components of the IWH approach to KTE are:

1. Building relationships with key stakeholders/potential knowledge users through regular contact outside the confines of specific projects.
2. Engaging stakeholders directly in the process of planning for and undertaking research projects.
3. Enhancing the capacity of stakeholders to use research findings in their work (i.e., to inform policy or practice).
4. Communicating about research in plain language through multiple channels.

These components are conceptually and practically distinct, but success in one area facilitates success in the others, so there is a synergistic effect to being active in all four areas (see Figure 1). The overall approach is an example of "integrated KTE." The CIHR refers to engagement with stakeholders during research projects as "integrated knowledge translation," which is distinct from a focus solely on informing stakeholders of findings when the research is complete, or "end-of-grant knowledge translation" (2016a). The IWH approach formalizes relationship-building and engagement

opportunities with stakeholders both during research projects as well as outside of specific projects.

Figure 1: Integrated KTE strategies and activities



Building relationships

The concept of integrated KTE suggests that interpersonal relationships and networks play an important role in knowledge dissemination. According to this thinking, research uptake is a social process, and the interpersonal connections between people can be key to whether research makes an impression and becomes integrated into people's understanding and practices. And as most people move in many overlapping networks, they often will take a lesson they have gained from one network and pass it along to another.

IWH has built ongoing relationships with a variety of knowledge users in the occupational health and safety field. A key element of this is regular, face-to-face meetings with representatives of each stakeholder community to review recent or planned research of interest to them and discuss issues in their work that might benefit from new research.

IWH hosts face-to-face meetings with a variety of stakeholders. There are five educationally influential (EI) networks that bring together annually clinical/professional practitioners who are considered by others in their professions to be mentors or opinion leaders. The five professions that have their own EI network are:

- Chiropractors,
- Ergonomists,
- Kinesiologists,
- Occupational therapists, and
- Physiotherapists.

Members of the EI networks are identified through a process of nomination: a survey is sent out to members of professional associations asking recipients to identify practitioners who enjoy teaching others and who take the time to share what they know, among other criteria, using a process modelled on the one developed by Roland Hiss, Robert Macdonald, and Wayne Davis (1978). IWH used to meet separately with each EI network, but in 2016 the Institute met with all of them in an EI summit, and plans to continue this approach in future.

Two networks serve the interests of workplace injury and disability prevention/management professionals: the Occupational Health and Safety Professionals Network and the Disability Managers Network. These networks are established through an open invitation process, and they meet annually to discuss research findings, new projects, and emerging practice issues. IWH established LinkedIn groups for each network, at the request of the members, to post and discuss research findings and provide networking opportunities.

Two networks are dedicated to workplace parties: the Labour Forum and the Employer Forum. Members of these networks, which each meet twice a year, are recruited through personal contacts and other networks. The Labour Forum has representatives from the larger Ontario unions, as well as labour umbrella organizations. The Employer Forum has representatives from employer associations, organizations serving employers in the area of OHS or disability management, and some large, individual employers.

IWH hosts meetings of the Prevention Knowledge Exchange Group (PKEG) four times a year. It brings together representatives of organizations in the Ontario work injury and illness prevention system, including the Ministry of Labour, the Workplace Safety and Insurance Board, the health and safety associations, and research organizations. IWH also meets twice a year with a group called the Influential Knowledge Users (IKU) Network. This network's members (from multiple stakeholder categories) are champions of using research evidence to inform policy and practice, and are senior enough in their organizations to influence decision-making. The group shares ideas about improving knowledge transfer and exchange across all the organizations represented. IWH has also interviewed individual and small groups of IKUs about how best to develop and sustain knowledge exchange between researchers and knowledge users.

All these forums and networks share a common purpose: to promote evidence-informed policy and practice in the prevention of work injury and disability. Members may also be approached to participate on research project teams or on project advisory committees, and to assist with the dissemination of research findings to their own networks, clients, or members.

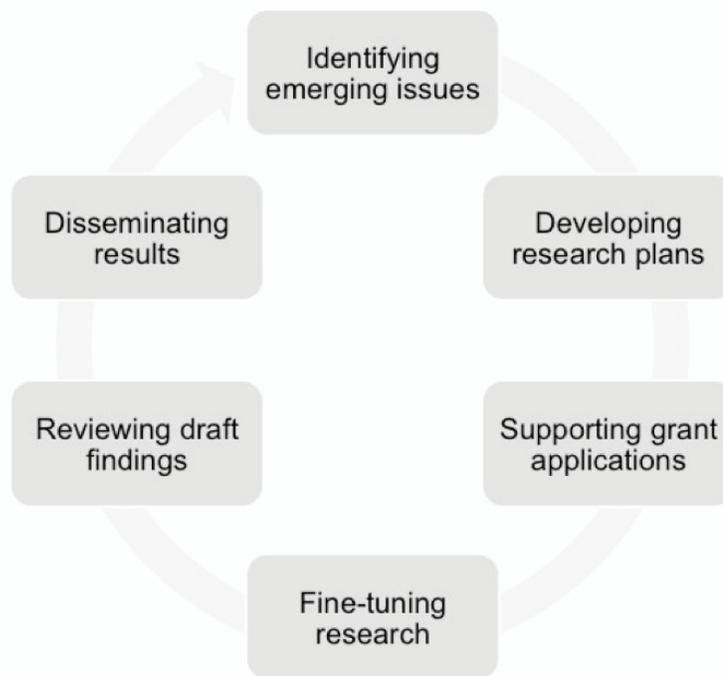
Engaging stakeholders in the research process

At IWH, stakeholder engagement is a substantive, two-way dialogue with stakeholders. This is both to help identify information gaps that might be addressed by new research, and to guide research projects. Regarding the former, IWH often works with

stakeholders in developing applications for research grants to help ensure that the research plan will be relevant to their work and that it takes into account their knowledge of the issue and their ability to contribute to the study. There is data dating back to 2003 on the total number of IWH research projects with funding of at least \$25,000. There have been 356 projects, all of which would have included some KTE.

When a project is funded, IWH typically engages stakeholders (particularly those who are in a position to influence policy or practice) in multiple stages of the research process. The IWH approach to KTE in projects involving systematic reviews of the research literature was published in 2008 (Keown, Van Eerd, Irvin) and has been extended to other IWH research studies. Stakeholders contribute to IWH research projects by suggesting pressing research questions, helping to recruit participants in workplace-based studies, and communicating about research findings in ways that are relevant, clear, and useful. Stakeholders who are engaged in the Institute's research processes also often help with the dissemination of research findings (see Figure 2). In some instances stakeholders have engaged as partners in the research team: fully engaged in fine-tuning the research and usually involved in all the elements represented in Figure 2.

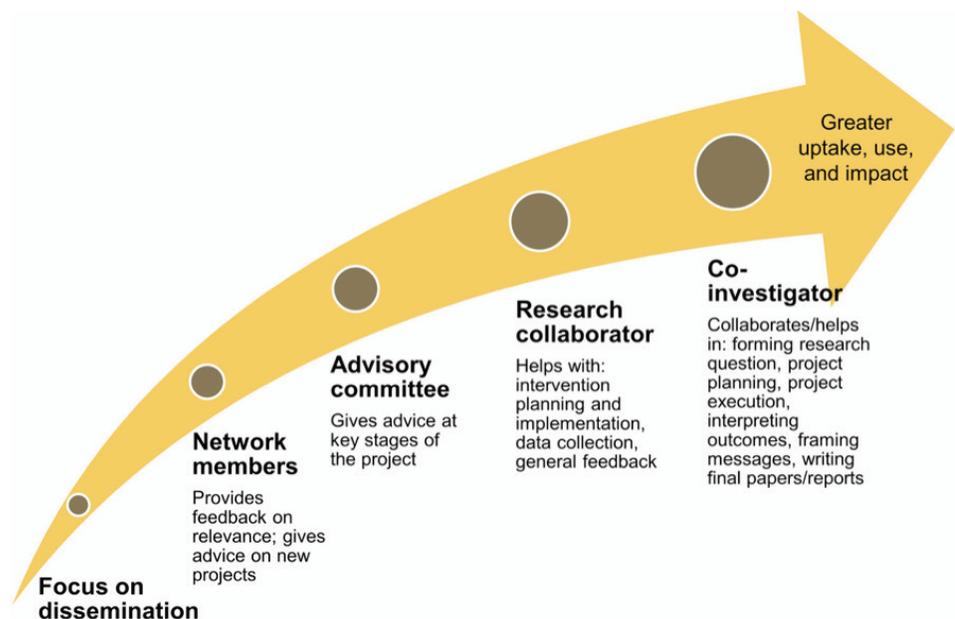
Figure 2: Engaging stakeholders in the research process



A number of researchers have found that engaging knowledge users/stakeholders in the research process increases the uptake and use of research findings, particularly in the formation of public policy. See, in particular, literature reviews by Mitton et al., (2007) and Kathryn Oliver, Simon Innvar, Theo Lorenc, Jenny Woodman, and James Thomas (2014) as well as the book by Sandra Nutley, Isabel Walter, and Huw Davies (2007) and recent articles by Gagliardi and colleagues (2016; 2017) and Kothari et al., (2014).

Often the engagement of stakeholders in a research project occurs through the establishment of a stakeholder advisory committee with representatives from different stakeholder communities. Since the beginning of 2010, IWH has hosted approximately 400 stakeholder meetings associated with research projects. Sometimes, stakeholders are more actively involved as collaborators on the project (e.g., developing or helping to develop and implement a workplace intervention that is to be tested). Sometimes they are full partners on the research team, participating in (co-creating) all aspects of the work, including the development of project outputs (reports, presentations, summaries). Occasionally, they are co-principal investigators. This spectrum of possible engagement is illustrated in Figure 3. The spectrum idea in Figure 3 was created independently based on experiences at IWH, but shares some similarity with a model originally proposed by Sherry Arnstein (1969) called the “Ladder of Engagement,” which has been widely adapted in the business literature. The similarity is noted, and Arnstein (1969) is referenced as an influence and precursor to this figure.

Figure 3: Stakeholder engagement spectrum



In developing a KTE plan for a new research project, IWH considers engagement questions, such as:

- Who are the key stakeholders/audiences?
- How will they use the research findings? What gap in knowledge will it address?
- How and when will stakeholders be engaged in the research? At what stages will they be involved?
- What are the expected outcomes of the research, and how will they be relevant to stakeholders' interests?
- How will success be measured?

Enhancing an audience's capacity to better understand and make use of evidence

If stakeholders are to use research evidence to inform policy and practice, it helps if they have some familiarity with research methods and terminology, as this makes it easier for them to interpret and apply the findings to their work.

The IWH approach to KTE involves several activities to enhance stakeholder capacity in this regard:

Workshops on research methods, which are designed to be accessible to non-researchers. In particular, IWH offers a workshop at least twice a year on how to plan, conduct, and communicate the results of a systematic review.

The publication of short articles in plain language about the meaning of terms commonly used by researchers (e.g., a series called “What researchers mean by...” [IWH, n.d.]).

Regular stakeholder meetings where research methods are explained. These meetings may focus on advisory committee members, but often also include broader groups of stakeholders that are interested in the research project.

Engaging stakeholders in research projects. That is, through the process of participating in research projects on advisory committees, or as collaborators or co-investigators (per the second of the four components), stakeholders learn about research methods and, by the end of the project, have an understanding of how the findings of the project were obtained, and what their implications are for policy and practice.

Communicating in plain language, with multiple vehicles, through multiple channels

Building relationships and integrating stakeholder engagement into the research process help key stakeholders (those in the networks and/or directly involved in the research) to use IWH research to inform policy and practice, and to identify stakeholder organizations that should be briefed on the results of the research. But IWH also aims to reach a wide audience—in Ontario and other jurisdictions—that may find its work useful to them in their efforts to improve worker health and safety. The set of questions described by Lavis et al., (2003) is considered when planning for the dissemination of research findings: To whom? By whom? How will your research findings be disseminated? With what effect? Key strategies for reaching a wide audience include:

- Summarizing research findings in plain language, at different levels of detail:
 - One-page highlights;
 - Short videos (30-45 seconds) illustrating key findings;
 - Longer project summaries (2-3 pages); and
 - Issue briefings that summarize IWH work across multiple projects around a particular theme.
- Developing tools or guides based on the research evidence (when appropriate).
- Communicating such products through multiple channels:
 - The IWH website;

- A monthly e-bulletin, sent to subscribers by email;
- A quarterly newsletter;
- Social media (Twitter, LinkedIn, YouTube);
- Outreach and media releases to (general and specialist) media organizations; and
- Outreach to OHS intermediaries, who may communicate research findings to their members/consultants/clients.

The results of an IWH survey undertaken in 2015 (Moser, 2015) to learn about the communication preferences and practices of people working in occupational health and safety and disability management inform the institute's communications strategies.

MEASURING IMPACT

IWH's communications team also leads the effort to document the reach of IWH (through such quantifiable measures as website visits, downloads, and the number of newsletter subscribers) as well as the impact of the Institute's research on policy or practice. For the latter, IWH identifies stakeholders who have used its research, and documents cases where IWH research has been used to influence policy or practice. IWH developed a classification of types of impact:

Type 1: Evidence of the diffusion of research. Where IWH research is noticed and referred to by external stakeholders in the occupational health and safety system (e.g., policy-makers, health and safety associations, employer groups, unions, clinicians, and workplaces) in their own deliberations and information vehicles.

Type 2: Evidence of research informing decision-making. Where IWH research is acted upon by external stakeholders in developing and changing legislation, policies, directives, and programs that have an impact (often through intermediaries) on workplaces, as well as where evidence-based practices suggested by IWH research are taken up directly by workplaces or clinicians.

Type 3: Evidence of societal impact. Where IWH research contributes to improvements at the societal level, including changes in: work injury/illness rates; workers' compensation and other insurance claims, durations, and costs; healthy workforce outcomes; and population health status. In some cases, stakeholders quantify these impacts, and when they do, these findings are cited, but IWH does not attempt to quantify the share of this impact that is attributable to the Institute's work.

IWH develops impact case studies only when it is able to identify (from contacts with stakeholders, or by monitoring their newsletters) clear evidence that the Institute's research is being used. This effort began in 2009 (which included looking back at the impacts of older projects) and IWH has published 32 impact case studies since then. Actual uptake is likely greater than what can be identified. Because the users of IWH's research are mainly intermediary organizations that set regulatory frameworks or deliver services to workplaces, employers, and workers (rather than direct use by workers and employers, though that does sometimes occur), most of the impact case studies (25 of the 32) are of the second type: informing policy and practice. Where

users have documented societal impact (which may take many years after the research to occur and be documented), IWH has developed case studies on that (four in total).

Discussion

The KTE approach described above has been developed over the past 20 years, but is a work in progress that can be adapted for a given project (or set of projects). The intent of this article is not to suggest that this is the only approach to integrated KTE. Within the IWH approach there may be useful components that other researchers (and organizations) could use, regardless of research area. Descriptions of other approaches are welcome in order for work and health researchers to continue to move research into practice and hopefully reduce the burden of workplace injuries and illness.

There is synergy among the four components of the IWH approach to KTE. There are numerous ways in which this occurs.

Engaging stakeholders in the research process enhances the capacity to use research and strengthens communication

Stakeholders who participate in the Institute's research projects as members of an advisory committee become familiar with the key steps of its methods (if not the details of how to implement them), which builds confidence in the research and improves the understanding of its implications. Stakeholders often play a crucial role in helping to convey the findings with language that will be accessible, clear, and meaningful to intended audiences.

Building ongoing relationships with key stakeholders helps improve all aspects of KTE strategies

Meeting stakeholders, either individually or through the network activities outlined above, can create trust between researchers and stakeholders, and help IWH identify stakeholders that have knowledge and expertise (and a willingness to participate) that would be helpful to future research projects.

Regular meetings with stakeholders over time have provided good opportunities to receive feedback and advice about the Institute's KTE approach. Stakeholders' advice has included the following:

Despite the ability to communicate and share information by electronic means, face-to-face dialogue remains invaluable, particularly in the early stages of the relationship between researchers and knowledge users, to help establish trust.

Participating in multiple stages of a research project (and not just near the end) makes it easier to see how the findings can be applied to policy and program design.

Regular dialogue outside the confines of individual research projects is seen as important for knowledge exchange (between researchers and knowledge users, but also among different knowledge users) and for sustaining relationships.

Access to concise, plain language summaries of research findings is important to facilitate uptake by decision-makers.

Building stakeholder capacity in research methods facilitates stakeholder collaboration in research projects

Building stakeholder capacity in research methods (through workshops, newsletters, and stakeholder meetings) enhances their ability to contribute to the research processes as members of advisory committees, collaborators, or as full-members of the research team (and, sometimes, as co-principal investigators).

Communicating in plain language through multiple channels can help build stakeholder relationships

Readers of IWH's newsletters, of articles IWH writes for stakeholder publications, IWH press releases, or its website, sometimes contact the Institute to express interest in its work or to explain how they are applying the research or intend to use a tool or guide IWH has developed. These contacts can lead to future involvement in IWH projects or to impact case studies.

As noted above, the communications function at IWH is integrated with stakeholder engagement activity in the same organizational unit. Although staff specialize in one or the other, the functional integration also creates synergy. For example, the Knowledge Exchange Associates, who organize stakeholder engagement for projects and coordinate stakeholder networks, help develop the key messages for communications products and are often in the best position to prepare the initial drafts of tools or guides emerging from the research. They can also use their networks to help extend the reach of IWH products. Communications staff often assist researchers and Knowledge Exchange Associates with the recruitment of individuals or workplaces to participate in research studies, and prepare newsletter articles and plain language summaries suitable for the target audiences.

Conclusion

This article describes a fully integrated KTE approach that is adaptable to many potential target audiences. The approach integrates communications and knowledge transfer activities and provides opportunities to involve various stakeholders throughout the research process.

The approach requires dedicated staff and resources. In addition research staff must be willing to involve stakeholders in research activities to achieve a fully integrated approach. However, the approach is flexible enough to allow various levels of integration, as dictated by specific circumstances.

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Website

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References

- Arnstein, Sherry.R. (1969). "A Ladder of Citizen Participation". *Journal of the American Institute of Planners*, 35(4), 216-224.
- AWCBC (Association of Workers' Compensation Boards of Canada). (2016). *Canadian workers' compensation system – 2014 Year at a glance*. URL: http://awcbc.org/?page_id=11803 [November 20, 2016].
- Barwick, Melanie, Phipps, David, Johnny, Michael, Myers Gary, & Coriandoli, Rossana. (2014). Knowledge translation and strategic communications: Unpacking differences and similarities for scholarly and research communications. *Scholarly and Research Communication*, 5(3).
- Brownson, Ross C., Jacobs, Julie A., Tabak, Rachel G., Hoehner, Christine M., & Stamatakis, Katherine A. (2013). Designing for dissemination among public health researchers: Findings from a national survey in the United States. *American Journal of Public Health*, 103(9).
- Canadian Institutes of Health Research (CIHR). (2012). *Guide to knowledge translation planning at CIHR: Integrated and end-of-grant approaches*. URL: <http://www.cihr-irsc.gc.ca/e/45321.html> [March 15, 2017].
- Canadian Institutes of Health Research (CIHR). (2016a). *About knowledge translation*. URL: <http://www.cihr-irsc.gc.ca/e/29418.html> [March 15, 2017].
- Canadian Institutes of Health Research. (CIHR). (2016b). *Knowledge translation definition*. URL: <http://www.cihr-irsc.gc.ca/e/29418.html#2> [March 15, 2017].
- Caplan, Nathan. (1979). The two-communities theory and knowledge utilization. *American Behavioral Science*, 22(3), 459-470.
- Chung, Amy Z.Q., Williamson, Ann, & Shorrock, Stephen T. (2014). What do human factors and ergonomics professionals value in research publications? Re-examining the research–practice gap. *Ergonomics*, 57(4), 490-502.
- Colquhoun, Heather, Leeman, Jennifer, Michie, Susan, Lokker, Cynthia, Bragge, Peter, Hempel, Susanne, McKibbin, K. Ann, Peters, Gal-Jorn Y, Stevens, Kathleen R, Wilson, Michael G, & Grimshaw, Jeremy. (2014). Towards a common terminology: A simplified framework of interventions to promote and integrate evidence into health practices, systems, and policies. *Implementation Science*, 9, 51.
- Dent, Elsa, Hoon, Elizabeth, Kitson, Alison, Karnon, Jonathan, Newbury, Jonathan, Harvey, Gillian, Gill, Tiffany K, Gillis, Lauren, & Beilby, Justin. (2016). Translating a health service intervention into a rural setting: Lessons learned. *BMC Health Services Research*, 16, 62.
- Estabrooks, Carole A, Thompson, David S, Lovely, Jacque E, & Hofmeyer, Anne. (2006). A guide to knowledge translation theory. *Journal of Continuing Education in the Health Professions*, 26(1), 25-36.
- Estabrooks, Carole A, Derksen, Linda, Winther, Connie, Lavis, John N, Scott, Shannon D, Wallin, Lars, & Profetto-McGrath, Joanne. (2008). The intellectual structure and substance of the knowledge utilization field: A longitudinal author co-citation analysis, 1945 to 2004. *Implementation Science*, 3, 49.
- Expert Advisory Panel on Occupational Health and Safety. (2010). *Report and recommendations to the Minister of Labour*. URL: <https://www.labour.gov.on.ca/english/hs/prevention/report/> [January 20, 2017].
- Field, Becky, Booth, Andrew, Ilott, Irene, & Gerrish, Kate. (2014). Using the Knowledge to Action Framework in practice: A citation analysis and systematic review. *Implementation Science*, 9, 172.
- Franco, Giuliano. (2001). The future of occupational health practice: reconciling customer expectation and evidence based practice [editorial]. *Occupational Medicine*, 51, 482-484.
- Franco, Giuliano. (2003). Evidence-based medicine and evidence-based occupational health [letter]. *Scandinavian Journal of Work, Environment & Health*, 29(1), 78-79.

- Franco, Giuliano. (2005) Evidence-based decision making in occupational health. *Occupational Medicine*, 55, 1-2.
- Gagliardi, Anna R., Berta, Whitney, Kothari, Anita, Boyko, Jennifer, & Urquhart, Robin. (2016). Integrated knowledge translation (IKT) in health care: A scoping review. *Implementation Science*, 11, 38.
- Gagliardi, Anna R., Kothari, Anita, & Graham, Ian D. (2017). Research agenda for integrated knowledge translation (IKT) in healthcare: What we know and do not yet know. *Journal of Epidemiology and Community Health*, 71, 105-106.
- Gholami, Jaleh, Ahghari, Sharareh, Motevalian, Abbas, Yousefinejad, Vahid, Moradi, Ghobad, Keshtkar, Abbasali, Alami, Ali, Mazloomzadeh, Saeideh, Masoud, Vakili Mohammad, Chaman, Reza, Salehi, Bahman, Fazelzadeh, Omid, & Majdzadeh, Reza. (2013). Knowledge translation in Iranian universities: Need for serious interventions. *Health Research Policy and Systems*, 11, 43.
- Graham, Ian D., Logan, Jo, Harrison, Margaret B., Straus, Sharon E., Tetroe, Jacqueline, Caswell, Wenda, & Robinson, Nicole. (2006). Lost in translation: Time for a map? *Journal of Continuing Education in the Health Professions*, 26(1), 13-24.
- Grimshaw, Jeremy M., Eccles, Martin P., Lavis, John N., Hill, Sophie J., & Squires, Janet E. (2012). Knowledge translation of research findings. *Implementation Science*, 7, 50.
- Hiss, Roland G., Macdonald, Robert, & Davis, Wayne K. (1978). Identification of physician educational influentials (EI's) in small community hospitals. *Res. Med. Educ*, 17, 283-288.
- Hudon, Anne, Gervais, Mathieu-Joël, & Hunt, Matthew. (2015). The contribution of conceptual frameworks to knowledge translation interventions in physical therapy. *Physical Therapy*, 95, 630-639.
- Institute for Work and Health. (n.d.). *What researchers mean by*. URL: <http://www.iwh.on.ca/what-researchers-mean-by> [March 15, 2017].
- Jenkins, Emily, Kothari, Anita, Bungay, Vicky, Johnson, Joy L., & Oliffe, John L. (2016). Strengthening population health interventions: developing the CollaboraKTion Framework for Community-Based Knowledge Translation. *Health Research Policy and Systems*, 14, 65.
- Keown, Kiera, Van Eerd, Dwayne, Irvin, Emma. (2008). Stakeholder engagement opportunities in systematic reviews: knowledge transfer for policy and practice. *Journal of Continuing Education in the Health Professions* 28(2): 67-72.
- Kitson, Alison L., Rycroft-Malone, Jo, Harvey, Gill, McCormack, Brendan, Seers Kate, & Titchen, Angie. (2008). Evaluating the successful implementation of evidence into practice using the PAR-iHS framework: Theoretical and practical challenges. *Implementation Science*, 3, 1.
- Kothari, Anita, Sibbald, Shannon, & Wathen, C. Nadine. (2014). Evaluation of partnerships in a transnational family violence prevention network using an integrated knowledge translation and exchange model: A mixed methods study. *Health Research Policy and Systems*, 12(15).
- Laroche, Elena, & Amara, Nabil. (2011). Transfer activities among Canadian researchers: Evidence in occupational safety and health. *Safety Science*, 49(3), 406-415.
- Lavis, John N., Robertson, Dave, Woodside, Jennifer M., McLeod, Christopher B, Abelson, Julia, & the Knowledge Transfer Study Group. (2003). How can research organizations more effectively transfer research knowledge to decision makers? *The Millbank Quarterly*, 81(2), 221-248.
- Lomas, Jonathan. (2000a). Connecting research and policy. *ISUMA*, 1(1), 140-144.
- Lomas, Jonathan. (2000b). Using 'linkage and exchange' to move research into policy at a Canadian foundation. *Health Affairs*, 19(3), 236-240.
- Maleki, Katayoun, Hamadeh, Randah R., Gholami, Jaleh, Mandil, Ahmed, Hamid, Saima, Ahmad Butt, Zahid, Bin Saeed, Abdulaziz, El Kheir, Dalia Y.M., Saleem, Mohammed, Maqsoud, Sahar, Safi, Najibullah, Abdul-Majeed, Ban A., & Majdzadeh, Reza. (2014). The knowledge translation status in selected eastern-Mediterranean universities and research institutes. *PLoS ONE*, 9(9), e103732.

- Mitton, Craig, Adair, Carol E., McKenzie, Emily, Patten, Scott B., & Perry, Brenda W. (2007). Knowledge transfer and exchange: Review and synthesis of the literature. *The Milbank Quarterly*, 85, 729-768.
- Moser, Cindy. (2015). *IWH communications survey: Results*. Institute for Work & Health. URL: <http://www.iwh.on.ca/kte/communications-survey> [March 15, 2017].
- Mosher, Janet, Anucha, Uzo, Appiah, Henry, & Levesque, Sue. (2014). From research to action: Four theories and their implications for knowledge mobilization. *Scholarly and Research Communication*, 5(3).
- Murray, Christopher J., Vos, Theo, & Lozano, Rafael, et al. (2012). Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990-2010: A systematic analysis for the Global Burden of Disease Study 2010. *Lancet*, 380(9859), 2197-2223.
- Nilsen, Per. (2015). Making sense of implementation theories, models and frameworks. *Implementation Science*, 10, 53.
- Nutley, Sandra M., Walter, Isabel, & Davies, Huw T.O. (2007). *Using evidence: How research can inform public services*. Bristol, UK: The Policy Press.
- Oliver, Kathryn, Innvar, Simon, Lorenc, Theo, Woodman, Jenny, & Thomas, James. (2014). A systematic review of barriers to and facilitators of the use of evidence by policymakers. *BMC Health Services Research*, 14, 2.
- Pierson, Leslea, & Rosella, Laurel. (2015). Navigating knowledge to action: A conceptual map for facilitating translation of population health risk planning tools into practice. *Journal of Continuing Education in the Health Professions*, 35(2), 139-147.
- Powell, Kathryn, Kitson, Alison, Hoon, Elizabeth, Newbury, Jonathan, Wilson, Anne, & Beilby, Justin. (2013). A study protocol for applying the co-creating knowledge translation framework to a population health study. *Implementation Science*, 8, 98.
- Russell, Dianne J., McCauley, Dale, Novak, Iona, Kolehmainen, Niina, Shikako-Thomas, Keiko, D'Costa, Rhea, & Gorter Jan W. (2015). Developing a knowledge translation strategy for a centre of childhood disability research: Description of the process. *Scholarly and Research Communication*, 7(1).
- Sackett, David L., Rosenberg, William M., Gray, JA, Haynes, RB, & Richardson, WS. (1996). Evidence based medicine: What it is and what it isn't. *British Medical Journal*, 312(7023), 71.
- Schneider, Elke, & Irastorza, Xabier. (2010). *OSH in figures: Work-related musculoskeletal disorders in the EU — Facts and figures*. Luxembourg: European Agency for Safety and Health at Work (EU-OSHA).
- Schulte Paul. (2002). Approaches to sharing occupational safety and health information on a global scale. *American Journal of Industrial Medicine*, 41, 210-216.
- Schulte Paul. (2006). Emerging issues in occupational safety and health. *International Journal of Occupational and Environmental Health*, 12, 273-277.
- Schulte, Paul, A., Okun, Andrea, Stephenson, Carol M., Colligan, Michael, Ahlers, Heinz, Gjessing, Chris, Loos, Gregory, Niemeier, Richard W., & Sweeney, Marie H. (2003). Information dissemination and use: critical components in occupational safety and health. *American Journal of Industrial Medicine*, 44, 515-531.
- Silverstein, Barbara, & Evanoff, Bradley. (2011). Musculoskeletal disorders. In B.S. Levy, D.H. Wegman, S.L. Baron, & R.K. Sokas (Eds.), *Occupational and environmental health: Recognizing and preventing disease and injury*. (pp. 335-365). New York, NY: Oxford University Press.
- Sinden, Kathryn, & MacDermid, Joy. (2014). Does the Knowledge-to-Action (KTA) framework facilitate physical demands analysis development for firefighter injury management and return-to-work planning? *Journal of Occupational Rehabilitation*, 24, 146-159.

- Social Sciences and Humanities Research Council (SSHRC). (2010). Knowledge transfer through re- search contracting: A social sciences and humanities perspective. URL: http://www.sshrc-crsh.gc.ca/about-au_sujet/publications/consultations/knowledge_transfer-transfer_connaissances_e.pdf [March 15, 2017].
- Tabak, Rachel G., Khoong, Elaine C., Chambers, David, & Brownson, Ross C. (2012). Bridging re- search and practice: Models for dissemination and implementation research. *American Journal of Preventative Medicine*, 43(3), 337-350.
- Verbeek, Jos H., van Dijk, Frank J.H., Malmivaara, Anti, Hulshof, Carol T.J., Rasanen, Kaj, Kankaan- paa, Elia E., & Mukala, Kriistina. (2002). Evidence-based medicine for occupational health. *Scan- dinavian Journal of Work, Environment & Health*, 28(3), 197-204.
- Verbeek, Jos, Husman, Kaj, van Dijk, Frank, Jauhiainen, Merja, Pasternack Iris, Vainio Harri. (2004) Building an evidence base for occupational health interventions. *Scandinavian Journal of Work, Environment & Health*, 30(2), 164-170.
- Visram, Shelina, Goodall, Deborah, & Steven, Alison. (2014). Exploring conceptualizations of knowl- edge translation, transfer and exchange across public health in one UK region: A qualitative map- ping study. *Public Health*, 128, 497-503.
- Vos, Theo, Flaxman, Abraham, D., & Naghavi, Mohsen, et al. (2012). Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990-2010: A systematic analysis for the Global Burden of Disease Study 2010. *Lancet*, 380(9859), 2163-2196.
- Ward, Vicky, House, Allan, & Hamer, Susan. (2009). Developing a framework for transferring knowl- edge into action: A thematic analysis of the literature. *Journal of Health Services Research & Policy*, 14(3), 156-164.
- Wehrens, Rik. (2014). Beyond two communities – from research utilization and knowledge transla- tion to co-production? *Public Health*, 128(6), 545-551.
- Welsh, Laura, S., Russell, Dustin, Weinstock, Deborah, & Betit, Eileen. (2015). Best practices for health and safety technology transfer in construction. *American Journal of Industrial Medicine*, 58, 849-857.
- Weiss, Carol H. (1979). The many meanings of research utilization. *Public Administration Review*, 39, 426-431.
- Weiss, Carol H. (1981). Measuring the use of evaluation. In J.A. Ciarlo (Ed.), *Utilizing evaluation* (pp. 17-33). Beverly Hills, CA: Sage.
- Wilson, Paul M., Petticrew, Mark, Calnan, Mike W., & Nazareth, Irwin. (2010a). Disseminating re- search findings: What should researchers do? A systematic scoping review of conceptual frame- works. *Implementation Science*, 5, 91.
- Wilson, Paul M., Petticrew, Mark, Calnan, Mike W., & Nazareth, Irwin. (2010b). Does dissemination extend beyond publication: A survey of a cross section of public funded research in the UK. *Im- plementation Science*, 5, 61.
- Zardo, Paula, Collie, Alex, & Livingstone, Charles. (2014). External factors affecting decision-making and use of evidence in an Australian public health policy environment. *Social Science & Medicine*, 108, 120-127.