

Editorial: Knowledge transfer and exchange through interactive research: a new approach for supporting evidence-informed occupational health and safety (OHS) practice

Commonly used research to practice strategies

Evidence-based practice or evidence-informed decision-making is considered a vital and practical approach to prevent workplace accidents and injuries (van Dijk *et al.*, 2010; Van Eerd, 2019). Despite discussions to better support evidence-informed practice in occupational health and safety (OHS) (Baker *et al.*, 2015; Schulte, 2017; Waterson, 2016), OHS research and systematic reviews describing various interventions to address occupational injuries (Dyreborg *et al.*, 2022; Teufer *et al.*, 2019), challenges remain in getting this research into practice (Van Eerd, 2019). Understanding the linkage between research and practice is needed to support evidence informed OHS policy and practices.

Supporting evidence-informed decision-making is relevant to OHS professionals in workplaces and has implications for OHS decision-makers (Laroche and Amara, 2011; Laroche and Patoine, 2021). Increasingly, funders are encouraging researchers to show and explain how they share knowledge with OHS audiences to disseminate and implement research findings into practice (Wilson *et al.*, 2010; CIHR, 2012). The National Institutes of Health (<https://www.nih.gov/>) and the Canadian Institute for Health Research (<https://cihr-irsc.gc.ca/e/193.html>) support research on how evidence-based practices can be effectively translated and used in real-world settings. Other international research institutions like the Campbell Collaboration (<https://www.campbellcollaboration.org/>) and Cochrane (<https://www.cochrane.org/>) support activities and methods to reach audiences using evidence syntheses. Recently the research to practice topic has been included in The Nordic Institute for Training in OHS (<https://niva.org/>) continuing education courses. However, it is unclear if OHS research is reaching the right audiences. However, researchers tend to disseminate their findings through academic conference proceedings and publications in peer-reviewed journals (Wilson *et al.*, 2010). Workplace decision-makers may not have access to up-to-date evidence from the scientific literature when they make decisions about health and safety approaches (Van Eerd *et al.*, 2018; van Dijk and Caraballo-Arias, 2021).

How researchers interact and collaborate with audiences and research users to help translate OHS knowledge to practice is not well known (Schulte, 2017; Van Eerd, 2019), e.g. how to apply knowledge for informed decision-making and changing practices or policies (Van Eerd *et al.*, 2018). Differences in goals between research and practice are important barriers to knowledge transfer between academia and industry, and thus limit knowledge uptake and use in industry settings (de Wit-de Vries *et al.*, 2019). Many researchers find it difficult to facilitate knowledge sharing and develop actionable knowledge for injury prevention because different terms and research approaches can be used (Tabak *et al.*, 2012). Some health services approaches focus on knowledge to action with external audiences and research users (Graham *et al.*, 2006) and dissemination and implementation (D&I) research that is specifically concerned with the determinants, adoption and sustainability of



knowledge implementation (Greenhalgh *et al.*, 2004; Dugan and Punnett, 2017) and help understand how knowledge exchange works (Ward *et al.*, 2009).

In this guest editorial, we suggest the term knowledge transfer and exchange (KTE) for bridging research with practice. A key aspect is interaction of researchers with practitioners and policymakers. Svensson *et al.* (2007) consider knowledge exchange processes as joint learning processes, where research and practice knowledge are exchanged as a basis for evidence-informed decision-making.

Knowledge transfer in synthesis research and university and industry partnerships has been influenced by several models (Graham *et al.*, 2006; Dugan and Punnett, 2017) and is often labelled “Knowledge Translation” (Graham *et al.*, 2006). The term originally appeared in medicine, health, health services and rehabilitation literature (Contandriopoulos *et al.*, 2010) as a planned one-way process where research results are disseminated and transferred to practitioners. Some widely used models are the consumer focus of Cochrane (<https://consumers.cochrane.org/>) and the complementary activities of diffusion (passive spread) and dissemination (active spread) of research. These often represent a linear and one-way relationship between research and practice, in which knowledge may be “packaged” and distributed as information between research providers and end-users in practice (Greenhalgh and Wieringa, 2011; Best and Holmes, 2010). One limitation of the linear transfer approach is that the ways research findings reach key audiences becomes the main success criterion, not how the research knowledge was taken up and adapted to guide decision-making in practice. Therefore transferring research knowledge requires more than the linear one-way process (Guzman *et al.*, 2008; Greenhalgh and Wieringa, 2011).

This guest editorial suggests a new research approach to exchanging knowledge about what works to support evidence-informed decision-making in workplace injury prevention. This new approach builds upon established research to practice strategies by (1) moving beyond a linear and one-way conception of transferring OHS research findings, and (2) combining KTE and interactive research to enhance engagement in exchanging OHS knowledge through an example of supporting evidence-informed decision-making in accident prevention.

Moving beyond linear and one-way communication and transfer of OHS research findings

We consider two critical pillars of KTE and interactive research for developing evidence-informed accidental injury prevention; (Pillar 1) the need to develop approaches to KTE where users are more engaged in the transfer process and (Pillar 2) applying an interactive research approach in the context of KTE research and practice.

Pillar 1: The need to develop KTE approaches where users are engaged in the transfer process

Two epistemological focal points are motives for thinking about the relationship between researchers and research users to facilitate evidence-informed practice; (1) limitations of the linear conception as a one-way process of knowledge translation from research into practice and (2) increased pressure to show research impact to policymakers and other audiences.

The dissemination or transfer of research knowledge is a complex, dynamic and iterative process, which requires a more practice-oriented approach (Graham *et al.*, 2006; Guzman *et al.*, 2008). Alternative perspectives are relevant for updating the linear (and one-way) conception of KT in work and health research (Best and Holmes, 2010). Within health services research, the ‘Knowledge to Action’ (KtA) approach describes how the dissemination of research knowledge requires an independent development process. It involves several steps and intermediaries of knowledge within each step requiring certain skills and competencies for knowledge users to translate and adapt knowledge in their local context (Graham *et al.*, 2006).

Others have described ways to reach knowledge users and provide insight into what is needed for applied OHS research to be effectively translated into practice. For example, [Schulte et al. \(2017\)](#) suggest an initial step of defining the specific OHS problem followed by a four-step process of development, testing, institutionalization and evaluation. The D&I science literature also offers methodological approaches that consider the determinants of knowledge implementation ([Damschröder et al., 2009](#)) and complexity of systems and the diffusion of innovations ([Greenhalgh et al., 2004](#)). Recently, integrated KTE has been advocated as an approach for promoting engagement of OHS knowledge users in OHS research and sharing of useful evidence with decision-makers and practitioners ([Van Eerd and Saunders, 2017](#)). The methods indicate a change in paradigm from research production alone to including knowledge exchange to help guide translating OHS research into decision-making.

We suggest to look at stakeholder engagement and to study the link between knowledge and action in more critical ways to help understand how knowledge exchange works ([Nielsen and Svensson, 2006](#)). We have adopted the definition of KTE from IWH in Canada, which defines KTE as “*a process of exchange between researchers and knowledge users designed to make relevant research information available and applicable for use in practice, planning and decision-making*” ([Van Eerd and Saunders, 2017](#)). In line with [Greenhalgh and Wieringa \(2011\)](#), we argue that this KTE process takes place within a complex system of interactions between researchers and knowledge users which may vary in intensity, complexity and level of engagement depending on the nature of the research and the findings as well as the needs of a knowledge user group.

Pillar 2: Applying an interactive research approach in a KTE context

The second pillar is comprised of Svensson’s (2015) concept of interactive research as a joint learning process and exchange of research and practice knowledge for evidence-informed decision-making. Such learning processes have the potential to support meaningful translation of research findings into practice and insights into the external validity of research findings (Wandersman, 2008; [Nguyen et al., 2020](#)). We suggest an interactive research approach may aid knowledge exchange and translation of research synthesis findings into the decision-making process for workplace injury prevention.

Overall, the issue of how-to best transfer OHS research knowledge into practice is a dynamic challenge that can benefit from a more iterative way of thinking about the relationship between knowledge and action. Research has shown the importance of building relationships between knowledge users and researchers ([Keown et al., 2008](#)), and that direct involvement of knowledge users and exchange of knowledge during the research process increases the use and uptake of knowledge ([Lomas, 2000a, b](#)). Expanding on this knowledge base, we need to better understand how the interactive exchange process between research perspectives and practice issues can be facilitated in a meaningful way. In a Nordic context, an interactive research approach called the Triple Helix perspective has been advocated and used to close the gap between knowledge and action and promote a closer engagement of research users in knowledge production ([Ellström, 2020](#); [Svensson et al., 2015](#)). [Ellström et al. \(2020\)](#) propose a synthesis between theory and practice through interconnected cycles of activities between the research system and the practice system ([Figure 1](#)).

Although the ideas of [Ellström et al. \(2020\)](#) were originally developed as a framework for interactive collaborative research, we believe the framework has value for facilitating exchange processes in practice and helping understand how knowledge exchange works. [Svensson et al. \(2015\)](#) describes how emphasizing the two cycles offers a mechanism for OHS researchers to reflect on the relationship between research and practice.

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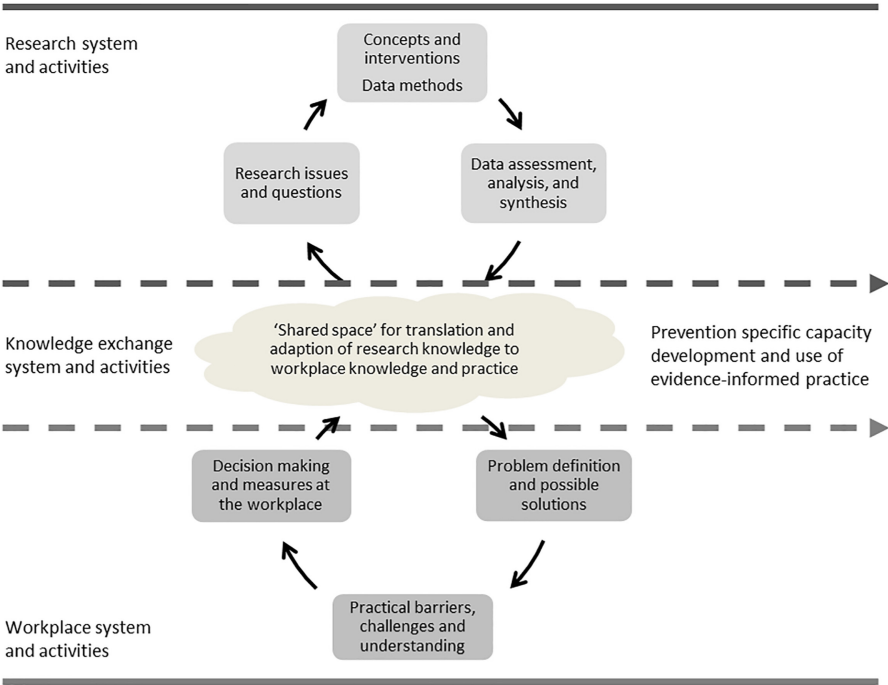


Figure 1. Knowledge transfer and exchange (KTE) through interactive research bridging three systems: research, knowledge transfer and exchange, and workplace

Source(s): Our adaption based on Ellström *et al.* (2020)

To support the exchange of knowledge, it is important that there is a “shared space” where exchange can take place on basically equal terms. We call this shared space the “knowledge transfer and exchange system” in line with Wandersman *et al.* (2008). As the interactive framework was developed for collaborative research, it considers the different positions and interest of researchers and research users (Ellström, 2020). In research projects the “shared space” refers to actual exchange activities facilitated by knowledge brokers during the research process. On a societal level this “shared space” could take the form of an institutionalized knowledge infrastructure in which funding agencies, research institutions, practitioners and policy makers engage with each other to share knowledge, coordinate KTE activities and support the use of knowledge in practice (Wandersman, 2008). Importantly, identifying and supporting knowledge using this type of infrastructure is a critical avenue for new KTE research.

The participatory aim of interactive research is to facilitate common understanding through conditions for joint analysis of organizational practice (Nielsen and Svensson, 2006). Thus, the interactive perspective asks questions about workers, groups or organizational practice, and their joint learning. Interactive research methods may be applied in organizational and community settings and are typically driven by complementary methods such as large group seminars or workshops (Svensson, 2007). Going beyond participatory evaluation research, the interactive framework for research considers knowledge exchange processes as joint learning, which offers OHS researchers a mechanism to examine how knowledge exchange works (Ellström, 2020).

How KTE and interactive research can enhance OHS research use in decision-making

We combined the interactive research approach with KTE in the context of a recent systematic Campbell review on ‘Safety Interventions to Prevent Accidents at Work (SIPAW) (Dyreborg *et al.*, 2022). The SIPAW review provided the evidence from research for practitioners to consider using in work injury prevention in their organizations. However, knowledge about safety interventions needs to be re-contextualised to be useful for practices and safety problems (Steckler and McLeroy, 2008). The KTE and interactive research approach was guided by the IWH approach presented by Van Eerd and Saunders (2017). We suggest four “best practice” components to help guide how KTE and interactive research can enhance OHS research use in decision-making, which can be adapted to the sectoral and jurisdictional context as needed:

- (1) Building engagement into the creation of research knowledge
 - Researchers may highlight what knowledge users get from the research process and listen to knowledge users’ problems to understand their need.
 - Knowledge users may help to ensure that the research approach is relevant and that the exchange process is planned in a way that they understand.
- (2) Developing relationships and networks
 - Facilitators may be used to help navigate the exchange process and identify key qualifiers for translating knowledge.
 - Both researchers, facilitators and knowledge users may share experiences with exchange and translation processes in professional networks.
- (3) Capacity building for evidence-informed decision-making in workplaces
 - Researchers may create insight for knowledge users to understand and select relevant information to solve issues and translate knowledge in a useful way.
 - Knowledge users’ may help to adapt relevant information to their context and decision-making process.
- (4) Developing means of using knowledge
 - Video clips may be used to demonstrate prevention issues and their solutions.
 - Interactive guidance and web-based resources may help develop evidence-informed measures for accidental injury prevention.
 - Stepwise description of how to use various tools and methods can be useful.

The interactive research methodology for conducting KTE allows researchers to facilitate participatory engagement for the exchange of research findings with end users. This approach also allows the study of knowledge users adaptation of knowledge for decision-making and the joint learning processes between researchers and research users to explain how the knowledge exchange worked in aiding implementation of injury prevention programs in their workplace.

Concluding remarks

We must continue exploring new ways of reaching workplaces with research knowledge. In this editorial, we go beyond reach and present an approach of how to facilitate research use in practice. This can help increase the societal value of OHS research. Our conclusion is that

combining interactive research and KTE can further promote a two-way KTE that has an impact on decision-making in the working environment. Future research can expand on how we move from one-way (linear) transfer processes where we disseminate findings to decision-makers to interactive research and KTE approach which includes the knowledge users' needs and takes their resources into consideration to increase the use of research knowledge.

One way to move forward is to consider adapting the KTE approach to OHS knowledge brokers or intermediaries to aid reaching a broader audience than the knowledge users' involved in the direct KTE process. This may be done by setting up relationships with other audiences such as OHS services and OHS professionals who can help improve and facilitate the exchange process in networks of workplaces. Other opportunities may be found in developing relationships through a systematic partnership approach that is integrated from the start of the research process.

Researchers, institutions and funding agencies are deepening their engagement in knowledge transfer and finding new ways to capture and communicate the benefits research can offer to all sectors of the economy, culture and society. In the short term this requires time and resources to support the exchange of ideas and experiences between researchers and knowledge users. However, the long term pay-off may be a shift in culture, in which OHS research knowledge is more relevant and useful for decision-makers, and a more practice-oriented culture is adopted by the researchers. Researchers could use a strategic lens to help guide activities to facilitate engagement with knowledge users and sharing of OHS knowledge. Time, resources and capacity are required to do this. Future research needs to take this on.

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