Enhancing the performance of Knowledge Brokers: implications for public health

by

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Abstract

The use of scientific findings in the development of health policy is a critical element of disease prevention and health promotion. Nonetheless, a well-established body of public health research has determined that scientific knowledge continues to inadequately inform and guide health-impacting decisions. Due to a lack of organizational evidence-informed-decision-making (EIDM), policies and practices, on average, do not sufficiently protect the health of workers exposed to occupational health hazards, such as respirable crystalline silica (RCS). Workers are commonly overexposed to RCS and consequently experience unacceptably high health risk levels.

While the concept of Knowledge Translation (KT) has made some progress transferring risk-mitigating knowledge into organizational practice, research use remains unsatisfactory. Poor organizational research implementation is associated with pervasive KT barriers that impede the flow of knowledge from knowledge producers to knowledge users. Within an occupational context, KT barriers create gaps in what has been identified as the Occupational Health and Safety Knowledge-to-Action Process.

In an effort to bridge knowledge-to-action gaps, the use of Knowledge Brokers has recently gained much traction. Through the use of engaging, interactive strategies that meaningfully convey messages, Kbs can attenuate KT barriers and prompt behaviour change in the form of increased EIDM. Due to a lack of Kb educational and performance standards however, many Kbs are ill equip to conduct effective KT. Supporting the Promotion of Activated Research and Knowledge (SPARK) is an evidence-informed intervention aimed to improve Kb KT capacity through a KT skills training program. To assess KT knowledge and skill acquisition a process evaluation was conducted. Evaluation results revealed that Kb KT skills can be enhanced. While thorough program efficacy has yet to be tested, evaluation findings are believed to be the first step in understanding the illness prevention and health promoting potential of this intervention.

Based on the need to mitigate occupational health risks, and prospects of promising evaluation results, it is believed that KT training should be applied to Kbs within the Occupational Health and Safety Knowledge-to-Action Process, specifically WorkSafe BC Prevention Officers. It is believed that the occupational public health implications of well-trained, KT-capable Kbs can significantly reduce health risks among
workers exposed to occupational health hazards and pave the way for increased organizational EIDM.

Keywords: knowledge translation; knowledge brokers, evidence-informed-decision-making; occupational health hazards; respirable crystalline silica
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Introduction

The uptake and implementation of new scientific findings into organizational practice is inadequate, inconsistent, passive and slow (Agency for Healthcare Research and Quality [AHRQ], 2001; Lang, Wyer & Haynes, 2007). Research from the Agency for Healthcare Research and Quality (2001) indicates that it can take up to two decades from the time new scientific knowledge is first generated to the time it is implemented into policy and practice. This considerable time lapse raises concern among the public health community as a well-established body of research indicates that the implementation of scientific findings is essential to mitigation of public health risks and alleviation of the burden of disease in populations (Canadian Institute for Health Research [CIHR] 2014; Graham, Logan, Margaret, Harrison, Sharon, et al., 2006).

While there is currently no definitive means to move scientific evidence into policy and practice (Dobbins, Robeson, Ciliska, Hanna, Cameron, et al., 2009), research suggests that evidence-informed-decision-making (EIDM) facilitates what is often referred to as the knowledge-to-action (KTA) process (Dobbins et al., 2009; Graham et al., 2006; Lavis, Robertson, Woodside, McLeod, Abelson, 2003). The use of best available evidence in practice facilitates “upstream” disease prevention interventions that best promote, protect, and maintain public health (Frumkin, 2010; Dobbins et al., 2009; Lavis et al., 2003). Conversely, the inadequate use of research findings results in patients failing to receive recently recommended standards of care, hinders continuous quality improvements, and most alarming, exposes populations to the risks of iatrogenic harm (Grimshaw, Eccles, Lavis, Hill, & Squires, 2012; Lang et al., 2007, AHRQ, 2001; McGlynn, Asch, Adams, Keesey, Hicks, et al., 2003).

Many iatrogenic health risks occur in the context of occupational settings (Takaro, 2013). A gap exists between scientific knowledge and practice policies intended to manage occupational health hazards (National Institute for Occupational Safety and Health [NIOSH], 2002; Occupational Safety and Health Administration, 2012; Madl et al., 2008). Inadequate application of scientific findings in organizational health decision-making commonly results in employee exposure to unacceptable levels of harmful toxic substances associated with adverse health effects (NIOSH, 2002; Madl, Donovan, Gaffney, McKinley, Moody, et al., 2008; Esswein, Breitenstein, Snawder,
Exposure to respirable crystalline silica (RCS) is a prime example of an occupational health hazard that exposes workers to excessive health risk levels and which requires improved risk management policies (NIOSH, 2002; Esswein et al., 2013).

Respirable crystalline silica (RCS) is an occupational health hazard with the intrinsic potential to cause harmful health effects (Takaro, 2013). RCS exposure is associated with numerous health outcomes including silicosis, pulmonary tuberculosis, scleroderma, chronic obstructive pulmonary disease, chronic renal disease, numerous autoimmune diseases, and lung cancer (NIOSH, 2002; Centre for Disease Control and Prevention [CDC], 2015). RCS is widely used in many industries including mining, construction, metal foundry, furniture making, and more recently hydraulic fracturing (Cyr, Le, Hollins & Henshaw, 2014; Madl et al., 2008; NIOSH, 2002). It is estimated that approximately 380,000 Canadian workers and 1.7 million American workers are exposed to RCS (Cyr et al., 2014; Centre for Disease Control, 2015; Carex Canada, 2015). Occupational Safety and Health Administration [OSHA], 2002). Through risk assessments, which characterize population risk levels based on silica’s dose-response relationship, it is concluded that crystalline silica poses grave health risks among exposed workers (NIOSH, 2002; Madl et al., 2008).

Upon inhalation, respirable crystalline silica causes lung tissue fibrosis. When fine, freshly fractured silica particles settle into alveolar sacs, macrophages attempt to degrade these particles through the release of cytokines such as tumor necrosis factor, interleukin-1, and leukotriene B-4 (Varkey, 2013). This stimulates a cykotoxic, inflammatory reaction in which reactive oxygen species and other cell damaging agents are released (Mald et al., 2008; Varkey, 2013). A series of these cellular reactions result in cell necrosis and lung tissue fibrosis, which contribute to the risk of silicosis onset. “In light of this pathophysiology and the observation that genetic susceptibility factors confer additional risks on some populations, no definitively safe level of exposure has been demonstrated.” (personal communication with Dr. Takaro, December 9, 2015).

In an effort to reduce the risks associated with RCS exposure, EIDM has been used to inform upstream prevention interventions (NIOSH, 2002; Madl, et al., 2008). Primary prevention level controls have included stricter silica exposure regulations in the
form of reduced occupational exposure limits (OEL) (Madl et al., 2008). Secondary prevention level interventions have involved Occupational Respiratory Disease Surveillance programs that offer workers medical screening and monitoring (Centre for Disease Control and Prevention [CDC], 2014). To alleviate the adverse health effects among those whom have developed a RCS-associated occupational disease, tertiary prevention interventions have included compensation programs (Mald et al. 2008).

While these EIDM efforts have contributed to improved risk management, longitudinal epidemiological evidence suggests that current policies and regulations continue to pose substantial health threats (e.g. silicosis onset) to RCS-exposed workers (NIOSH, 2002; Madl et al., 2008). Even at exposure levels below the OSHA’s Permissible Exposure Limit (PEL) of 0.1mg/m3 as an 8hr Time-Weighted-Average (OSHA, 2013), workers are on average over-exposed and remain at considerable risk levels (OSHA, 2013; Cyr et al. 2014; NIOSH, 2002). A study by Kreiss and Zhan (1996) found that among miners exposed to the current PEL concentrations, 34% were diagnosed with silicosis. Another study by Rosenman, Reiley and Rice (1996) found a silicosis increased risk of 1.45 after 20 years (CI= 1.25-1.68) and 2.10 after 40 years of exposure (CI= 1.56-2.82) among foundry workers exposed to the current PEL. Furthermore, within the quickly expanding hydraulic fracturing (i.e. fracking) industry (Ridlington & Rumpler, 2013), little to no knowledge has been generated regarding the risks to RCS-exposed fracking crews (Esswein et al., 2013). RCS exposure among fracking crews is of particular concern as they are typically exposed throughout every stage of the fracking process (Esswein et al., 2013). Additionally, it is important to note that the latency period of chronic silicosis is 10+ years, therefore it can be presumed that much of the RCS-associated burden of disease has yet to be witnessed among exposed population (NIOSH, 2002).

Inadequate occupational health risk mitigating policies are associated with gaps in what has been identified as the Occupational Health and Safety Knowledge-to-Action Process (see Figure 1). The Occupational Health and Safety KTA Process refers to the series of stakeholders and phases through which knowledge must travel to reach the end user and make its way into organizational occupational health policy and practice. Within the Occupational Health and Safety KTA Process gaps exits between the knowledge producers (i.e. scientific community) and organizational knowledge users
responsible for the implementation of practices that adequately protect the health of
ers. Organizational knowledge end users may consist of different professional groups including Risk Management
departments, organizational Health and Safety Committees and organizational leaders in
professional positions to make final decisions that directly impact the health of RCS-
exposed employees (i.e. organizational Chief Executive Officers) (personal
communication with Bilsker and Takaro, October 7, 2015). It is ultimately the
responsibility of these organizational decision-making groups to “correct deficiencies and
make improvements” that reduce employee health risks (Workplace Safety and
Prevention Services, 2011, p. 17). As such, to better protect the health of RCS exposed
employees, it is essential that risk-mitigating efforts be tailored to bridge KTA gaps
between researchers and RCS industry decision-makers.

**Knowledge Translation: Knowledge-to-Action Gap Proposed solution**

Gaps in the KTA process have been addressed through a sophisticated concept
known as Knowledge Translation. Knowledge translation (KT) is now widely recognized
as an essential component of evidence-informed practice (CIHR, 2014). The Canadian
Institute of Health Research (2014) defines KT 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 healthcare care system” (para. 1). The principle
objective of KT is to transfer research-generated discoveries and innovations (i.e.
knowledge) from the scientific community (i.e. researchers) to the health decision-
making community (e.g. organizational policy makers).

In theory, effective KT between knowledge producers and knowledge users
results in evidence-informed policies and practices that improve and maintain public
health outcomes (CIHR, 2014). As such, KT methods are used to mitigate health risks
associated with occupational RCS exposure. To date, commonly used KT methods
have included synthesized literature in the form of epidemiological meta-analyses
(Steenland and Stayner, 1997) and hazard review reports (NIOSH, 2002), conference
presentations (Esswein et al., 2013), and the development of an Occupational Health Guideline for Crystalline Silica (CDC, 2013). Though these KT efforts have contributed to the aforementioned multilevel RCS prevention controls, persistent KTA challenges continue to result in poor organizational EIDM and the inadequate health protection of RCS-exposed workers.
Scoping Review: Knowledge Translation Barriers

While scientists and organizational decision-makers are aware of the need for EIDM, complex relations between these stakeholders make effective, action-oriented KT a sizeable endeavour (Lavis, Davies, Oxman, Denis, Golden-Biddle et al., 2005). Stakeholders’ failure to mutually navigate through the KTA process results in KT action barriers that hinder organizational EIDM. KT barriers impede the effective uptake of innovations that decrease employee health risks. Based on a preliminary scoping review, three systemic KT action barriers were identified - the persistent use of passive, one-directional KT approaches, the inconsistent conceptual understanding of the KTA process, and the competing ideological values and interests among researchers and organizational decision-makers. It is important to note, these are perpetual KT barriers for which KT research methods remain underdeveloped and have yet to clearly identify causal pathways (Lomas et al., 2005; Grimshaw et al., 2004). The obstructive effects of these identified KT barriers are believed to be interactive and likely have synergistic effects.

Passive KT Methods

Traditional passive KT approaches, continue to be widely used (Dobbins et al, 2009; Graham et al, 2006; Grol & Grimshaw, 2003). These KT methods are characterized by their one directional flow of synthesized evidence from knowledge producer to knowledge user (Dobbins et al., 2009; Lavis et al. 2005). They are the conventional form of KT used by researchers (Barwick et al., 2014), and include journal publications, systematic reviews, conference presentations, didactic continuing medical education sessions and material (Grol & Grimshaw, 2003). In general, traditional KT methods synthesize information and thus facilitate the appraisal of the health challenges using EIDM practices (Grol & Grimshaw, 2003). While some research suggests that one-way approaches, “increase the prospects for research use” (Lavis et al, 2006, p. 37), more recent evidence reveals effective KT is inadequately achieved using these strategies alone (Dobbins et al., 2009; Lavis et al., 2005; Grol & Grimshaw, 2003).

First, organizational health decision makers are not the target audience for synthesized literature (e.g. systematic reviews) (Lavis et al., 2005; Lomas, 2005). The
breadth of scientific knowledge needed to adequately assist organizational health decision makers is often too broad to be effectively captured in synthesized material (Lomas et al., 2005, p. 650). To make evidence-informed decisions, decision-makers need access to knowledge that is dispersed throughout the social sciences, education, and numerous other disciplines (Green, Ottoson, Garcia & Hiatt, 2009). Also, the types of questions organizational decision-makers need answered are often omitted from systematic reviews as they are not clearly operationalized or seen to yield generalizable findings (Lomas et al. 2005; Lavis et al., 2005; Black 2001). As systematic reviews generally aim to answer clearly operationalized questions with generalizable findings, they are an ideal source to inform clinical decisions (Lomas et al., 2005). Unlike clinical decisions, however, managerial and policy decisions are often context specific and need to be informed by applied research not covered in systematic reviews (Lomas, 2005; Lavis et al., 2005; Walshe and Rundall, 2001).

Second, the passive nature of one-way KT approaches lacks stakeholder engagement, which research suggests results in poor research uptake (Lavis et al., 2005, Grol & Grimshaw, 2003). In comparison to passive approaches, KT methods that actively engage stakeholders, and which use face-to-face communication and continuous feedback, show superior knowledge transfer in a variety of contexts and environments (Dobbins et al. 2009; Lang et al, 2007; Lavis et al., 2005; Grol & Grimshaw, 2003; Lavis et al., 2003). A systematic review by O’Brien et al, (2001) compared the effects of passive KT techniques (e.g. didactic presentations, printed material dissemination) to interactive techniques (e.g. educational workshops). Results revealed little to no EIDM effects associated with passive KT techniques, while interactive techniques showed moderate to large EIDM effect, particularly those that included a workshop component (O’Brien, Freemantle, Oxman, Wolfe, Davies et al., 2001; Lang et al, 2007). It is well-established that interactive two-way knowledge exchange, which includes knowledge user engagement and provides reciprocal guidance and feedback, better translates knowledge than strategies that do not include stakeholder interaction (CIHR, 2014; Dobbins et al., 2009; Lang, 2007). The promising effects associated with interactive communication are linked to the reinforcement of positive relationship between researchers and health decision-makers (Lavis et al., 2007; Lomas, 2005). A full exploration of this nuanced topic is beyond the scope of this paper.
Inconsistent Conceptual Understanding of KTA Process

Conceptual confusion regarding the KTA process is a key KT barrier that obstructs the use of research evidence. An inconsistent, unstandardized understanding of the KTA process creates conceptual confusion and exacerbates correlated KT challenges (Graham et al., 2006; Grimshaw et al., 2012; Lang et al., 2007). For example, KT terms associated with the KTA process are often synonymously used regardless of whether they describe the same concept (Graham et al., 2006). An international study by Graham et al. (2005) identified 29 KTA terms with similar conceptual meanings. Following testing through Google searches, authors found that clear, consistent definitions of the terms were not readily available. The ambiguous understanding of KT terms has been linked to term misuse, educational challenges, and an exacerbation of poor KT conceptual clarity (Graham et al., 2006; Grimshaw, Thomas, MacLennan, Fraser, Ramsay, & Vale, 2004; Lang et al., 2007).

Methodological challenges within the study of KT contribute to conceptual confusion and vise versa (Grimshaw et al., 2004). Methodological challenges have limited the empirical study of KT, which has resulted in a weak understanding of the KTA process and research implementation (Grimshaw et al., 2004, Lang et al., 2007). According to Lomas et al. (2005), weak research methods, which do not control for contextual factors, limit result interpretations and provide little to no insight into intervention effectiveness. A study by Harrison and colleagues (2003), which failed to find the effects of guideline implementation, attributed negative results to policy context (i.e. behaviour change among the control group was attributed to pressure to adhere to policy changes), rather than the intervention itself (as cited in Lomas et al. 2005). Furthermore, weak KT research methods have contributed to a limited number of multiple stakeholder group interaction studies. This has consequently restricted the development of scientifically sound, rigorous KT research methods. A scoping review of mental healthcare KT revealed that among 187 mental health care KT publications, 62% addressed KT among two stakeholder groups (primarily between researcher –provider), while only 33% addressed KT among three or more stakeholder groups (Goldner, Jeffries, Bilsker, Jenkins, Menear et al., 2011). While the present capstone paper focuses on dyadic KT between researches and RCS industry organizational decision-makers, it is important to note that policy decisions generally occur among multiple
stakeholder groups. Weak KT research methods have hampered the study of how multiple stakeholder group interactions influence health policy.

**Competing Ideological Values and Interests**

A poor understanding of multiple stakeholder group interactions contributes to the third identified KT barrier - stakeholders' competing ideological values and interests. Research suggests that unlike the scientific community, whom place greater value on empirical knowledge assessments, organizational policy makers place greater value on assessments based on pragmatic knowledge (Lomas, 2005, p. 61; Black, 2001). According to Lomas et al. (2007), pragmatic decisions lead to consensus, coordination, and strategic positioning. Among non-research groups, these outcomes are viewed as more valuable than science-based decisions that lead to collaboration with researchers (Lomas et al., 2007). As mentioned, unlike clinicians, who are a target audience for synthesized literature, industry health decision makers do not have access to adequately effective EIDM tools (Green et al., 2009). This prompts decisions made based on best available ideas (i.e. heuristics) rather than best available evidence (Slovic, 1987; Lavis, 2006; Lavis et al., 2003, Weiss, 1991), while researchers continue to operate in a silo of empirical data-based decisions. According to Lomas et al. (2005), operational silos restrict scientists’ pragmatic interpretive skills and exacerbate weak stakeholder engagement.

Moreover, evidence suggests that research interests compete with organizational interests (Lavis, 2006). Unlike the scientific community, which is primarily driven by grant acquisition and publication accumulation (Lomas, 2007), organizational decision makers are driven by the need to make prompt decisions and produce rapid results, sometimes with limited available resources (Lomas, 2005). As organizational decisions are largely influenced by budgetary constraints, political landscapes and pressures for fiscal gain (Lavis, 2006; Black, 2001), they are commonly motivated by goals beyond the health and well-being of the work force (Black et al., 2001).

The result of a combination of these interacting KT barriers is ineffective KT that is impractical, riddled with knowledge to action gaps, and lacking concrete action to
protect the health of workers. These barriers impede EIDM and the effective uptake of evidence informed best practices and policies that reduce employee health risks.
Knowledge Brokers: Key to Overcoming KT Barriers

In an effort to alleviate KT action barriers, and increase evidence informed policies that reduce public health risks, the use of knowledge brokers (Kbs) has become a rapidly growing strategy (Dobbins et al., 2009; Lomas, 2007). Through the act of knowledge brokering, effective knowledge brokers bridge KTA gaps between stakeholders (Dobbins et al., 2009; Lomas, 2007). Knowledge brokers facilitate interactions between groups interested in a common goal and prompt the collaborative development of evidence-informed interventions (Canadian Health Services Research Foundation [CHSRF], 2003). They are intermediaries who, through the use of engaging, action-oriented KT techniques, establish and maintain relationships between knowledge producers and knowledge users (CHRF, 2003; Meyers et al. 2010). Actions performed by Kbs include seeking-out new knowledge, synthesizing it, scanning for best practices within the literature and within other organizations, and helping audiences stay updated on the latest best practices using interactive strategies (CHSRF, 2003). Kbs are also responsible for conducting audience assessment, recognizing stakeholder’s preferred form of knowledge, tailoring messages according to stakeholder values, and understanding political landscapes that facilitate and hinder EIDM (Dobbins et al., 2009; CHSRF, 2003).

Kbs are identified as one of the main avenues for researchers to increase the uptake of risk reducing organizational interventions (personal communication with Bilsker, August 13, 2015; Graham et al., 2006). Research suggests that Kbs’ health influence is highly attributed to their optimal positioning between knowledge producers and knowledge users (CHSRF, 2003; Graham et al., 2006). In theory, they are ideally situated to influence and foster actions among their audiences (CHSRF, 2003; Graham et al., 2006). Kbs’ positioning allows them to utilize planned action models, which are shown to effectively integrate scientific knowledge into practice (Graham et al, 2006). Graham et al. (2006) defines planned action theory as “deliberately engineering (not haphazardly) change in groups that vary in size and setting” (Graham et al, 2006, p. 20). Planned action models are used to create behavioural change at a social systems, group and individual level (Graham et al. 2006). These models help agents of change (e.g. Kbs) create a plan that aids them to “control variables that increase or decrease the likelihood of the occurrence of change”(Graham et al. 2006, p. 20). It is believed that
through the use of engaging, interactive communication techniques, qualified Kbs can effectively utilize planned action models to reduce KT barriers that impede organizational research use.
Occupational RCS Regulatory Landscape and Kbs Role within it

To effectively utilize Kbs to reduce employee RCS-associated health risks, it is necessary to identify Kbs within the Canadian occupational health and safety regulatory landscape who are in positions to activate organizational behaviour change. In Canada, the health of workers is protected by the occupational health and safety legislation of each workers’ designated jurisdiction (Canadian Centre for Occupational Health Safety [CCOHS], 2015). Fourteen occupational health and safety jurisdictions exist in Canada – one federal, ten provincial and three territorial (CCOHS, 2015). Each jurisdiction has its own occupational health and safety legislation as per each jurisdictions’ Occupation Health and Safety Act. The health of all Canadian employees is protected under the legislation of his/her jurisdiction. With the exception of the 10% of Canadian employees covered under federal legislation, 90% of Canada’s workforce is, in theory, protected by the occupational health and safety legislation of his/her province or territory. Although federal legislation (i.e. Canada Labour Code part II and Regulations) “outlines the general rights and responsibilities of the employer, the supervisor and the workers” (CCOHS, 2015, para. 2), it is the responsibility of jurisdictional governmental departments to enforce regulations (CCOH, 2015).

In British Columbia, this governmental department is WorkSafe BC, a workers compensation board (WorkSafe BC, 2015, CCOHS, 2015). Regulation enforcement officers at WorkSafe BC, also referred to as Prevention Officers, strive to obtain compliance through the use of progressive enforcement methods (WorkSafe BC, 2015, para. 2). To reduce employee health risks at an upstream level, they engage in prevention activities including industry education, consultation, and stakeholder outreach programs (WorkSafe BC, 2015). As a result of their jurisdictional enforcement authority, their use of occupational disease prevention methods, and their intermediary positioning between researchers and organizational decision makers, in this paper, WorkSafe BC Prevention Officers are identified as critical Kbs. They are believed to be in optimal positions to conduct KT and prompt behaviour change in the form of increased organizational EIDM. Through the use of Prevention Officers it is believed that there is an opportunity for a system of competent Kbs at WorkSafe BC to successfully conduct
KT, bridge the KTA gap between researchers and organizational decision makers, and alleviate worker health risks associated with RCS exposure (Figure 1).

**Figure 1**: Occupational Health and Safety Knowledge-to-Action Process

**Note**: the CCOHS is an important national knowledge sharing body, therefore included in the diagram. However, due to its lack of policy levers enabling regulation enforcement, the CCOHS is not a pertinent stakeholder in the Occupational Health and Safety KTA process.
Shortage of Qualified Knowledge Brokers

Unfortunately, a shortage of qualified Kbs exists (personal communication with Bilsker, 2015; CHSRF, 2003). Despite Kbs’ wide scope-of-practice, an established standard for Kb knowledge and skill (i.e. accreditation) has yet to be developed (CHSRF, 2003). As such, Kbs are not formally trained to adequately fulfill their diverse range of duties. In many cases role requirements depend on the needs of the organization rather than Kb qualifications (CHSRF, 2003). Research by Lavis et al. (2003) suggests that among research organizations, which are reasonably assumed to be attuned to the importance of KT capacity building, few allocate resources to enhance professional capacity and effectively transfer scientific findings (p.22). Due to a lack of KT disciplinary coherence, many Kbs are not equipped to successfully accomplish their knowledge brokering goals (Walshe & Rundall, 2001; Dobbins et al. 2009). Furthermore, despite indication that Kbs could be an invaluable resource, there is a lack of research showing that their skills can be enhanced to an adequate level to effectively promote and protect public health (CHSRF, 2003; Dobbins et al., 2009; Lavis et al., 2003). Kbs’ impact on behaviour change has been well documented in the sectors of agriculture and business, but remains limited in health decision-making (Dobbins et al., 2009).

It is hypothesized that Kbs can be trained to become more effective knowledge translators through the use of a Kb KT training program. The following section explores this hypothesis through the evaluation of a KT training program intended to improve Canadian healthcare Kb’s KT capacity. Specifically, it trains Kbs to promote EIDM, and to implement evidence-informed innovations within their organizational setting. The evaluation includes both quantitative and qualitative analysis methods. Quantitative methods were used to analyze Kbs’ skill acquisition using secondary data collected from SPARK 2012. Qualitative methods were used to collect SPARK 2015 qualitative data. The primary purpose of the evaluation was to assess if and how the SPARK program improves KT skills among a group of healthcare KB. To the authors’ knowledge, to date no evaluation has assessed the effects of a KT training program. Furthermore, it is believed that the answer to this question will provide insight into whether capable Kbs in the context of the Occupational Health and Safety KTA Process can reduce employee health risks associated with occupational RCS exposure.
Research Objectives

The purpose of this capstone is two fold:

1. To evaluate whether Kb's KT skills can be enhanced through participation in the SPARK KT training program

2. To explore the impact that well-trained, capable Kbs can have on organizational EIDM as a means to reduce employee health risks associated with occupational hazardous such as RCS exposure.
SPARK Training Program Evaluation
SPARK (Supporting the Promotion of Activated Research and Knowledge) is a KT intervention that aims to mitigate KTA barriers as they relate to mental health care in Canada (SPARK Year 1 Report, n.d.). This is achieved through the training of mental healthcare Kbs with the objective of improving their “capacity for implementing effective knowledge translation practices” (SPARK Year 1 Report, n.d., p. 2). SPARK uses an innovative training approach developed by the Knowledge Exchange Centre at the Mental Health Commission of Canada. Each year 40 Kbs from numerous sectors across Canada, including researchers, practitioners, and policy makers, are selected and brought to participate in the 2-day training workshop. The first year of the workshop took place in 2012.

During the workshop, participant’s KT skills are reinforced using the Innovation to Implementation KT Planning Model (I2I). The I2I is a planned action model that supports Kbs in transitioning their organizations to adapt evidence-based innovations. The I2I is a practical, action-oriented KT model composed of a step-by-step guide that helps Kbs design a KT plan for successful innovation implementation. It is composed of seven stages (Figure 2). Each stage requires Kbs to reflect upon essential KT principles and formulate responses according to relevance within their organizational context (Appendix A).
Figure 2. Innovation to Implementation KT Planning Model
Methods

KT Skill Testing Methods

To evaluate the effectiveness of SPARK, a mixed methods formative evaluation was conducted. First, using secondary data collected from SPARK 2012 participants, quantitative methods were used to analyze Kbs' knowledge and skill acquisition. Next, qualitative data gathered during SPARK 2015 was used to gain insight into participants’ experiences and the skill enhancement process.

To assess SPARK 2012 knowledge and skill acquisition, all forty SPARK 2012 participants were asked to complete pre and post workshop KT planning tests. Testing focused on KT skill application as it related to the I2I KT plan model. As such, tests required participants to apply their KT knowledge and skills (at the time of testing) to address a set of KT criteria derived from the I2I. It is important to note that SPARK 2012 participants represented a range of sectors: “10 researchers, 19 practitioners, 5 policy/decision-makers and 6 in more than one of these categories” (SPARK Year 1 Report, n.d. p. 8). Data identifying their specific job titles was not gathered.

Tests presented participants with a scenario, which included a public health challenge and a potential intervention (Appendix B). The public health challenge proposed was the overuse of physical restraints, rapid tranquilization, and seclusion in a hospital emergency department. The use of less intrusive de-escalation techniques was the proposed innovation. Participants were asked to apply their KT knowledge and skills to implement the proposed innovation as though they were a Kb in the emergency department. From 40 program participants, all of whom completed the pre-workshop tests, 22 completed both pre and post tests. Consequently, 18 protocols were excluded from the data set. This resulted in 44 protocols eligible for quantitative data analysis inclusion.

Quantitative Analysis

Test responses (i.e. protocols) were scored using a scoring scheme that focused on 3 key criteria questions derived from the I2I: Q1 - How will you decide whether the innovative practice is good for the organization? Q2 - What methods will you use to
communicate about the practice? Q3 - How will you know whether you have succeeded? (Appendix B).

Coding was based on the correct skill application for each of these criteria questions. To increase confidence that coding accurately reflected effective application of KT knowledge and skills, inter-rater reliability was established by two raters, myself, a Masters of Public Health Candidate, and Grace Higgins, a public health professional. To increase internal validity, blind methods were used to conceal whether a protocol was completed before or after training.

Prior to commencing protocol scoring, raters received I2I content training. Each criterion was defined and described using the scoring scheme that included sub-criteria (Appendix B). Using the set of excluded pre-test only protocols, together raters reviewed variances in responses according to each sub-criteria and attempted to establish inter-rater reliability. Following six hours of consensus practice, raters scored the practice protocols independently.

Statistical software SPSS Statistics 22 was used to determine inter-rater reliability. First, each practice protocols’ sub-criteria scores were analyzed using the Interclass Correlation Coefficient (ICC). Upon completion of analysis, sub-criteria with an ICC average measure lower than 0.3 were discussed in further detail. This was done as a means to increase inter-rater reliability before scoring of the 44 eligible protocols in the data set.

Following an adequate amount of inter-rater consensus practice, raters independently scored the eligible 44 protocols. Once again, inter-rater reliability was determined using the ICC on each sub-criteria. Sub-criteria were then summed for each rater and compared using the ICC. This was done to permit for simpler analysis. When the total scores of each rater were compared the average ICC was 0.909. This is believed to be a highly reliable score.

As inter-rater reliability was determined to be sufficiently high, hypothesis testing was conducted using the scores of one rater only – Connie Berrios. Hypothesis testing,
which compared pre and post workshop test overall results, was completed using pair paired-sample t-tests.

**Qualitative Data Collection Methods**

The qualitative component of the present evaluation is based on attendance to SPARK 2015. Throughout the two-day workshop, the evaluator assumed the role of a participant, and collected data using informal qualitative research methods. Qualitative data is based on group observations, one-on-one discussions with participants, and field notes. As the qualitative component of the evaluation was exploratory in nature, an informal participatory approach for data gathering was deemed appropriate.
Results

Quantitative Results

Following SPARK 2012, KT knowledge and skill improvements were seen across all three criteria. Statistically significant levels of improvement were seen in criteria Q2 (mean = 1.523, SD= 3.0, p=0.027), and in the Average Score which showed a mean (mean = 3.409, SD= 6.35, p= 0.2) (Table 1 and Figure 1).

Table 1. Paired sample test

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>n</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
<th>95% Confidence Interval of the Difference</th>
<th>Lower</th>
<th>Upper</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td>SC1PreTOT - SC1PostTOT</td>
<td>-3.40909</td>
<td>6.35392</td>
<td>1.35466</td>
<td>.22626</td>
<td>-.59192</td>
<td>-2.517</td>
<td>21</td>
<td>.020</td>
</tr>
<tr>
<td>Pair 2</td>
<td>SC1Q1Pre - SC1Q1Post</td>
<td>-.75000</td>
<td>2.97909</td>
<td>.63514</td>
<td>-2.07086</td>
<td>.57086</td>
<td>-1.181</td>
<td>21</td>
<td>.251</td>
</tr>
<tr>
<td>Pair 3</td>
<td>SC1Q2Pre - SC1Q2Post</td>
<td>-1.52273</td>
<td>3.00189</td>
<td>.64001</td>
<td>-2.85369</td>
<td>-.19176</td>
<td>-2.379</td>
<td>21</td>
<td>.027</td>
</tr>
<tr>
<td>Pair 4</td>
<td>SC1Q3Pre - SC1Q3Post</td>
<td>-1.13636</td>
<td>3.30649</td>
<td>.70495</td>
<td>-2.60238</td>
<td>.32965</td>
<td>-1.612</td>
<td>21</td>
<td>.122</td>
</tr>
</tbody>
</table>
Qualitative Results (summarized)

1. Participants received limited guidance on how to effectively apply the I2I KT model. Each stage of the I2I was not explored in a thorough, systematic manner.
2. Participants did not have sufficient time to apply their KT skills to each step in the I2I.
3. In general, participants valued pragmatic and experiential knowledge more than scientific knowledge.
4. Limited resources was a common KT barrier identified by many participants.
5. A large portion of skill enhancement efforts occurred in stage 5 of the I2I, Design a KT Plan.
6. It is believed that it would have beneficial to have placed greater emphasis on Stage 2 of the I2I, Select an Innovation. This would have highlighted the value of scientific knowledge and the importance of using evidence-based knowledge to design a mode of delivery (e.g. social media platform).
7. Participants were given the opportunity to engage in group discussions. This helped them feel validated and supported.
8. Although each stage of the I2I was not explored in great detail, participants learned some concepts of each stage throughout the 2 day workshop.
9. Based on group discussions and personal conversations with participants, participants enjoyed listening to guest speakers who shared their knowledge and experiences. They felt engaged and motivated by these speakers.
10. In general, participants described feeling re-energized and motivated to push the boundaries of their project as a result of SPARK training.

(Appendix C)
Discussion

SPARK Evaluation

Based on the present evaluation it is concluded that a Kb KT training program, such as SPARK, can enhance KT capacity among a group of Canadian healthcare Kbs. Both SPARK 2012 quantitative and SPARK 2015 qualitative data findings suggest program effectiveness. SPARK 2012 quantitative data findings revealed that on average, Kb’s KT knowledge and skills were significantly enhanced. The highest level of skill improvement was seen in the planning of communication delivery method. Similarly, SPARK 2015 qualitative findings suggest that the highest level of knowledge enhancement was also observed in the area of communication delivery methods.

During the SPARK workshop, participants’ KT skills were enhanced using the Innovation to Implementation (I2I) KT Planning Model. The I2I is a step-by-step guide intended to enhance Kbs’ KT skills by planning the implementation of evidence-based innovations into organizational settings. Based on SPARK 2015 observations, it is concluded that due to the disproportional amount of time allocation to various stages of the I2I, during SPARK 2012 statistically significant skill improvements were only seen in communication delivery method planning. Conversely, statistically insignificant improvements were seen in the selection of a suitable innovation, and in the evaluation of the effectiveness of the KT plan. While communication delivery method is an important component of effective KT, it believed that the unsystematic manner in which the I2I was taught hindered performance improvement in arguably more complex areas of KT, such as the selection of an innovation that integrates scientific and pragmatic knowledge. Furthermore, it is believed that while reviewing communication delivery method, more emphasis should have been placed on ensuring that the message is scientifically sound.

Occupational Public Health Implications

The SPARK workshop is one case example demonstrating the application of the I2I. Based on evaluation findings, there is evidence to believe that a Kb KT training workshop, which utilizes a planned action model as a training tool, can meaningfully enhance Kbs KT skills. As such, it is proposed that a workshop, which uses the I2I KT
Planning Model, be offered to WorkSafe BC Prevention Officers. It is hypothesized that the proposed intervention would enhance KT performance among Prevention Officers and increase the prospects of organizational EIDM for the purposes of reducing RCS-associated occupational health risks.

To fully realize the health promoting potential of Kb KT training, it is recommended that Prevention Officers receive a revised version of the SPARK workshop. The revised workshop should be informed by an audience assessment and tailored to meet the specific needs of Prevention Officers. Workshop development should consider contextual factors such as WorkSafe BC’s resource restrictions and the current political influences. Additionally, while it has been determined that some aspects of the SPARK workshop result in effective KT skill enhancement, other aspects are believed to need modification. Given that during SPARK the I2I was not taught systematically, there is reason to believe that this intervention’s Kb skill enhancement potential has yet to be achieved. It is recommended that the adjusted workshop, be one that systematically reviews the I2I and allows participants to apply their skills to each stage. Specifically, increased emphasize should be placed on abstract, socially complex areas of KT. Allocating more time to complex KT objectives can adequately equip Prevention Officers to address persistent systemic KT barriers that impede organizational EIDM.

The interactive, face-to-face, two-directional communication strategies used during SPARK are believed to have the potential to effectively attenuate the common use of passive KT approaches and should be used in the revised version of the workshop. Research suggests that in comparison to passive, one-directional KT approaches, audience-engaging strategies are more likely to lead to research use. Therefore, Prevention Officers who are actively engaged in two-way dialogue during every stage of the I2I are more likely to use I2I’s KT strategies in their KT practice, including those that relate to more complex areas of KT planning. Additionally, as their KT knowledge acquisition experience will be interactive, they are likely to model these interactive methods in the event they assist organizational decision makers develop their own KT plan.
A revised version of the workshop, specifically one that systematically reviews every stage of the I2I, can provide Prevention Officers with a broad, yet thorough understanding of KT principles. It is speculated that this would enhance their ability to decrease the current inconsistent conceptual understanding of the KTA process. A systematic review of the I2I can help Prevention Officers better understand contextually influenced areas of KT planning such as the selection of innovations that incorporate numerous forms of knowledge. Additionally, by spending more time engaging in two-way dialogue in more abstract, socially complex areas of KT, Prevention Officers can increase their appreciation for both research and policy domains. Specifically, they can enhance their understanding of practical challenges involved in the use of scientific evidence and collaboratively devise creative techniques to overcome these challenges.

While it is recognized that competing ideological interest between researchers and RCS- industry organizational decision-makers is an intrinsically rooted, systemic KT barrier, it is not believed to be an insurmountable challenge. To begin to address this KT barrier, it is recommended that risk communication strategies be introduced into the revised version of the workshop. Risk communication strategies commonly use techniques that target knowledge users’ attitudes as a way to prompt behaviour change. For example, techniques such as those included in Sandmans’ (2009) Precautionary Advocacy paradigm, can help Prevention Officers to increase hazard perception among organizational decision-makers. Practical risk communication techniques can help Prevention Officers’ tailor their massages in a manner that explicitly conveys the financial costs associated with poor use of evidence. By learning to appeal to industry objectives, Prevention Officers can become better equipped to align the interest of researchers and organizational decision makers thereby increasing the prospects of research use.

Due to their professional positioning, which allows them to meaningfully mitigate occupational risks within Canada’s occupational health and safety regulatory landscape, WorkSafe BC Prevention Officers have been identified as critical Kbs. They are deemed to be essential knowledge translators necessary to activate behaviour change in the form of increased organizational EIDM. Prevention Officers’ enforcement authority, use of upstream disease prevention efforts, and strategic intermediary positioning make them ideal agents of change in positions to bridge gaps within the Occupational Health
and Safety KTA Process. Despite their risk mitigating potential, evidence suggests that a lack of Kb educational and performance standards thwarts Prevention Officers’ ability to perform effective KT. Similar to Kbs within the healthcare system, Prevention Officers are believed to be ill prepared to adequately attenuate KT barriers that impede the use of scientific evidence in RCS industry organizational policies and practices. Based on an abundance of evidence suggesting the need to reduce systemic KT barriers, the need for qualified Kbs, and the potential effectiveness of a Kb KT training program, it is believed that a system of competent and well-trained Kbs at WorkSafe BC can meaningfully increase organizational EIDM and reduce health risks associated with occupational RCS exposure.
Limitations

- During SPARK 2012 data on participants’ professional roles was not collected and analyzed. This prevented analysis of time restrictions and resource access. These are factors which facilitate the effective use of the I2I to improve organizational KT. Based on the available data it is unclear whether some participant Kbs were at an advantage to activate behaviour change, both at baseline and following training. Based on 2015 SPARK findings, many Kbs struggled with time restrictions, but some seemed to be in more influential positions compared to others.

- Neither SPARK cohort was analyzed using both quantitative and qualitative research methods. This limited the evaluation’s interval validity and left much room for speculation and observer biases.

- The SPARK evaluation analyzed short-term outcomes (i.e. KT knowledge and skill acquisition). Medium-term and long-term outcome evidence is needed to substantiate that Kb KT training ultimately results in organizational EIDM that increases the uptake of evidence informed innovations. To better understand the impact of Kb KT training, it is recommended that future evaluations examine medium and long-term outcome data.
Critical Reflection

The process of completing my Masters of Public Health (MPH) degree has been an invaluable learning experience. Upon entering the program, I questioned whether a concentration in environmental and occupational public health was the right fit for me. Given that my prior academic and professional experience was in mental health and crisis management, I wondered whether I was well equipped for this new distinct challenge. Fortunately, I quickly realized that my passion for learning, ability to adapt to new environments, and desire to apply my reflexive, inter-personnel communication skills, made me an ideal candidate to communicate between distinct audiences and disciplinary domains.

This MPH capstone project has been informed and influenced by a dynamic array of professional and academic opportunities, including an MPH practicum at Fraser Health Authority, and the evaluation of the SPARK program. These experiences have allowed me to “build knowledge bridges” between diverse stakeholders in numerous contexts. For example, while completing my MPH practicum at Fraser Health Authority, I communicated the risks associated with poor workplace mental health to a diverse group of stakeholders including Medical Health Officers, Occupational Health and Safety members, Workplace Wellness Committee front-line healthcare professionals.

With a growing interest in health behaviours, throughout the second year of the program, I focused my attention on behaviour change for the purposes of mitigating psychological and environmental health risks. Through a directed studies course, I was introduced to knowledge translation and risk communication. I became fascinated with the study of risk perception and factors that motivate and discourage population level behaviour change (e.g. attitudes).

Evaluating SPARK gave me a wonderful opportunity to reinforce my theoretical knowledge and to apply my practice skills. I drew on my practical experience to establish rapport with participants and engage in two-way knowledge exchange regarding the importance of using scientific evidence. Fortunately, I became savvy to some of the challenges practitioners experience and that should be considered during program planning.
I hope that the information contained in this report helps to inform future KT initiatives aimed to improve health risk reduction policies. While complex factors make this a difficult goal to achieve, it is believed it can be done. I look forward to applying my public health knowledge and skills to work towards realizing this goal and protecting the health of vulnerable populations. I believed this to be especially important during this critical time in our history.

I would like to thank my supervisors for their mentorship during this process. Their commitment to mobilize knowledge to advance public health has been deeply inspiring and has significantly shaped my future career aspirations.
References


Appendix A.

I2I KT Planning Model: 7 Stages

- **Stage 1 - State the Purpose**: Kbs clearly identify the health care problem they are to address and mitigate through the KT plan.

- **Stage 2 - Select an Innovation**: Kbs select an appropriate innovation that best mitigates the health risk. The selected innovation should be specific, scientifically grounded, and include different knowledge bases (e.g. scientific, pragmatic, experiential, and cultural knowledge).

- **Step 3 - Specify Actors and Actions**: Kbs explicitly specify the actors and actions they will perform to effectively implement the innovation.

- **Step 4 - Identify Agents of Change**: Kbs identify individuals whom are in professional positions to motivate actors and activate behaviour change (i.e. innovative practices) within the organization.

- **Step 5 - Design Strategy**: Kbs design and plan suitable KT communication methods. Appropriate communication methods should be audience targeted, practical, creative and engaging, peer-championed, and indorsed by reputable organizations.

- **Step 6 - Implement**: Kbs implement the KT plan. A vital component of this stage is to gather feedback regarding the plan’s appropriateness, feasibility, and overall effectiveness.

- **Stage 7 - Evaluate**: Kbs evaluate the success of the KT plan itself (not the success of the innovation). To evaluate the KT plan itself, Glasgow’s RE-AIM framework is used.
Appendix B

KT Planning Test

**KT Planning test**

A guideline regarding the use of physical restraint in psychiatric care facilities recommends that: “Staff must receive training to recognize anger, potential aggression, antecedents and risk factors of violence and to monitor their own verbal and non-verbal behaviour. It should include methods of anticipating, de-escalating or coping with violent behaviour. Rapid tranquilization, physical interventions and seclusion should only be considered once de-escalation and other strategies have failed to calm the service user.” You have been given the task of implementing this innovative practice in the Emergency Department of a general hospital:

<table>
<thead>
<tr>
<th>Questions/Scoring Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Q1 How will you decide whether the innovative practice is good for this organization?</strong></td>
</tr>
<tr>
<td>Considering whether the innovation is specific enough</td>
</tr>
<tr>
<td>Considering the feasibility of the innovation in this organization at this time</td>
</tr>
<tr>
<td>Considering the scientific or pragmatic knowledge base for this innovation</td>
</tr>
<tr>
<td>Incorporating other perspectives e.g. patients or families, policymakers</td>
</tr>
<tr>
<td><strong>Q2 What methods will you use to communicate about the practice? How will you explain the practice to staff and others?</strong></td>
</tr>
<tr>
<td>Specifies agents of change</td>
</tr>
<tr>
<td>Specifies particular KT methods</td>
</tr>
<tr>
<td>Uses KT methods that are engaging (brief, entertaining, persuasive) to the audience</td>
</tr>
<tr>
<td>Communicates that the innovation is endorsed by organizations</td>
</tr>
<tr>
<td>Communicates that the innovation is championed by peers</td>
</tr>
<tr>
<td><strong>Q3 How will you know whether you have succeeded?</strong></td>
</tr>
<tr>
<td>Identifies an index of Reach</td>
</tr>
<tr>
<td>Identifies an index of Effectiveness (e.g. knowledge acquisition about the innovative practice)</td>
</tr>
<tr>
<td>Identifies an index of Adoption (behavior change involving adopting the innovative practice)</td>
</tr>
<tr>
<td>Identifies an index of Implementation quality (fidelity to the innovation, doing the innovative practice well)</td>
</tr>
<tr>
<td>Identifies an index of Maintenance (sustainment of the innovation, keeping up the innovative practice over time)</td>
</tr>
</tbody>
</table>
Appendix C

1. **SPARK welcomed participants in an engaging manner.** The bingo game proved to be an effective ice-breaker. It facilitated conversation among participants. It permitted an opportunity to learn each other’s roles (e.g. mentor, participant, organizers), each others’ work (i.e. youth worker) and what they hoped to gain from the workshop (i.e. bridging the gap between physicians and health authorities).

2. **Participants from a diverse range of backgrounds in the field within mental health were present.** I personally spoke with participants in the fields of stigma reduction, workplace mental health, mental health first aid, Aboriginal youth support, and autism support. By having practitioners from a diverse range of background, participants had the ability to broadly gauge the current mental health landscape in Canada. This provided an opportunity identify knowledge gaps, common KT challenges, and common KT goals. This being said, one participant’s comment implied that more cultural diversity among participants would have been appreciated.

3. **The I2I was found to be validating.** One mentor whom had applied to I2I to her work mentioned that she found it validating. She explained that as she had gone through it, she realized that she had been on the right track but that the I2I validated those initial thoughts and actions. Use of the I2I resulted in motivating to continue forward with her project.

4. **SPARK taught participants foundational KT knowledge.** The Elliot and Dan’s presentation encouraged participants to think about KT as an active, iterative conversation.

5. **Participants seemed to appreciate and value and feel supported by their mentors.** Throughout the two days of the workshop, participants listened intently to their mentors feedback and noted resources their mentors suggested. During the welcome dinner, one of this years’ mentors mentioned that as a participant, one of the things she found to be most helpful was receiving immediate feedback from her mentor. This is what motivated her to become a mentor herself.

6. **SPARK gave participants the opportunity to engage in KT with their peers.** This was one of the key benefits of the program. The program allowed
participants to share their knowledge (included all forms of knowledge) and build connections for future resources.

7. **In general, group discussions benefited all participants.** During group discussion participants received advise and feedback from their peers, mentors, program organizers, and the experts. It seemed as though this helped participants feel supported. As participants often experienced common challenges, group discussions seemed to provide mutual benefit to all. However, on occasion, group discussions became too context specific to be relevant to the group as a whole. On these occasions, participants benefited from private consultations with Dan.

8. **Involving individuals with lived experiences proved to be an effective engagement strategy.** When some participants disclosed that they were people with lived experiences, it seemed to have evoked feelings of trust, empathy, and motivation among participants. Additionally, following Kelly Joyce’s poetic narrative participants expressed feeling re-energized and willing to “push the boundaries” of their MH KT projects.

9. **SPARK placed significant emphasis on stakeholder engagement.** It was pointed out that often not all stakeholders are at the table. Often times this is a result of competition between stakeholders (e.g. funds). Rational driving stakeholders’ absence from the table cannot be assumed however. Silences should be better understood as key stakeholder participation is essential for effective KT.

   Additionally, principles to stakeholder engagement were reviewed during a Power Point presentation. These principles included mutual benefits, mutual respect, authenticity (e.g. clear expectations), and barriers to authentic engagement (e.g. tokenism, lack of confidence in stakeholder’s voice).

10. **Lack of commitment from actors was a common source of frustration among many participants.** During a group discussion, in which participants shared this common challenge, one participant recommended the use of “partnership brokering”. Partnership brokering, makes each actors accountable to complete his/her designated action. In the event that the individual can no longer perform his/her assigned task, he/she is responsible for assigning another staff member who can.
11. **At the end of day 1, participants were given the opportunity to document KT concepts that needed further exploration/clarification.** Many of these questions related overcoming organizational barriers that created KT challenges. It seemed as though most participants felt restricted by limited resources, heavy workloads, and lack of control. Although these KT concerns were noted, they did not seem to be explicitly addressed on day 2 of the workshop.

12. **Organizational staff turnover was a KT challenge for many participants.** Participants expressed feeling frustration because many of the initiatives that have been implemented in the past often do not gain traction and are not implemented effectively because the original key players leave the organization and momentum is lost.

13. **Adequate KT plan documentation was deemed to be an effective strategy.** Program organizers emphasized the importance of documenting an innovations progress. Adequate documentation mitigates the loss of innovation momentum that could result from staff turnover. It is also useful for program evaluation purposes. The importance of program evaluation was emphasized on the second day of the workshop during Dan’s presentation.

14. **Avoiding “reinventing the wheel”**. Participants were encouraged to seek out information on what works and what doesn’t work from numerous sources including, documented progress from other initiatives, other departments and other organizations, grey literature and scientific literature. This aroused a heated debate on the second day. Further details to follow.

15. **On average, participants valued pragmatic and experiential knowledge more than scientific knowledge.** Many participants expressed feeling overwhelmed by scientific literature as there is often little time to review it. One participant mentioned that evidence-based innovations do not exist, as science is constantly changing and therefore no longer innovative. During a group discussion, one participant was heard saying “I don’t care about research”.

16. **SPARK emphasized learning and understanding mental health concepts through different forms of such as art and poetry.** Photo-voice is a tool which allows people with lived experiences to share their experiences through pictures without the need to verbally articulate their emotions and cognitions.
17. **The workshop directed participants with numerous KT tools.** These included numerous social media platforms, photo-voice, and Portico.

18. **SPARK did not effectively train participants to use and apply the I2I KT model.** The program did not clearly, systematically explore the KT concepts and goals of each stage of the model. Rather, general KT concepts were explored in a disorganized, superficial manner throughout the two days of the workshop. Although participants seemed to have gained a lot from making connections, learning about new KT channels/tools, they struggled to apply their skills to the I2I when they were asked to do so. This was likely highly attributed to the fact that on the second day of the workshop, I2I stages 3-7 were covered in 1.5 hrs. During this time participants were not given the opportunity discuss the concepts contained in each stage or the time to practice applying these concepts. When participants were asked to complete their KT plans (given 20 minutes), many expressed feeling confused and overwhelmed. One participant expressed not feeling ready and sufficiently trained complete the task. One participant said “I’m blurred, lots coming at me”.