

# Role Domains of Knowledge Brokering: A Model for the Health Care Setting

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Knowledge brokering is a strategy to support collaborations and partnerships within and across clinical, research, and policy worlds to improve the generation and use of research knowledge. Knowledge brokers function in multiple roles to facilitate the use of evidence by leveraging the power of these partnerships. The application of theory can provide clarity in understanding the processes, influences, expected mechanisms of action, and desired outcomes of knowledge brokering. Viewing knowledge brokering from the perspective of its role domains can provide a means of organizing these elements to advance our understanding of knowledge brokering. The objectives of this special interest article are (1) to describe the context for knowledge brokering in health care, (2) to provide an overview of knowledge translation theories applied to knowledge brokering, and (3) to propose a model outlining the role domains assumed in knowledge brokering. The Role Model for Knowledge Brokering is composed of 5 role domains, including information manager, linking agent, capacity builder, facilitator, and evaluator. We provide examples from the literature and our real-world experience to demonstrate the application of the model. This model can be used to inform the practice of knowledge brokering as well as professional development and evaluation strategies. In addition, it may be used to inform theory-driven research examining the effectiveness of knowledge brokering on knowledge generation and translation outcomes in the health care field, as well as on patient health outcomes.

**Video Abstract** is available for more insights from the authors (see Supplemental Digital Content 1, <http://links.lww.com/JNPT/A126>).

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## INTRODUCTION

Knowledge brokering in health care has gained momentum over the last 15 years as a means of facilitating evidence-informed practice (EIP) and knowledge translation (KT).<sup>1-4</sup> Knowledge brokers (KBs) have been described as the human force that makes knowledge transfer (the movement of knowledge from one place or group of people to another).<sup>4</sup> In the health care context, knowledge brokering can be carried out formally and informally by a variety of people including researchers and clinicians,<sup>3,5</sup> with a goal of facilitating knowledge sharing within, between, or across groups and organizations, and with a variety of stakeholders.<sup>2,5-10</sup> Knowledge brokers bridge different disciplines and sectors by developing a common language, by fostering interactions between individuals that generate a shared understanding of their issues and objectives, and by reshaping knowledge to improve its meaningfulness and applicability across contexts.<sup>1</sup> From this perspective, KBs move among groups fostering collaborative processes, with the aim of generating new “brokered” knowledge that is more robust and readily applicable within its intended local context.<sup>1</sup>

Although knowledge brokering is recognized increasingly as an important KT strategy, no consensus exists on the roles of KBs, with varying descriptions provided on the core functions and competencies.<sup>2,5,6,10-18</sup> Because of the complexities of the health care system, the nature of the information, the purpose in translating it and the interrelationships, perspectives, and needs of different stakeholders, a combination of activities across different role domains is often required.<sup>19,20</sup> This lack of clarity limits the ability of organizations to define, create, and evaluate KB roles to achieve their objectives and to advance knowledge brokering practice. Recruitment, accountability, recognition, training, and professional development are each compromised without the clear delineation of the role and its expectations.<sup>17</sup> Insight into theories and roles related to knowledge brokering may provide a starting point from which to guide its practice.

The purpose of this special interest article is to propose a new model of the knowledge brokering role in health care by outlining the role domains of KBs drawn from the literature. The article begins with a discussion about how KT theory

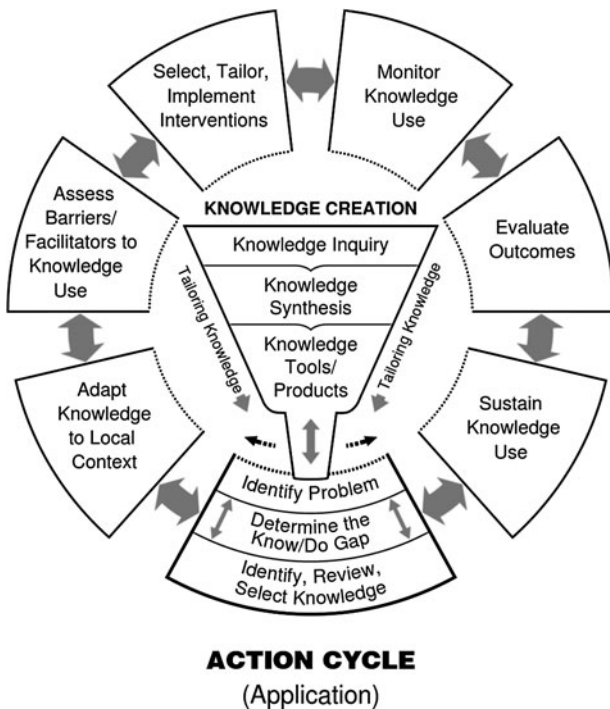
can provide insight into knowledge brokering, followed by an introduction to the model. Examples from the real-world experiences of 2 KBs (the authors) are then used to demonstrate its application.

**THEORETICAL BASIS FOR KNOWLEDGE BROKERING**

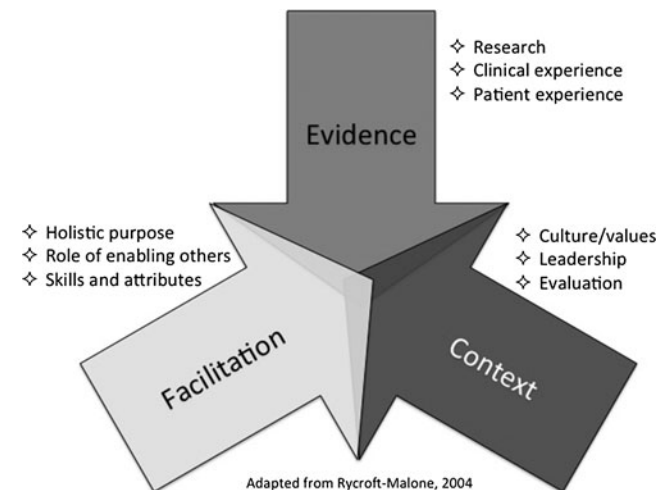
Several KT frameworks and theories can be used to understand the knowledge brokering process and the determinants of its success. The first framework, the Knowledge To Action (KTA) process,<sup>21,22</sup> (Figure 1) is arguably the most commonly applied KT process framework in the literature. It describes a dynamic multidirectional process in which knowledge is created and refined to improve its applicability for health professionals, policy makers, and other knowledge users.<sup>22</sup> The KTA process guides researchers to identify knowledge and practice gaps, develop strategies to address them, evaluate their impact, and promote sustainability. At the center of the framework is the “knowledge funnel” in which knowledge creation activities generate products that can be used in health care. The knowledge becomes more refined and applicable for end users as it moves through the funnel. This funnel can spin to direct its knowledge product(s) through the external “action cycle” series of steps on

its route to implementation. Activities within this cycle involve problem identification, barrier assessment, intervention selection and implementation, and outcome and sustainability monitoring. In this framework, KBs may act as information managers in the creation and sharing of knowledge, by drawing evidence from primary research and the local context, and by engaging with knowledge users to generate a shared understanding of that knowledge (ie, knowledge cocreation) to promote its use. Knowledge brokers may also act as facilitators and capacity builders in their support of evidence implementation, by specifically identifying and targeting barriers to knowledge use, while fostering communication and collaborations between researchers and knowledge users throughout the KTA process.<sup>23</sup> Finally, as evaluators, KBs can participate in the monitoring of clinical and service delivery outcomes over time.<sup>24,25</sup>

A second framework adopted in relation to KBs<sup>2,6,14</sup> is the Promoting Action on Research Implementation in Health Services (PARIHS) framework (Figure 2), which describes the determinants or influences of KT. Its authors purport that for successful research implementation to occur, facilitation strategies must be selected on the basis of the nature of the evidence and the characteristics of the context.<sup>26</sup> This framework is a logical fit for knowledge brokering as it relies on a human-driven *facilitation* process. Social interactions aimed at facilitating research use are tailored to meet the needs of end users on the basis of an evaluation of the evidence, and of the context in which the evidence is to be implemented.<sup>27</sup> Capacity building for individuals, teams, organizations or larger systems, or facilitation of the processes required for knowledge uptake or for sustaining partnerships are 2 examples of knowledge brokering activities described in the context of this framework, aimed at increasing the likelihood of knowledge use over time.<sup>27</sup> Recent work explored the process of facilitating knowledge cocreation (a knowledge brokering function also represented in the KTA process) by researchers and decision makers within this framework in the context of policy development.<sup>14</sup> Although the primary objective of the work



**Figure 1.** The knowledge to action process.<sup>21</sup> (Reproduced with permission by copyright holder: John Wiley and Sons, Inc. All rights reserved. No part of this material may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, except as permitted by the UK Copyright, Designs and Patents Act 1988, without the prior permission of the publisher.)



**Figure 2.** The PARIHS framework.<sup>26</sup>

was to describe the qualities required of KBs, the authors also alluded to many of the social processes involved in KB-driven facilitation with stakeholders across contexts. Understanding the mechanisms by which facilitation is effective can inform knowledge brokering practice modeled after this framework.

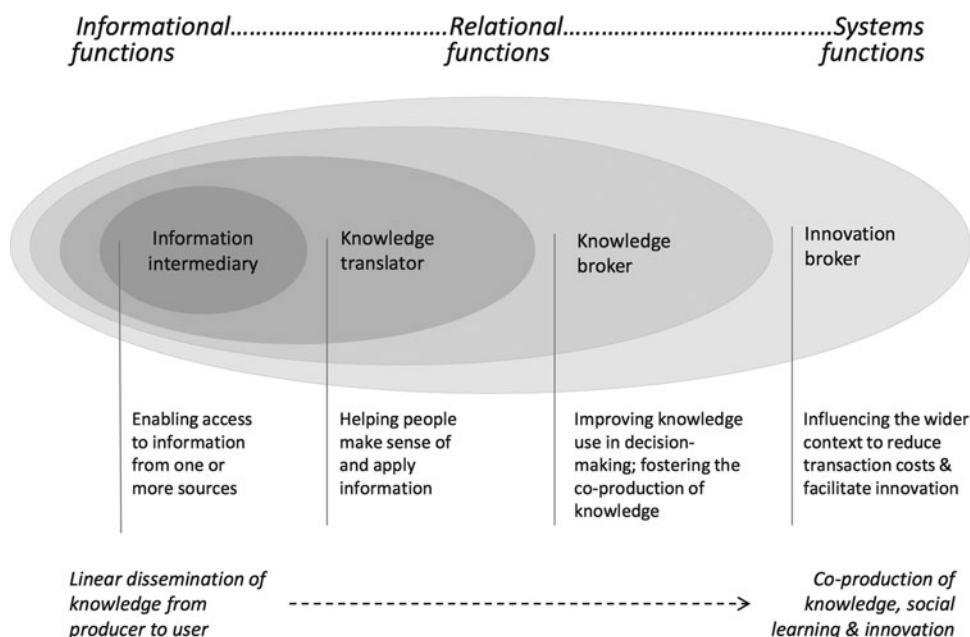
The role that stakeholder relationships play in supporting KT is addressed in a discussion of the social processes inherent in health care knowledge brokering<sup>10</sup> by authors applying Fernandez and Gould’s model.<sup>28</sup> This third model highlights the different power differentials that exist when brokering processes are carried out by individuals internal versus external to the group in which they mobilize knowledge. Power differentials are thought to negatively affect the process of knowledge brokering in situations in which KBs do not belong to the group (ie, liaison or consultant roles), although group perceptions of the KB being an “objective outsider” may be of benefit in mediating this effect.<sup>8</sup> Conversely, peer influence can facilitate the coordination of KT activities by KBs internal to the group with which they work, promote the informal filtering of knowledge for the group, and situate the KB to act as the group’s representative with external stakeholders.<sup>10</sup>

A fourth theoretical perspective, diffusion of innovation theory,<sup>29</sup> has been reported to have potential utility in the context of knowledge brokering,<sup>30</sup> although this application has also been challenged.<sup>31</sup> This theory purports that the spread of new ideas or approaches is largely driven by observation of their adoption by others.<sup>29</sup> Knowledge translation is seen as a complex social activity that spans dynamic communities in which knowledge or innovation is created, shared, and integrated.<sup>30</sup> Knowledge brokers act as a social intervention to spread innovation<sup>32</sup> by conducting need assessments, synthesizing knowledge, framing and answering questions, linking with appropriate experts to support their work, and fostering skill development in knowledge users.<sup>30</sup>

A final KT framework that aptly applies to knowledge brokering is the K\* Spectrum<sup>33</sup> (Figure 3). This framework describes a continuum of functions and processes for KT, from 1-way dissemination of information to users, to the cocreation of new knowledge through social interaction and learning, which leads to innovation.<sup>33</sup> Similar to the PARIHS framework, the K\* Spectrum highlights the importance of mediating the environment or context to optimize knowledge use. The KB role is suggested to be primarily a relational one—of facilitating relationships between people, although one could argue that a KB may also simultaneously fulfill any or all of the functions described in the framework. For example, the KB may act as “information intermediary” in their information manager role, as “knowledge translator” in their collaborative work to enhance the meaning of knowledge for end users such that it can be applied, and as “innovation broker” to facilitate the implementation of knowledge by addressing system-level barriers. This framework offers the potential for a comprehensive model for knowledge brokering, while also addressing social processes and the importance of context. Interestingly however, it isolates “nonrelational functions,” such as information management, from the KB role. Although not specifically discussed with respect to KBs, the success of knowledge brokering relies on the evaluator role being as ubiquitous as that of linking agent to ensure that each described knowledge brokering function is being optimized at the individual, organizational, and system level.

### A PROPOSED MODEL OF THE ROLE DOMAINS OF KNOWLEDGE BROKERING

An understanding of how theory has been applied to knowledge brokering provides the basis for selecting an appropriate framework or model whose underlying paradigm matches the objectives of knowledge brokering in a given



**Figure 3.** The K\* Spectrum.<sup>33</sup> (Reproduced with permission by copyright holder: UNU-INWEH.)

context. A model provides a way of thinking about something complex—it delivers a simplified description of a phenomenon that is designed to support our understanding of it.<sup>34</sup> Various approaches to the development of models of KT have been identified and categorized.<sup>34</sup> These approaches include describing KT processes (process models), explaining influences on KT outcomes (determinant models), applying classic theories from other fields, developing KT-specific theories, and defining aspects of KT that should be evaluated (evaluation

models).<sup>34</sup> Some of these approaches are represented in the KT models, theories, and frameworks that have been applied to knowledge brokering (Table 1). However, none of the KT models or frameworks, or the theory reviewed earlier in this article, addresses all of the knowledge brokering roles described in the literature. Thinking about knowledge brokering in terms of its overlapping role domains offers a means of categorizing the activities,<sup>20</sup> processes, influences, expected mechanisms of action, and desired outcomes of knowledge brokering to

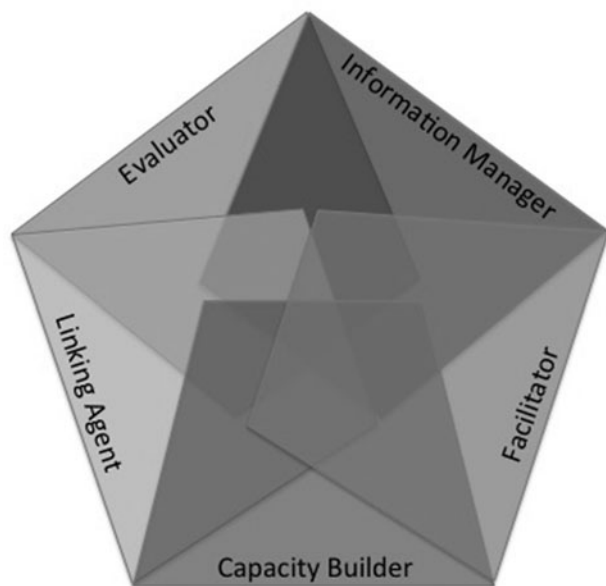
**Table 1. Representation of the 5 Role Domains in Existing Models, Frameworks, and Theory Applied to Knowledge Brokering**

	<b>KTA Process</b>	<b>PARiHS Framework</b>	<b>Fernandez and Gould Model</b>	<b>Diffusion of Innovation Theory</b>	<b>K* Spectrum</b>
Type of KT model	Process model	Determinants model	Determinants model	Classic theory from another field	Process and determinants model
Representation of the proposed role domains					
Information manager	Role carried out during “knowledge synthesis,” “knowledge tools/product creation,” and “adapt knowledge to local context” steps	Not addressed explicitly	Role carried out by “gatekeeper” KBs; information and resource exchange is enabled through links created by KBs	Role carried out by knowledge users themselves, as autonomous decision makers	Role carried out by “information intermediary” to enable access to information; and by “knowledge intermediary/translator” to assist in making sense of and applying knowledge
Linking agent	Not addressed explicitly	Not addressed explicitly	Role carried out in bridging otherwise unconnected organizations	Role carried out by existing social structures (eg, connections to trusted early adopters with greater peer influence), which allow for the diffusion of innovations	Role carried out by “knowledge broker” to improve relationships between stakeholders, to enable communication and to foster knowledge co-creation
Capacity builder	Not addressed explicitly	Not addressed explicitly	Not addressed explicitly	Not addressed explicitly	Not addressed explicitly
Facilitator	Not addressed explicitly	Role carried out by external and internal facilitators to mediate change	Role carried out by “itinerant” KB (external, working with 2 internal groups) and by “coordinator” KB (internal to groups) through mediation activities	Not explicitly addressed	Role carried out by “innovation broker” to enable contextual (environmental) change and to manages processes and relationships; and by “knowledge broker” to facilitate knowledge use in decision making
Evaluator	Role carried out during the steps: “identify the problem,” “identify the know/do gap,” “assess barriers/facilitators to knowledge use,” “monitor knowledge use,” and “evaluate outcomes”	Role carried out in evaluating the evidence and the context, to inform facilitation activities	Not addressed explicitly	Not addressed explicitly	Not addressed explicitly

Abbreviations: KB, knowledge broker; KT, knowledge translation; KTA, knowledge to action; PARiHS, Promoting Action on Research Implementation in Health Services.

advance our understanding of it. This perspective informed the identification of role domains that form the foundation of this proposed model of the knowledge brokering role, The Role Model for Knowledge Brokering, illustrated in Figure 4; examples of the general functions or processes associated with each domain are summarized in Table 2.

The model is not intended to be an all-encompassing model of knowledge brokering; rather, it focuses on delineating the range of overlapping roles involved in knowledge brokering. As such, by intent it does not comprehensively define the processes and activities involved in every knowledge brokering context (an effort addressed elsewhere<sup>20</sup>), nor does it offer conjecture about the influences, determinants, or mechanisms leading to successful knowledge brokering outcomes. This simple model has the advantage of enabling the categorization of knowledge brokering functions, processes, and outcomes by role domain, without dictating a temporal sequence of processes, nor requiring that all processes or role domains be present or equally relevant within a given context. Another advantage is that a number of theoretical perspectives can be applied to knowledge brokering using this model, after identifying the intended outcome(s) associated with the different role domains. In this way, the mechanisms of action within these different domains can be examined easily and accurately. KT frameworks that present a determinant approach can also be applied in the context of the model to facilitate exploration of the barriers, facilitators, and influences on knowledge brokering processes and outcomes that emerge within a given role domain. As such, the model provides a basis for describing the functions of knowledge brokering, a foundation by which to inform the practice and evaluation of knowledge brokering, and a framework for exploring the mechanisms by which knowledge brokering may be effective.



**Figure 4.** Role domains of the Role Model for Knowledge Brokering in health care.

**Table 2. Knowledge Brokering Role Domains Represented in the Proposed Model**

Role Domain	Examples of Functions
Information manager	<ul style="list-style-type: none"> <li>● Seek, promote access to, appraise, organize, and share relevant health research and context-specific knowledge (eg, culture, processes, and barriers)</li> </ul>
Linking agent	<ul style="list-style-type: none"> <li>● Connect and foster trust and relationships between people with overlapping interests (eg, researchers and decision makers)</li> <li>● Coordinate interactions between stakeholders to cultivate “shared agendas” and information sharing</li> <li>● Foster engagement in the research process</li> <li>● Connect with a network of knowledge brokers</li> </ul>
Capacity builder	<ul style="list-style-type: none"> <li>● Build the knowledge and skills required to access, appraise, and apply evidence</li> <li>● Address barriers to change (eg, individual and organizational)</li> <li>● Enable communication across sectors through the development of a common language</li> <li>● Increase capacity for research by leveraging network connections</li> </ul>
Facilitator	<ul style="list-style-type: none"> <li>● Guide or support evidence-informed practice processes to assist knowledge users to integrate research, contextual and experiential knowledge into clinical decision making or research processes</li> <li>● Improve attitudes toward research use</li> <li>● Enhance the clinical applicability of research</li> </ul>
Evaluator	<ul style="list-style-type: none"> <li>● Assess the local context to inform knowledge brokering activities</li> <li>● Integrate KT frameworks and evidence into evaluation processes</li> <li>● Evaluate linkage and exchange networks</li> <li>● Evaluate knowledge brokering activities and outcomes</li> </ul>

Abbreviation: KT, knowledge translation.

### Knowledge Brokering Role Domains

The health care knowledge brokering literature emerged in the late 1990s and described 3 distinct role domains for the KB, including (1) information manager, (2) linking agent, and (3) capacity builder.<sup>35,36</sup> These domains have subsequently been validated in a recent systematic review examining KB activities in health care.<sup>20</sup> Information management is represented across the KT frameworks, being central to the KTA framework and K\* Spectrum. As information managers, KBs seek and share relevant health research, as well as context-specific knowledge (eg, about the local culture, EIP processes, and barriers to change).<sup>16,18,30</sup> Knowledge brokers possess an understanding of less formal contextual evidence across settings that can be important to exchange with stakeholders to inform decision-making processes.<sup>24</sup> Knowledge brokers also work with credible messengers to deliver key information to specific audiences in ways that will best promote its uptake.<sup>37</sup> Furthermore, KBs have the capacity to improve access to evidence in the clinical setting through academic affiliations and collaborations that permit access to databases otherwise unavailable to clinicians.<sup>7</sup> The establishment of evidence surveillance strategies helps them to identify, organize, and retrieve evidence from the best sources in their fields,<sup>1,7,11</sup> and critically appraise and synthesize evidence in a way that can

be understood and used by the target audience, be it clinicians, patients, or researchers from different disciplines.<sup>1,4,7,9,13,18</sup>

All but the KTA framework explicitly emphasize the significant influence of social connections on KT. As linking agents, KBs connect and foster trust and relationships among people with shared interests, and facilitate “shared agendas.”<sup>2,4,14,38</sup> Linking researchers and clinicians, decision makers, and/or other key stakeholders can expedite the process of KT by creating opportunities for knowledge exchange.<sup>39</sup> These interactions and relationships can enhance the design of clinically relevant research and support the integration of findings into practice,<sup>30,35,39</sup> through user involvement in the research process<sup>23,39</sup> and through discussion and collaboration.<sup>16,30</sup> Knowledge brokers facilitate the creation of networks of individuals or groups with overlapping interests and promote understanding about other members’ local contexts,<sup>7,9</sup> perspectives, and objectives.<sup>3</sup> Interconnections among KBs may also enhance problem solving and networking.<sup>11,16</sup> The focus is on establishing and strengthening relationships, as well as creating and coordinating the interactions between players<sup>23</sup> that will advance the quality, effectiveness, and efficiencies of the processes and intended outcomes of the KB’s activities, while considering the power dynamics inherent in social structures.<sup>10</sup>

Although none of the KT frameworks speak explicitly to the role of capacity builder, each has been applied in the context of knowledge brokering to describe the value in empowering stakeholders through capacity development. As capacity builders, KBs foster the development of positive attitudes toward evidence, as well as EIP knowledge and skills.<sup>6,8,22</sup> Competency development involves establishing a common language among stakeholders,<sup>1,9</sup> as well as providing education and mentoring in the clinical setting on both research skills and how to apply research.<sup>1,8,23,31,40</sup> Knowledge brokers can enhance organizational capacity for research use by targeting individual or organization barriers to change,<sup>2,8,11</sup> including promoting positive attitudes toward evidence and developing structures and supports for individuals within those organizations.<sup>8,11</sup> The connections of the KB can also enhance capacity for research by expanding participant recruitment potential and enhancing funding competitiveness<sup>23</sup> by bringing together a strong team with a common vision.

Subsequent literature introduced the KB as a facilitator of EIP, drawing primarily on the PARiHS framework for theoretical support.<sup>6,24,39</sup> For example, facilitation is prevalent in the description of knowledge brokering activities identified by Bornbaum and colleagues.<sup>20</sup> Because human interaction plays a key role in moving research into practice,<sup>36</sup> KBs guide and support knowledge users to find ways to integrate knowledge about research, as well as context and experience into decision making about practice or research processes.<sup>5,6,9,23</sup> Collaborating to address identified knowledge or skill gaps,<sup>25</sup> promoting interprofessional knowledge exchange,<sup>10</sup> and fostering a cultural shift within an organization to enhance the valuing of EIP by its members<sup>9</sup> are facilitation roles in which KBs engage to optimize the clinical applicability of the evidence<sup>31,39</sup> and support its integration. The development and dissemination of tools to enhance adoption is a KT strategy that can facilitate engagement in EIP, enhance efficiency, and pro-

vide guidance for evidence-informed decision making.<sup>1,41,42</sup> Knowledge brokers are also able to highlight the scientific and tacit knowledge from the worlds of the researchers and their stakeholders to inform the design of robust, clinically relevant research in addition to engaging stakeholders, and fostering problem solving throughout the research process.<sup>4,25</sup>

A fifth and emerging role of KBs is that of an evaluator.<sup>24</sup> This role encompasses evaluation of the context, of the processes and outcomes of KT at the research and clinical levels, and of the KB’s own knowledge brokering performance. This domain applies to and is critical for the success of brokering activities carried out within the 4 previous domains. Its identification as a distinct domain in the model mirrors the emphasis on evaluation across the KT frameworks, and highlights its importance throughout the brokering process. It also highlights the importance of increasing opportunities for KBs to engage in evaluation. From conducting a needs assessment and measuring KT impact to reflective self-evaluation, the evaluator domain of knowledge brokering is pervasive and continuous.

Evaluating the context is fundamental to identifying the barriers and facilitators of evidence use at the individual, team, and organizational level, and in selecting the most promising strategies to support the creation of shared knowledge and its subsequent application.<sup>6-8,10,11,16,24,30,32,36,43</sup> This process also involves collaborating with end users to identify or refine their most important issues and questions, and evaluating current knowledge and linkage and exchange networks to determine the need to strengthen these in support of KT.<sup>13,30</sup>

In the research sector, evaluation focuses on outcomes and outputs of the research process, whereas in health care, outcomes are typically evaluated for the purpose of informing decision makers at a program level. Knowledge brokers are well positioned to contribute to research and program evaluation design and implementation because of their understanding of the questions of interest, potential barriers, and goals of multiple sectors involved in the KT process. Involvement in program evaluation allows KBs to gain insights into the clinical processes (eg, assessment and treatment patterns) and outcomes (eg, functional improvement, patient satisfaction, and length of stay) they seek to influence.<sup>43</sup> Knowledge brokers can also integrate KT frameworks and evidence from KT (or implementation) science into program evaluation processes, and be positioned to share knowledge about evaluation results to influence behavior change within that setting.<sup>24</sup>

Evaluating one’s own knowledge brokering activities is another critical responsibility.<sup>6</sup> This task helps to determine effectiveness and accountability, to improve efficiency and treatment fidelity, and to ensure sustainability.<sup>13</sup> Logbooks or diaries are a common method of data collection.<sup>7,13,16</sup> Self-reflection within a community of practice also represents a valuable aspect of the evaluator domain, because of its capacity to enhance both professional development and effectiveness of knowledge brokering activities.

## APPLYING THE MODEL

The Role Model for Knowledge Brokering can be applied in a variety of health care contexts. We provide several examples on the basis of the real-world experiences of the

authors, drawn from 2 distinct knowledge brokering environments. The British Columbia (BC) Physical Therapy KB position is structured to bridge research, clinical and policy realms with equal funding and direction from a university department, the research institutes of 2 local health authorities and the discipline's professional association. This KB is considered external to the groups with whom she liaises, in that her work spans across the multiple clinical and research sites within her portfolio. However, her background as a clinical physical therapist reflects a peer association with clinicians, as well as offers knowledge of the professional context in which she brokers knowledge. Contextual knowledge of the individual health care settings in which she works is acquired through previous clinical experience, experiential learning, and exploratory discussions with key stakeholders in all settings (clinical, research, and education). In contrast, the Sunny Hill Health Centre for Children (SHHC) KB initiative, supported by the onsite Child Development and Rehabilitation Evidence Centre, engages clinicians as KBs within a pediatric health center to support EIP within their interprofessional teams or discipline groups. These KBs were selected from within each group through a process of self-identification and subsequent leader endorsement, with the intention of identifying individuals perceived by their peers as role models and experts in evidence-informed health care.<sup>6</sup> As internal KBs, they have an intimate understanding of the local context, which assists them in tailoring activities to meet the needs and idiosyncratic culture of the group. The nature of their relationship as peers to their clinician colleagues, and the codevelopment of goals with these peers, helps to attenuate potential perceptions of power differentials. The extent of knowledge brokering involving external individuals or groups, however, ranges from minimal to moderate, depending on the goals and initiatives of the group.

### Information Manager

An example of the information manager role domain within the BC Physical Therapy knowledge broker position is the collaborative establishment of ongoing alerts for new literature within the 15 most popular areas of practice/topics identified by search requests submitted to the librarian by members of the Physiotherapy Association of BC. Annual review of search requests informs the update of search terms and the addition of new topics. The KB in this role also led a team of clinician and research experts in appraising, synthesizing, and interpreting the literature on the management of Achilles tendinopathy to develop a toolkit<sup>44</sup> for physical therapists to guide treatment selection and provision (details provided in Physical Therapy Knowledge Broker Report Year 5: September 2014 to October 2014<sup>45</sup>). This toolkit has been accessed over 35,000 times from approximately 50 countries. Moreover, the provision of journal club webinars, provided in conjunction with recognized research and clinical experts, has been attended and/or downloaded approximately 7500 times. The success of this toolkit spawned the construction of a similar toolkit for lateral epicondyle tendinopathy. Collectively these toolkits have been accessed nearly 70,000 times. An evaluation of the impact of the Achilles tendinopathy toolkit has recently been completed and submitted for publication. Sim-

ilarly, SHHC KBs generated context-specific subject guides for their sectors to increase use of preappraised, synthesized evidence and to improve the efficiency of finding the best evidence to answer a clinical query.<sup>6</sup>

### Linking Agent

At SHHC, the physiotherapy KB engaged physiotherapists to refine content for and to co-facilitate a case-based conference workshop<sup>46</sup> in collaboration with therapists from the community and the local children's hospital, on the topic of best practices in the management of cerebral palsy. This endeavor fostered awareness and learning of current evidence and strengthened knowledge exchange and relationships with community partners, while enhancing relevance of and receptiveness to content for workshop participants. In addition, as exemplified by the BC Physical Therapy KB position, the KB may catalyze the formation of research teams by providing a mechanism to enable collaboration. The creation of an online registry<sup>47</sup> has enabled the expedient creation of multiple teams of clinicians, researchers, and decision makers to identify each other when opportunities to collaborate in specific areas of shared interest and expertise were available.

### Capacity Builder

At SHHC, KBs build EIP capacity by directly supporting learning for members of their sectors at EIP workshops, by organizing educational opportunities to augment their team's EIP skills (eg, identifying sources of evidence, developing search strategies, and appraising the evidence), and by introducing or adapting resources to support evidence use, such as tools to aid in selecting appropriate sources of evidence, evidence classification frameworks, and practice change plan templates. The Physical Therapy KB in BC built capacity for EIP from 2009 to 2011 in the management of wounds.<sup>48</sup> A baseline online survey<sup>49</sup> completed by 243 physical therapists in BC revealed that the relative frequency of use of electrophysical agents was in reverse to that of the evidence of effectiveness (ie, electrical stimulation followed by ultrasound and LASER). In response to the findings detailing specific challenges faced in this area of practice, a toolkit of online resources was developed, which included (1) instructional videos on the theory and practice of electrical stimulation; (2) clinical decision-making aids, such as checklists, and information for ordering equipment; and (3) an ongoing virtual community of practice to enable sharing between novice and expert physical therapists, and mentoring support of best practices through email discussions and annual workshops.

### Facilitator

At SHHC, KBs support small working groups to answer clinical queries, assist clinicians to appraise pertinent evidence during journal clubs, facilitate consensus-building processes to engage clinicians in making meaning of new evidence and in problem solving around its application, and facilitate behavior change through the collaborative creation of formal practice change plans. These KBs draw on evidence synthesis about treatment effectiveness, frameworks to guide clinical decision making and other resources, including an online EIP toolkit,<sup>41</sup> to support and streamline the varied steps involved

in identifying evidence, assessing its value, and implementing it where appropriate. Resources that aid clinicians in accessing, appraising, synthesizing, and applying evidence are also brokered to clinicians and leaders by KBs for the Evidence Centre, whose role is to facilitate EIP across the organization; similar web-based modules and accompanying webinars have been developed and shared by the BC Physical Therapy KB, in addition to facilitation during journal club sessions to support the implementation of best evidence.

## Evaluator

Knowledge brokers at SHHC conducted a formal needs assessment of their sectors in partnership with leadership to establish goals and to identify barriers and facilitators to inform their action plan. Moreover, ongoing informal needs assessments identify EIP knowledge and skill gaps of clinicians; this information is used to develop learning activities to enhance skills, to create new tools to guide processes, and to structure resources to enhance access to emerging evidence. Discipline- and interprofessional team-based KBs also have the opportunity to learn from one another at quarterly meetings by describing and reflecting on their activities and contexts, collaboratively problem solving to overcome challenges, and participating in ongoing professional development that targets their self-identified learning needs. Reflection about their sectors, activities, and roles within a greater community has led to important insights and strategies that have been adapted across sectors with success. For example, evaluating the factors contributing to decreasing motivation of sector members to participate in large group facilitation allowed one KB to re-engage them through small group activities, focusing on highly clinically relevant practice areas. The BC Physical Therapy KB reports regularly on evaluation processes and outcomes (<http://physicaltherapy.med.ubc.ca/knowledge-broker-position-reports-and-presentations>), including needs assessment results, progress on goals and deliverables, and survey results on the impact of the KB position and its most valuable activities and functions, from the perspective of clinicians, researchers, and decision makers. This information is used to identify priorities for upcoming work in the role.

## CONCLUSIONS

This article proposes a model of knowledge brokering roles in health care that offers a common language that can be applied when discussing the determinants and processes associated with knowledge brokering, and when evaluating the mechanisms of action and outcomes of them. We anticipate that this model will spark future research into the function and value of knowledge brokering interventions in the health sector. Furthermore, this model offers a starting point from which to develop training and support for individuals who assume the role of KB in different health care settings. As knowledge brokering becomes increasingly visible and its functions better understood, the expectation for health professionals and researchers to embody the role in their daily work demands that training and support be available to optimize knowledge brokering capacity. Through an understanding of knowledge brokering activities in these different role domains, and the

competencies required to execute them, these training opportunities can be developed to support a growing sector of KT professionals in health care.

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