The Role of the Nurse Scientist as a Knowledge Broker

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Abstract

Purpose: This article introduces the importance and nature of the role of the nurse scientist as a knowledge broker.

Design: A systematic literature review was completed using a modified version of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) appraisal tool[JC1] to trace the emergence and characteristics of the knowledge broker role across disciplines internationally and in the United States.

Methods: Salient publications were identified using PubMed, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Sociological Abstracts, and ProQuest Dissertations & Theses, as well as hand searches and searches of the grey literature. Authors used these resources to define the knowledge broker role and with their role-related experiences developed the Thompson Knowledge Brokering Model.

Findings: A knowledge broker is one who connects science and society by building networks and facilitating opportunities among knowledge producers and knowledge users. The knowledge broker role includes three components: forming and sustaining partnerships; facilitating knowledge application; and creating new knowledge. There are five major strategies central to each role component: establish, engage, educate, empower, and evaluate.

Conclusions: The knowledge broker role has been increasingly recognized worldwide as key to translating science into practice and policy. The nurse scientist is ideally suited for this role and should be promoted worldwide. The Thompson Knowledge Brokering Model can be used as a guide for nurse scientists.

Keywords

Knowledge broker; knowledge brokering; nurse scientist; research translation

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"The perspective of the nurse scientist is vital to identifying the most effective strategies to accelerate translational research" (Grady, 2010, p. 164). Knowledge brokering allows the nurse scientist to capitalize on opportunities to lead collaborative research teams and advance a culture of health, key recommendations in the Future of Nursing (Institute of Medicine, 2010). The importance and nature of the role of the nurse scientist as a knowledge broker is introduced in this article. The role of the knowledge broker is described as it emerged over time and across disciplines internationally and its relatively recent expansion within the United States. A critique of existing practice models and implementation strategies, strengths, and challenges are based on a systematic review of the research and grey literature, with insights built upon prior work (Pennell et al., 2013) and continued experience in population-based environmental health research conducted in collaboration with indigenous peoples. Three components to the knowledge broker role and five strategies that the nurse scientist can employ when translating research and engaging stakeholders—scientists (i.e., knowledge producers) and nonscientists (i.e., knowledge users)—are introduced. This work expands on the involvement and long-standing interest of nurse scientists in translational research (Polit & Beck, 2016).

Scientific research should not sit on academic bookshelves or be quarantined in laboratories. Yet, it takes an average of 17 years for research to be integrated into practice and policy (Morris, Wooding, & Grant, 2011). Regardless of discipline, scientists are expected to disseminate, translate, and integrate their research into broader contextual and interdisciplinary perspectives to inform practice, policy, and decision making, all the while ensuring the information is understandable and that individuals understand the research (American Association of Colleges of Nursing Task Force, 1999).

For scientific knowledge to be usable and useful, it must have adequacy, value, legitimacy, and effectiveness on a realistic timescale (Clark & Majone, 1985). This requires scientific knowledge to be synthesized, exchanged, and applied within specific social, institutional, and human constructs (Greenhalgh & Wieringa, 2011). Knowledge users need scientific research to resolve issues of their concern. Knowledge users include intra- and interdisciplinary professionals, regulators, and legislators, as well as leaders and members of various organizations and communities. For knowledge users, the amount and scope of scientific information can be seemingly overwhelming and often incomprehensible—what does it mean? As a result, many meaningful conversations and decisions about health care and policy are neither science nor evidence based. This leads to less than informed decisions and many unintended consequences that impact health adversely (Culley & Highey, 2008).

The biggest challenges for knowledge producers and knowledge users are issues that are complex, particularly where there is scientific or regulatory uncertainty; where contextual and scientific knowledge conflict; and multiple stakeholders (i.e., scientists and nonscientists) are involved (Braun & Kropp, 2010). These conditions require a "team science" approach that creates convergence across disciplines and communities (Sharp et al., 2011). This interdisciplinarity creates challenges in and of itself. While different disciplines may use the same terms, their definitions are often different, as are the methods by which each discipline measures these concepts. Additionally, each discipline may examine disparate outcomes (Thompson & Schwartz Barcott, 2017). The knowledge broker role was

designed to meet these challenges. Not only are nurse scientists adept at conducting basic and applied research, but they are knowledgeable in promoting efficient and effective translation and utilization of research so that it is meaningful and useful in various contexts to all stakeholders. Thus, nurse scientists are ideally suited for the knowledge broker role.

Design

A modified version of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) appraisal tool (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009) was employed to conduct a systematic review of the literature aimed at tracing the emergence and characteristics of the knowledge broker role across disciplines internationally and in the United States. This approach included the identification and critical evaluation of existing knowledge-brokering models that led to the clarification and refinement of an innovative model.

Method

Salient publications were identified using PubMed (1980–2017) with the key words "knowledge broker" OR "knowledge brokering" in any field with filters (abstract available and English), resulting in 92 citations for review. A search of the Cumulative Index to Nursing and Allied Health Literature (CINAHL; 1994–2017), Sociological Abstracts (1989–2017), and ProQuest Dissertations & Theses (1979–2017) using the same key words and filters resulted in 30 and 105 abstracts and 19 doctoral dissertations, respectively. Duplicate citations were eliminated across databases. After reading each abstract to determine if a knowledge broker or knowledge brokering was used in the context of role development germane to health, health care, or policy, a total of 83 articles and 12 dissertations were categorized by discipline and area of specialty, then reviewed in detail by each author independently. Subsequently, the authors met for in-depth discussions of the analyses until agreement was reached on the level of intersubjectivity of existing implicit and explicit definitions, and role descriptions, models, and points needing further clarification or inclusion in a refined definition or description or model (Table S1). Additionally, hand searches were conducted to document the evolution of the knowledge broker role and knowledge-brokering strategies. A broader search of grey literature followed using the additional related terms implementation science, program evaluation, capacity building, evidence-informed decision making, and team science. Authors used these resources and their role-related experiences to develop a comprehensive definition of the knowledge broker, including role components, and knowledge-brokering strategies for the nurse scientist specifically.

Findings

Knowledge brokering is a worldwide phenomenon. The World Health Organization (2004) recognized the need for knowledge-brokering systems to strengthen the relationship between policy-relevant research and evidence-based policy. There is a knowledge brokers' forum (http://www.knowledgebrokersforum.org) with 964 members worldwide. Publications reviewed for this article represented authors from six continents and 28 countries. Of note,

35% of the articles reviewed were from Canadian authors. Since 1996, the practice of knowledge brokering has been a conscious and concerted effort within Canada's health system (Canadian Health Systems Research Foundation, 2003). By comparison, the role of the knowledge broker has been slower to emerge in the United States, even though government agencies have been promoting and funding efforts to translate scientific research into practice and policy (Westfall, Mold, & Fagnan, 2007).

Evolution of the Knowledge Broker Role

As early as the 1950s, anthropologists described a culture broker or cultural broker as an intermediary who promoted interactions of disparate subcultures (Lindquist, 2015). In the 1960s, library scientists referred to an information liaise, who provided customized services to scientific and technical researchers (Tennant et al., 2001). With the dawn of the Information Age (1970s), there was a corresponding rise of the information broker, who facilitated identification of information, data collection, and data sharing (Christozov & Toleva-Stoimenova, 2014). A boundary spanner was described first by social scientists in the late 1950s as one who crossed or spanned two social groups (March & Simon, 1958). More recently, a boundary spanner has evolved more broadly as a systems thinker with the ability to move across and through formal and informal organizational structures (Cooper & Fox, 2013). A policy broker linked knowledge production, policymaking, and economic development through enhancing the translation of research into use for the benefit of the poor (Kingiri & Hall, 2011). A social entrepreneur pursued opportunities to deliver innovative products or services in a socially responsible way in order to promote cohesion and inclusion, particularly of marginalized populations (Spruijt, n.d.). There are numerous job titles associated with knowledge brokering, with each job title inferring a particular approach to brokering knowledge. Kitson and Harvey (2016) advocated for nurse clinicians to be facilitators who enabled and encouraged individual clinicians to adopt new evidence-based practices using action learning techniques.

Burt (1992) was among the first to use the term knowledge brokering to describe what an entrepreneur does to network individuals with complementary resources or information. In this context, this individual built social capital from developing benefit-rich networks and a reliable flow of useful information, thus providing individuals or organizations with a competitive advantage in market transactions. The knowledge broker model introduced in this article was built upon Burt's work.

Though the role of the knowledge broker is not new, it is a relatively novel concept for nurse scientists engaged in translational research. In the two nursing articles found through this search, Jaja, Gibson, and Quarles (2013) and Yost et al. (2014) emphasized the importance of the nurse scholar as a knowledge broker when connecting diverse stakeholders in evidence-informed decision making, though there was neither in-depth discussion of the role nor introduction of a practice model. Additionally, there remained conceptual uncertainty around the concept of the knowledge broker, hence the need for an explicit definition.

Definition of a Knowledge Broker

Based on the above systematic review and analysis of the interdisciplinary literature, the following definition was developed: A knowledge broker is one who connects science and society by building networks and facilitating opportunities between and among knowledge producers and knowledge users to share knowledge, learn from it, apply it meaningfully in research, practice, education, and policy, and to create new knowledge together.

Evaluation of Existing Knowledge-Brokering Models

Existing models have been critiqued elsewhere (Davies, Powell, & Nutley, 2015; Davison, Ndumbe-Evoh & Clement, 2015). Four areas were not addressed or articulated sufficiently: stakeholder engagement, resources, and evaluation, and engaging nonscientists, specifically, nonprofessional knowledge users. Overwhelmingly, frameworks described the processes that occurred around knowledge creation, flow, and application. While these frameworks coalesced around one of three strategies (i.e., contexts in which knowledge was produced, used, and mediated; interactions among actors; and organizational infrastructure), the vital importance of sustaining relationships over time was addressed rarely. Most of these models did not begin with the requisite relationship building among the knowledge producers, knowledge users, and knowledge broker. There was discussion as to whether each of these roles was represented by different individuals. If so, this would require extensive collaboration, a potentially complicated and challenging process. Implicit in these descriptions was that the knowledge broker was not a knowledge generator. Additionally, most models were not explicit about the actions or resources required to succeed, especially around planning for change. Outcomes of knowledge utilization were not defined clearly or prospectively. Dagenais, Laurendeau, and Briand-Lamarche (2015) identified three outcome categories: direct use of research results; research results that changed opinion but not practice or policy; and research that was used to legitimize and sustain a priori actions or decisions. Alternatively, a logic model could be used to evaluate the effectiveness and efficacy of a project, whether a planned activity was implemented as it was intended, or to determine if a specific activity had the desired result. Depending on the activity and timeline, short- and long-term impacts could be assessed as well (National Institutes of Health/National Institute of Environmental Health Sciences, 2012). Strategies for knowledge brokering when the knowledge users are nonscientists (i.e., vulnerable and marginalized populations) were virtually absent from the literature. Those articles that focused on building and sustaining academic–community partnerships (including those studies involving citizen science) did not address specifically the role of a knowledge broker (e.g., Korfmacher, Pettibone, Gray, & Newman, 2016). The following knowledge broker model was developed to address these weaknesses specifically but not exclusively.

The Thompson Knowledge Brokering Model

In this model (Figure 1), there are three components to the knowledge broker role: (a) forming and sustaining mutually beneficial partnerships with and among scientists, practitioners, policymakers, or the public; (b) facilitating these stakeholders' application of knowledge, analyses, and evaluation of scientific and contextual knowledge; and (c) creating new knowledge of value and utility to all stakeholders.

There are five major strategies that are central to each role component: (a) establish, (b) engage, (c) educate, (d) empower, and (e) evaluate. These strategies represent a nonlinear and reiterative process that evolves over time. Implementing each of these strategies can be tailored specifically to knowledge producers or knowledge users, while others span across all stakeholders. These strategies are supported by community-based participatory research approaches and mixed (quantitative and qualitative) methodologies (D'Alonzo, 2010).

A knowledge broker must employ these innovative multitiered collaborative strategies to form complementary transdisciplinary research teams, establish long-term mutually beneficial synergistic partnerships, facilitate multidirectional knowledge exchanges, implement practice-based evidence, and build capacity among stakeholders. To illustrate this knowledge broker model with its role components and strategies in practice, an example is taken from the first author's (M.R.T.'s) experience as a knowledge broker in an ongoing academic–government–community partnership in which the she was co-leader for community engagement and the principal investigator (PI). This ongoing work illustrates the complexities of the knowledge broker role. Some strategies discussed have been employed, while others are in planning or process (Tables 1–3).

1. Establish.—The knowledge broker identifies potential stakeholders (i.e., knowledge producers and knowledge users). In the example, each of six community partners was closely affiliated with a specific Superfund National Priority List or Brownfield site situated on or adjacent to critical waterways. The knowledge broker identifies stakeholders' issues of concern, thereby fusing purpose and direction with meaning and utility (Armstrong et al., 2013). The knowledge broker supports the technical needs of those impacted by these contaminated sites by working with residents, tribal members, legislators, and regulators regarding the potential health impacts of complex exposures to contaminants. The knowledge broker assures that the academic center's research is used to inform real decisions and priorities, assess real problems, develop programs and policies, facilitate their implementation, and measure outcomes. Often, Native tribes rebuff offers of assistance from federal, state, and local government agencies and local universities. In the example, a co-PI with Native heritage and active involvement in local and regional Native-American events facilitated the introduction of the knowledge broker to the tribe that led to a partnership between the academic research center and the tribe. At this stage, the knowledge broker builds and subsequently sustains two separate networks of stakeholders—knowledge producers and knowledge users (Ahmed et al., 2016). A knowledge broker connects the academic center's research to real public health issues by integrating the scientific knowledge of the center's researchers with the contextual knowledge of community and tribal members. These efforts enhance the center's research agenda by providing a source of community-based information that is relevant and valuable to the center's planning. An active advisory board with community representation was created and continues to be nurtured.

2. Engage.—The knowledge broker recognizes stakeholders' cultural norms and practices and employs cultural self-reflexivity (Harding et al., 2012). In the example, complex environmental contamination within the contexts of environmental justice required

"team science" that included multidisciplinary academic researchers, state and federal regulators, tribal government officials, educators, artists, and community and tribal members of all ages. The knowledge broker establishes mutually beneficial and synergistic partnerships with these stakeholders. Once introduced to the tribal director of community planning and natural resources, the knowledge broker built and nurtured a collaborative working relationship and jointly developed a plan to address the tribe's critical environment and environmental health–related needs. A memorandum of understanding and a work plan was developed jointly. The knowledge broker nurtures long-term mutually beneficial synergistic partnerships with stakeholders. In the example, this relationship-building process took approximately 3 years before the research project was launched.

3.   Educate.—At this point in the project, the plan is that the knowledge broker will facilitate multidirectional knowledge exchanges among the knowledge producers and knowledge users. The knowledge broker will assist stakeholders in applying, analyzing, and evaluating knowledge in appropriate contexts (Bannister & O'Sullivan, 2013).

4.   Empower.—In the example, the knowledge broker will build capacity among stakeholders for evidence-informed participatory decision making (Jernigan, Jacob, The Tribal Community Research Team, & Styne, 2015) and assist stakeholders with integrating best available research-based evidence into practice and policy. The knowledge broker will be working collaboratively with knowledge generators and knowledge users to create new transdisciplinary knowledge whenever possible and appropriate.

5.   Evaluate.—In the example, the knowledge broker identified resources, processes, outcomes, and impacts with timelines early in the project. It was important to define knowledge utilization outcomes early in the process as well (LaFrance, Nichols, & Kirkhart, 2012). Capturing the translational narrative as it unfolds over time will assist with tracking process and progress (Pettibone, 2017).

Conclusions

The knowledge broker role has been increasingly recognized worldwide as the key to translating science into practice and policy. The nurse scientist is ideally suited for this role. In this article, the knowledge broker was defined as a person who connects science and society by building networks and facilitating opportunities between and among knowledge producers and knowledge users to share knowledge, learn from it, apply it meaningfully in research, practice, education, and policy, and to create new knowledge together. The Thompson Knowledge Brokering Model was presented and included three major components (forming and sustaining partnerships; facilitating knowledge application; and creating new knowledge) and five strategies (establish, engage, educate, empower, and evaluate) that the nurse scientist can employ when translating research and engaging stakeholders.

Limitations

There were three limitations. Characteristics or attributes found among successful knowledge brokers were not elaborated. Based on the authors' experiences, individuals gravitate to this role because of their unique blend of competencies, skills, and experience. Secondly, it was impossible to cover fully the complexity of the subject. The large number of actors involved made creating this model particularly difficult. Finally, examples were not exhaustive in order to provide flexibility and allow for alternative strategies to be used.

Implications

The role of the nurse scientist as a knowledge broker should be promoted worldwide. The knowledge broker role needs to be integrated into advanced practice curricula (i.e., doctoral studies) to teach the necessary skills and provide experiential learning. The knowledge broker role should be developed in healthcare organizations. There is much potential for the nurse scientist in the role of a knowledge broker to change the availability and access to information, improve health literacy, and reduce health disparities among varying communities, particularly within the contexts of social justice and empowerment (O'Fallon, Wolfe, Brown, Deary, & Olden, 2003). Knowledge broker strategies can be incorporated when developing health policy. More outcome research is needed. Lastly, mechanisms for funding should be promoted strongly among agencies to provide monies for research translation and community engagement.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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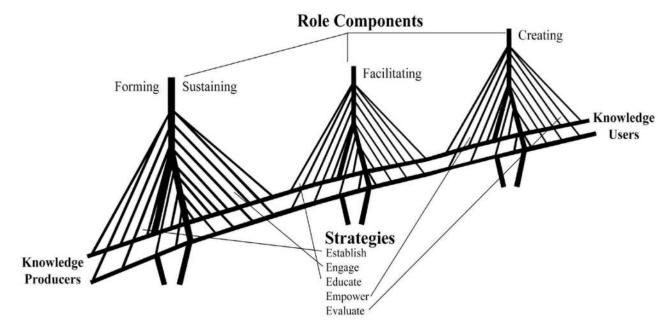
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Clinical Relevance: (a) Facilitate translation of useful research to practice and policy. (b) Connect stakeholders through meaningful engagement.

Clinical Resource

- Knowledge Broker Forum. http://www.knowledgebrokersforum.org

Figure 1.
The Thompson Knowledge Brokering Model.

Table 1.

Examples of Strategies for Working With Knowledge Producers and Knowledge Users by Knowledge Broker Role Component

Strategies	Forming/sustaining mutually beneficial partnerships with and among scientists, practitioners, policymakers, and/or the public		Facilitating these stakeholders' application, analyses, and evaluation of scientific and contextual knowledge		Creating new knowledge of value and utility to all stakeholders	
	Working with knowledge producers	**Working with knowledge users**	**Working with knowledge producers**	**Working with knowledge users**	**Working with knowledge producers**	**Working with knowledge users**
Establish						
Identify potential stakeholder(s)						
	Identify individuals in relevant disciplines	Identify individual(s) who are respected and trusted by stakeholder(s) as first contact	Request meeting(s) to discuss ideas and propose potential projects	Request introduction to gatekeeper(s) through individual(s) who are respected and trusted by these gatekeeper(s)		
	Gauge interest and availability of these individuals to participate as well as adequacy and availability of resources and key personnel	Meet gatekeepers(s) and begin protracted dialogue			Build credibility among stakeholders	Build trust and mutual respect among stakeholders
	Be flexible, adaptable, and politely persistent				Maintain equity among stakeholders	
	Be patient: think long term partnerships (years)					
Identify stakeholders' issues of concern						
		Conduct key informant interviews	Gain in-depth understanding about ongoing program(s) of research	Conduct focus groups	Create a shared vision	Create a shared vision
	Identify knowledge producers' strengths	Identify knowledge users' strengths	Manage expectations of knowledge producers	Manage expectations of knowledge users	Propose making decisions through consensus	Propose making decisions through consensus
Build networks of stakeholders						
					Create (external) advisory board	Create (community) advisory board
					Assemble complementary team(s) of scientists	

Strategies	Forming/sustaining mutually beneficial partnerships with and among scientists, practitioners, policymakers, and/or the public		Facilitating these stakeholders' application, analyses, and evaluation of scientific and contextual knowledge		Creating new knowledge of value and utility to all stakeholders	
	Working with knowledge producers	**Working with knowledge users**	**Working with knowledge producers**	**Working with knowledge users**	**Working with knowledge producers**	**Working with knowledge users**
					from different disciplines	
					Coalesce around complementary multidisciplinary or interdisciplinary project(s)	
Sustain networks						
			Facilitate regularly scheduled meetings	Facilitate regularly scheduled meetings	Work collaboratively	Work collaboratively
	Summarize periodic performance evaluation of knowledge producers by knowledge users	Summarize periodic performance evaluation of knowledge users by knowledge producers	Seek opportunities for continued dialogue	Seek opportunities for continued dialogue	Build collegiality	Build collegiality
Engage						
Recognize cultural norms and practices of stakeholders					Seek clarity and consensus among knowledge producers	Seek clarity and consensus among knowledge users
	Identify cultural framework from knowledge producers' perspective(s)	Identify cultural framework from knowledge users' perspective(s)				
	Read, listen, ask, learn, explore	Read, listen, ask, learn, explore	Develop experiential learning opportunities for knowledge producers to learn about the knowledge users where appropriate	Develop experiential learning opportunities for knowledge users to learn about the knowledge producers where appropriate		
	Encourage stakeholder feedback	Encourage stakeholder feedback				
	Attend and participate in stakeholder events	Attend and participate in stakeholder events				
		Identify health disparities and social justice issues				

Strategies	Forming/sustaining mutually beneficial partnerships with and among scientists, practitioners, policymakers, and/or the public		Facilitating these stakeholders' application, analyses, and evaluation of scientific and contextual knowledge		Creating new knowledge of value and utility to all stakeholders	
	Working with knowledge producers	Working with knowledge users	Working with knowledge producers	Working with knowledge users	Working with knowledge producers	Working with knowledge users
Employ cultural self-reflexivity						
	Identify cultural values and goals of diverse disciplines	Identify cultural lenses (emic/etic)	Acknowledge differences and commonalities	Acknowledge differences and commonalities	Establish a common set of values and goals	Establish a common set of values and goals
		Explore, learn, declare aloud				
	Recognize interstitiality of K* role in academia	Identify existing and potential power differentials				
	Integrate plurality of perspectives		Incorporate cultural practices of knowledge producers into activities as appropriate	Incorporate cultural practices of knowledge users into activities as appropriate		
	Identify decision-making processes of each stakeholder					

Table 2.

Examples of Strategies for Working With Knowledge Producers and Knowledge Users by Knowledge Broker Role Component

Strategies	Forming/sustaining mutually beneficial partnerships with and among scientists, practitioners, policymakers, and/or the public		Facilitating these stakeholders' application, analyses, and evaluation of scientific and contextual knowledge		Creating new knowledge of value and utility to all stakeholders	
	Working with knowledge producers	**Working with knowledge users**	**Working with knowledge producers**	**Working with knowledge users**	**Working with knowledge producers**	**Working with knowledge users**
Engage						
Establish mutually beneficial and synergistic partnerships with stakeholders	Obtain a memorandum of understanding issued by each stakeholder stating common principles	Obtain a memorandum of understanding issued by each stakeholder stating common principles	Accommodate differences in time frames of professionals and affiliate organizations	Accommodate differences in conceptual time frame of knowledge users	Create working relationships across stakeholders	
	Develop jointly a scope of work co-signed by principles: 1. Objectives, plan, timeline 2. Roles and responsibilities of co-investigators 3. Address institutional changes 4. Oversight 5. IRB certification and training requirements 6. Communications 7. Data sharing, ownership and release-confidentiality, research results sharing plan, copyrights, dispute resolution 8. Equitable payments to stakeholders 9. Cancellation clause	Develop jointly a scope of work co-signed by principles: 1. Objectives, plan, timeline 2. Roles and responsibilities of co-investigators 3. Address institutional changes 4. Oversight 5. IRB certification and training requirements 6. Communications 7. Data sharing, ownership and release-confidentiality, research results sharing plan, copyrights, dispute resolution 8. Equitable payments to stakeholders 9. Cancellation clause			Create strategic plan that reflects short-term achievable milestones while working towards longer-term goals	
	Obtain letters of support from stakeholder organizations	Obtain written declarations from organizational/community leaders in support of project	Identify and engage "champions" selectively			
	Recruit knowledge generator(s) to be co-investigator(s)	Recruit select knowledge user(s) to be co-investigator(s)	Secure extramural funding for sustaining projects	Secure extramural funding for sustaining partnerships	Collect baseline data and create metrics for short-term and long-term project outcomes and evaluation of process	Collect baseline data and create metrics for short-term and long-term project outcomes and evaluation of process

Strategies	Forming/sustaining mutually beneficial partnerships with and among scientists, practitioners, policymakers, and/or the public		Facilitating these stakeholders' application, analyses, and evaluation of scientific and contextual knowledge		Creating new knowledge of value and utility to all stakeholders	
	Working with knowledge producers	**Working with knowledge users**	**Working with knowledge producers**	**Working with knowledge users**	**Working with knowledge producers**	**Working with knowledge users**
	Recruit students as research assistants	Recruit and involve knowledge user(s) throughout research process		Pay knowledge users who are involved in conducting the research	(see also "Evaluation")	(see also "Evaluation")
				Pay study participants		
Nurture long-term mutually beneficial and synergistic partnerships with stakeholders	Schedule onsite visits regularly with co-investigators	Schedule onsite visits regularly with co-investigators	Schedule meetings regularly with team			
			Monitor and verify delivery on all commitments	Monitor and verify delivery on all commitments	Foster synergy among all stakeholders	Foster synergy among all stakeholders
Educate	Request or generate compilation on state of the sciences across relevant disciplines (e.g., summative reviews, comprehensive reviews, meta-analyses, or meta-syntheses)	Knowledge users present issues of concern and needs for (new) knowledge		Semi-annual or annual retreats for knowledge producers and knowledge users to listen to each other		
Facilitate multidirectional knowledge exchanges among these stakeholders	Request or summarize scientific facts and weights-of-evidence for knowledge users	Ensure equitable access to information		Promote coherent and effective communication across all stakeholders	Assemble transdisciplinary teams of knowledge producers and users	

Note. IRB = institutional review board.

Table 3.

Examples of Strategies for Working With Knowledge Producers and Knowledge Users by Knowledge Broker Role Component

Strategies	Forming/sustaining mutually beneficial partnerships with and among scientists, practitioners, policymakers, and/or the public		Facilitating these stakeholders' application, analyses, and evaluation of scientific and contextual knowledge		Creating new knowledge of value and utility to all stakeholders	
	Working with knowledge producers	**Working with knowledge users**	**Working with knowledge producers**	**Working with knowledge users**	**Working with knowledge producers**	**Working with knowledge users**
	Request knowledge generators present progress of ongoing and new research	Maintain a balance across all stakeholders' needs		Encourage participation and dialog		Foster synergy among stakeholders
Educate	Examine practice-based evidence	Examine evidence-based practices	Pursue new opportunities as they arise		Use diverse methodologies to enhance quality of exchanges	
Facilitate multidirectional knowledge exchanges among these stakeholders (continued)	Identify contexts in which research may be used	Raise awareness of problem(s) and potential solution(s)	Assist knowledge generators with conducting research as appropriate			
Assist stakeholders with applying knowledge in appropriate contexts	Extrapolate potential implications	Present content in context	Summative or comprehensive reviews	Apply, analyze and evaluate research	Aim collective efforts at affecting population level changes	
	Use terms and definitions consistently	Use terms and definitions consistently		Hold classes during sentinel events	Build an infrastructure for communication among groups/individuals	
Empower						
Build capacity among stakeholders for evidence-informed participatory decision making						

Strategies	Forming/sustaining mutually beneficial partnerships with and among scientists, practitioners, policymakers, and/or the public		Facilitating these stakeholders' application, analyses, and evaluation of scientific and contextual knowledge		Creating new knowledge of value and utility to all stakeholders	
	Working with knowledge producers	Working with knowledge users	Working with knowledge producers	Working with knowledge users	Working with knowledge producers	Working with knowledge users
		Identify and capitalize on knowledge users' assets				Raise critical consciousness regarding issues of concern, health impacts, and need for social action
Assist stakeholders in evidence-informed participatory decision making				Offer opportunities for knowledge users to participate at varying levels		Identify and mentor leaders
Assist stakeholders with integrating best available research-based evidence into practice and policy		Employ organization and community-based participatory methodologies				Form coalitions among knowledge users when appropriate
	Summarize risk-benefit analyses and relative risks, identify uncertainties		Share results with others including processes and lessons learned			Initiate systems level changes
Work collaboratively to create new transdisciplinary knowledge		Advocate for social change		Celebrate successes		Sustain systems level changes
	Ensure succession: identify future nurse scientists as knowledge brokers	Ensure legacy and continuity identify future stewards/leaders			Encourage development of new research based on users' needs	Imagine the knowledge broker role as the catalyst for change

Strategies	Forming/sustaining mutually beneficial partnerships with and among scientists, practitioners, policymakers, and/or the public		Facilitating these stakeholders' application, analyses, and evaluation of scientific and contextual knowledge		Creating new knowledge of value and utility to all stakeholders	
	Working with knowledge producers	Working with knowledge users	Working with knowledge producers	Working with knowledge users	Working with knowledge producers	Working with knowledge users
Evaluate					Foster opportunities for others to build upon these successes	
Identify resources, processes, outcomes, and impacts with timelines early	Select evaluation methods/tools	Select evaluation methods/tools	Employ mixed methodologies		Create logic model(s)	
	Reflect on stakeholders' experiences, observations, and interpretations		Conduct periodic review		Describe ongoing documentation strategies	
		Document use of research results	Discuss research results and translational efforts			
		Examples of research result in changing opinion but not practice or policy				
Define knowledge utilization outcomes		Examples of research were used to legitimize and sustain a priori action/decision				
	Use appropriate disciplinaries' lens in selecting outcomes and evaluation methods	Use cultural lens in selecting outcomes and evaluation methods as appropriate	Formulate a strategic evaluation plan		Incorporate recommendations into policy and practice	
	Compare to baseline		Conduct periodic reviews			
	Measure impact on research, research trajectories, and related policies	Measure impact on health, health disparities, and related policies and individual behaviors when appropriate				