The role and theoretical evolution of knowledge translation and exchange in public health

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ABSTRACT

Background There is an increased emphasis in public health research on effective models and strategies to support knowledge translation (KT), the exchange, synthesis and ethically sound application of research findings within a complex set of interactions among researchers and knowledge users. In other words, KT can be seen as an acceleration of the knowledge cycle—an acceleration of the natural transformation of knowledge into use (Canadian Institutes of Health Services Research. Knowledge Translation Strategy, 2004). The most recent conceptualizations consider the complexities of public health decision-making. The role of practitioners and communities is increasingly considered.

Methods We identify, describe and discuss the theoretical underpinnings of KT and recommend a way forward to build the evidence for more effective practice.

Results Theoretical perspectives increasingly influence research on KT in public health. A range of innovative work is being conducted to explore methods for KT using practical tools, often with the support of government.

Conclusions KT describes a crucial and to date under-developed element of the research process. There is an important gap in theoretically informed empirical studies of effectiveness of proposed approaches in public health, health promotion and preventive medicine, and thus much of the debate remains abstract. There is clearly an urgent policy need to establish the effectiveness of KT models in a range of contexts. This must include both the consideration of development and the utilization of knowledge.

Keywords evidence, knowledge translation, public health

Introduction

The need for evidence-informed public health has been promoted both by political imperatives and by increased resource accountability requirements. As a consequence, debate about how evidence is generated and used by policymakers, practitioners and communities increasingly needs to incorporate the complexity and dynamics of public health environments. Terminologies have evolved and moderated to best describe the underlying practices involved. Most recently, the term knowledge translation (KT) has been favoured in the literature. The principles of KT are well established and have been long described as ‘dissemination’, ‘utilization’, ‘evidence into practice’ and ‘knowledge transfer’ both within and external to the health sector. As iterations develop so too does an increased understanding of the roles of various players. The health sector has moved from a model in which researchers disseminate to one where some attempt is made by researchers to transfer to one in which there is acknowledgement of the reciprocity needed to practice evidence-informed public health (translation and exchange). This article outlines some of the key concepts and debates in KT and exchange and highlights some of the investigative work being conducted to explore KT strategies and their effectiveness. It concludes by outlining some frameworks to support public health action in KT.
Theoretical perspectives

KT has been defined in various ways but has generally focused on the application of knowledge. For example, the Canadian Institutes of Health Services Research (CIHR)\(^6\) has described KT as the complex process of the ‘exchange, synthesis and ethically-sound application of research findings within a complex set of interactions among researchers and knowledge users. In other words, knowledge translation can be seen as an acceleration of the knowledge cycle; an acceleration of the natural transformation of knowledge into use’. KT is a global concept and is often used in the commercial world to explore ways in which ideas/products can be commercialized.\(^7\) It is also used across a range of sector including education, engineering, social care and in industry–university partnerships.\(^1,7,8\)

KT is underpinned by several theoretical perspectives. Research utilization theory (based on constructivism) suggests that knowledge is a changing set of understandings shaped by those who both generate and use research.\(^9\) The implication of this is that potential users of evidence are more likely to do so if there is an identified need or incentive.\(^10\) This perspective bears some similarities to the diffusion of innovations theory first popularized in the early 1960s.\(^11\) This suggests that potential adopters of innovations can be categorized as innovators, early adopters, early majority, late majority and laggards.\(^11\) Greenhalgh et al.\(^12\) suggest that if knowledge required to support the use of an innovation is easily transferable across contexts, it is more likely to be adopted. The adoption of complex innovations are also influenced by fuzzy boundaries, risk, task issues and level of required support.\(^12\)

Despite the potential for a broader focus, much of the KT literature focuses on the translation of research into policy and practice. Davies et al.,\(^1\) informed by the work of Lavis et al.\(^13\) and Weiss,\(^14\) have proposed six models of research use that seek to describe relationships between researchers and users of research (Table 1). An additional perspective (the dialogical model) suggests that knowledge is created through interaction between the ‘social science’ and the ‘social world’, i.e. between researchers, policy makers and lay people.\(^15,16\) This highlights the importance of context and relationships in the development and application of research.

Evidence-informed public health incorporates many components of these models. It is important to acknowledge that evidence-informed policy and practice in public health is inherently complex, and theoretical perspectives provide insight and testable hypotheses rather than definitive answers.\(^17\) These models have generally been used to explore links between researchers and end-users rather than those involved in the generation of knowledge. Further exploration of these models should be a focus of public health action.

### Involvement in the KT process

Whilst there is limited exploration or investigation into community involvement in the KT process,\(^18–21\) some examples emerge as contrasting ways in which evidence is being built and utilized. For example, in a disadvantaged Glasgow suburb, the community recognized the threat to public health of children’s accidental injury, invited and co-produced research and were instrumental in service developments arising from it.\(^18\)

Furthermore, one-direction knowledge transfer model where the intention is to make research results understandable to a lay audience is unlikely to be beneficial,\(^3,6,22\) although there is some evidence to suggest that lay people may find the ‘simple’ provision of research-based knowledge valuable. For example, Cochrane reviews in obstetrics have been used by, for instance, birthing mothers and campaigning groups.\(^23\) So, whilst some have argued that a model in which respectful, trusting relationships are developed in collaborative and supporting environments that span the research process is more likely to be beneficial,\(^3\) it is likely that there is a case for multiple approaches.

<table>
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<tr>
<th>Table 1</th>
<th>Types and processes of research use(^1)</th>
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<tr>
<td>Classic, knowledge-driven model: a linear view that research findings may be communicated to impel action</td>
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<tr>
<td>Problem-solving, policy-driven model: a second linear view that begins with the end-users of research and the problems they face, before tracking back in search of useful findings</td>
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<td>Interactive model: here the process is modelled as a set of (non-linear, less predictable) interactions between researchers and users, with research impact happening through complex social processes of ‘sustained interactivity</td>
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<td>Enlightenment model: this model eschews the notion that research impacts are simple and instrumental in effect; instead research is seen to impact through ‘the gradual sedimentation of insight, theories, concepts and perspectives’</td>
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<td>Political model: here research findings are seen as more ammunition in adversarial systems of decision-making</td>
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<td>Tactical model: in this model, research becomes a resource to be drawn on wherever there is pressure for action on complex public health issues and may be used not just to bolster decision-making but also to stall and deflect pressure for action</td>
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With some notable exceptions (e.g. Knowledge Translation Program, University of Toronto, and projects funded by the CIHR), there has been relatively little empirical research into the effectiveness of these activities and interventions and the differential impact of these between settings, disciplines and professional experiences. In the workplace settings, where much of public health is undertaken, it is likely that there are many more of these activities being implemented, and this presents challenges regarding their reach, effectiveness and learnings. Conventionally, many of these are either not evaluated or written up in organizational reports. Integrating evaluations into initiatives to help share the learnings will make an important contribution.

**Barriers to the use of evidence for policy and practice**

Whilst there is an imperative for policy-makers and practitioners to use evidence to inform their decision-making, they face many barriers. These have been well documented and include absence of personal contact between researchers and policy-makers and practitioners, lack of timelines of research, mutual mistrust, power and budget struggles, poor quality of research, political instability and debates about what constitutes evidence. Understanding diffusion (how ideas are spread throughout systems) is crucial to understanding (and influencing) the pathway to evidence-informed policy and practice. Research has explored the characteristics of effective KT initiatives from community partners’ perspectives, identifying the importance of ‘quality of relationships’ and ‘trust’ as facilitators for KT and organizational barriers and lack of confidence as barriers. The importance of personal interaction in KT is also acknowledged, and the concept of a ‘Knowledge Broker’ (KB) has emerged as a result.

**Innovation in KT research**

There has been recent investment into research focusing on the implications of KT to public health. The following section is not intended to be a definitive summary but rather highlight some areas of action.

In 2000, the Canadian Government created the CIHSR with a strong KT mandate. This, they suggest, has the potential to significantly increase and accelerate the benefits from investments in health research and will establish Canada as an innovative and authoritative contributor to health-related KT. CIHSR has funded several research projects to explore methods of KT. Of note is a randomized controlled trial that aims to test the effectiveness of three KT strategies: a website, targeted evidence messages and knowledge brokerage. Many areas of public health are not limited to the health care sector in terms of action, and KT needs to include education, social care, planning, housing and those sectors that control the determinants of health. Building on the Canadian work and developing new tools, the What Works for Children initiative in the UK provides Web-based tools, for service planning in social care including one describing the evidence for intervening, and one (adapted from Canada) for looking at the extent to which organisations are able to take on research.

The Scottish Executive Analytical Services Division has recently conducted a pilot study to test the theory and practice of KT and KB at a Corporate and Departmental level in the Scottish Executive (responsible for a range of social and economic public policy issues). The project reported successfully applying theory to practical activity including electronic communication, development of networks and communities of practice and locating evidence provision within broader national and international contexts. The team acknowledged that further exploration is needed to better understand cultural differences that impact on KT between policy-makers, academics and practitioners. It was identified that KT works in practice within a policy context.

**Frameworks to support public health action in KT**

The Prevention Group of the International Obesity Task Force (IOTF) has developed a framework to support the translation of evidence into action. Although it was developed with a focus on obesity prevention, its general principles are applicable across the public health spectrum. The framework consists of five key stages: building a case for action, identifying contributory factors and points of intervention, defining opportunities for action, evaluating potential interventions and selecting a portfolio of specific policies, programmes and actions. Each stage is cumulative and culminates in the development of a plan to support the combination of research evidence, theoretical perspectives and contextual factors into a plan for translation into action.

Concepts of applicability and transferability must form part of any KT model. Applicability refers to whether an intervention (regardless of the outcome) could be implemented within a local setting. By contrast, transferability refers to the likelihood that the intervention will be as effective within the local setting as it has been in others. Addressing questions relevant to applicability and transferability is likely to support the translation of knowledge into action.

The importance of context in KT is clearly important. In particular, understanding the contexts in which users of evidence sit...
provides valuable insight into effective methods to support KT. The framework prescribed by Jacobson et al. outlines a series of questions designed to illuminate contextual factors. These focus on the user group, the research, the researcher–user relationship and dissemination strategies. As they focus specifically on the role of researchers and disseminators of knowledge (e.g. KBs) and take a reasonably linear approach, this tool should not be used in isolation. However, it does present some important issues to consider when at the point of holding knowledge considered by researchers as worthy of sharing.

Each of these tools presents important frameworks to guide KT. Resolving who has the right to a say in how each of these stages is defined and developed is a key challenge for KT.

Potential developments

After systematically reviewing the literature on diffusion of innovations, Greenhalgh et al. identified the following priorities for research in this area: it should be theory-driven, focus on process rather than ‘package orientation (e.g. why did this project work in the context rather than is program X effective), ecological (exploring the interaction between program and setting), and should use common definitions, measures and tools, and it should be collaborative and co-ordinated, multidisciplinary and multi method, meticulously detailed, participatory’. Rather than exploring the attributes of innovations that promote their adoption, they suggest a range of questions focusing on innovation processes, adopters and adoption, dissemination and social influence, the organizational context, system’s readiness for innovation, the outer context and implementation. These questions may be useful in informing public health-focused KT research.

Linear or not, all these models focus on the transfer of research knowledge to shape policy and practice. A complementary interactive approach that deserves more attention is the transfer of policy, practice and personal knowledge to shape research with the aim of creating a demand for subsequent findings. This is encouraged by national policies across the globe and its potential has been explored as part of advancing public health research and knowledge transfer. Within the Cochrane Collaboration, practitioner and service user input into the preparation of systematic reviews is routine. Indeed, some reviews in preparation have emerged from a formal priority setting exercise with policy organizations.

Conclusion

Stages of the KT process have now been well defined, and models have been developed to support KT in action. The next challenge is to use these frameworks to create partnerships between all players for whom the knowledge is important. Decisions about public health issues made in partnership between policy-makers, researchers and lay people are more likely to be beneficial, more likely to be applicable and, therefore, more likely to result in positive health outcomes.

New public health relevant Cochrane reviews and protocols from issues 2 and 3, 2006

Reviews

- Alcoholics anonymous and other 12-step programmes for alcohol dependence
- Effects of routine oral iron supplementation with or without folic acid for women during pregnancy
- Exercise in prevention and treatment of anxiety and depression among children and young people
- Insecticide-treated nets for preventing malaria in pregnancy
- Interventions to improve water quality for preventing diarrhoea
- School-based secondary prevention programmes for preventing violence
- Screening for prostate cancer
- Speed enforcement detection devices for preventing road traffic injuries
- Vaccines for preventing influenza in the elderly
- Vaccines for preventing malaria (SPf66)

Protocols

- Antenatal breast examination for promoting breastfeeding
- Behavioural interventions to reduce the transmission of HIV infection among commercial sex workers and their clients in developed countries
- Calcium supplementation for improving bone mineral density in children
- Family support in reducing morbidity and mortality in HIV-infected persons
- Household interventions for the prevention of domestic-lead exposure in children
- Smoking bans for reducing smoke prevalence and tobacco consumption
- The impact of health financing strategies on access to health services in low and middle income countries
- Vitamin A for preventing acute lower respiratory tract infections in children and adults
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