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Knowledge Translation Practices Of Health Services Research Organizations In The United States

Wendy Opsahl

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KNOWLEDGE TRANSLATION PRACTICES OF
HEALTH SERVICES RESEARCH ORGANIZATIONS
IN THE UNITED STATES

by

Wendy Ann Wiseman Opsahl
Bachelor of Arts, University of North Dakota, 2000
Master of Arts, University of North Dakota, 2002

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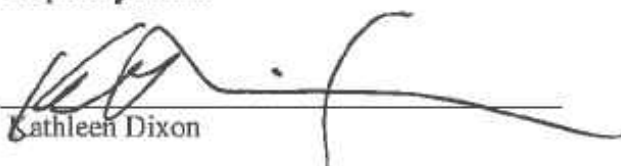
This dissertation, submitted by Wendy Ann Wiseman Opsahl in partial fulfillment of the requirements for the Degree of Doctor of Philosophy from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done, and is hereby approved.

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_____
Deborah Worley

_____
Kyle Muus

_____
Stephen Rendahl

_____
Kathleen Dixon

This dissertation is being submitted by the appointed advisory committee as having met all of the requirements of the Graduate School at the University of North Dakota and is hereby approved.

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Wayne Swisher
Dean of the Graduate School

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Date

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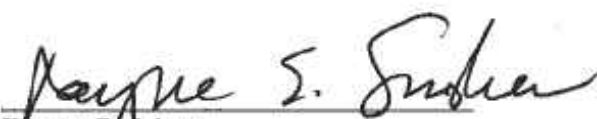
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                                            Wendy A. W. Opsahl
                                            November 26, 2012

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ACKNOWLEDGMENTS

Nani gigantum humeris insidentes. I am but a dwarf, standing on the shoulders of giants.

Thank you to the following individuals for their guidance, support, mentorship, and

encouragement on this research project and throughout my doctoral journey:

ABSTRACT

Health services research organizations have generated a growing body of

literature that focuses on better understanding challenges facing health care delivery.

However, their findings do not always reach end users (e.g., policymakers, providers,

managers, general public) in ways that are helpful, relevant, or cost-effective despite the

availability of numerous resources designed to aid researchers in communicating more

effectively. The purpose of this study was to understand better how health services

research organizations in the United States communicate their research findings to end

users; determine the degree to which they are translating research findings in ways

consistent with the empirical evidence; and determine whether organizational

characteristics such as university affiliation, organizational specialty, or size explain any

variation in responses.

Leaders of health services research organizations in the United States responded

to a survey about their organizations' knowledge translation practices. The survey

instrument and knowledge translation framework were based largely on work conducted

by Lavis, Robertson, Woodside, McLeod, and Abelson (2003a) in Canada. Findings

from this empirical study expanded the Lavis et al. (2003a) study by setting a baseline for

knowledge translation practices, across the research continuum, for health services

research organizations in the United States.

The data showed that health services research organizations largely communicate

about their research in the same manner, regardless of university affiliation,

organizational specialty, or size. Research organizations conduct knowledge translation activities throughout the course of their research projects, although in many cases there are gaps between what the literature suggests research organizations optimally should be doing and what they report doing. Notably, these gaps include evaluating knowledge translation activities, utilizing social media tools to extend messaging to end users, engaging with end users throughout the research process, building expectations for knowledge translation into policies and procedures, and investing in knowledge translation development at the organizational level.

The findings suggest areas of improvement for health services research organizations. This study observes, however, that increasing knowledge translation capacity will require a cultural shift, and increased collaboration, across the health services research community. Accordingly, this study recommends several action steps. Specifically, health services research organizations should develop knowledge translation expectations through organizational policies and procedures, and invest in capacity building, including training research staff or working with knowledge brokers. Funders should include expectations for knowledge translation in projects, and universities might consider updated promotion and tenure systems that acknowledge and reward translation activities.

Bolstering knowledge translation practices as identified in this study, and using the baseline data as a measuring point to evaluate future interventions, contributes to end users successfully receiving research findings in ways that can be useful for decision making, ultimately enhancing the quality of health and health care.

CHAPTER I

INTRODUCTION

Background

For centuries, universities have been a collective engine of knowledge production, and the influence of university research across science, education, the economy, society, and culture has been profound (Conroy, 1989). In particular, university-affiliated health services research organizations have the ability to be key actors in advancing health policy and practice solutions (Kingdon, 2003; Sabatier & Weible, 2007; Weissert & Weissert, 2006). The field of health services research examines health care delivery, safety, availability, and affordability and is an important tool used for informing a range of decisions about structure, financing, quality, and access to health care (Coalition for Health Services Research, 2010). These organizations, some with long-term interests in policy issue areas, can serve as influential intermediaries for translating research knowledge into policies and practice (Davies, Nutley, & Smith, 2000). The health services research field more than doubled from 1995 to 2007 (McGinnis & Moore, 2009) and research organizations experienced an increase in research opportunities, which transpired in part by some governmental agencies prioritizing the translation of research into policies and practice (e.g., The Centers for Disease Control and Prevention's Guide to Community Preventive Services, the Substance Abuse and Mental Health Services Administration's National Registry of Evidence-Based Programs, and the Institute of Medicine of the National Academies), as well as increased attention related to health care

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reform (Coalition for Health Services Research, 2010) and increased emphasis on evidence-based health care (Lomas, 1997). However, findings do not always reach end users (i.e., policymakers, service providers, health care managers, the general public), or findings reach them in ways that are not helpful, relevant, or cost-effective (AcademyHealth, 2006; Berwick, 2003; Glasgow & Emmons, 2007; Scholl, 2006; Simpson, 2011), leading to the need for solutions to close what Graham, Logan, Harrison, Straus, Tetroe, Caswell, and Robinson (2006) called the *knowledge-to-action gap*. Given these trends, understanding the current knowledge translation practices of research organizations across the United States is an important initial step to advance health communication research and practices. In large part, this introductory exploration may identify gaps in practice, areas for improvement, and new methods that address cost-effectiveness and accountability.

Statement of the Problem

Over the past decade, the term *knowledge translation* emerged (along with others, including *knowledge exchange*, *knowledge transfer, knowledge dissemination,* and *implementation science*) to describe the interaction that takes place between research organizations and end users to plan, produce, or communicate existing or new research findings than can be used or applied to end user needs (AcademyHealth, 2011; Damschroder, Aron, Keith, Kirsch, Alexander, & Lowery, 2009; Lavis et al., 2003a; Lomas, 2003). Information about this term and the reason for its selection are explained in Chapter II. Previous scholarly work (e.g., Bradley, Webster, Baker, Schlesinger, Inouye, Barth, Lapane, Lipson, Stone, & Koren, 2004) describes knowledge translation as complex phenomena influenced by a wide array of factors. The ways in which these

factors interact impact health policy by facilitating or limiting the influence of research

on the policy process. The literature also describes several important characteristics

along each point of the communication continuum (in this case, *message, end users,*

messenger, engagement, and *evaluation*, as framed by the Lavis et al. (2003a) study,

discussed further in the following section) that can facilitate the creation, uptake, and use

of new knowledge. For example, end users prefer compelling summaries of key points

and practical, actionable recommendations (Choi, McQueen, & Rootman, 2003; Dobbins,

Ciliska, Cockerill, Barnsley, & DiCenso, 2002; Mueller, McBride, Coburn, Slifkin,

Wakefield, & MacKinney, 2007) and can become frustrated when the research methods

overshadow the takeaway messages (Dash, Gowman, & Traynor, 2003). As Willison and

MacLeod (1999) and Lavis et al. (2003a) suggested, it is highly important to consider

who will be receiving the message so the content can be customized accordingly. The

uptake of research findings is more successful when translation activities are multifaceted

and take place strategically (Bero & Jadad, 1998) and when the findings have been

tailored to the particular context of the audience (Graham & Tetroe, 2009; Grimshaw,

Thomas, MacLennan, Fraser, Ramsay, Vale, Whitty, Eccles, Matowe, Shirran, Wensing,

Dijkstra, & Donaldson, 2004). There are important elements of a message that affect the

effectiveness of the knowledge translation, including the message attractiveness and

structure, intensity of language, and use of evidence (Metzger, Flanagin, Eyal, Lemus, &

McCann, 2003). In addition, the credibility of the messenger and reputation of the author

are key components in the knowledge translation process (Lavis et al., 2003a). The

literature identifies several items that affect research utilization, including timeliness,

accessibility, relevance, and political perception (Davies et al., 2000; Innvaer, Vist,

Trommald, & Oxman, 2002; Lavis, Davies, Oxman, Denis, Golden-Biddle, & Ferlie, 2005; Webber, 1987), interactive, interpersonal relationships and face-to-face contact (Jacobson, Butterill, & Goering, 2003; Innvaer et al., 2002; Lomas, 2000a; Roos & Shapiro, 1999; Thompson, Estabrooks, & Degner, 2006), and incentives, leadership, and training (Glasgow, Lichtenstein, & Marcus, 2003; Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004).

While the knowledge translation literature is somewhat developed in terms of how knowledge is received by end users, a line of research that is less understood about knowledge translation is how it is developed and deployed by the health services research organizations throughout the course of a research project. Nonetheless, there are numerous studies, models, and resources that inform research organizations how to move their research data from creation to utilization (see e.g., Canadian Institutes of Health Research, 2012; Graham et al., 2006; Landry, Lamari, & Amara, 2003; Lavis et al., 2003a; Lavis, Lomas, Hamid, & Sewankambo, 2006; Lavis, Ross, Hurley, Hohenadel, Stoddart, Woodward, & Abelson, 2002; Nutley, Walter, & Davies, 2003; Opsahl, Scurry, McEllistrem-Evenson, Gabriel, & Moulton, 2010; Strach & Everett, 2006; Weiss, 1979;).

Put simply, what we do not know is the degree to which research organizations in the United States are translating knowledge using leading practices as identified in the literature. Further, selected literature suggests that organizational characteristics such as university affiliation, organizational specialty, size, or geographic location in terms of rurality may explain the variation in how research organizations translate research findings, but the extant literature is largely silent on what this means in terms of what

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communication mechanisms health services research organizations use for knowledge translation.

Purpose of the Study

Despite the availability of resources and strategies designed to aid researchers in communicating more effectively, health services research findings do not always reach end users in ways that are helpful, relevant, or cost-effective (AcademyHealth, 2006; Berwick, 2003; Borenstein, Chiou, Henning, Wilson, Hohlbauch, Richards, Ofman, & Weingarten, 2003; Glasgow & Emmons, 2007; Scholl, 2006; Simpson, 2011). The purpose of this study was to understand better how health services research organizations in the United States communicate their research findings; determine the degree to which they are translating research findings in ways consistent with the empirical evidence; and determine whether university affiliation, organizational specialty or size, or geographic location in terms of rurality explain any variation in responses.

Lavis et al. (2003a) examined the knowledge translation practices of Canadian health services research organizations. Lavis et al. determined that the rapidly evolving field of knowledge translation contains a wide and confusing variety of perspectives and methodologies. They developed a systematic approach to research utilization for policy and practice and created a knowledge translation framework based on empirical evidence surrounding five key elements: message, end users, messenger, engagement, and evaluation.

As a foundational study on knowledge translation research practices, Lavis et al. (2003a) set the stage by developing an evidence-based organizing framework for a comprehensive knowledge translation strategy and by developing a mechanism to

identify knowledge translation improvement opportunities by examining the actual

knowledge translation practices of research organizations compared with what the

literature suggests they should be doing. The study offers a wealth of information but is

based on data from Canadian health services research organizations. Although Canada

and the United States are similar in many ways, the two countries differ significantly in

how their health care services are organized, managed, and delivered and the ways in

which health care policies are created and implemented. Both countries are in the midst

of bold health care reform, the United States through the Patient Protection and

Affordable Care Act (PPACA) and Canada through its Ten-Year Action Plan on Health.

However, the reform activities are very different from one another (LaPierre, 2012). For

example, all Canadian citizens are eligible to receive certain health care services through

a publically funded plan, whereas U.S. citizens receive care through a more fragmented

system of private and government health insurance, or no insurance whatsoever

(LaPierre, 2012). Both countries have increased funding for health services research, in

part to study the impact of the recent reform efforts (LaPierre, 2012; National

Pharmaceutical Council, 2010). These differences are important, and a lot less is known

about the comprehensive knowledge translation activities of health services research

organizations in the United States. To address this gap, this study aims to contribute to

the literature on knowledge translation of health services research organizations in three

ways. First, this study adds to existing knowledge by examining knowledge translation

practices of health services research organizations in the United States in order to

understand better how these organizations are communicating their research findings to

end users. This study used Lavis et al.'s (2003a) framework to examine the degree to

which health services research organizations communicate research in ways consistent with the evidence. Thus, this study builds off what is known to occur in Canada and offers a basis for comparison. Second, this study contributes to the field's understanding of knowledge translation by determining the degree to which health services research organizations are translating knowledge (i.e., research findings) in ways consistent with the empirical evidence. In addition, this study extended Lavis et al. (2003a) by asking questions about electronic communication and social networking methods that have evolved over the past decade. Third, this study offers additional considerations about knowledge translation practices by determining whether organizational characteristics— specifically, university affiliation, organizational size or specialty, or geographic location in terms of rurality—explain any variation in responses. These additional considerations permit a more robust comparison with the goal of building from Lavis et al.'s foundational study.

Like Lavis et al. (2003a), this study employed survey research methods. *T* tests were used to compare university and non-university-affiliated research organizations. To explore variations across university and non-university-affiliated organizations, analyses of variance (ANOVAs) were used to compare each category of research organization with the organizational size and the organizational specialty. Chi-Square tests of significance were used to test the social media items, employment of dedicated knowledge translation staff, and the use of incentives for knowledge translation activities.

Research Questions

This study initially addresses a gap in the literature by identifying the current knowledge translation practices of health services research organizations ("research

organizations") in the United States. Specifically, the main research question was, "What are the current knowledge translation practices of health services research organizations?" There were two overarching research objectives. The first objective was to determine the degree to which research organizations translate knowledge in ways consistent with the empirical evidence, which was organized using the Lavis Knowledge Translation Framework as described in more detail in Chapter II. The second objective was to examine university affiliation, organizational size and specialty, and geographic location in terms of rurality to see if they explain any variation in responses.

The present study utilized the same research sub-questions as the Lavis et al. (2003a) study, with each research question corresponding to an element in the Lavis Knowledge Translation Framework as follows:
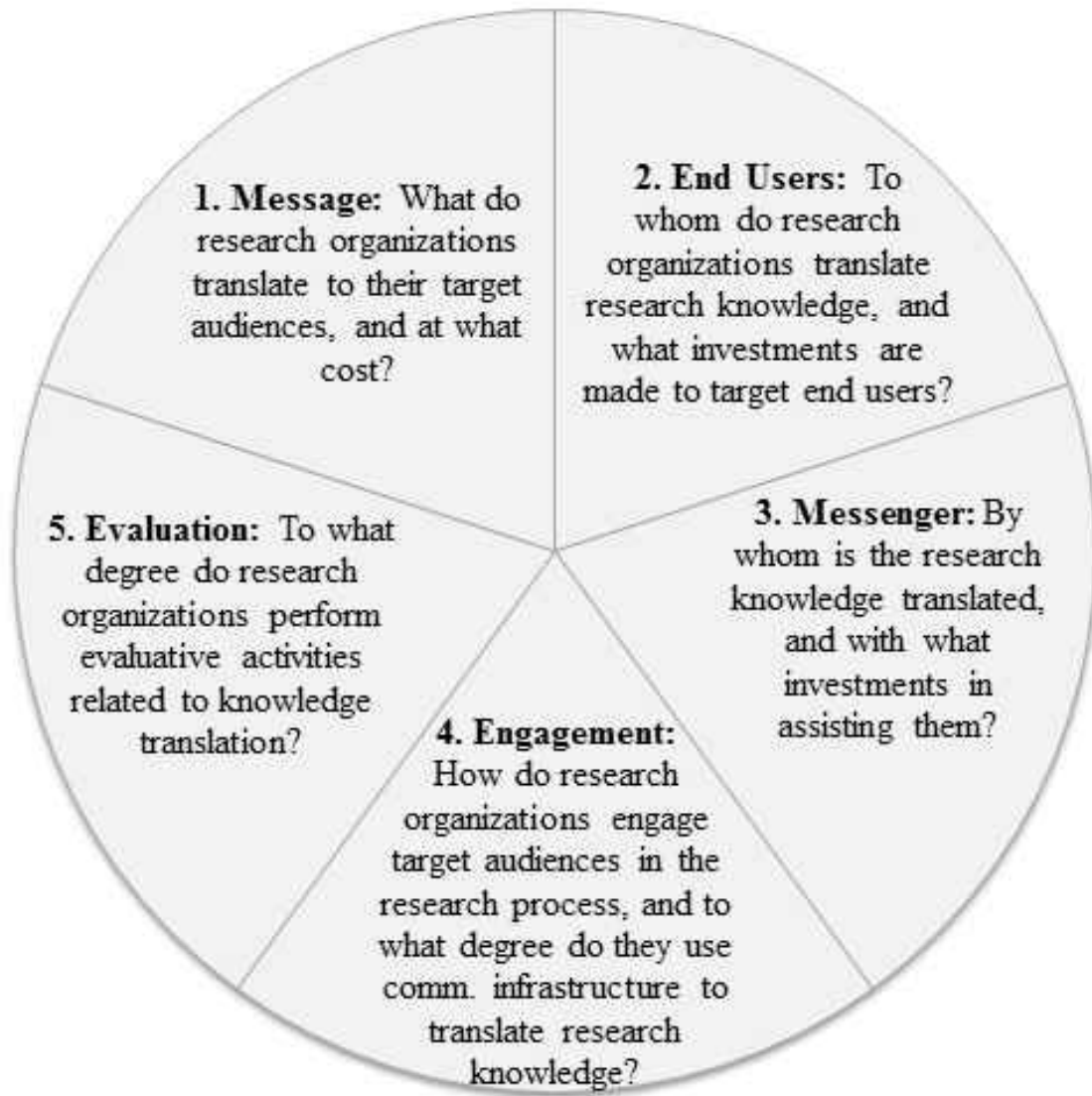
Figure 1. Research Sub-Questions and Lavis Knowledge Translation Framework

The study also included the examination of four independent variables to see if they explain any variation in how research organizations translate research findings. They are as follows:

1. Are there significant differences in knowledge translation activities between university-based and non-university based research organizations?

2. Are there significant differences in knowledge translation activities between research organizations of different sizes?

3. Are there significant differences in knowledge translation activities between research organizations of different specialties (e.g., public health, health economics)?

4. Are there significant differences in knowledge translation activities between research organizations of different geographical locations in terms of their rurality (i.e., differences between urban and rural locations)?

A graphical depiction of the main research question, research sub-questions, and variables of interest can be seen in Table 1. Each variable of interest, with the exception of geographic location (the examination was not supported by data), was tested for the items within each research sub-question. The findings for the research sub-questions contributed to the response to the main research question.

Table 1.

Research Questions

Main Research Question	Research Sub-Questions	Variables of Interest			
		Univ. Affil.	Org. Size	Org. Specialty	Urban/Rural Geo. Location*
What are the knowledge translation practices of health services research organizations in the United States?	MESSAGE: What do research organizations translate to their target audience, and at what cost?	X	X	X	X
	END USERS: To whom do research organizations translate research knowledge, and with what investment in targeting them?	X	X	X	X
	MESSENGER: By whom is the research knowledge translated and with what investments in assisting them?	X	X	X	X
	ENGAGEMENT: How do research organizations engage target audiences in the research process, and to what degree do they use supporting communications infrastructure to translate research knowledge?	X	X	X	X
	EVALUATION: To what degree do research organizations perform evaluation activities related to knowledge translation?	X	X	X	X

*Geographical location in terms of rurality was not supported by data and was subsequently not examined.

Study Design

This study was designed to build on the Lavis et al. (2003a) research study and

knowledge translation framework. Accordingly, it included the application of the same

survey instrument Lavis et al. created and used for their 2003 study. The survey

instrument was partially modified (A more detailed explanation of modifications is

available in Chapter III.) and was sent to 745 leaders of health services research

organizations throughout the United States who are members of AcademyHealth.

Whereas the Lavis et al. (2003a) study examined research organizations in Canada, this

study examined the knowledge translation practices of health services research

organizations in the United States. Adding to Lavis et al. (2003a), this study also

includes an examination of the organizations' use of social media tools to translate

research findings and examines whether university affiliation, organizational size or

specialty, or geographic location in terms of rurality explain any variation in responses.

Chapter Organization

This dissertation is organized in five chapters. Chapter II offers an overview of

the theoretical underpinnings of this study featuring a discussion of the relevant

knowledge translation literature. Chapter III describes the research questions, study

design, study population, and methods. Chapter IV presents the findings of this study.

Finally, Chapter V interprets the findings and presents the theoretical and practical

implications of this study for the translation of research findings by health services

research organizations.

CHAPTER II

LITERATURE REVIEW

Introduction

This chapter contains a review of the literature used to inform and shape this study on the knowledge translation practices of health services research organizations. The first section presents the role of universities in health services research. The second section outlines the development of a knowledge translation framework, followed by a section that advances the systems model. The fourth section contains literature supporting each of the five main research questions and the four variables of interest. This chapter also features a series of case summaries about the Northern California Perinatal Research Unit to illustrate a successful model of knowledge translation.

The Role of Universities in Health Services Research

Universities are defined as centers for the production of knowledge (Huberman, 1983). University-based research, an important source of knowledge generation, informs everything from industrial innovation to the well-being of citizens in the knowledge-based era (Abbott & Doucouliagos, 2004; Etzkowitz, Webster, Gebhardt, & Terra, 2000). Research not only helps solve practical problems and brings about improvements, it also provides insights and new ideas that enrich human understanding of various social, economic, and cultural phenomena (Abbott & Doucouliagos, 2004). Research also is regarded as an important indicator of economic competitiveness for the present and the future (Abbott & Doucouliagos, 2004).

There has been tremendous growth in health services research organizations (both

university-based and non-university-based) to accommodate the demand for new and

practical knowledge that can inform

the health care system (Johnson,

Green, Frankish, MacLean, &

Stanchenko, 1996; Lomas, 2007a;

Lomas, 1997). The health services

research field more than doubled from

1995 to 2007 (McGinnis & Moore,

2009). Changes in the sociopolitical

environment, increased

 specialization (e.g., health services

research), increased attention and

funding (e.g., the American Recovery

and Reinvestment Act of 2009),

policies that encourage corporate

**Example: The Northern California
Perinatal Research Unit
Part 1 of 3**

To fast-track knowledge translation from hard data to change in clinical practice, the Northern California Perinatal Research Unit (PRU) connects research, quality improvement, and clinical practice in neonatology at Kaiser Permanente medical facilities in Northern California through a unique hybrid model. The PRU consists of an interdisciplinary team of researchers, programmers, statisticians, and project staff and leadership, as well as investigators from the University of California, Santa Cruz, Harvard University, and the University of Pennsylvania. The team conducts evidence-based collaborative research with an emphasis on implementation of practice and policy changes. The PRU works closely with the neonatal chiefs to explore and identify changes in practice by using data. (Garrido & Barbeau, 2010)

funding of university research, and congressional reorganization have contributed to the

growth in the number of research organizations (Andrews & Edwards, 2004; Rynes,

Bartunek, & Daft, 2001). Over the past decade in particular, health services research

organizations have experienced an increase in research opportunities, which have

transpired in part by some governmental agencies prioritizing the translation of research

into policies and practice (e.g., The Centers for Disease Control and Prevention's Guide

to Community Preventive Services, the Substance Abuse and Mental Health Services

Administration's National Registry of Evidence-Based Programs, and the Institute of Medicine of the National Academies).

Although government and private institutions have set up their own research centers and initiated their own research in recent years (e.g., the U.S. Veterans Health Administration Quality Enhancement Research Initiative in 1998 and the U.S. Health and Human Services Patient-Centered Outcomes Research Institute in 2010), universities continue to play a prominent role in knowledge production and transmission (Conroy, 1989; Geuna, 1998; Landry, Lamari, & Amara, 2003). The influence of university research is profound and permeates nearly every corner of society, from education and culture to policy and economy (Conroy, 1989). Some of the roles played by university research include maintaining research infrastructure in existing academic disciplines, creating new disciplines, maintaining the research standard and research excellence in specific areas, training new researchers, informing university teaching, and informing policy making (Conroy, 1989).

Health services research, in particular, "takes the innovations from basic bench science and translates them into medical practice, allowing providers, patients, health plans, and policymakers to make more informed health choices. In sum, health services research is the link between research and the patient care that Americans receive" (Coalition for Health Services Research, 2010, p. 3). The conceptualization of health services research for this study can be described as a multidisciplinary field of scientific investigation that studies how social factors, financing systems, organizational structures and processes, health technologies, and personal behaviors affect access to health care, the quality and cost of health care, and ultimately citizens' health and well-being

(AcademyHealth, 2000). Its research domains are individuals, families, organizations, institutions, communities, and populations (AcademyHealth, 2000). Another characteristic that bounds the concept of health services research in this study is the source of information. In this context, health services research is information produced by technical and scientific experts at universities and other health services-related organizations. While there clearly is a range of experts and institutions that produce research, the production of explanatory knowledge of a technical nature necessitates expertise. These characteristics also may have implications for how research is used in the decision-making process.

However, health services research organizations at universities are experiencing a shifting and challenging environment. Pittman, Trinity, and Tsai (2010) described how researchers are being squeezed by both their universities and their funders, which ultimately has an impact on their knowledge translation activities. The majority of universities continue their longstanding tradition of providing promotion and tenure based on obtaining research grants and publishing in peer-reviewed publications (in addition to teaching and service) (Tomlinson, 2000). However, the government is funding fewer research grants (flexible instruments that the government uses to provide funding in hope of achieving a particular aim) and more contracts (legally binding documents where contractors are paid by the government to deliver a product or service). The problems researchers face with contracts are that they may be contractually restricted from publishing findings; they may be required to provide gray literature, which, if it becomes publically available through the government agency, will not be accepted by peer review journals; or the contracts may be shorter in nature and may not allow enough

time to go through the peer review process, which can take several months or even years. Researchers may thus provide contractual deliverables to their funders that are, in some cases, not recognized by their university as being significant or valuable to the promotion and tenure process. Therefore, researchers on a tenure track may dismiss conducting any sort of knowledge translation activity not directly related to either their contract work or their promotion and tenure criteria. This paradox proves challenging for knowledge translation. In fact, Kothari, McLean, & Edwards (2009) called the wide difference between funders and universities a "clash of cultures" (p. 15) and Fraser (2004) asserted that the current university incentive system is the opposite of what is valuable to end users.

Knowledge Translation: Framework Development

When it comes to the communication of health services research, an understanding of the knowledge translation literature is helpful, but even before that, it may be useful to determine what exactly knowledge translation is. Knowledge translation is one of several terms in the knowledge-to-action field used to describe an exchange of knowledge (in this case, research findings) between researchers and end users that results in action; other terms include *knowledge utilization, knowledge exchange, knowledge transfer, information dissemination, research utilization, research translation*, or *research transfer* (Bender & Fish, 2008; Berwick, 2003; Dobbins et al., 2002; Graham et al., 2006; Landry, Amara, & Lamari, 2001; Mitton, Adair, McKenzie, Patten, & Waye Perry, 2007; Rynes, Bartunek, & Daft, 2001). In fact, one study identified 29 different terms used to describe moving knowledge to action (Graham et al., 2006). While the meaning and context of each term are slightly different, they all

demonstrate the idea of moving knowledge to action (Best, Hiatt, & Norman, 2008).

Regardless of the term, many contemporary authors agree that an effective movement of

knowledge to action involves interaction and learning between knowledge creators (e.g.,

researchers) and knowledge users (e.g., policy makers, service providers, and other end

users) (Graham et al. 2006; Lavis et al., 2002; Straus, Tetroe, & Graham, 2009).

Three types of models can be used to illustrate how knowledge has moved to

action historically according to the literature, summarized in Table 2 (Best et al., 2008;

Estabrooks & Glasgow, 2006).

Table 2.

Knowledge-to-Action Models

Linear Models	Relationship Models	Systems Models
1960s–1990s	1990s–Present	2000s–Present
One-Directional	Collaborative-Based	Knowledge Integration
If researchers publish, policymakers will read. Knowledge is a product and translation is a process.	Knowledge comes from multiple sources; translation involves social relationships.	Relationships are critical and must be understood from a multilevel systems perspective. Translation strategies are different for each level.

Linear Models of Translation

The one-directional approach of linear models, which assumes that end users

receive and implement the new knowledge published by researchers, was the primary

mode of communication from the 1960s to the mid-1990s (Best et al., 2008; Estabrooks

& Glasgow, 2006). Best et al. (2008) asserted the terms *knowledge transfer* and *research*

uptake fall into this category. The literature indicates this passive "push" approach is not

very effective in leading to action or change, either in the health care realm or beyond

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(Davis, Evans, Jadad, Perrier, Rath, Ryan, Sibbald, Straus, Rappolt, Wowk, & Zwarenstein, 2003; Glasgow et al., 2003; Glasgow, Marcus, Bull, & Wilson, 2004; Grimshaw, Shirran, Thomas, Mowatt, Fraser, Bero, Grilli, Harvey, Oxman, & O'Brien, 2001).

Relationship Models of Translation

Relationship models were identified in the mid-1990s as being more effective than the one-directional translation models used in prior years (Best et al., 2008; Estabrooks & Glasgow, 2006). Central to the relationship approach is the idea of collaboration between researchers and end users, with the translation's success' depending upon the interactions between them (Best et al., 2008; Graham & Tetroe, 2009; Jewell & Bero, 2008; Lavis et al., 2005; Lomas, 2000b; Lomas, 2007a).

Systems Models of Translation

The most recent translation approach put forward by Best et al. (2008) is referred to as a *systems model* and emphasizes how each of the many parts of the knowledge-to-action cycle (e.g., organizations, funders, incentives, processes, people, relationships, timelines, expectations) relate to the entire system. Best et al. (2008) posited that this interdisciplinary *knowledge integration* approach allows for knowledge to become integrated into the system at individual, organizational, and broader network levels (Estabrooks & Glasgow, 2006).

This interdisciplinary approach to translation matches that of the Canadian Institutes of Health Research's (2012) conceptualization of *knowledge translation,* which they define as "a dynamic and iterative process that includes synthesis, dissemination, exchange, and an ethically sound application of knowledge to improve the health of

Canadians, provide more effective health services and products, and strengthen the health care system" (Tetroe, 2007, p. 1). This definition (as opposed to knowledge transfer or similar terms) will be used for this study. The term and definition were selected for several reasons. First, the term and its definition have their roots with the Canadian Institutes of Health Research, established in 2000 by the Canadian government to conduct both health research and knowledge translation. The term knowledge translation has since been utilized by experts at the Canadian Foundation for Healthcare Improvement (formerly known as the Canadian Health Services Research Foundation) and AcademyHealth, both leaders in the field of health services research and the communication of research findings. Second, this particular definition, with its reference to two-way communication rather than the linear communication of years past, best represents the contemporary environment within which we exist and communicate presently, influenced in no small part by two-directional social networking communication in multiple facets of our lives. Finally, knowledge translation is a broad concept and addresses communication throughout the research continuum. Table 3 outlines other related terms as identified by Graham et al. (2006) and the reasons they were not used for this study.

Table 3

*Related Terms**

Other Terms	Description	Reasons for Non-Use
Knowledge transfer	The process of getting knowledge used by stakeholders	Criticized for being unidirectional
Knowledge exchange	Bringing together researchers and decision makers and facilitating their interaction	No expectation for collaboration across research continuum
Research utilization	Moving research findings into action	Only focused on moving findings into action
Implementation	Methods to promote the systematic uptake of clinical research findings and other evidence-based practices into routine practice	The focus is on the uptake of knowledge
Dissemination	The spreading of knowledge or research	Lack of emphasis on knowledge creation or uptake
Diffusion	The process by which an innovation is communicated through certain channels over time among members of a social system	Lack of emphasis on knowledge creation or uptake

*Information in this table was derived from Graham et al. (2006).

Knowledge Translation: Systems Model as the Theoretical Foundation

Many studies present conceptual frameworks or models for knowledge

translation, knowledge transfer, research utilization, or other related terms. These models

represent the necessary principles and the mediating loops from knowledge creation to

knowledge utilization. (See e.g., Canadian Institutes of Health Research, 2012; Graham et

al., 2006; Landry et al., 2001; Lavis et al., 2002; Lavis et al., 2003a; Lavis et al., 2006;

Nutley et al., 2003; Strach & Everett, 2006; Weiss, 1979). For this study, it is useful to

understand the germinal work by Everett Rogers and how it has shaped the more

contemporary understanding of knowledge translation today. Rogers' (2003) diffusion of

innovations theory addresses how new ideas, products, and social practices spread within

a society.   Diffusion theory, in particular, discussed in the following paragraph, provides the basis for the development of many knowledge translation frameworks, including the knowledge translation framework that will be used in this study.

Diffusion of Innovation Theory

Diffusion theory, created by Everett Rogers in the 1960s, has been used to translate information within a wide variety of disciplines, such as economics, education, communication, geography, public health, and sociology (Rogers, 2003). According to Rogers (2003), diffusion is "the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 5). He defined an innovation as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p. 11). The innovation, communication channels, time, and social system all influence the rate of the innovation's adoption; together these form the process of diffusion (Rogers, 2003).

From Knowledge Diffusion to Translation

Lavis and colleagues (2003a), in developing a framework to illustrate (what they termed at the time) the *knowledge transfer* process, based their work on Rogers' diffusion of innovations theory utilizing knowledge, persuasion, decision, implementation, and confirmation stages as part of a systematic approach to research utilization for policy and practice. For the purposes of this research project, the framework is referred to as the Lavis Knowledge Translation Framework. As seen in Figure 2, five elements provide the organizing framework for their strategy: the messages, the end users, the messengers, the engagement and supporting communications infrastructure, and the evaluation of the research knowledge. Each domain will be examined in more detail below.

Figure 2. Lavis Knowledge Translation Framework

Knowledge Translation: Applying the Lavis Framework

What do research organizations translate to their end users? (Message)

It is well documented that researchers and end users do not use the same language. As the literature reports, end users can become frustrated when the research methods overshadow the takeaway messages (Dash et al., 2003) and prefer compelling summaries of key points and practical, actionable recommendations (Choi et al., 2003; Dobbins et al., 2002; Mueller et al., 2007). Another repeating theme is that of customizing messages for each target audience. The uptake of research findings is more successful when translation activities are multifaceted and occur strategically (Bero & Jadad, 1998) and when the findings have been tailored to the particular context of the

audience (Graham & Tetroe, 2009; Grimshaw et al., 2004; Jewell & Bero, 2008).

Finally, Lavis et al. (2003a) suggested that messaging should stem from a body of

research rather than a single study.

To whom should research knowledge be translated? (End Users)

While other steps may differ somewhat, the identification of end users is a near-

universal prescription in knowledge translation models and strategies. As Willison and

MacLeod (1999) and Lavis et al. (2003a) determined, it is vital to consider who will be

receiving the message so the content can be customized accordingly, as each audience

will have differing sets of needs and wants, and the findings will be relevant in different

ways.

Accordingly, empirical research on knowledge translation indicates that

messaging to each group is optimized when the message is tailored to the context of each

audience. The beliefs and values of end users affect how research knowledge is used in

the decision-making process, as do timing, costs, politics, and perceptions (Haines &

Donald, 1998; Johnson et al., 1996; Kingdon, 2003). The next section identifies four key

categories of end users: policymakers, service providers, businesses and organizational

managers, and the general public.

Health Services Research End Users #1: Policymakers

Scholars have given much attention to describing how research organizations, and

research, inform the policy process (Davis & Howden-Chapman, 1996; Jewell & Bero,

2008; Landry et al., 2003; Petticrew, Whitehead, Macintyre, Graham, & Egan, 2006;

Sorian & Baugh, 2002). For example, Kingdon (2003) noted that they are among the

most important non-governmental groups in the policy process because, while they do

not construct the governmental agenda, they inject their preferred policy solutions into the political discussion. Austen-Smith (1993) argued that organizations influence policy through the distribution of specialist information.

Browne (1998) contended that organized interests can inform public attitudes, are closely linked to their constituencies, and can mobilize these constituencies over specific issues. Finally, in describing the influence of organizations on health policymaking, Weissert and Weissert (2006) determined that these organizations "clarify and articulate citizens' preferences, warn policymakers of problems with their proposals, and suggest ways to make proposals more palatable" (p. 133).

Example: Northern California Perinatal Research Unit
Part 2 of 3

Using the Northern California Perinatal Research Unit case (Garrido & Barbeau, 2010) as an example, data regarding neonatal hospital admissions would resonate very differently with patients (in this case, the patients' parents), physicians, hospital administrators, and government officials. Parents may be interested in how the admission policy impacts the quality of life for both their infant and themselves (e.g., stress, disruption, separation), whereas the neonatology chiefs may be interested in using the evidence to change their admission criteria. Hospital administrators may focus on cost or systems implications, whereas government officials may hone in on policy modifications.

The literature also concludes that research organizations can and do play an important role by serving as intermediaries between researchers and policymakers and by facilitating translation activities. For example, organizations that have become expert in a particular policy area can engage in the production of translational products such as fact sheets, position papers, research reviews, and other documents that synthesize research findings. An example of this is the work conducted by the South Carolina Rural Health Research Center, which specializes in examining health inequalities within rural

populations and uses research findings to inform policy and practice. Likewise, by establishing relationships with policymakers, health service research organizations can serve as a trusted source of information for policymakers (Hanney, Gonzalez-Block, Buxton, & Kogan, 2002; Jewell & Bero, 2008). Finally, the literature has noted that research organizations with policymaker relationships may be positioned to facilitate knowledge translation by supplying researchers who are willing to testify in policy forums, Congressional hearings, or staff briefings (Center for Health Policy Research & Ethics, George Mason University, and Rural Policy Research Institute, 2000).

The literature on knowledge translation has repeatedly observed that researchers can play a significant role in the public shaping of science (Hess, 2004). Early theories of scientific knowledge production held that the research process is highly autonomous, but most recent theories include researchers as part of larger networks that also may include patients, funders, clinicians, and/or advocacy groups (Hess, 2004). As knowledge plays a central role in the relationship between research organizations and policymakers, researchers may develop their capacity to access and, in some cases, produce new knowledge.

For health services research, research organizations may play a role in shaping the development of new knowledge in two ways. First, some research organizations become experts in relevant areas of health services research in order to engage policymakers and funders (Hess, 2004). This expertise allows them to indirectly influence the research environment by shifting research funding priorities within their field of expertise. Second, organizations gain enough expertise to become contributors of new scientific research (Hess, 2004). These researchers directly shape the research environment

through their own research programs. By influencing the research environment, research organizations can change the content of the informational resources they offer to policymakers. In either of these cases, the effectiveness of researchers in informing policymakers depends a great deal upon their mastery of effective knowledge translation practices.

Scholars have given somewhat limited attention to the factors that influence policymaker behavior regarding their use of health services research. Lavis and colleagues (2005) identified a set of attributes that increase or decrease research used by policymakers. The strongest evidence supported the importance of research timing and timeliness in policymaker behavior. Policymaker trust of the researcher increases the likelihood of research knowledge use as do increased interactions between researchers and policymakers (Innvaer, et al., 2002; Lavis et al., 2005). Personal contact, relevance, and summaries with policy recommendations also facilitate research uptake (Innvaer et al., 2002). The use of jargonized language, translation solely through academic journals, and a perceived lack of political relevance decrease the likelihood that policymakers would use research knowledge (Lavis et al., 2005). James and Jorgenson (2009) determined that all of the items that affect policymaker use of research knowledge can be grouped into three categories: organizational variables (such as organizational norms, culture, and incentives for research use), decision-maker variables (such as personal beliefs and perceptions of the scientific process), and information variables (such as the source of the research, format, and quality).

One can conclude from the literature that research organizations and the research knowledge they generate have important roles to play in terms of informing

policymakers. Policy solutions often spend years outside of the attention of policymakers before appearing on the political agenda, and, when they do, may quickly result in new public policy or fade away without any resolution (Kingdon, 2003). The knowledge translation process can facilitate the synchronization of the research and policymaking processes and, in cases where translation influences research funding, vice versa.

Health Services Research End Users #2: Service Providers

Much of the knowledge translation research conducted in the health care sector focuses on the implementation or use of evidence by health care providers. As with research and policymaking, a well-documented gap exists between research and clinical practice (Green & Seifert, 2005; Grol & Grimshaw, 2003). A key component of knowledge translation is putting knowledge into practice, which may include changes in behavior, attitudes, knowledge, or awareness (Canadian Institutes of Health Research, 2012; Lavis et al., 2003a). Standard outreach practices used in health care, such as newsletters, web content, journal articles, and grand rounds (training sessions for health care providers) are effective at increasing awareness but overall ineffective at leading to action that changes behavior (Grimshaw et al., 2001). Grimshaw et al. (2001) outlined a number of effective strategies for changing provider behavior, including audit and feedback, computerized decision support, educational interventions, financial incentives, and combined interventions. A decade later, Boaz, Baeza, and Fraser (2011) took Grimshaw et al.'s findings a step further and identified multifaceted interventions, audit and feedback, computerized decision support, and opinion leaders as effective interventions, with multifaceted interventions (i.e., interventions utilizing more than one type of implementation strategy) showing the most effectiveness for translating research

findings. Both studies asserted active knowledge translation strategies are more effective than passive strategies.

The literature also quite clearly states that knowledge translation is effective in the clinical context when the knowledge source is perceived to be credible and trustable (Lavis et al., 2003a). The literature also indicates that translation is effective when the knowledge is relevant, easy to use, and focused (Casebeer, Bennett, Kristofco, Carillo & Centor, 2002; Petticrew et al., 2006).

Health Services Research End Users #3: Health Care Organizations or Businesses

In addition to policymakers and health care providers, managers of health care organizations or businesses represent another important stakeholder group for receiving and integrating research findings. The literature suggests there are significant improvements to be made in effectively translating research knowledge into health care management. A Google search on *evidence-based management* returned more than 1.5 million scholarly articles, indicating the popularity of the idea of basing management approaches and organizational practices on research findings rather than on unsystematic experience or personal preference. However, despite the vast literature, organizations and managers still suffer from a "research-practice gap" (Rousseau, 2006, p. 256), a theme similarly identified in the policymaking and clinical care realms. While managers of health care organizations or businesses may facilitate uptake of research evidence by clinicians, they are less likely to utilize research evidence themselves (Hewison, 1997). Rousseau attributed the gap to a number of reasons, including the lack of: models for evidence-based management, focus on using scientific evidence in business and management programs of study, communities of practice, and active use of evidence

throughout one's career. Shortell, Rundall, and Hsu (2007) further attributed the gap to

"time pressures, perceived threats to autonomy, the preference for colloquial knowledge

based on individual experiences, difficulty in accessing the evidence base, difficulty

differentiating useful and accurate evidences from that which is inaccurate or

inapplicable, and lack of resources" (p. 674) (Chan, Morton, & Shekelle, 2004; Walshe &

Rundall, 2001).

McGlynn et al. (2003) posited that only 55% of adults in the United States receive

care consistent with the latest scientific evidence. To reduce this deficit in care, advances

are needed in evidence-based practice and, more central to this study's discussion,

evidence-based management (Shortell et al., 2007). Specifically in health care, Bradley

et al. (2004) identified multiple factors that influence the success and speed of adoption

of evidence-based interventions:

> The roles of senior management and clinical leadership; the generation of
>
> credible supportive data; an infrastructure dedicated to translating the innovation
>
> from research into practice; the extent to which changes in organizational culture
>
> are required; and the amount of coordination needed across departments or
>
> disciplines. The translation process also depends on the characteristics and
>
> resources of the adopting organization, and on the degree to which people believe
>
> that the innovation responds to immediate and significant pressures in their
>
> environment. (p. 1)

Health Services Research End Users #4: General Public

The literature also identifies the general public as an important audience for health

services research knowledge (e.g., Boscarino & Adams, 2004; Braun, Kind, Fowles, &

Suarez, 2002; Hibbard & Jewett, 1997; Institute of Medicine, 2001; Sick & Abraham, 2011). Every year people make decisions related to their health care, from when and where to get care to how to finance it. People consult their family, friends, colleagues, or current health care providers when they have questions regarding health or health care (Boscarino & Adams, 2004; Braun et al., 2002; Feldman, Christianson, & Schultz, 2000), and many turn to the Internet, where good and bad quality information live side by side. Eysenbach, Powell, Kuss, and Sa (2002) asserted that users' risk of encountering a website bereft of quality information is from both the proportion of insufficient information on the Internet and their inability to filter out the insufficient sites.

Research knowledge is one of several items considered in health care decision-making. Law, Pollock, and Stewart (2004) asserted that evidence-based practice can be considered a combination of information from research, clinical wisdom, and information from patients and their families. Consumers, in trying to learn more about their health, face numerous challenges in accessing and utilizing research findings effectively. In order for consumers to make use of research, the research must be available in a location in which a consumer might look. That means journal articles are generally unhelpful, and popular online clearinghouses (e.g., WebMD, Mayo Clinic) are helpful. Consumers then need to be able to find the information relevant, which means they need to be able to understand it. This means useful formats, summaries, and action-oriented statements rather than dense text about methodology. The Cochrane Musculoskeletal Group outlines methods to aid knowledge translation to patients and consumers, which include providing relevance tables, graphic displays, consumer summaries, and patient decision aids (Santesso, Maxwell, Tugwell, Wells, O'Connor, Judd, & Buchbinder, 2006).

By whom is the research knowledge translated? (Messenger)

A stream of literature within knowledge translation examines the messenger, also referred to as the *connector, scientific translator, intermediary,* or *knowledge broker* (see, e.g., Canadian Foundation for Healthcare Improvement, 2003; Center for Health Policy Research & Ethics et al., 2000; Lomas, 2007b; Roberts, 2010; Robeson, Dobbins, & DeCorby, 2010; Vingilis et al., 2003). These studies tell us there are important elements of messengers that affect the effectiveness of the knowledge translation, including the message attractiveness and structure, intensity of language, and use of evidence

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Example: Northern California Perinatal Research Unit Part 3 of 3

As the literature suggests, bringing researchers and end users together throughout the research process to collaborate increases the effectiveness and efficiency of the knowledge translation. To illustrate this point, the PRU works closely with the neonatal chiefs at Kaiser Permanente in Northern California to make decisions. "According to Allen Fischer, MD, Northern California's Regional Director of Neonatology, the value of the PRU is that 'their efforts inform our action. When we consider a change in practice, we ask the PRU, What does the literature look like? What do KP outcomes look like?'" (Garrido & Barbeau, 2010, p. 53). Further, this close collaboration with the PRU "facilitates buy-in" (p. 53) with practitioners and is supported by senior leadership, both of which increase the likelihood of successful practice change based on the evidence.

(Metzger, et al., 2003). In addition, as identified by Lavis et al. (2003a), the credibility of the messenger is a key component in the knowledge translation process. Credibility has been examined at every juncture of Berlo's (1960) model of the communication process, which illustrates a path from source to encoder to message to channel to decoder to receiver, but Roberts (2010) noted message *receivers* are the item in Berlo's model that determine the credibility of a message and messenger.

In recent years, the literature has taken into account the differing contexts, cultures, and environments associated with researchers and end users (e.g., Lomas, 1997), sometimes referred to as *two communities* (Caplan, 1979). Some studies have identified interactive, interpersonal, and face-to-face communications as being effective ways to bridge the divide between researchers and end users (Innvaer et al., 2002; Jacobson et al., 2003; Lomas 2000a; Roos & Shapiro 1999; Thompson et al., 2006). In addition, more frequent and longer-term collaboration can improve research utilization (Elliot & Popay, 2000; Lavis et al., 2003a). Collaboration, which may include networks or working groups, provides opportunities for end users to internalize knowledge through regular interaction with researchers (Kothari et al., 2009; Lavis et al., 2003a; Mitton et al., 2007).

How do research organizations engage target audiences in the research process, and to what degree do they use supporting communications infrastructure to translate research knowledge? (Engagement)

When it comes to the mechanisms for translating knowledge, contemporary literature generally points to interactive and engaged processes as those most effective, rather than the passive and one-directional processes of years past. The engagement, or exchange process, brings researchers and end users together, often throughout the research process, to collaborate (Graham et al., 2006). Mueller et al. (2007) indicated that end users should be engaged at the beginning of the process to help frame research. It also is important to include exchange opportunities throughout the translation process (Lomas, 2007a), because, as several studies conclude, simply providing the information is usually not enough to cause the end user to take action or make a change (Davis et al., 2003; Glasgow et al., 2003; Glasgow et al., 2004; Grimshaw et al., 2001).

The more sources from which a message emanates, the more likely it is to be heard and incorporated into planning, practice, and decision making (Bero & Jadad, 1998; Borenstein et al., 2003). Effective translation relies on the use of varied channels, such as publications and reports, websites, listservs, conferences, hearings, person-to-person communications, and information networks. Consideration given to all of these channels and formats helps ensure that end users are exposed to research findings presented in formats conducive to their needs and wants. End users generally prefer electronic and verbal delivery modes (McBride, Coburn, MacKinney, Mueller, Slifkin, & Wakefield, 2008; Mueller et al., 2007) with timely and easy access to research.

The literature identifies several items that affect knowledge translation, including timeliness, accessibility, relevance, and political perception (Innvaer et al., 2002; Lavis et al., 2005; Webber, 1987), interactive, interpersonal relationships and face-to-face contact (Estabrooks, & Degner, 2006; Jacobson et al., 2003; Lomas, 2000a; Roos & Shapiro, 1999; Thompson et al., 2006), and incentives, leadership, and training (Glasgow et al., 2003; Greenhalgh et al., 2004).

Social Media and Health Services Research Knowledge Translation

The literature is less developed on the application of social media tools as a source for knowledge translation. A new area for examination, not covered by the Lavis et al. (2003a) study because it did not widely exist at that time, is that of the role of online social networking in the knowledge translation process for health services research. Web-based knowledge translation efforts have been shown to improve access and uptake of information and speed up knowledge translation processes among a variety of

stakeholders (Ho, Novak Lauscher, Best, Walsh, Jarvis-Selinger, Fedeles, & Chockalingam, 2004).

The period of time called *web 2.0* began in the late 1990s (although the term was introduced in 2004) and refers to a shift toward collaboration and open sharing of information on the web (Barsky, 2006; Van De Belt, Engelen, Berben, & Schoonhoven, 2010). Whereas the first generation of the web was mostly unidirectional, web 2.0 includes the evolution of interactive social media tools, including social networking sites, blogging, microblogging, collaborative authoring tools for sharing and editing documents, social tagging and bookmarking, scheduling and meeting tools, conferencing, and image or video sharing (Center for Information Behavior and the Evaluation of Research, 2010), which allow users to contribute information to the web, thus creating multi-directional communication channels in which individuals both create and consume content. Through the use of social media tools, users have redefined experts (the information providers) and laypeople (the information consumers) (Schein, Wilson, & Keelen, 2010). Today's Internet allows users to gather information from peers (e.g., crowdsourcing), a variety of online tools, and the aggregate knowledge from collaborative sites (e.g., Wikipedia) (Eysenbach, 2008; Schein et al., 2010). Empowered by technology, people increasingly decide how and when and even if messages will be received (Schultz, 2006b) and they want access to information immediately (Mueller et al., 2007). Electronic communication and the rise of social networking have transformed the way information is shared with and marketed to end users, shifting from a "push" to a "pull" strategy. As end users gain access to more information and more sophisticated technology, they have become more demanding, requiring information be made available

on their terms, rather than when it is convenient for the information producer (i.e., the research organizations) to deliver them. Schultz (2006a) posited that people create barriers to shut out information overload in both traditional and nontraditional media, effectively avoiding the push of messages from many sources and leaving them free to "pull" the information they want from the Internet or elsewhere at any time and manner convenient to them. In other words, people do not want to have to ask for information; they want it to be available for them to review at their convenience.

Social media have become serious academic tools for many scholars who use them for collaborative writing, conferencing, sharing images, and other research-related activities, according to a 2010 study on social media and research by researchers at the Centre for Information Behaviour and the Evaluation of Research (Ciber) at the University College London. According to the study, researchers associate several benefits with social media use, including the ability to communicate internationally, have faster dissemination, connect with people outside the academy, and target research communities. The study also identified perceived barriers to social media in research, which include lack of time, problems of authority, unclear benefits, technology factors, and difficulties in citing non-traditional content.

The Ciber study (2010) reported 74.8% of health science researchers surveyed use social media tools in research, but they are less likely to use social media professionally than their peers in other sectors of the academy. Nonetheless, this "Health 2.0" movement represents the creation of new social networking technologies across the health care and health research industries. Social media platforms are being mobilized for a variety of purposes, and organizations are shifting their communications strategies

to encourage public engagement. Hospitals and academic medical centers are steadily adopting social media tools to bolster brand loyalty, attract new patients, raise funds, and recruit for clinical trials; health care organizations are using social media tools for collaboration, advocacy, and professional development; and governmental organizations are adopting social media platforms for public health messaging and infectious disease monitoring (Sharp, 2012). "The adoption of social media…reflects a widespread sense that these tools are increasingly necessary to reach demographics who are abandoning traditional broadcast technologies (e.g., telephones, television) such as teens, or a significant portion of the public who are rapidly transforming the manner in which they interact with experts" (Schein et al., 2010, p. 3).

Engaging in these types of knowledge translation processes can be resource-intensive for researchers who wish to facilitate the translation of their work into policy. Health services researchers typically have received little education or training in knowledge translation; it is not currently a universally accepted core competency in health services research doctoral training programs (Forrest, Holve, Martin, & Millman, 2009). They are not, in general, well-versed in non-traditional knowledge translation methods, including social media, blogs, and news articles, and often have few resources (e.g., technical assistance, time) at their disposal (Ciber, 2010). Landry and colleagues (2001) contended that researchers who wish to make their research findings available to end users typically need to make "significant investments in acquiring skills, expertise, and know-how, and to support significant costs of customization that are tailored to one or a few users and not easily transferable to other situations of knowledge utilization" (p. 414).

So, on the one hand, we know that social media channels are becoming increasingly important as a communication tool and that three-quarters of health services researchers are currently utilizing some form of social media. Yet, on the other hand, we know they lag behind their peers in terms of usage and adoption and that they face substantial barriers in terms of resources. This study investigates further the social media practices of health services research organizations as a whole (rather than individual researchers).

To what degree do research organizations perform evaluation activities related to knowledge translation? (Evaluation)

With the recent focus on evidence-based practice and decision making (APA Presidential Task Force on Evidence-Based Practice, 2006; Institute of Medicine, 2001; Lomas, 1997; Riemer, Kelley, Casey, & Haynes, 2011), it comes as no surprise that the literature also points to the use of evidence in knowledge translation activities. Many models, frameworks, and strategies contain an evaluation of knowledge translation activities, although some evidence (e.g., Lavis, 2003a) indicates researchers and research organizations often forego evaluation altogether. Conducting evaluations are essential for determining impact and justifying knowledge translation activities (Mitton, 2007). Lavis, Ross, McLeod, and Gildiner (2003b) argued that performance measures for knowledge translation need to reflect the target audience and the objectives appropriately. Others, including Jansson, Benoit, Casey, Phillips, and Burns (2010), have posited that evaluation of policy implications and program innovations are important areas for future development.

Knowledge Translation: Other Considerations

Some organizational theories posit that an organization's activities are influenced by resource dependency, efficiency, and population (Ulrich & Barney, 1984) as well as the organization's social, economic, and political environment (Handler, Issel, & Turnock, 2001). Further, a study of 60 Fortune 1000 firms in the 1980s found that economic factors (e.g., industry, firm size) and organizational factors (e.g., organizational climate) accounted for a significant portion of performance variance (Hansen & Wernerfelt, 1989). In addition to exploring the current knowledge translation practices of research organizations, then, it also is worthwhile to examine organizational factors that may account for variation of their practices. For example, one might assume that a small research organization would have less access to knowledge translation staff, resources, or infrastructure when compared with a large research organization. New areas for examination in this study, not covered by the 2003 Lavis et al. study, include university affiliation, organizational specialty and size, and geographic location in terms of rurality. These are explained in more detail below.

University Affiliation

It is almost certain that universities have existing communications infrastructure, staffing, resources, and expertise that may be available for researchers to take advantage of when communicating research findings. Might this be a factor that affects knowledge translation activities? One study found that although perceived adherence to recommendations was greater in academic and larger organizations (Brunkhorst, Engel, Ragaller, Welte, Roissant, Gerlach, Mayer, John, Stuber, Weiler, Oppert, Moerer, Bogatsch, Reinhart, Loeffler, & Hartog, 2008), actual practice was not significantly

influenced by organizational size or university affiliation. Conversely, Coburn (1998) reports many differences between university-based health services research organizations and end users, including mismatched timeframes, lack of understanding of each other's working environment and objectives, and funding and information control issues, all of which might contribute to interaction (or lack thereof) between organizations. Further, the current academic incentive system—based on publications and tenure—does not always foster an environment that encourages researchers to conduct knowledge translation, and "…since academic settings do not reward translation, 'there is not a lot of reason to teach it'" (AcademyHealth, 2006, p.4).

Organizational Size

Similarly, the size of an organization also may affect knowledge translation activities, with larger organizations having more access to knowledge translation resources than smaller organizations, although it should be noted that there is not a uniformly acceptable definition of a small organization (Wong & Aspinwall, 2004). Most of the knowledge-related literature has focused on large organizations (McAdam & Reid, 2001). Tang, Mu, and MacLachlan (2008) asserted the larger the organization and the greater number of translation opportunities are available, the greater the proportion of opportunities for knowledge translation will be utilized. Horta and Lacy (2011) found that, as the size of a research organization increases, it influences the overall communication of academics. Organizational size was determined to influence implementation of innovations, with large organizations implementing innovations more readily than small ones (Greenhalgh et al., 2004). However, small research organizations

have distinct characteristics that set them apart from large research organizations, and these characteristics may impact knowledge translation activities.

Organizational Specialty

Might we see differences in translation practices between organizational specialties, and, if so, what accounts for the differences? An organization's specialization influences implementation of innovations; an organization with a focused specialty implements innovations more readily than other organizations (Greenhalgh et al., 2004). It could be possible that organizations that specialize in topics of federal priority (e.g., public health, health policy reform) may receive or have access to increased resources and funding compared with other non-priority specialties. Several studies note that the lack of such resources and funding can be a barrier to engagement or implementation (Coburn, 1998; Crosswaite & Curtice, 1994; Davis & Howden-Chapman, 1996; Dobbins et al., 2002; Huberman, 1983). It also is possible that government perception of the value of health services research, and the subsequent allocation of funding and resources for it, varies by political party and political majority. For example, in July 2012, the Republican-controlled House Appropriation Subcommittee proposed terminating the entire Agency for Healthcare Research and Quality, which conducts research on health care quality, disparities in care, and patient safety. (Results of the bill are pending.)

Geographic Location (Urban/Rural)

In areas such as health care, geographically remote communities often face challenges in receiving access to quality services and care. In addition, "rural research and policy voices tend to be lost in national policy debate" (Center for Health Policy

Research & Ethics, George Mason University, and Rural Policy Research Institute, p. 2).

Might the location of the research organization be an indicator of a particular level of knowledge translation activity? While some studies lead one to believe that geography may negatively affect knowledge translation practices (e.g., John, Knyazeva, & Knyazeva, 2010), another study conducted in Austria (Tödtling, Lehner, & Kaufmann, 2008) indicated urban locations do not lead to a higher probability of knowledge translation relationships between science and industry. Further, the increase in broadband access and mobile computing across the United States has increased the translation opportunities for people regardless of whether they live in urban or rural areas. Currently, 88% of American adults have a cellular phone, 57% have a laptop computer, 19% own an e-book reader, and 19% have a tablet computer (Zickuhr & Smith, 2012).

During the data analysis for this study, 96.3% of survey respondents reported being from a metropolitan area and 3.6% reported being from a micropolitan area. While it is notable to learn that these research organizations are almost all based in large cities, there was not enough difference in the data to warrant further analysis.

Summary

For effective knowledge translation to occur, the literature tells us researchers need to present their findings in such a way that end users can see their impact (Choi et al., 2003). Even with the many knowledge translation frameworks found in the literature, there is minimal identification of current knowledge translation processes for research organizations, including the synthesis and evaluation of such information. Given the importance placed on evidence-based health policymaking and in light of the role of research organizations in the policy process, the lack of investigation of knowledge

translation practices conducted by research organizations in the United States, including

their use (or lack thereof) of social media tools, represents a key gap in the literature.

Although many studies have examined knowledge translation, little is known about how

research organizations in the United States translate research findings across the research

continuum, how university-affiliated organizations compare with non-university-

affiliated organizations, and whether new tools such as social media represent viable

avenues for knowledge translation. Further, little is known about whether organizational

specialty, organizational size, or geographic location in terms of rurality explain any

variation in knowledge translation activities. This study seeks to examine these areas.

CHAPTER III

METHODS

Introduction

This study examined the degree to which health services research organizations in the United States translate research knowledge in ways consistent with the understanding of the research evidence, and whether university affiliation, organizational specialty or size, or geographic location in terms of rurality explained any variation in responses. Further, the use of social media tools and the examination of this audience in the United States, both of which have not been studied previously, provide important information about the knowledge translation practices of research organizations. This chapter begins with an explanation of the assumptions, followed by the research questions. The next section describes the survey instrument, pilot study, and survey population. It is followed by an explanation of the data collection and data preparation methods, as well as a description of the tests that were conducted, which include t tests, analyses of variance (ANOVAs), Chi-Square tests of significance, and mean calculations, to explore variations across the two types of organizations involved in this study (university-affiliated and non-university-affiliated) as well as across the four categories of organizational size and six categories of organizational specialty. The final section on descriptive statistics identifies the variables of interest and explains how they were calculated and recoded. Study findings and discussion are presented in Chapters IV and V.

Assumptions

This study is built upon two assumptions. The first assumption is that the field of health services research can and should be doing a better job at communicating research findings. At AcademyHealth's Annual Research Meeting in 2008, Board Chair Dr. Margarita Alegria opened the first plenary session with this statement:

> I found that although there was a considerable knowledge base available to solve these problems and a substantial body of recommendations, we had no Randy Moss at the other end to grab the recommendations and run with them … Why is there such an enormous gap between the recommendations about how to solve enduring problems and the implementation of these recommendations? In fact, Lavis et al. (2003a) referred to this gap as "the paradox of health services research, i.e., if it is not used, why do we produce so much of it?" (p.5)

Sitting in the audience that day, the investigator found inspiration in those words to initiate a two-pronged approach to health services research: study how it is translated and help researchers translate it better.

The second assumption is that most (but not all) findings, in fact, should be translated, and widely at that, to targeted groups of stakeholders, including policymakers. This assumption is rooted in the investigator's training and practice as a professional communicator. As much of this country's health services research is funded by federal dollars, it is the investigator's opinion that study findings should circle back to their origins and be used to inform policy, practice, and other relevant decision making.

Research Questions

The overarching research question examined the knowledge translation practices of health services research organizations in the United States. Just as in the Lavis et al. (2003a) study, there were two overarching research objectives. The first objective was to determine the degree to which research organizations translate knowledge in ways consistent with the empirical evidence, which is organized using the Lavis Knowledge Translation Framework. The second objective was to examine whether university affiliation, organizational specialty or size, or geographic location in terms of rurality explained any variation in responses. The present study utilized the same research questions as the Lavis et al. (2003a) study, with each question corresponding to an element in the Lavis Knowledge Translation Framework:

1. What do research organizations translate to their target audiences and at what cost? (Message)

2. To whom do research organizations translate research knowledge, and what investments are made to target end users? (End Users)

3. By whom is the research knowledge translated and with what investments in assisting them? (Messenger)

4. How do research organizations engage target audiences in the research process, and to what degree do they use supporting communications infrastructure to translate research knowledge? (Engagement)

5. To what degree do research organizations perform evaluation activities related to knowledge translation? (Evaluation)

The study also included the examination of four independent variables to see if they explained any variation in how research organizations translate research findings:

a. Are there significant differences in knowledge translation activities between university-affiliated and non-university-affiliated research organizations?

b. Are there significant differences in knowledge translation activities between research organizations of different specialties?

c. Are there significant differences in knowledge translation activities between research organizations of different sizes?

d. Are there significant differences in knowledge translation activities between research organizations of different geographical locations in terms of rurality? (This was not supported by data and was subsequently not tested. More information can be found in Chapter IV.)

A graphical depiction of the research questions and variables of interest can be seen in Table 4.

Table 4.

Research Questions

Main Research Question	Research Sub-Questions	Variables of Interest			
		Univ. Affil.	Org. Size	Org. Specialty	Urban/Rural Geo. Location*
What are the knowledge translation practices of health services research organizations in the United States?	MESSAGE: What do research organizations translate to their target audience, and at what cost?	X	X	X	X
	END USERS: To whom do research organizations translate research knowledge, and with what investment in targeting them?	X	X	X	X
	MESSENGER: By whom is the research knowledge translated and with what investments in assisting them?	X	X	X	X
	ENGAGEMENT: How do research organizations engage target audiences in the research process, and to what degree do they use supporting communications infrastructure to translate research knowledge?	X	X	X	X
	EVALUATION: To what degree do research organizations perform evaluation activities related to knowledge translation?	X	X	X	X

*Geographical location in terms of rurality was not supported by data and was subsequently not examined.

Survey Instrument

This study employs an existing (but modified) survey instrument, the McMaster

University Survey on Current Practices in Research Transfer, developed by Lavis et al.,

(2003a). Permission was received from Dr. Lavis in August of 2011 to use and modify

the instrument (see Appendix B). Reliability and validity statistics were not available.

The original instrument contains 53 items with a 5-point Likert scale that captures

the frequency with which a particular approach is used or activity is undertaken, eight

items with binomial response, and three optional open-ended items (see Appendix C). In

order to make the instrument more appropriate for this study, it was modified by

changing a term, using a web-based survey delivery (rather than paper-based), altering

several items to accommodate the web-based delivery, deleting 25 questions, and adding eight questions.

The first item adjusted in the instrument was the reference to *knowledge transfer*; throughout the instrument the term was changed to *knowledge translation* in order to utilize the term used by the Canadian Institutes of Health Research, AcademyHealth, and other leading scholars in the United States. Second, the survey was retrofitted from a paper-based format to a web-based format, and a few questions were reorganized to accommodate the new format. Items 4 through 9 in particular asked the same questions as in the original survey, but were slightly rearranged to accommodate the web-based survey tool, which does not allow for two-part items.

Four items were added to the instrument to gather data about social media utilization, as these social media tools did not exist or were not commonly used in 2003, when the survey was originally administered. Each item asked respondents whether their organization made use of commonly used social media tools to translate research to their end users. The social media tools include organizational blogs, Facebook, LinkedIn, and Twitter (Stelzner, 2009). All four items contain fixed binomial responses of "Yes" or "No."

A new item was added to determine the research organization's specialty practice. This item response helped determine whether there were significant differences between specialties in their knowledge translation activities. The item stated, "Please indicate your research organization's specialty." It was followed by a menu of options, including public health, international health, rural health, health equity, indigent populations,

population health, policy, prevention, medicine, behavioral, and other (where participants self-identified organizational specialty).

A new item was added to determine the research organization's size. This item response helped determine if there were significant differences of knowledge translation activities between organizations of different sizes. The item stated, "Please indicate the approximate number of individuals comprising your organization." It was followed by a menu of options, including 1-10, 11-20, 21-30, 31-40, 41-50, 51-75, 76-100, 101-150, 151-200, 201-300, 301-400, 401-500, 501-700, 701-900, and more than 900.

Finally, a new item was added in order to determine the participant's affiliation (or lack thereof) with a university. It stated, "Is your organization based at or affiliated with a university?" and had response options of "Yes" or "No."

Twenty-five items were deleted from the original instrument. They were not found to be explicitly applicable to the purpose of this study, and removing them shortened the overall length of the survey, which was rather long. The items deleted were:

1. Please indicate how often your organization develops messages for your target audiences that transcend particular research reports (or the research projects on which these research reports are based).

2. Please indicate how often your organization obtains and/or updates contact information on your target audiences.

3. Please indicate how often your organization dedicates resources to skill building amongst your target audiences.

4. Please indicate how often your organization spends time with your target audiences discussing your research reports.

5. Please indicate whether your organization dedicates part of its budget to knowledge translation activities

6. If yes, please estimate the percentage of your budget allocated to knowledge translation activities.

7. Please indicate how often your organization engages in interactive processes with target audiences to execute the research.

8. Please indicate how often your organization engages in interactive processes with target audiences to analyze/interpret the research findings.

9. Please indicate how often your organization engages in interactive processes with target audiences to respond to individual queries resulting from your knowledge translation efforts.

10. through 25. "If you answered 'yes' to 6a (use of a website), please indicate how often your organization's website offers the following options," and "If you answered 'yes' to 6b (use of a newsletter), please indicate how often your organization's newsletter contains the following material."

Table 5 summarizes the adjustments made to the survey instrument.

Table 5.

Survey Instrument Adjustments

Lavis et al. (2003a) study	Present study
Participants included directors or leaders of Canadian research organizations	Participants included leaders of health services research organizations in the United States
Sectors = health, economic/social policy	Sectors = rural health, public health, health services, minority health, community health, mental health, health administration, health policy, etc.
No inclusion	Addition of social media line of questioning (e.g., Does your organization make use of Facebook, Twitter, blogs, or LinkedIn?)
Research organizations included research groups, research groups in university departments, research groups in federal government departments, and regional health authorities	Research organizations included health services research organizations
Research organizations excluded university departments, virtual networks of researchers, consulting firms, market research firms, professional membership organizations, lab-based research groups and those that had existed for less than one year	Research organizations excluded non-health related university groups, virtual networks of researchers, consulting firms, market research firms, and professional membership organizations; also excluded lab-based research groups and those that have existed for less than one year
Paper-based survey administration	Web-based survey administration
Reference to *knowledge transfer*	Reference to *knowledge translation*
No inclusion	Inclusion of question that asked participants to indicate their research organization's specialty
No inclusion	Inclusion of question that asked participants to indicate the approximate number of individuals comprising their organization
No inclusion	Inclusion of question that asked participants whether they were affiliated with a university
Line of questioning regarding how often the organizational website offered certain options	No inclusion
Line of questioning regarding how often the organizational newsletter contained certain material	No inclusion
Offer to share individual results after the completion of the study	No offer

An account was established with the online survey software tool SurveyMonkey, which was used to administer the survey and collect and export the data. SurveyMonkey is an easy-to-use, professional tool with appropriate security, exportability, and privacy functionality. The survey was created in SurveyMonkey, and participants received a web link to the survey in their emailed recruitment letter.

Pilot Study

In order to test the new survey items, ensure validity and reliability of the survey instrument, and identify any problems with the survey process before the main study, two pilot studies were conducted. Approval was first obtained from the University of North Dakota's Institutional Review Board. Details regarding each pilot study can be found in Appendix D.

Overall, conducting two pilot studies was a valuable exercise before administration of the survey instrument to the main study population. Modifications to the length and design of the survey were made to increase user friendliness and participation rate. To assess the degree of internal consistency among sets of indicators, a Cronbach's alpha coefficient was calculated for each construct that uses a Likert scale of measurement. As seen in Table 6, the Cronbach's alpha for each construct was high enough to indicate strong internal consistency among the items within each construct.

Table 6.

Reliability Analysis

	Reliability Statistics	
Construct	Cronbach's alpha	*n* of Items
Knowledge translation activities 1 (disseminating research findings)	0.880	6
Knowledge translation activities 2 (working with target audiences)	0.781	5
Investment in knowledge translation activities	0.922	7
Engagement with target audiences	0.888	5
Evaluation	0.781	5

Target Population and Participant Selection

The target population for this study was leaders of applied health services

research organizations in the United States. It resembles the target population for the

Lavis et al. (2003a) study, with the key difference being the country of origin. Lavis et

al.'s (2003a) definition of *applied* research organizations is "research groups producing

research that could be acted on by any one of four target audiences: general

public/service recipients, service providers, managerial decision makers, and policy

decision makers" (p. 230). This definition excludes clinical or lab-based research groups.

Lavis et al.'s (2003a) definition of applied *health* research organizations is "research

groups studying the effectiveness and efficiency of clinical services and health care

systems" (p. 230). Organizational leaders were selected because they are most likely

authorized to speak on behalf of their organization and they likely also have situational

awareness of knowledge translation activities across their organization.

The survey population originated from a centralized source, the AcademyHealth

membership list, which was provided by AcademyHealth at no cost to the investigator for

use in the study. AcademyHealth is a non-profit, nonpartisan resource for health services

research and policy, and it is the professional home for health services researchers, policy

analysts, and practitioners, representing almost 4,000 individual members and 125

affiliated organizations in the United States and abroad. Thus, the survey sample was a

non-probabilistic convenience sample. Email addresses were not included in the

membership list because of the organization's strict privacy policy, so email addresses for

each of the 745 potential participants were manually identified via Internet searches and

telephone inquiries.

The survey population was filtered based on similar criteria as determined in the

Lavis et al. (2003a) study. The following populations were excluded: marketing-research

firms, professional membership organizations, virtual networks of researchers, research

groups that had existed for less than one year, and individuals not based in the United

States. (In the Lavis et al. (2003a) study, individuals not based in Canada were excluded.)

The following populations in the United States were included: health services research

centers, departments, and organizations. The result was a survey population of 745.

Data Collection

As in the pilot studies, the investigator initiated contact with the potential

participants through an emailed recruitment letter with a web link to the online survey

hosted by SurveyMonkey. The first letter, sent on July 12, 2012, introduced the

investigator, described the study, explained the survey process, and provided the potential

participants an opportunity to assess the risks of the study before volunteering to

participate. The letter also explained that the survey would take about 10–15 minutes to

complete and that responses would be confidential. Finally, the letter gave participants

the option to "opt out" of the study and list their name on a "do not contact list" within SurveyMonkey. Fourteen individuals selected the opt-out option. Eleven days later, 626 non-responders were emailed a second request for participation. This request contained a letter of support from AcademyHealth President and CEO Lisa Simpson, M.B., B.Ch., M.P.H., FAAP. Copies of both letters can be found in Appendix E. All participants who complete the survey or opted out of the survey received an auto-generated thank you note.

Permission was gained in advance from all participants. In the recruitment letter, they were provided with a web link to the survey, which began with a review of the informed consent information. At the end of the informed consent section, participants were asked to select "Yes" to indicate that the research study was explained to them, that their questions had been answered, and that they agreed to take part in the study. By selecting "Yes," 153 participants were able to continue on with the survey. Those who selected "No" (four individuals in total) received a note thanking them for their consideration, and they were subsequently not allowed to take the survey. All participant information is kept confidential at the investigator's home in secure files and a secure, password-enabled, encrypted server on the home network. Data are also stored on an offsite server under 256-bit encryption. All data were captured utilizing the SurveyMonkey software and were transferred to the statistical program SPSS for analysis by the investigator.

Data Preparation

Sample Size and Missing Data

From the original population of 745 people, this study received an initial sample size of 157 records. However, not all of the records were usable. Four records were removed because the participants chose not to participate and rejected the Informed Consent. Thirty-nine records were removed due to a lack of item responses beyond the acceptance of Informed Consent. Responses for each item varied between 100 and 114, with an overall response rate of 15.3%. In cases where participants skipped an item on the survey, a blank cell was imported into SPSS.

Alpha Level

Given the exploratory nature of this study, an alpha of 0.05 was used so as to be more inclusive of potentially important variables. This significance level is often used in the social sciences.

Coding, Recoding, and Corroborating

Each of the three variables of interest (university affiliation, organizational size, organizational specialty) were tested across research sub-questions 1, 2, 3, 4, and 5 (message, end users, messenger, engagement, and evaluation, respectively) to examine whether they affected the knowledge translation practices of health services research organizations. In order to do this, the variables were calculated and recoded and their means and standard deviations were determined, as described below. The fourth variable of interest, geographic location in terms of rurality, was not supported by data and was subsequently not examined. In addition, responses to the qualitative items were sorted into categories for analysis.

Variable 1: University Affiliation

The question, "Is your organization based at or affiliated with a university?" was developed to determine whether an organization's affiliation (or lack thereof) with a university had an impact on knowledge translation practices. Respondents identified their affiliation (or lack thereof). To corroborate the accuracy of the responses, the investigator manually coded the entire survey population (N = 745) for university affiliation and found a similar percentage of university-affiliated research organizations. It should be noted that the survey participants self-selected their university affiliation, whereas the investigator determined university affiliation based on the employing organization.

Variable 2: Organizational Size

The instruction, "Please indicate the approximate number of individuals comprising your organization," was developed in order to determine whether organizational size had an impact on knowledge translation practices of responding organizations. Respondents selected from the following categories: 1-10, 11-20, 21-30, 31-40, 41-50, 51-75, 76-100, 101-150, 151-200, 201-300, 301-400, 401-500, 501-700, 701-900, and more than 900. This proved too many categories to analyze effectively, so results were collapsed into four categories: 1-20, 21-100, 101-900, and 901 or greater, based on an even distribution of the sample. A map of the recoding process is available in Appendix H.

Variable 3: Organizational Specialty

The instruction, "Please indicate your research organization's specialty," was developed in order to determine whether organizational specialty had an impact on

survey responses. Respondents selected from the following categories: public health, international health, rural health, health equity, indigent populations, population health, health policy, prevention, medicine, behavioral health, health economics, and other. The "other" open-ended category had 45 various responses. Results were recoded into the following six new categories based on response similarities: public health, health policy and economics, special populations, quality and performance, health services or clinical research, and medicine and health systems. A map of the recoding process is available in Appendix F.

Variable 4: Geographic Location (Urban/Rural)

Participants were asked to provide their zip code in order to determine whether their organization's geographic location in terms of rurality had any bearing on knowledge translation practices. Each zip code was coded to its rural-urban commuting area (RUCA) code. RUCA codes were created based on 2000 Census commuting data and 2004 zip codes and made available by the Washington, Wyoming, Alaska, Montana, and Idaho (WWAMI) Rural Health Research Center (2005). There are ten primary codes, with 1 equaling a metropolitan area with a primary flow within an urbanized area (i.e., 1=the most urban area) and 10 equaling a rural area with a primary flow to a tract outside an urban area or urban cluster (i.e., 10=the most rural area). There are 33 sub-categories that further specify the zip code areas. To corroborate accuracy of the responses, the investigator coded the self-reported zip codes of the entire survey population (N = 745) using RUCA codes.

Qualitative Items

Items 20 and 21 of the survey instrument were optional open-ended inquiries to gather additional data about 1) what respondents thought target audiences could do to facilitate their knowledge translation efforts, and 2) what they thought funders (e.g., governments, granting agencies, foundations) could do to facilitate their knowledge translation efforts. The qualitative data analysis process included exporting the responses into a double-spaced Word document. The document was then read and coded, using both color codes and notations, for key words and concepts related to the research questions. Similar words or concepts in the document received the same code. Through the coding process, eight codes were identified based on similar characteristics. A complete list of the codes is available in Appendix I.

Tests

The main research question for this study was, "What are the current knowledge translation practices of health services research organizations in the United States?" To answer this question, five research sub-questions explored the areas of message, end users, messenger, engagement, and evaluation. Each research sub-question contained multiple items that were examined using four statistical tests, as summarized in Table 7.

Table 7.

Summary of Variables of Interest and Statistical Tests

Variable Name	Recoded Values	Statistical Test	Corresponding Research Question
University Affiliation	• University-affiliated • Non-university-affiliated	• *t* test • Chi-Square • Means	1 (Message) 2 (End Users) 3 (Messenger) 4 (Engagement) 5 (Evaluation)
Organizational Size	• 1-20 • 21-100 • 101-900 • 901+	• ANOVA • Means	1 (Message) 2 (End Users) 3 (Messenger) 4 (Engagement) 5 (Evaluation)
Organizational Specialty	• Public health • Health policy and economics • Special populations • Quality and performance • Health services or clinical research • Medicine and health systems	• ANOVA • Means	1 (Message) 2 (End Users) 3 (Messenger) 4 (Engagement) 5 (Evaluation)
Geographic Location (Urban/Rural)	• Metropolitan • Micropolitan	None	None

Test 1: Comparing university-affiliated research organizations with non-university-affiliated research organizations.

The Lavis et al. (2003a) study did not examine whether the university affiliation

of a research organization had an effect on knowledge translation practices, so to

determine this relationship, a two-tailed *t* test was used to compare university-affiliated

health services research organizations with non-university-affiliated health services

research organizations across several knowledge translation activities related to message,

end users, messenger, engagement, and evaluation. This identified whether the means of

the two groups were statistically different from one another and tested for the possibility

of the relationship in both directions. These tests were designed to answer research sub-

questions 1 (message), 2 (end users), 3 (messenger), 4 (engagement), and 5 (evaluation).

Test 2: Comparing each category of research organization with the three variables of interest.

The literature discussed in Chapter II suggests that organizational size and/or

specialty may have an effect on the knowledge translation practices of health services

research organizations (the fourth original variable of interest, geographic location in

terms of rurality, was found to be unsupported by data during the data preparation phase).

To explore variations across the four organizational size categories and the six

organizational specialty categories, analyses of variance (ANOVAs) were used, applying

Tukey's multiple comparison test for post-hoc analyses when the ANOVA was

significant at $p < 0.05$. These tests were designed to answer research sub-questions 1

(message), 2 (end users), 3 (messenger), 4 (engagement), and 5 (evaluation).

Test 3: Comparing university and non-university-affiliated research organizations with nominal variables.

The literature discussed in Chapter II indicates the use of social media tools is an

effective way for research organizations to share their research findings with end users.

However, social media tools were not examined in the Lavis et al. (2003a) study. To

explore variations across the two types of organizations involved in this study

(university- and non-university-affiliated) Chi-Square tests of significance were used to

test the social media items, which were nominal variables. Chi-Square tests of

significance also were used to test the employment of dedicated knowledge translation

staff and the use of incentives for knowledge translation activities, as the Lavis et al.

(2003a) study indicated these items are leading knowledge translation practices. These tests were designed to answer research sub-questions 3 (messenger) and 4 (engagement).

Test 4: Comparing the means of university-affiliated, non-university-affiliated, and all research organizations.

In order to examine the frequency with which research organizations conduct the range of knowledge translation activities identified in the survey instrument and examined previously by Lavis et al. (2003a) for Canadian health services research organizations, the means were calculated for each item, including the mean for all respondents, for those indicating a university affiliation, and for those indicating a non-university affiliation. The means demonstrate the frequency of the research organizations' particular knowledge translation activities, as the responses were on a Likert scale. The Likert scale items were as follows: 1 (never), 2 (rarely), 3 (occasionally), 4 (frequently), and 5 (always). These tests were designed to answer research sub-questions 1 (message), 2 (end users), 3 (messenger), 4 (engagement), and 5 (evaluation), and they also directly answer the main research question, which was, "What are the current knowledge translation practices of health services research organizations?"

Chapter Summary

The purpose of this study was to determine the degree to which research organizations translate knowledge in ways consistent with the empirical evidence and to determine whether university affiliation, organizational specialty or size, or geographic location in terms of rurality explained any variation in responses. Although not a true replication, this research was heavily influenced by a 2003 Canadian study by Lavis et al., but it included new criteria to address changes in the knowledge translation

environment and unexamined facets that may influence translation practices. The Lavis survey was modified, with permission, for use in this study and was electronically distributed to an identified population of leaders of health services research organizations in the United States.

CHAPTER IV

FINDINGS

Introduction

The purpose of this study was to examine the knowledge translation practices of health services research organizations. Chapter III contained a description of the study methods including discussions about the survey instrument, survey population, data collection methods, and data analysis. This chapter presents the results of statistical testing of the data, organized initially by the descriptive statistics and then by each of the five supporting sub-research questions (message, end users, messenger, engagement, and evaluation), and finally a summary of the significant findings.

Descriptive Statistics

Each of the three variables of interest (university affiliation, organizational size, and organizational specialty) were tested across research sub-questions 1 (message), 2 (end users), 3 (messenger), 4 (engagement), and 5 (evaluation) to examine whether they affected the knowledge translation practices of health services research organizations. As described in Chapter III, one of the original variables of interest, geographic location in terms of rurality, was unsupported by data and subsequently not examined. In order to test the variables of interest, they were calculated, recoded, and calculated again, and their means and standard deviations were determined, as described below.

Of the 745 individuals who were invited to participate in this study, participant responses for each item in the survey varied between 100 and 114 responses, resulting in

a 13.4% to 15.3% response rate, respectively. Descriptive information about the sample

population is presented in Table 8.

Table 8.

Descriptive Statistics Regarding University Affiliation, Organizational Size,
Organizational Specialty, and Geographic Location

Characteristics	*n*	%
University Affiliation (n = 110)		
University affiliation	28	25.5
No university affiliation	82	74.5
Organizational Size (# of employees) (n = 110)		
1-20	33	30.0
21-100	28	25.4
101-900	18	16.3
901+	31	28.1
Organizational Specialty (n = 105)		
Public Health	17	16.2
Health Policy and Economics	36	34.3
Special Populations	18	17.1
Quality and Performance	5	4.8
Health Services/Clinical Research	9	8.6
Medicine and Health Systems	20	19.0
Geographic Location (n = 109)		
Metropolitan	105	96.3
Micropolitan	4	3.6

The next section describes characteristics about the sample population by

identifying details regarding each of the four independent variables of interest (university

affiliation, organizational specialty, size, and geographic location in terms of rurality).

Details about how the variables do or do not influence each of the five research sub-

questions and the overarching main research question can be found in Chapter V.

Variable 1: University Affiliation

The question, "Is your organization based at or affiliated with a university?" was developed in order to determine whether a relationship exists between organizations' university affiliation (or lack thereof) and their knowledge translation practices. The percentage of respondents indicating a university affiliation was 25.5% ($n = 28$), and those without a university affiliation comprised 74.5% ($n = 82$). To corroborate accuracy of these percentages, the investigator manually coded the entire survey population ($N = 745$) for university affiliation and found that 22.7% ($n = 138$) of individuals possessed university affiliations. It should be noted that the survey participants self-selected their university affiliation, whereas the investigator determined university affiliation based on employing organization.

Variable 2: Organizational Size

The request, "Please indicate the approximate number of individuals comprising your organization," was developed in order to determine whether a relationship exists between organizations' size and their knowledge translation practices. Of the survey participants, 110 answered this item. Responses were as follows: 1-20 employees ($n = 34$), 21-100 employees ($n = 28$), 101-900 employees ($n = 18$), and more than 901 employees ($n = 30$). A graphic depiction of the results appears in Figure 3.
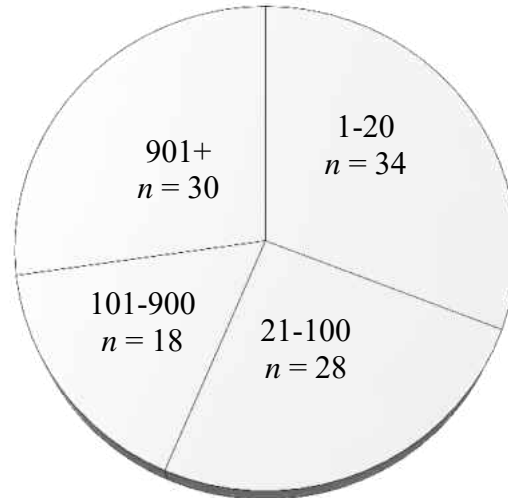
Figure 3. Organizational Size

Through the examination of the data, it became apparent that there may have been a discrepancy with this item. The purpose of examining organizational size was to determine whether the size of the respondents' *entire* organization affected knowledge translation practices. Some respondents may have interpreted *organization* to mean *department* or *division*, whereas some may have interpreted it as *entire organization.* There is no way to determine this, but it should be noted that the item was possibly not explicit enough, which may have affected responses.

Variable 3: Organizational Specialty

The request, "Please indicate your research organization's specialty," was developed in order to determine whether a relationship exists between organizations' specialty and their knowledge translation practices. Of the survey participants, 110 answered this item. Responses were as follows: public health ($n = 17$), health policy and economics ($n = 39$), special populations ($n = 18$), quality and performance ($n = 8$), health

services or clinical research ($n = 4$), and medicine and health systems ($n = 19$). A

graphical depiction of the results is seen in Figure 4.
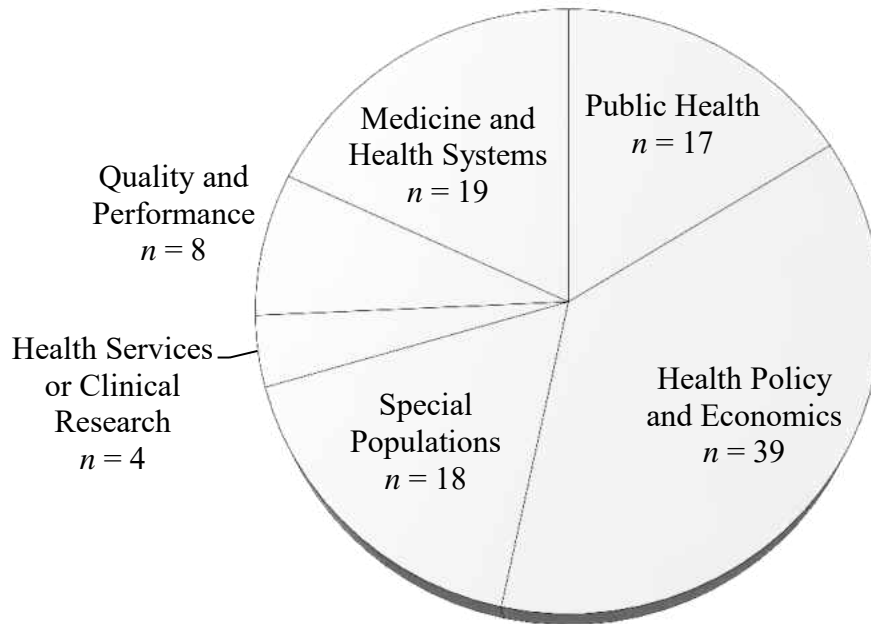
Figure 4. Organizational Specialty

Variable 4: Geographic Location (Urban/Rural)

Participants were asked to provide their zip code in order to determine whether

their organization's geographic location in terms of rurality had any bearing on

knowledge translation practices. There were 109 complete responses to this item; one

respondent provided a false zip code, "00000." Each legitimate zip code was coded to its

rural-urban commuting area (RUCA) code.

Of the respondents, 96.3% ($n = 105$) reported being located in a metropolitan

area, and 3.6% ($n = 4$) reported being located in a micropolitan (e.g., large rural city or

town) area. To corroborate accuracy of these figures, the investigator coded the self-

reported zip codes of the entire survey population (N = 745) using RUCA codes and

found 97.5% ($n = 727$) of individuals who reported being located in a metropolitan area,

2.1% ($n = 16$) who reported being located in a micropolitan area, and 0.3% ($n = 2$) who

reported being located in a small town (between 2,500 and 9,999 residents). The data

indicated the vast majority of research organizations are located in metropolitan areas,

with very few being located in micropolitan areas or small towns. The micropolitan

category of the sample population was not large enough to test effectively; therefore,

geographic location in terms of rurality, determined by using RUCA codes, was not

examined as a variable.

Results from Statistical Tests

In order to determine an answer to the main research question, "What are the

knowledge translation practices of health services research organizations in the United

States?" this section identifies survey responses related to each of the five research sub-

questions and tests each of the items within each sub-question against the variables of

interest to determine their impact using means comparison, t tests, ANOVAs, and Chi-

Square tests. The alpha level was set at the .05 for the purpose of this study. Because

there are five research sub-questions, multiple items within each research sub-question,

and multiple tests (over 100) conducted, the data are extensive. The following "signpost"

graphic (Figure 5) is used throughout this section to clarify which research sub-question

is being answered (outer circle), which variable is being examined (inner circle), and

which statistical test is being used (inner circle, italicized):

Figure 5. Signpost Graphic

Research Sub-Question 1: What do research organizations translate to their end users and at what cost? (Message)

To respond to this research question, the respondents were asked to indicate how often their organization performs the following research activities (question 3 from the survey instrument):

a. Provides at cost and upon request full reports on research projects.

b. Provides free upon request full reports on research projects, either in hard copy or electronically.

c. Mails or emails full reports on research projects to end users.

d. Provides free upon request brief summaries of research reports.

e. Mails or emails brief summaries of research reports to end users.

f. Develops messages for end users that specify action.

Table 9 displays the mean responses to each item and presents the data by organizations with and without university affiliation. The item responses have been placed in rank order, from highest to lowest overall mean, to demonstrate the knowledge translation activities performed most and least often by organizations. The activities

conducted with the highest frequency were providing brief summaries and full reports of research reports free and upon request, which were high "occasionally" and almost "frequently" on the survey's Likert scale. The activity conducted with the lowest frequency was providing full research reports at cost and upon request, falling between "rarely" and "occasionally" on the Likert scale.

Table 9.

Means Comparison: Messages and University Affiliation

Knowledge Translation Activity	U-Affil Mean	No U-Affil Mean	Overall Mean
Provides free upon request brief summaries of research reports	3.963	3.585	3.679
Provides free upon request full reports on research projects, either in hard copy or electronically	3.929	3.593	3.679
Mails or emails brief summaries of research reports to end users	3.630	3.630	3.630
Develops messages for end users that specify action	3.036	3.580	3.440
Mails or emails full reports on research projects to end users	3.464	3.195	3.264
Provides at cost and upon request full reports on research projects	2.821	2.463	2.556

*$p < .05$

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A two-tailed *t* test (assuming equal variances) tested for differences in knowledge translation activities among organizations with or without university affiliation. The data presented one item of significance: developing messages for end users that specify action between organizations with a university affiliation (M = 3.0357, SD = 1.13797), and organizations with no university affiliation (M = 3.5802, SD = 1.07080). The results, depicted in Table 10, show that non-university-affiliated research organizations develop messages for end users that specify action with a significantly higher frequency than university-affiliated research organizations.

Table 10.

T *Tests for Messages Based on University Affiliation*

Translation Activity		U-Affil	No U-Affil	Df	T Stat	P
Provides full reports at cost upon request	Mean	2.821	2.463	106	-1.167	0.246
	Standard Deviation	1.517	1.359			
	Observations	28	80			
Provides full reports free upon request via mail or email	Mean	3.929	3.593	107	-1.288	0.200
	Standard Deviation	1.233	1.052			
	Observations	28	81			
Mails or emails full reports to end users	Mean	3.464	3.195	108	-1.058	0.292
	Standard Deviation	1.170	1.159			
	Observations	28	82			
Provides free upon request brief summaries	Mean	3.963	3.585	107	-1.516	0.133
	Standard Deviation	1.170	1.159			
	Observations	27	82			
Mails or emails brief summaries to end users	Mean	3.630	3.630	106	0.000	1.000
	Standard Deviation	1.115	1.101			
	Observations	27	81			
Develops messages for end users that specify action	Mean	3.036	3.580	107	2.283	**0.024***
	Standard Deviation	1.138	1.071			
	Observations	28	81			

*p < .05

A one-way analysis of variance (ANOVA) tested for differences in knowledge translation activities among the four categories of organizational size. The results, shown in Table 11, show small organizations (1-20 employees and 21-100 employees) provide full reports free upon request with a higher

frequency than large organizations (101-900 employees and 901+ employees), explained

in more detail in Table 12.

Table 11.

Analysis of Variance for Messages Based on Organizational Size

Source of Variation		Sum of Squares	Df	Mean Square	F	Sig
Provides full reports at cost upon request	Between Groups	9.551	3	3.184	1.646	0.183
	Within Groups	201.115	104	1.934		
	Total	210.667	107			
Provides full reports free upon request via mail or email	Between Groups	14.002	3	4.667	3.507	**0.018***
	Within Groups	139.759	105	1.331		
	Total	153.761	108			
Mails or emails full reports to end users	Between Groups	4.582	3	1.527	1.134	0.339
	Within Groups	142.772	106	1.347		
	Total	147.355	109			
Provides free upon request brief summaries	Between Groups	6.311	3	2.104	1.680	0.176
	Within Groups	131.450	105	1.252		
	Total	137.761	108			
Mails or emails brief summaries to end users	Between Groups	6.638	3	2.213	1.848	0.143
	Within Groups	124.547	104	1.198		
	Total	131.185	107			
Develops messages for end users that specify action	Between Groups	3.893	3	1.298	1.056	0.371
	Within Groups	128.969	105	1.228		
	Total	132.862	108			

*p < .05

Table 12.

Analysis of Variance for Providing Full Reports Free Upon Request Based on Organizational Size

Organizational Size	Mean	SD	N		
1-20	3.765	1.257	34		
21-100	4.179	1.020	28		
101-900	3.167	1.150	18		
901+	3.414	1.150	29		
Source of Variation	SS	Df	MS	F	Sig.
Organizational Size	14.002	3	4.667	3.507	**.0180***
Total	153.761	108			

*p < .05

A two-tailed *t* test (assuming equal variances) tested whether there were any differences in knowledge translation activities between six categories of organizational specialties. The results, depicted in Table 13, show that there was not a significant difference between organizational specialties for any of the knowledge translation activities.
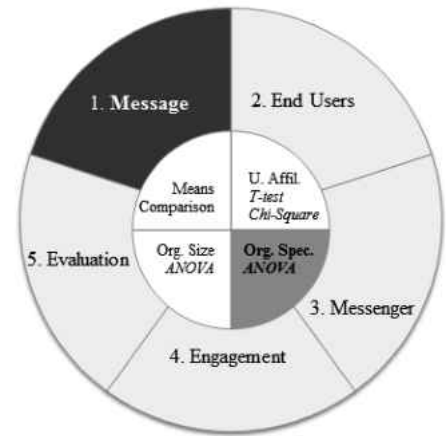
Table 13.

Analysis of Variance for Messages Based on Organizational Specialty

Source of Variation		Sum of Squares	Df	Mean Square	F	Sig
Provides full reports at cost upon request	Between Groups	6.252	5	1.250	0.632	0.675
	Within Groups	193.748	98	1.977		
	Total	200.000	103			
Provides full reports free upon request via mail or email	Between Groups	3.265	5	0.653	0.447	0.814
	Within Groups	144.583	99	1.460		
	Total	147.848	104			
Mails or emails full reports to end users	Between Groups	5.048	5	1.010	0.725	0.607
	Within Groups	137.942	99	1.393		
	Total	142.990	104			
Provides free upon request brief summaries	Between Groups	5.185	5	1.037	0.813	0.543
	Within Groups	124.969	98	1.275		
	Total	130.154	103			
Mails or emails brief summaries to end users	Between Groups	6.485	5	1.297	1.092	0.370
	Within Groups	115.224	97	1.188		
	Total	121.709	102			
Develops messages for end users that specify action	Between Groups	4.106	5	0.821	0.695	0.629
	Within Groups	115.808	98	1.182		
	Total	119.913	103			

*$p < .05$

To summarize the answer to research sub-question 1, "What do research organizations translate to their end users and at what cost?" the data show that research organizations occasionally provide brief summaries of research reports free and upon request (the highest translation activity in this section). They rarely provide full research reports at cost and upon request (the lowest translation activity in this section). University affiliation is a statistically significant variable affecting the development of messages for end users that specify action; non-university-affiliated research organizations conduct this activity with a higher frequency. Organizational size is a statistically significant variable affecting the provision of full reports free upon request, as small organizations provide them with a higher frequency than large organizations. Organizational specialty was not statistically significant.

Research Sub-Question 2: To whom do research organizations translate research knowledge, and what investments are made to target end users? (End Users)

To respond to research sub-question 2, the respondents were asked how often their organization translates research to each of the following categories of potential users of research findings (question 2 from the survey instrument):

a. Targets general public or service recipients (e.g., voters, patients, clients).

b. Targets service providers (e.g., clinicians).

c. Targets managers in publically funded facilities or enterprises (e.g., hospitals), planning regions (e.g., regional health authorities), or private organizations/businesses.

d. Targets policymakers in municipal or federal governments.

Respondents also were asked to identify how frequently their organization invests in the following knowledge translation activities (question 4 from the survey instrument):

a. Tailors knowledge translation approach to specific end users.

b. Tailors mailings or emails to specific end users.

c. Dedicates resources to getting to know end users.

d. Spends time with end users discussing research reports.

e. Spends time with end users discussing ideas for possible action.

Table 14 displays the mean responses to each item and presents the data by organizations with and without university affiliation. The item responses have been placed in rank order, from highest to lowest overall mean, in order to demonstrate the end users targeted most and least often by organizations, as well as the investments made most and least frequently. The end users research organizations translate research knowledge to with the highest frequency are policymakers, falling just short of "frequently" on the survey's Likert scale. The end users targeted with the lowest frequency are the general public or service recipients, falling halfway between "occasionally" and "frequently." This finding demonstrates that research organizations are targeting key stakeholders and end users that correspond to the evidence presented in Chapter II. With regards to investments made to target end users, research organizations most frequently tailor their approaches to specific audiences and least frequently spend time with end users discussing ideas for possible action.

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Table 14.

Means Comparison: End Users and University Affiliation

Proportion Reporting Knowledge Translation to the Following End Users	U-Affil Mean	No U-Affil Mean	Overall Mean
Targets policymakers	3.821	3.793	3.800
Targets service providers	3.893	3.663	3.722
Targets managers in public or private organizations	4.000	3.610	3.710
Targets general public or service recipients	3.536	3.420	3.450
Proportion Reporting Investment in the Following Knowledge Translation Activities			
Tailors knowledge translation approach to specific end users	3.714	3.854	3.818
Tailors mailings or emails to specific end users	3.500	3.756	3.691
Spends time with end users discussing research reports	3.464	3.691	3.633
Dedicates resources to getting to know end users	3.500	3.671	3.628
Spends time with end users discussing ideas for possible action	3.429	3.549	3.519

*$p < .05$

A two-tailed *t* test (assuming equal variances) tested for differences in end users and investment of knowledge translation activities between organizations with or without a university affiliation, as outlined in Table 15. The results show that there is no difference between university and non-university-affiliated research organizations in targeting specified end users or investing in knowledge translation activities.

Table 15.

T Tests for End Users Based on University Affiliation

End Users and Investment Activities		U	Non-U	Df	T Stat	P
Targets general public or service recipients	Mean	3.536	3.420	107	-0.498	0.619
	Standard Deviation	1.071	1.060			
	Observations	28	81			
Targets service providers	Mean	3.893	3.663	106	-1.099	0.274
	Standard Deviation	1.066	0.913			
	Observations	28	80			
Targets managers in public or private organizations	Mean	4.000	3.610	108	-1.821	0.071
	Standard Deviation	0.943	0.991			
	Observations	28	80			
Targets policymakers	Mean	3.821	3.793	108	-0.134	0.894
	Standard Deviation	1.156	0.913			
	Observations	28	82			
Dedicates resources to getting to know end users	Mean	3.500	3.671	108	0.791	0.431
	Standard Deviation	1.262	0.876			
	Observations	28	82			
Tailors mailings or emails to specific end users	Mean	3.500	3.760	108	1.203	0.232
	Standard Deviation	1.072	0.937			
	Observations	28	82			
Tailors knowledge translation approach to specific end users	Mean	3.714	3.854	108	0.643	0.522
	Standard Deviation	1.213	0.904			
	Observations	28	82			
Spends time with end users discussing research reports	Mean	3.464	3.691	107	1.141	0.257
	Standard Deviation	0.999	0.875			
	Observations	28	81			
Spends time with end users discussing ideas for possible action	Mean	3.429	3.549	108	0.618	0.538
	Standard Deviation	0.836	0.905			
	Observations	28	82			

*p < .05

A one-way ANOVA tested for differences in end users and investment of knowledge translation activities among the four categories of organizational size. The results, shown in Table 16, indicate small organizations (21-100 employees) target policymakers with a statistically significant higher frequency than large organizations (901+ employees), as explained in more detail in Table 17. This finding was the only item of significance to result from this test; for all other items, organizational size did not contribute to variation in response.

Table 16.

Analysis of Variance for End Users Based on Organizational Size

Source of Variation	Sum of Squares	Sum of Squares	Df	Mean Square	F	Sig
Targets general public or service recipients	Between Groups	2.594	3	0.865	0.767	0.515
	Within Groups	118.378	105	1.127		
	Total	120.972	108			
Targets service providers	Between Groups	1.021	3	0.340	0.366	0.778
	Within Groups	96.646	104	0.929		
	Total	97.667	107			
Targets managers in public or private organizations	Between Groups	0.748	3	0.249	0.249	0.862
	Within Groups	105.943	106	0.999		
	Total	106.691	109			
Targets policymakers	Between Groups	10.478	3	3.493	3.976	**0.010***
	Within Groups	93.122	106	0.879		
	Total	103.600	109			
Dedicates resources to getting to know end users	Between Groups	2.029	3	0.676	0.692	0.559
	Within Groups	103.689	106	0.978		
	Total	105.718	109			
Tailors mailings or emails to specific end users	Between Groups	0.473	3	0.158	0.162	0.921
	Within Groups	103.018	106	0.972		
	Total	103.491	109			
Tailors knowledge translation approach to specific end users	Between Groups	0.249	3	0.083	0.083	0.969
	Within Groups	106.114	106	1.001		
	Total	106.364	109			
Spends time with end users discussing research reports	Between Groups	4.756	3	1.585	1.969	0.123
	Within Groups	84.565	105	0.805		
	Total	89.321	108			
Spends time with end users discussing ideas for action	Between Groups	3.201	3	1.067	1.375	0.254
	Within Groups	82.263	106	0.776		
	Total	85.464	109			

*p < .05

Table 17.

Analysis of Variance for Targeting Policymakers Based on Organizational Size

Organizational Size	Mean	SD	N		
1-20	3.824	1.029	34		
21-100	4.214	0.630	28		
101-900	3.833	0.707	18		
901+	3.367	1.159	30		
Source of Variation	SS	df	MS	F	Sig.
Organizational Size	10.478	3	3.493	3.976	**0.010***
Total	103.600	109			

*$p < .05$

A one-way ANOVA tested for differences in end users and knowledge translation investment activities among six categories of organizational specialty. The results, depicted in Table 18, indicate organizations that specialize in health policy and economics target policymakers with a statistically significant higher frequency than organizations with other specialties, explained in more detail in Table 19. The results also show that organizations that specialize in quality improvement and performance target service providers with a statistically significant higher frequency than organizations with other specialties, as seen in Table 20. Organizational specialty did not indicate any other variation in response.
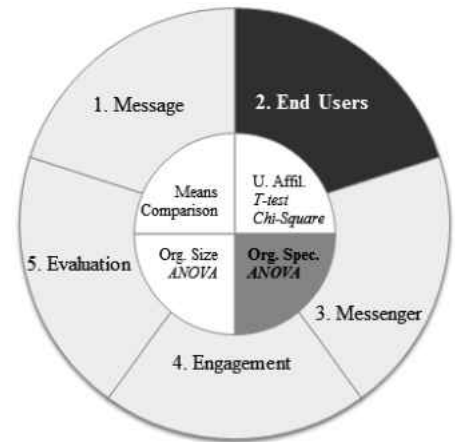
Table 18.

Analysis of Variance for End Users Based on Organizational Specialty

Source of Variation		Sum of Squares	Df	Mean Square	F	Sig
Targets general public or service recipients	Between Groups	4.382	5	0.876	0.759	0.581
	Within Groups	113.147	98	1.155		
	Total	117.529	103			
Targets service providers	Between Groups	10.528	5	2.106	2.379	**0.044***
	Within Groups	85.860	97	0.885		
	Total	96.388	102			
Targets managers in public or private organizations	Between Groups	0.220	5	0.044	0.041	0.999
	Within Groups	105.209	99	1.063		
	Total	105.429	104			
Targets policymakers	Between Groups	12.354	5	2.471	2.747	**0.023***
	Within Groups	89.036	99	0.899		
	Total	101.390	104			
Dedicate resources to getting to know end users	Between Groups	8.158	5	1.632	1.712	0.139
	Within Groups	94.356	99	0.953		
	Total	102.514	104			
Tailor mailings or emails to specific end users	Between Groups	5.514	5	1.103	1.143	0.343
	Within Groups	95.476	99	0.964		
	Total	100.990	104			
Tailor knowledge translation approach to specific end users	Between Groups	10.324	5	2.065	2.193	0.061
	Within Groups	93.237	99	0.942		
	Total	103.562	104			
Spend time with end users discussing research reports	Between Groups	1.305	5	0.261	0.302	0.911
	Within Groups	84.810	98	0.865		
	Total	86.115	103			
Spend time with end users discussing ideas for possible action	Between Groups	3.522	5	0.704	0.886	0.494
	Within Groups	78.725	99	0.795		
	Total	82.248	104			

*$p < .05$

Table 19.

Analysis of Variance for Targeting Policymakers Based on Organizational Specialty

Organizational Specialty	Mean	SD	N		
Public Health	4.059	0.659	17		
Health Policy and Economics	4.077	0.929	39		
Special Populations	3.556	1.042	18		
Quality and Performance	2.750	1.708	4		
HSR or Clinical Research	3.750	0.886	8		
Medicine and Health Systems	3.421	0.961	19		
Source of Variation	SS	Df	MS	F	Sig.
Organizational Specialty	12.354	5	2.471	2.747	**0.023***
Total	101.390	104			

*$p < .05$

Table 20.

Analysis of Variance for Targeting Service Providers Based on Organizational Specialty

Organizational Specialty	Mean	SD	N		
Public Health	3.882	0.928	17		
Health Policy and Economics	3.421	0.948	38		
Special Populations	3.611	1.195	18		
Quality and Performance	4.750	0.500	4		
HSR or Clinical Research	3.857	0.690	7		
Medicine and Health Systems	4.054	0.780	19		
Source of Variation	SS	Df	MS	F	Sig.
Organizational Specialty	10.528	5	2.106	2.379	**0.044***
Total	96.388	102			

*$p < .05$

To summarize the answer to research sub-question 2, "To whom do research organizations translate research knowledge, and what investments are made to target end users?" the data show the end users to whom research organizations translate research knowledge with the highest frequency are policymakers, doing so just short of "frequently." This finding demonstrates that these research organizations are targeting key stakeholders and end users that correspond to the evidence presented in Chapter II.

Organizational size is a statistically significant variable affecting the targeting of end users, as small organizations target policymakers with a higher frequency than large organizations. Organizational specialty is a statistically significant variable affecting the targeting of policymakers with research findings, as organizations that specialize in health policy and economics target policymakers with a higher frequency than other research organizations, and organizations specializing in quality performance and measurement target service providers with a higher frequency than other research organizations. University affiliation was not found to be a statistically significant variable.

Research Sub-Question 3: By whom is the research knowledge translated and with what investments in assisting them? (Messenger)

In order to respond to research sub-question 3, respondents were asked to indicate how often their organization invests in knowledge translation in the following ways (question 5 from the survey instrument):

a. Dedicates resources to getting to know the research literature about effective approaches to knowledge translation.

b. Dedicates resources to skill building amongst knowledge translation staff (e.g., pays for conferences or courses about knowledge translation).

c. Dedicates resources to learning about what constitutes a credible messenger for end users (e.g., background and approach) and ensuring knowledge translation staff meet these expectations.

d. Dedicates resources to identifying opinion leaders and working with them to translate research findings.

e. Dedicates resources to developing relationships with print, radio, and/or television journalists.

f. Knowledge translation staff knows of and interacts with people performing similar roles in other research organizations.

g. Knowledge translation staff subscribes to and shares information from listservs about knowledge translation.

The respondents were asked to indicate whether their organization employs dedicated staff with knowledge translation duties (question 7 from the survey instrument). Almost half of the organizations ($n = 55$) reported employing dedicated staff, as seen in Table 21.

Table 21.

Organizations with Dedicated Knowledge Translation Staff

	Frequency	Valid Percent
No	59	51.8
Yes	55	48.2

Perhaps more noteworthy is the 51.8% ($n = 59$) of organizations who do not employ dedicated staff with knowledge translation duties. Who then, if anyone, is conducting knowledge translation activities? The respondents were asked to indicate whether they have knowledge translation duties within their organization (question 9 from the survey instrument). More than three-quarters of respondents, 79.8% ($n = 91$), reported having knowledge translation duties, as seen in Table 22.

Table 22.

Knowledge Translation Duties for Self

	Frequency	Valid Percent
No	23	20.0
Yes	91	79.8

Respondents were asked to estimate the number of full-time equivalent staff

employed (question 8 from the survey instrument) with dedicated knowledge translation

duties. At 68.1% ($n = 32$), the majority of respondents reported having between one and

five full-time staff with dedicated duties, as seen in Table 23.

Table 23.

Estimated Number of Full-Time Staff Members Employed

	Frequency	Valid Percent
Unknown	110	70.1
1–5	32	68.1
6–10	10	21.3
21+	3	6.4
11–20	2	4.2

Respondents were asked to indicate whether their organization creates explicit

incentives for research staff to engage in knowledge translation activities (e.g.,

performance objectives related to knowledge translation) (question 10 from the survey

instrument). Almost three-quarters of respondents, 71.9% ($n = 82$), reported that their

organizations do not create incentives for research staff to engage in knowledge

translation activities, as seen in Table 24.

Table 24.

Provision of Organizational Incentives

	Frequency	Valid Percent
No	82	71.9
Yes	32	28.1

For the respondents who indicated that their organizations *do* offer incentives for

research staff to engage in knowledge translation activities, they were asked to describe

the incentives (question 11 from the survey instrument). Twenty-five individuals

responded to the open-ended item. Responses were reviewed and coded for recurring

themes, and the codes were then placed in three overarching categories: performance

reviews/job requirements, compensation, and organizational staffing/goals, as seen in

Table 25. Original responses, codes, and categories appear in Appendix G.

Table 25.

Incentives for Staff to Engage in Knowledge Translation Activities

	Frequency	Valid Percent
Performance	12	48.0
Organizational Goals	9	36.0
Compensation	4	16.0

Respondents were asked to identify their job title if they were not the head of their

organization (question 18 on the survey instrument). Sixty individuals responded to the

open-ended item. Responses were reviewed and placed into similar categories: president

or executive director, senior vice president, vice president, senior director, director,

assistant or associate director, and a category of faculty and managers. Coded responses

can be found in Table 26. Original responses and categories are available in Appendix J.

Table 26.

Job Titles

	Frequency	Valid Percent
Director	23	38.3
Assistant or Associate Director	10	16.7
Vice President	9	15.0
Senior Vice President	5	8.3
Senior Director	5	8.3
Managers President or Executive	4	6.7
Director and Faculty Members	4	6.7

If research organizations did not employ dedicated knowledge translation staff, they were asked to substitute research staff who perform knowledge translation activities. Table 27 displays the mean responses to each item for organizations with and without university affiliation. Items have been placed in rank order, from highest to lowest overall mean, in order to demonstrate the messenger-related investment activities made most and least frequently. The activity research organizations conduct with the highest frequency is identifying opinion leaders and working with them to translate research, which ranked "occasionally" on the survey's Likert scale. The activity research organizations conduct with the lowest frequency is subscribing to and sharing information from listservs about knowledge translation, falling just below "occasionally" in the "rarely" category.
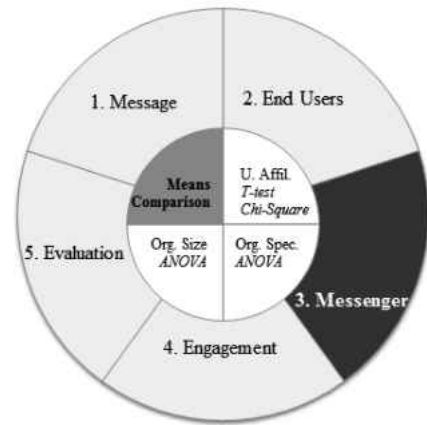
Table 27.

Means Comparison: Messengers and University Affiliation

Proportion Reporting Knowledge Translation Investment in the Following Ways	U-Affil Mean	No U-Affil Mean	Overall Mean
Dedicates resources to identifying opinion leaders and working with them to translate research	3.370	3.500	3.468
Knowledge translation staff knows of and interacts with people performing similar roles in other research organizations	3.464	3.161	3.239
Dedicates resources to developing relationships with print, radio, and/or television journalists	2.929	3.346	3.239
Dedicates resources to learning about what constitutes a credible messenger for end users (e.g., background and approach) and ensuring knowledge translation staff meet these expectations	3.107	2.975	3.010
Dedicates resources to getting to know the research literature about effective approaches to knowledge translation	3.393	2.866	3.000
Dedicates resources to skill building amongst knowledge translation staff (e.g., pays for conferences or courses about knowledge translation)	3.214	2.878	2.964
Knowledge translation staff subscribes to and shares information from listservs about knowledge translation	3.107	2.750	2.843

*$p < .05$

A two-tailed *t* test (assuming equal variances) tested for differences in messengers and investment activities among organizations with or without university affiliation, as outlined in Table 28. The results suggest that research organizations with a university affiliation dedicate resources to getting to know the research literature about effective
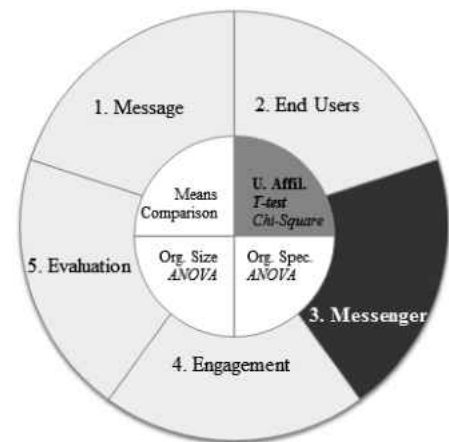
approaches to knowledge translation with a statistically significant higher frequency than

research organizations without a university affiliation. University affiliation does not

account for any other significant relationships in this item.

Table 28.

T *Tests for Messengers Based on University Affiliation*

Messenger Investment Activities		U Affil	Non-U Affil	Df	T Stat	P
Dedicates resources to getting to know the research literature about effective approaches to knowledge translation	Mean	3.393	2.866	108	-2.144	**0.034***
	Standard Deviation	1.166	1.108			
	Observations	28	82			
Dedicates resources to skill building amongst knowledge translation staff	Mean	3.214	2.878	108	-1.361	0.176
	Standard Deviation	1.287	1.070			
	Observations	28	82			
Dedicates resources to learning about what constitutes a credible messenger for end users	Mean	3.107	2.975	107	-0.507	0.613
	Standard Deviation	1.286	1.151			
	Observations	28	81			
Dedicates resources to identifying opinion leaders and working with them to translate research	Mean	3.370	3.500	107	0.627	0.532
	Standard Deviation	1.006	0.906			
	Observations	27	82			
Dedicates resources to developing relationships with print, radio, and/or television journalists	Mean	2.929	3.346	107	1.555	0.123
	Standard Deviation	1.359	1.174			
	Observations	28	81			
Knowledge translation staff knows of and interacts with people performing similar roles in other research organizations	Mean	3.464	3.161	107	-1.258	0.211
	Standard Deviation	1.201	1.066			
	Observations	28	81			
Knowledge translation staff subscribes to and shares information from listservs about knowledge translation	Mean	3.107	2.750	106	-1.278	0.204
	Standard Deviation	1.571	1.153			
	Observations	28	80			

*p < .05

A one-way ANOVA tested for differences in messengers and knowledge translation investment activities among the four categories of organizational size. The results in Table 29 show that there is no difference between the different categories of organizational size and how research organizations conduct these particular knowledge translation activities.

Table 29.

Analysis of Variance for Messengers Based on Organizational Size

Source of Variation		Sum of Squares	Df	Mean Square	F	Sig
Dedicates resources to getting to know the research literature about effective approaches to knowledge translation	Between Groups	0.434	3	0.145	0.108	0.955
	Within Groups	141.566	106	1.336		
	Total	142.000	109			
Dedicates resources to skill building amongst knowledge translation staff	Between Groups	1.494	3	0.498	0.382	0.766
	Within Groups	138.360	106	1.305		
	Total	139.855	109			
Dedicates resources to learning about what constitutes a credible messenger for end users	Between Groups	1.243	3	0.414	0.290	0.832
	Within Groups	149.748	105	1.426		
	Total	150.991	108			
Dedicates resources to identifying opinion leaders and working with them to translate research	Between Groups	3.657	3	1.219	1.431	0.238
	Within Groups	89.480	105	0.852		
	Total	93.138	108			
Dedicates resources to developing relationships with print, radio, and/or television journalists	Between Groups	3.440	3	1.147	0.751	0.524
	Within Groups	160.358	105	1.527		
	Total	163.798	108			
Knowledge translation staff knows of and interacts with people performing similar roles in other research organizations	Between Groups	1.984	3	0.661	0.535	0.659
	Within Groups	129.814	105	1.236		
	Total	131.798	108			
Knowledge translation staff subscribes to and shares information from listservs about knowledge translation	Between Groups	0.857	3	0.286	0.171	0.916
	Within Groups	173.467	104	1.668		
	Total	174.324	107			

*$p < .05$

A one-way ANOVA tested for differences in messengers and knowledge translation investment activities among the six categories of organizational specialty. The results, shown in Table 30, indicate there is a significant difference between organizations of different specialties; organizations specializing in health policy and economics dedicate resources to identifying opinion leaders and work with them to translate research with a higher frequency than other organizations, explained in further detail in Table 31.
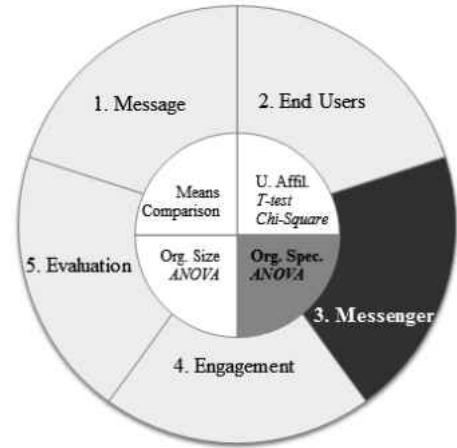
Table 30.

Analysis of Variance for Messengers Based on Organizational Specialty

Source of Variation		Sum of Squares	Df	Mean Square	F	Sig
Dedicates resources to getting to know the research literature about effective approaches to knowledge translation	Between Groups	10.214	5	2.043	1.621	0.162
	Within Groups	124.777	99	1.260		
	Total	134.990	104			
Dedicates resources to skill building amongst knowledge translation staff	Between Groups	5.713	5	1.143	0.889	0.491
	Within Groups	127.201	99	1.285		
	Total	132.914	104			
Dedicates resources to learning about what constitutes a credible messenger for end users	Between Groups	4.180	5	0.836	0.578	0.717
	Within Groups	141.820	98	1.447		
	Total	146.000	103			
Dedicates resources to identifying opinion leaders and working with them to translate research	Between Groups	9.850	5	1.970	2.411	**0.042***
	Within Groups	80.064	98	0.817		
	Total	89.913	103			
Dedicates resources to developing relationships with print, radio, and/or television journalists	Between Groups	5.199	5	1.040	0.667	0.649
	Within Groups	152.715	98	1.558		
	Total	157.913	103			
Knowledge translation staff knows of and interacts with people performing similar roles in other research organizations	Between Groups	1.598	5	0.320	0.254	0.937
	Within Groups	123.392	98	1.259		
	Total	124.990	103			
Knowledge translation staff subscribes to and shares information from listservs about knowledge translation	Between Groups	6.008	5	1.202	0.711	0.616
	Within Groups	165.530	98	1.689		
	Total	171.538	103			

*$p < .05$

Table 31.

Analysis of Variance for Dedicating Resources to Identifying Opinion Leaders and Working with Them to Translate Research on Organizational Specialty

Organizational Specialty	Mean	SD	n		
Public Health	3.471	0.800	17		
Health Policy and Economics	3.842	0.754	38		
Special Populations	3.222	0.236	18		
Quality and Performance	3.000	0.408	4		
HSR or Clinical Research	3.375	0.420	8		
Medicine and Health Systems	3.105	0.241	19		
Source of Variation	SS	Df	MS	F	Sig.
Organizational Specialty	9.850	5	1.970	2.411	**0.042***
Total	89.913	103			

*$p < .05$

A Chi-Square test of significance compared the employment of dedicated knowledge translation staff between university-affiliated and non-university-affiliated research organizations. The results, $\chi2$ (2,2) = .192; p = .662, show that no relationship exists between employing dedicated knowledge translation staff and the university affiliation of a research organization.
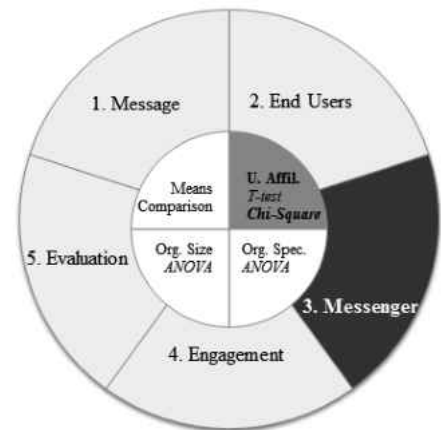
A Chi-Square test of significance also compared the use of knowledge translation incentives between university-affiliated and non-university-affiliated research organizations. The results, $\chi2$ (2,2) = .005; p = .944, show that no relationship exists between the use of incentives and the university affiliation of a research organization. Results for both Chi-Square tests appear in Table 32.

Table 32.

Comparison of Messenger Activities Based on University Affiliation

Investment		No U-Affil	Yes U-Affil	χ^2	df	p
No—Employs dedicated staff with knowledge translation duties	Observed/Expected	42/41	40/41	0.192[a]	1	0.662
Yes—Employs dedicated staff with knowledge translation duties	Observed/Expected	13/14	15/14			
No—Creates explicit incentives for research staff to engage in knowledge translation activities	Observed/Expected	58/58.1	24/23.9	0.005[b]	1	0.944
Yes—Creates explicit incentives for research staff to engage in knowledge translation activities	Observed/Expected	20/19.9	8/8.1			

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 14.000.
b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.150.

To summarize the answer to research sub-question 3, "By whom is the research knowledge translated and with what investments in assisting them?" the data indicate 51.8% of organizations do not employ dedicated staff with knowledge translation duties and that 79.8% of respondents (who are organizational leaders) have knowledge translation duties themselves. Almost three-quarters of organizations do not create incentives for research staff to engage in knowledge translation activities, but for those who do, the incentives are related to performance reviews, compensation, and organizational staffing/goals. Research organizations translate research findings to opinion leaders with the highest frequency and subscribe to and share information from listservs about knowledge translation with the lowest frequency. Organizations specializing in health policy and economics dedicate resources to identifying opinion

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leaders, and they work with them to translate research with a higher frequency than other organizations. Organizational size was not found to be a statistically significant variable.

Research Sub-Question 4: How do research organizations engage end users in the research process, and to what degree do they use supporting communications infrastructure to translate research knowledge? (Engagement)

To answer research sub-question 4, the respondents were asked to indicate how often their organization engages in interactive processes (e.g., teleconferences, face-to-face meetings) with end users in each of the following stages of the research process (question 12 from the survey instrument):

a. Establishes the overall direction of the research organization (e.g., through an advisory board).

b. Develops a specific research question, objectives, or hypothesis.

c. Establishes the preferred research design and methods.

d. Develops research products (e.g., research reports or brief summaries).

e. Translates the research findings to end users.

Table 33 displays the mean responses to each item for organizations with and without university affiliation. Items have been placed in rank order, from highest to lowest overall mean, in order to demonstrate the engagement activities conducted most and least frequently. The end user engagement activity that research organizations conduct with the highest frequency is translating their research findings to their end users, falling midway between

"occasionally" and "frequently" on the survey's Likert scale. The end user engagement activity research organizations conduct with the lowest frequency is engaging with end users to establish the research design and methods, which ranks slightly above "occasionally" on the survey's Likert scale.

Table 33.

Means Comparison: Engagement and University Affiliation

Research Organizations Engage in Interactive Processes with End Users in the Following Stages of the Research	U-Affil Mean	No U-Affil Mean	Overall Mean
Translates the research findings to end users	3.536	3.646	3.619
Develops a specific research question, objectives, or hypothesis	3.607	3.500	3.527
Develops research products (e.g., research reports or brief summaries)	3.286	3.407	3.376
Establishes the overall direction of the research organization (e.g., through an advisory board)	3.536	3.146	3.246
Establishes the preferred research design and methods	3.179	3.171	3.173

$*p < .05$

A two-tailed t test (assuming equal variances) tested for differences in end user engagement activities between organizations with or without a university affiliation, outlined in Table 34. The results show that there is no difference between university and non-university-affiliated research organizations for each of the engagement activities.

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Table 34.

T *Tests for Engagement Based on University Affiliation*

End User Engagement Activity		U-Affil	No U-Affil	Df	T Stat	P
Establishes the overall direction of the research organization	Mean	3.536	3.146	108	-1.513	0.133
	Standard Deviation	1.105	1.198			
	Observations	28	82			
Develops a specific research question, objectives, or hypothesis	Mean	3.607	3.500	108	-0.455	0.650
	Standard Deviation	1.133	1.057			
	Observations	28	82			
Establishes the preferred research design and methods	Mean	3.179	3.170	108	-0.031	0.975
	Standard Deviation	1.156	1.131			
	Observations	28	82			
Develops research products	Mean	3.286	3.407	107	0.497	0.620
	Standard Deviation	1.213	1.081			
	Observations	28	81			
Translates the research findings to end users	Mean	3.536	3.646	108	0.465	0.643
	Standard Deviation	1.290	1.011			
	Observations	28	82			

*$p < .05$

A one-way ANOVA tested for differences in end user engagement activities among the four categories of organizational size. The results, shown in Table 35, demonstrate there is a significant difference between organizations of different sizes in establishing the overall direction of the research organization. Large organizations work with end users to establish the overall direction of the research organization with a higher frequency than small organizations, explained in further detail in Table 36.

Table 35.

Analysis of Variance for Engagement Based on Organizational Size

Source of Variation		Sum of Squares	Df	Mean Square	F	Sig
Establishes the overall direction of the research organization	Between Groups	10.923	3	3.641	2.729	**0.048***
	Within Groups	141.450	106	1.334		
	Total	152.373	109			
Develops a specific research question, objectives, or hypothesis	Between Groups	2.113	3	0.704	0.606	0.613
	Within Groups	123.305	106	1.163		
	Total	125.418	109			
Establishes the preferred research design and methods	Between Groups	4.558	3	1.519	1.192	0.317
	Within Groups	135.160	106	1.275		
	Total	139.718	109			
Develops research products	Between Groups	0.909	3	0.303	0.240	0.868
	Within Groups	132.669	105	1.264		
	Total	133.578	108			
Translates the research findings to end users	Between Groups	5.058	3	1.686	1.454	0.231
	Within Groups	122.906	106	1.159		
	Total	127.964	109			

*p < .05

Table 36.

Analysis of Variance for Establishing the Overall Direction of the Research Organization on Organizational Size

Organizational Size	Mean	SD	N		
1-20	2.853	1.158	34		
21-100	3.179	1.307	28		
101-900	3.722	1.018	18		
901+	3.467	1.074	30		
Source of Variation	SS	df	MS	F	Sig.
Organizational Size	10.923	3	3.641	2.729	**0.048***
Total	153.761	108			

*p < .05

A one-way ANOVA tested for differences in end user engagement activities among the six categories of organizational specialty. The results, shown in Table 37, demonstrate there is no difference between organizations of different specialties in how they conduct each of the end user engagement activities.

Table 37.

Analysis of Variance for Engagement Based on Organizational Specialty

Source of Variation		Sum of Squares	Df	Mean Square	F	Sig
Establishes the overall direction of the research organization	Between Groups	5.073	5	1.015	0.708	0.619
	Within Groups	141.974	99	1.434		
	Total	147.048	104			
Develops a specific research question, objectives, or hypothesis	Between Groups	0.685	5	0.137	0.113	0.989
	Within Groups	119.562	99	1.208		
	Total	120.248	104			
Establishes the preferred research design and methods	Between Groups	5.022	5	1.004	0.787	0.562
	Within Groups	126.368	99	1.276		
	Total	131.390	104			
Develops research products	Between Groups	8.171	5	1.634	1.316	0.263
	Within Groups	121.665	98	1.241		
	Total	129.837	103			
Translates the research findings to end users	Between Groups	1.659	5	0.332	0.266	0.930
	Within Groups	123.331	99	1.246		
	Total	124.990	104			

*$p < .05$

To answer research sub-question 4, survey participants also were asked whether their organization makes use of the following communications tools to translate research knowledge (question 6 from the survey instrument):

a. Website

b. Newsletter

c. Listserv

d. News releases

e. Blogs

f. Facebook

g. Twitter

h. LinkedIn

Table 38 displays the responses to each item for organizations both with and without university affiliation. Items have been placed in rank order, from highest to lowest number of respondents, to demonstrate the translation tools used most and least frequently. Websites are the translation tools used most frequently, and three social media tools (Facebook, Twitter, and LinkedIn) are those used least frequently. The respondents also were able to submit answers to an open category labeled "other." Three respondents mentioned using webinars or web-related events. Other items receiving one mention apiece included YouTube, presentations at association meetings, community forums, client advocacy efforts, and using news sources as distributors.

Table 38.

Organizational Usage of Translation Tools

Tool	Yes (Frequency/valid proportion)	No (Frequency/valid proportion)
Websites	**110 (0.956)**	5 (0.044)
Newsletters	**72 (0.643)**	40 (0.357)
Media Releases	**94 (0.832)**	19 (0.168)
Blogs	47 (0.412)	**64 (0.588)**
Facebook	41 (0.366)	**71 (0.634)**
Twitter	49 (0.433)	**64 (0.567)**
LinkedIn	31 (0.272)	**83 (0.728)**

*$p < .05$

A Chi-Square test of significance compared the use of all of the translational tools between research organizations with and without university affiliation. The results, $\chi 2$ $(2,2) = 5.044$; $p = 0.025$ (as seen in Table 39), show a significant relationship; non-university-affiliated research organizations publish research findings via blogs with a statistically significant higher frequency than university-affiliated research organizations.

Table 39.

Comparison of Knowledge Translation Investments Based on University Affiliation

Investment		No U-Affil	Yes U-Affil	χ^2	df	p
No—Website	Observed/Expected	3/3	79/79	0.000[a]	1	0.983
Yes—Website	Observed/Expected	1/1	27/27			
No—Newsletter	Observed/Expected	25/26.6	54/52.4	0.541[b]	1	0.462
Yes—Newsletter	Observed/Expected	11/9.4	17/18.6			
No—Listserv	Observed/Expected	45/47.3	34/31.7	1.021[c]	1	0.312
Yes—Listserv	Observed/Expected	19/16.7	9/11.3			
No—Media Releases	Observed/Expected	12/12.8	69/68.3	0.209[d]	1	0.647
Yes—Media Releases	Observed/Expected	5/4.3	22/22.8			
No—Blogs	Observed/Expected	41/46.1	40/34.9	5.044[e]	1	**0.025***
Yes—Blogs	Observed/Expected	21/15.9	7/12.1			
No—Facebook	Observed/Expected	47/48.7	32/30.3	0.612[f]	1	0.434
Yes—Facebook	Observed/Expected	19/17.3	9/10.7			
No—Twitter	Observed/Expected	41/43.7	39/36.3	1.422[g]	1	0.233
Yes—Twitter	Observed/Expected	18/15.3	10/12.7			
No—LinkedIn	Observed/Expected	58/58.7	23/22.3	0.120[h]	1	0.729
Yes—LinkedIn	Observed/Expected	21/20.3	30/30			

$*p < .05$

a. 2 cells (50%) have expected count less than 5. The minimum expected count is 1.020.
b. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 9.420.
c. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 11.250.
d. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 4.250.
e. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 12.070.
f. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 10.730.
g. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 12.700.
h. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.710.

To summarize the answer to research sub-question 4, "How do research organizations engage end users in the research process, and to what degree do they use supporting communications infrastructure to translate research knowledge?" the data indicated the engagement activity that research organizations conduct with the highest frequency is translating their research findings to their end users, and the activity with the lowest frequency is engaging with end users to establish the research design and methods. Websites are the translation tools used most frequently, and social media tools

(Facebook, Twitter, and LinkedIn) are those used least frequently. Non-university-affiliated research organizations publish research findings via blogs with a significantly higher frequency than university-affiliated research organizations. Organizational size is a statistically significant variable affecting the establishment of the overall direction of the research organization, as large organizations conduct this activity with a higher frequency than small organizations. Organizational specialty does not account for variation in response.

Research Sub-Question 5: To what degree do research organizations perform evaluation activities related to knowledge translation? (Evaluation)

To answer research sub-question 5, the respondents were asked to indicate how often their organization performs each of these evaluation activities related to knowledge translation (Question 13 from the survey instrument specifically asked about assessment of changes, which is really a matter of evaluation activities. Thus, while one might perceive the survey instrument items as a measure of assessment, in reality, these items capture the evaluation activities.):

a. Assesses any changes in end users' awareness of research results.

b. Assesses any changes in end users' knowledge of research results.

c. Assesses any changes in end users' attitudes toward research results.

d. Assesses any changes in end users' self-reported behavior.

e. Assesses any changes in end users' actual (i.e., objectively measured) behavior.

Table 40 displays the mean responses to each item for organizations with and without university affiliation. Items have been placed in rank order, from highest to lowest overall mean, in order to demonstrate the evaluation activities conducted most and

least often by organizations. The combined means

range from 2.648 to 2.532, indicating that research

organizations conduct evaluation activities for all of

the items "rarely." They most frequently evaluate

changes in their end users' awareness of research

results and least frequently evaluate changes in their

end users' actual behavior. Almost half of the
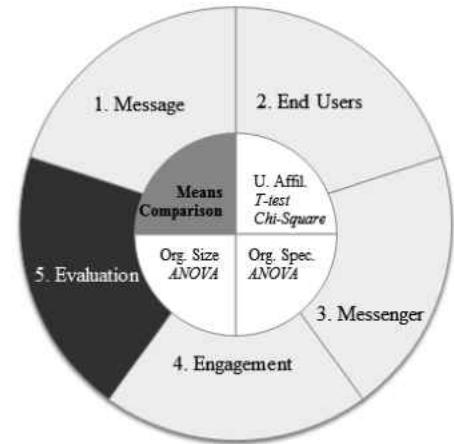
research organizations reported never or rarely conducting evaluation activities to

measure changes in end user awareness of research results, knowledge of research results,

attitudes toward research results, self-reported behavior, and actual behavior.

Table 40.

Means Comparison: Evaluation and University Affiliation

Evaluation Activity	U-Affil Mean	No U-Affil Mean	Overall Mean
Assesses any changes in end users' awareness of research results	2.815	2.593	2.648
Assesses any changes in end users' knowledge of research results	2.679	2.531	2.569
Assesses any changes in end users' self-reported behavior	2.821	2.475	2.560
Assesses any changes in end users' attitudes toward research results	2.714	2.482	2.541
Assesses any changes in end users' actual (i.e., objectively measured) behavior.	2.714	2.506	2.532

*p < .05

A two-tailed *t* test (assuming equal variances) tested for differences in evaluation activities between organizations with or without university affiliation, outlined in Table 41. The results show that there is no difference between university- and non-university-affiliated research organizations in how they conduct these particular evaluation activities.

Table 41.

T *Tests for Evaluation Based on University Affiliation*

Evaluation Activity		U	Non-U	Df	T Stat	P
Assesses end users' awareness of research results	Mean	2.815	2.593	106	-1.002	0.319
	Standard Deviation	1.039	0.985			
	Observations	27	81			
Assesses end users' knowledge of research results	Mean	2.679	2.531			
	Standard Deviation	1.124	1.026			
	Observations	28	81	107	-0.641	0.523
Assesses end users' attitudes toward research results	Mean	2.714	2.482			
	Standard Deviation	1.084	1.001			
	Observations	28	81	107	-1.038	0.301
Assesses end users' self-reported behavior	Mean	2.821	2.475			
	Standard Deviation	1.056	1.006			
	Observations	28	80	106	-1.548	0.125
Assesses end users' actual (i.e., objectively measured) behavior	Mean	2.714	2.506			
	Standard Deviation	1.150	1.038			
	Observations	28	81	107	-0.889	0.376

*p < .05

A one-way ANOVA tested for differences in evaluation activities among the four categories of organizational size. The results show there is a difference between research organizations of different sizes in how frequently they evaluate their end users' actual behavior, as seen in Tables 42 and 43. One subsection of small organizations (21–100 employees) and one subsection of large organizations (901 or more employees) evaluate the actual behavior of end users more frequently than organizations of other sizes; however, the evaluation activity still falls into the "rarely" category on the Likert scale.

Table 42.

Analysis of Variance for Evaluation Based on Organizational Size

Source of Variation		Sum of Squares	Df	Mean Square	F	Sig
Assesses end users' awareness of research results	Between Groups	5.414	3	1.805	1.854	0.142
	Within Groups	101.216	104	0.973		
	Total	106.630	107			
Assesses end users' knowledge of research results	Between Groups	6.307	3	2.102	1.964	0.124
	Within Groups	112.427	105	1.071		
	Total	118.734	108			
Assesses end users' attitudes toward research results	Between Groups	3.525	3	1.175	1.126	3.525
	Within Groups	109.539	105	1.043		
	Total	113.064	108			
Assesses end users' self-reported behavior	Between Groups	4.413	3	1.471	1.415	4.413
	Within Groups	108.134	104	1.040		
	Total	112.546	107			
Assesses end users' actual (i.e., objectively measured) behavior	Between Groups	10.091	3	13.364	3.132	**0.029***
	Within Groups	123.722	105	1.074		
	Total	122.862	108			

*$p < .05$

Table 43.

Analysis of Variance for Organizational Size on Measuring End Users' Actual Behavior

Organizational Size	Mean	SD	N		
1–20	2.235	1.103	34		
21–100	2.857	1.008	28		
101–900	2.235	0.903	17		
901+	2.833	1.053	30		
Source of Variation	SS	df	MS	F	Sig.
Organizational Size	10.091	3	3.364	3.132	**0.029***
Total	122.862	108			

*$p < .05$

A two-tailed *t* test (assuming equal variances) tested for differences in end users and knowledge translation investment activities among six categories of organizational specialty. The results, depicted in Table 44, show there is no difference between organizations of different specialties in how they conduct these evaluation activities.
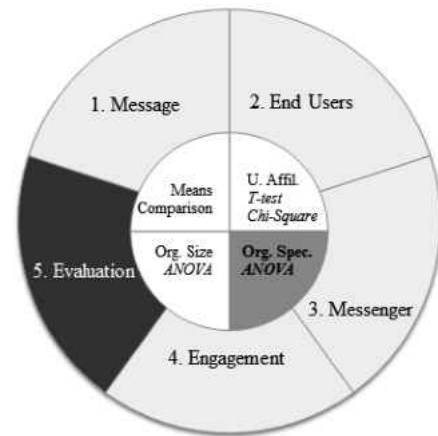
Table 44.

Analysis of Variance for Evaluation Based on Organizational Specialty

Source of Variation		Sum of Squares	Df	Mean Square	F	Sig
Assesses end users' awareness of research results	Between Groups	3.360	5	0.672	0.706	0.620
	Within Groups	92.349	97	0.952		
	Total	95.709	102			
Assesses end users' knowledge of research results	Between Groups	1.943	5	0.389	0.353	0.879
	Within Groups	107.817	98	1.100		
	Total	109.760	103			
Assesses end users' attitudes toward research results	Between Groups	6.073	5	1.215	1.242	0.295
	Within Groups	95.840	98	0.978		
	Total	101.913	103			
Assesses end users' self-reported behavior	Between Groups	10.748	5	2.150	2.247	0.056
	Within Groups	92.805	97	0.957		
	Total	103.553	102			
Assesses end users' actual (i.e., objectively measured) behavior	Between Groups	10.503	5	2.101	1.991	0.087
	Within Groups	103.411	98	1.055		
	Total	113.913	103			

*$p < .05$

To summarize the answer to research sub-question 5, "To what degree do research organizations perform evaluation activities related to knowledge translation?" the data indicate that research organizations conduct evaluation activities for all of the items "rarely." They most frequently evaluate changes in their end users' awareness of research results and least frequently evaluate changes in their end users' attitudes toward research results. University affiliation, organizational size, and organizational specialty do not account for variation in response.

Qualitative Analysis

Items 20 and 21 of the survey instrument were optional open-ended inquiries to gather additional data about what respondents thought end users could do to facilitate

their knowledge translation efforts and what they thought funders (e.g., governments, granting agencies, foundations) could do to facilitate their knowledge translation efforts. The data analysis, which included the examination of statements as well as the observation of frequency of color codes, resulted in three key themes related to the research design. The first and most prominent theme was that of funding. Respondents supported and recommended funding for both knowledge translation research as well as knowledge translation activities. Specific examples of suggestions include providing small grants for dissemination activities with fast-tracked review and approval times, as well as funders' doing more to publicize the work they fund. The second theme was involvement. In terms of the end users, respondents thought they could become more involved in the research process by, for example, the creation of patient councils or partnerships, or by including key stakeholders at the beginning of a project to help facilitate knowledge translation efforts. Respondents suggested funders could work toward including end users in research, but did not cite any specific examples. The final theme was evaluation. Respondents recommended that end users provide feedback through surveys, discussions, and committees on what is and is not working regarding knowledge translation. One respondent suggested that funders require evaluation for knowledge translation efforts, while another recommended the dedication of funding to the evaluation of end users.

Summary

This chapter presented the results of using mean calculations, *t* tests, analyses of variance (ANOVAs), and Chi-Square tests to determine the degree to which research organizations translate knowledge in ways consistent with the empirical evidence, and to

determine whether university affiliation, organizational size, or organizational specialty explain any variation in responses. The data identify the activities research organizations perform most frequently (e.g., tailoring research findings for end users) and the activities they perform least frequently (e.g., conducting evaluation activities and using social media tools).

University affiliation, organizational size, and organizational specialty accounted for statistical significance in ten knowledge translation items out of more than 100 total items. The data indicate that university affiliation is a significant variable in dedicating resources to getting to know the research literature about effective approaches to knowledge translation, developing messages for end users that specify action, and translating research findings via blogs. University affiliates dedicate resources to getting to know the research literature, and they develop messages for end users that specify action with a higher frequency than non-university affiliates. Meanwhile, non-university affiliates translate research findings via blogs with more frequency than university affiliates.

The data also demonstrate that organizational size is a significant variable in providing full reports free upon request, targeting policymakers, working with end users to establish the overall direction of the research organization, and evaluating end users' actual behavior. Small organizations provide full reports free upon request and target policymakers with a higher frequency than large organizations. Large organizations work with end users to establish the overall direction of the research organization with a higher frequency than small organizations. Small organizations with 21–100 employees

and large organizations with 901 or more employees evaluate end users' actual behavior with a higher frequency than other organizations.

Finally, the data determined that organizational specialty is a significant variable in targeting policymakers and service providers with research findings. Organizations that specialize in health policy and economics target policymakers with a higher frequency than organizations with other specialties. They also dedicate resources to identifying opinion leaders and work with them to translate research with a higher frequency than other research organizations. Organizations that specialize in quality improvement and performance target service providers with a higher frequency than organizations with other specialties. A summary of all research findings appears in Appendix K.

The main research question for this study was, "What are the current knowledge translation practices of health services research organizations in the United States?" To answer this question, there were two overarching research objectives. The first objective was to determine the degree to which research organizations translate knowledge in ways consistent with the empirical evidence, which was organized using the Lavis Knowledge Translation Framework and is described in Chapter II. The data indicate health services research organizations in the United States in this study, as in Canada a decade earlier, generally conducted knowledge translation activities in ways consistent with the evidence (means ranged from 2.541 to 3.819 on a Likert scale of 1 to 5, with 1 = never and 5 = always). The second objective was to examine university affiliation, organizational size, and organizational specialty to see if they explained any variation in responses. University affiliation, organizational size, and organizational specialty accounted for

statistical significance in ten knowledge translation items. These findings are further

explored and explained in Chapter V.

CHAPTER V

DISCUSSION

This final chapter presents a summary of the overall research findings and interprets them in relation to the existing literature related to knowledge translation. This chapter draws attention to what the study contributes to the literature in terms of conceptualization and study findings. It also discusses the implications of the study for practitioners and scholars and offers recommendations for future research on knowledge translation.

Summary

To answer the main research question for this study, "What are the current knowledge translation practices of health services research organizations?" the investigator first determined the degree to which research organizations translate knowledge in ways consistent with the empirical evidence, which was organized using the Lavis Knowledge Translation Framework described in Chapter II. The statistical data indicate research organizations conduct many knowledge translation activities and that there are gaps between what the literature suggests research organizations optimally should be doing and what they report doing . The investigator then examined university affiliation, organizational size, and organizational specialty to see if they explain any variation in responses (as noted earlier, one variable of interest, geographic location in

terms of rurality, was not supported by data and was subsequently not examined). The

data indicate research organizations in the United States largely communicate about their

research in the same manner, regardless of university affiliation, organizational size, or

specialty. Certain organizational characteristics signal higher degrees of effective

knowledge translation in 10 particular situations as seen in Table 45.

Table 45.

Variables with Statistical Significance

#	Item	Variable	Statistically Significant Category
1	Dedicates resources to getting to know the research literature about effective approaches to knowledge translation	University affiliation	Affiliation
2	Develops messages for end users that specify action	University affiliation	No affiliation
3	Translates research findings via organizational blogs	University Affiliation	No affiliation
4	Provides full reports free upon request	Organizational Size	Small organizations
5	Targets policymakers	Organizational Size	Small organizations
6	Evaluates end users' actual behavior	Organizational Size	Small organizations
7	Works with end users to establish the overall direction of the research organization	Organizational Size	Large organizations
8	Targets policymakers	Organizational Specialty	Health policy and economics
9	Dedicates resources to identifying opinion leaders and working with them to translate research	Organizational Specialty	Health policy and economics
10	Targets service providers	Organizational Specialty	Quality improvement

In answering the overall research question, "What are the knowledge translation

practices of health services research organizations in the United States?" descriptive

statistics are useful in gauging the activities organizations perform with highest and

lowest frequencies. Table 46 presents the overall mean scores for each item, sorted from

highest to lowest frequency.

Table 46.

Knowledge Translation Activities Ranked by Overall Mean Score

KT Activity	N	Overall Mean	
Tailors knowledge translation approach to specific end users	110	3.819	Occasionally to Frequently
Targets policymakers in municipal or federal governments	110	3.800	
Targets service providers (e.g., clinicians)	108	3.722	
Targets managers in publically funded facilities or enterprises, planning regions, or private organizations/businesses	110	3.701	
Tailors mailings or emails to specific end users.	110	3.691	
Provides free upon request brief summaries of research reports	109	3.679	
Provides free upon request full reports on research projects, either in hard copy or electronically	109	3.679	
Spends time with end users discussing your research reports	110	3.633	
Dedicates resources to getting to know end users	110	3.627	
Translates the research findings to end users	110	3.618	
Develops a specific research question, objectives, or hypotheses	110	3.527	
Spends time with end users discussing ideas (based on research findings) for possible action	110	3.519	
Dedicates resources to identifying opinion leaders and working with them to translate research	109	3.468	Occasionally
Targets general public or service recipients (e.g., voters, patients, clients)	109	3.450	
Develops messages for end users that specify possible action	109	3.440	
Develops research products (e.g., research reports or brief summaries)	109	3.376	
Mails or emails brief summaries of research reports to end users	110	3.264	
Establishing the overall direction of the research organization (e.g., through an advisory board)	110	3.246	
Knowledge translation staff knows of and interacts with people performing similar roles in other research organizations	109	3.239	

Table 46. Cont.

Dedicates resources to developing relationships with print, radio, and/or television journalists	109	3.234	Occasionally
Establishes the preferred research design and methods	110	3.173	
Mails or emails full reports on research projects to end users	120	3.167	
Dedicates resources to learning about what constitutes a credible messenger for end users (e.g., background and approach)	109	3.001	
Dedicates resources to getting to know the research literature about effective approaches to knowledge translation	110	3.000	
Dedicates resources to skill building amongst knowledge translation staff (e.g., pays for conferences or courses about knowledge translation)	110	2.964	Rarely to Occasionally
Knowledge translation staff subscribes to and shares information from listservs about knowledge translation	108	2.843	
Assesses any changes in end users' awareness of research results	108	2.648	
Assesses any changes in end users' knowledge of research results	109	2.569	
Assesses any changes in end users' self-reported behavior	108	2.565	
Assesses any changes in end users' actual (i.e., objectively measured) behavior	109	2.560	
Provides at cost and upon request full reports on research projects	108	2.556	
Assesses any changes in end users' attitudes toward research results	109	2.541	

Interpretation

Through statistical tests using mean calculations, *t* tests, analyses of variance (ANOVAs), and Chi-Square tests, the following conclusions were drawn about the relationships between research organizations and their knowledge translation practices.

Research Sub-Question 1: What do research organizations translate to their end users, and at what cost? (Message)

The data demonstrate that research organizations perform some translation activities that correspond to the evidence presented in Chapter II. For example, the

uptake of research findings is more successful when translation activities are multifaceted and take place strategically (Bero & Jadad, 1998) and when the findings have been tailored to the particular context of the end users (Graham & Tetroe; 2009; Grimshaw et al., 2004). Of all the items in the survey, the tailoring of findings to end users is performed with the highest frequency by research organizations. End users typically prefer summaries (Choi et al., 2003; Mueller et al., 2007), in electronic format (Mueller et al., 2007) which is what respondents reported doing most of the time.

It is interesting to note that two of the items with the highest frequency involve end users' having to request information (in this case, brief summaries or full reports of research findings) from research organizations in order to receive it. This finding also was the case a decade ago with the Lavis et al. (2003a) study. Requiring end users to request information runs contrary to some of the more recent models of communication which explain behavior by information consumers (i.e., end users). Empowered by technology, people increasingly decide how and when and even if messages will be received (Schultz, 2006b) and want access to information immediately (Mueller et al., 2007). Electronic communication and the rise of social networking have transformed the way information is shared with and marketed to end users, shifting from a "push" to a "pull" strategy. As end users gain access to more information and more sophisticated technology, they have become more demanding, requiring information be made available on their terms, rather than when it is convenient for the information producer (i.e., the research organizations) to deliver them. Schultz (2006a) posited that people create barriers to shut out information overload in both traditional and nontraditional media, effectively avoiding the push of messages from many sources and leaving them free to

"pull" the information they want from the Internet or elsewhere at any time and manner convenient to them. In other words, people do not want to have to ask for information; they want it to be available for them to review at their convenience. So, while research organizations are doing a good job making available research summaries rather than full research reports and making information available electronically in addition to or rather than on paper, in order to capture a wider audience, they might consider making the information freely available on their website, for example, rather than only distributing it when asked.

The data presented two items of significance regarding messages. The first is that research organizations with no university affiliation develop messages for end users that specify action with a statistically significant higher frequency than those organizations with a university affiliation. While the non-university relationship significance is a new finding, this activity itself is aligned with the literature, which suggests research organizations should simplify their findings and include action-oriented messages, solutions, or options with the research briefs they send to end users in order to communicate more effectively (Canadian Foundation for Healthcare Improvement, 2000; Center for Health Policy Research & Ethics et al., 2000; Mueller et al., 2007). However, the data from this study tell us that research organizations are only conducting this activity occasionally. Possible reasons for not including action-oriented messages more often include lack of incentives, opportunities, or know-how (Choi, Gupta, & Ward, 2009). University-affiliated research organizations (M = 3.035) provide action-oriented messages significantly less often than do research organizations without a university affiliation (M = 3.580), but both should include action-oriented messages more often in

order to communicate more effectively with their end users. The second item of significance regarding messages shows a relationship between small organizations and providing full reports free upon request. These data run contrary to the available evidence, which demonstrates that large organizations generally have more opportunities to conduct knowledge translation activities than small organizations (Tang et al., 2008). However, the relevant part of this finding is that it indicates an area of expansion for small organizations, as the literature notes providing full reports and doing so upon request by end users are both antiquated practices, and that organizations should instead produce brief summaries and make them freely available in electronic format (Choi et al., 2003; Dobbins et al., 2002; McBride et al., 2008; Mueller et al., 2007).

Research Sub-Question 2: To whom do research organizations translate research knowledge, and what investments are made to target end users? (End Users)

According to the data, research organizations frequently translate research to end users 46% of the time. They target policymakers most frequently and the general public least frequently. The Lavis et al. (2003a) study in Canada found similar results. Research organizations make investments in translation activities between "occasionally" and "frequently." They occasionally engage with end users to discuss research reports (M = 3.593) and ideas for possible actions (M = 3.492), even though the literature suggests that engagement of end users throughout the research process is a key component of effective knowledge translation and should be of higher priority (Lavis et al., 2003a; Mueller et al., 2007). Thus, engagement with end users represents an area of development for research organizations.

The literature tells us there are many demands on researchers' time, and they face pressure to win research grants and publish in peer review publications (Pittman et al.,

2010; Tomlinson, 2000). One possible reason for only investing "occasionally" in the specified knowledge translation activities is that there may not be an organizational or institutional incentive to do so. In fact, data presented in the next section confirm this idea as almost three-quarters of respondents, 71.9% ($n = 82$), reported that their organizations do not offer incentives for research staff to engage in knowledge translation, despite their (researchers') desire for funding to increase their capacity for knowledge translation activities. The disconnected relationship between what organizations provide and what researchers seek is an area for further exploration.

There were three items of statistical significance regarding end users. First, the data shows small organizations target policymakers with a statistically significant higher frequency than organizations of other sizes. These data run contrary to the available evidence, which suggests that large organizations generally have more opportunities to conduct knowledge translation activities than small organizations (Tang et al., 2008). One reason for this difference may be that small organizations are more likely to receive research contracts rather than research grants, and the contracts may require a government briefing product of some sort. The second significant finding regarding end users is that organizations that specialize in health policy and economics target policymakers with their research findings with a higher frequency compared with organizations with other specialties. These data are new findings for the field, as organizational specialty has not been examined this way previously, to the extent known by the investigator. It seems natural that health policy organizations would target policymakers with a greater frequency than other organizations simply because of the nature of their work and because of the demand for research related to the Affordable

Care Act of 2010 to address policy changes taking place in health care. The literature demonstrates that the provision of resources and funding encourages engagement (Coburn, 1998; Crosswaite & Curtice, 1994; Davis & Howden-Chapman, 1996; Huberman, 1983). The third significant finding is that organizations that specialize in quality improvement target service providers with their research findings with a higher frequency than other research organizations. This finding echoes the literature, as physicians, other health care providers, and health care systems are increasingly being expected to implement and measure quality improvement interventions focused on improving care quality, reliability, accessibility, safety, and cost (U.S. Department of Health and Human Services, 2011). This increased focus on quality improvement over the past decade is often attributed to two landmark reports from the Institute of Medicine: *To Err is Human: Building a Safer Health System* (2000) and *Crossing the Quality Chasm: A New Health System for the 21st Century* (2001), in addition to a report to Congress in 2011 by the U.S. Department of Health and Human Services entitled the *National Strategy for Quality Improvement in Health Care.*

While not statistically significant, it is important to note one other item here. Because of the promotion and tenure incentives for university-affiliated researchers, which typically do not include knowledge translation activities other than publishing in peer review publications (Pittman et al., 2010), securing research funding, and conducting professional presentations, the investigator hypothesized that the university-affiliated research organizations would report lower knowledge translation investments than non-university-affiliated research organizations. However, this hypothesis was incorrect. The results show there is not a significant difference between university and

non-university-affiliated research organizations in how they conduct these specific

knowledge translation investment activities, or in how they target end users. As

demonstrated in the upcoming section, almost three-quarters of both university and non-

university-affiliated research organizations do not provide incentives for knowledge

translation.

Research Sub-Question 3: By whom is the research knowledge translated and with what investments in assisting them? (Messenger)

Research organizations identify opinion leaders and work with them to translate

research "occasionally," and this is the outreach activity they report conducting most

often. The literature (e.g., Boaz et al., 2011) supports this partnership as an effective

means of knowledge translation; however, when it is only done occasionally, there

certainly is room for improvement. Organizations that specialize in health policy and

economics identify opinion leaders and work with them to translate research with a

significantly higher frequency than research organizations with other specialties. The

activity research organizations conduct with the lowest frequency is subscribing to and

sharing information from listservs about knowledge translation, which they report doing

"rarely." One reason for this low frequency may be that the survey respondents, who are

organizational leaders, are not familiar with the specific literature the dedicated

knowledge translation staff may follow, subscribe to, and/or share. Another reason may

be that there are few available or valuable listservs to follow. The important part of this

data is that it suggests research organizations should be more proactive at learning about

their end users and sharing information about their end users with their staff. The results

also suggest that university-affiliated research organizations dedicate resources to getting

to know the research literature about effective approaches to knowledge translation with a

significantly higher frequency than those without a university affiliation. These data are new findings for the field. It may be that universities have access to additional resources and infrastructure within the university environment, compared with non-university affiliates. Perhaps university-affiliated research organizations have access to or are partnering with schools of communication, marketing, health administration, or public relations and are aware of the research literature in this regard. The relationship between university-affiliated research centers and getting to know the research literature about effective approaches to knowledge translation warrants further exploration.

Incentives

Because universities generally do not reward researchers in the tenure and promotion process for conducting knowledge translation activities other than publishing in peer review journals (Pittman et al., 2010), securing research funding, or conducting professional presentations, the investigator hypothesized non-university-affiliated research organizations would provide more incentives for knowledge translation activities. However, the results showed that no relationship existed between the use of incentives and the university affiliation of a research organization.

Perhaps more noteworthy is the 51.8% of organizations who do not employ dedicated staff with knowledge translation duties. As a point of comparison, this figure was 38% in the 2003 Canadian study by Lavis et al. (2003a). Who then, if anyone, is conducting knowledge translation activities? More than three-quarters of respondents confirmed that they themselves have some knowledge translation duties within their organization.

So, the majority of the organizational leaders have knowledge translation duties,

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and some organizations have dedicated communications staff, but it also is likely that individual researchers carry out the knowledge translation activities as specified by their contract or grant. The literature suggests that knowledge translation is a low priority for researchers because there are infrequent organizational incentives for doing it and they generally are not rewarded for it in the tenure and promotion review process (Davies et al., 2000; Pittman et al., 2010). The literature also suggests knowledge translation is not a core competency in doctoral-level health services research programs (Forrest et al., 2009). Researchers are not, in general, well-versed in non-traditional knowledge translation methods, including social media, blogs, and news articles, and they often have few resources (e.g., technical assistance, time) at their disposal (Center for Information Behaviour and the Evaluation of Research, 2010). One way to overcome this challenge is for organizations to have dedicated and experienced staff (e.g., knowledge brokers, connectors, communications professionals, or other types of intermediaries) to facilitate effective knowledge translation to end users (Lomas, 2007b; Mueller et al., 2007; Robeson et al., 2010; Vingilis et al., 2003).

Almost three-quarters of respondents, 71.9%, ($n = 82$), reported that their organizations do not create incentives for research staff to engage in knowledge translation activities. As a point of comparison, this figure was 58% in the Canadian study by Lavis et al. (2003a). While there has been some recent evidence that the incentive and reward system is changing at a small number of institutions (Pittman et al., 2010), this study's data are reflective of the literature, which suggests that knowledge translation holds less organizational and institutional value than it should.

Finally, when comparing the study's results to those from the study conducted in 2003 by Lavis et al. in Canada, a few notable items surface. It appears that health services research organizations in Canada, at least in 2003, invest more resources in knowledge translation activities than do research organizations from the United States. They employ a higher percentage of dedicated staff with knowledge translation duties (63%, as compared with 48.2% in the United States), and they are more likely to offer staff incentives (42% compared with 28.1% in the United States). There are limitations to this comparison, of course (e.g., because of the differences in the survey instruments, survey populations, and timeframes), but it is enough to suggest that there may be things to be learned from our northern neighbors and that further exploration is warranted.

Research Sub-Question 4: How do research organizations engage end users in the research process, and to what degree do they use supporting communications infrastructure to translate research knowledge? (Engagement)

The end user engagement activity that research organizations conduct with the highest frequency is translating their research findings to their end users, falling midway between "occasionally" and "frequently" on the survey's Likert scale. The end user engagement activity research organizations conduct with the lowest frequency is engaging with end users to establish the research design and methods, which ranks slightly above "occasionally" on the survey's Likert scale. While the literature suggests end user engagement is a central component to the knowledge translation process (e.g., Graham, et al., 2006; Lomas, 2003; Mueller et al., 2007), the literature and data from this study show that the majority of research organizations do not provide incentives for knowledge translation activities and they are not prone to investing time, dedicated staff, or other resources for such activities to take place. These data support prior findings

(e.g., Lavis et al., 2003) in that there is a discrepancy between what research organizations are currently doing and what they should be doing according to the literature (e.g., Mueller et al., 2007) in order to conduct effective knowledge translation. The data also demonstrate that large organizations work with end users to establish the overall direction of the research organization at a higher frequency than small organizations. This activity may be because larger organizations have more resources with which to conduct such activities or that the steps of the research process are more formalized in larger organizations. This finding is a new contribution to the field, as this relationship has previously not been examined to the extent known by the investigator.

Social Media Tool Usage

Survey participants were asked whether their organization made use of a number of online communications tools. Websites were used most frequently, and three social media tools (Facebook, Twitter, and LinkedIn) were used least frequently. Literature presented in Chapter II strongly suggests that social media are prominent communications tools that continue to grow at a rapid pace, but that health services researchers lag behind their peers in terms of social media usage (Ciber, 2010; Schein et al., 2010). When used correctly, social media tools can help build a research organization's reputation, make it more accessible to end users, engage stakeholders in the research development process, gather interest in the research, and attract funders and other important stakeholders (e.g., Ho et al., 2004). The data *and* the literature suggest researchers typically are not rewarded for conducting this sort of knowledge translation activity. The promotion and tenure structure at universities may even further discourage researchers from interacting with end users (Pittman et al., 2010), and the literature

similarly suggests that staff are rewarded (e.g., promotion, tenure) for conducting more traditional knowledge translation activities such as publishing journal articles and presenting at conferences. These data align with prior findings in that there is a discrepancy between what research organizations are currently doing and what they optimally should be doing (e.g., Lavis et al., 2003) in order to conduct effective knowledge translation; the data on social media tool usage are new contributions to the field.

The results also showed that there is a difference between university and non-university-affiliated research organizations in publishing research findings via blogs and that non-university-affiliated research organizations utilize blogs with a higher frequency. Underutilization of blogs among university-affiliated research organizations is potentially due in part to the pressures university-affiliated researchers face in the promotion and tenure review process to focus on publishing in peer review publications rather than conduct other knowledge translation activities. It also is possible that non-university-affiliated research organizations are more likely to conduct their research through contracts, where the use of blogs to publish findings may be a funder-directed translation component, rather than research grants, which typically only encourage publication in peer review journals. It also may be that non-university organizations face less bureaucracy in establishing blogs. More research is needed to understand this relationship adequately.

Research Sub-Question 5: To what degree do research organizations perform evaluation activities related to knowledge translation? (Evaluation)

With the recent focus on evidence-based practices in health care, the literature also points to the importance of the use of evidence in knowledge translation activities.

Many models, frameworks, and strategies contain a component for evaluating knowledge translation activities and feeding the findings back into the translation process. Despite the prevalence of such resources, research organizations reported conducting evaluation activities "rarely." One item of statistical significance included evaluating end users' actual behavior; small organizations of between 21–100 employees and large organizations with 901 or more employees do so with more frequency than organizations of other sizes, but they still do so rarely. The data showed that a small proportion of research organizations reported frequently evaluating changes in their end users' awareness of, knowledge of, and attitudes toward research results. Most notably, almost half of the research organizations reported never or rarely conducting evaluation activities. Low evaluation activity also was found in the Lavis et al. (2003a) study in Canada. In both cases, the low evaluation activity runs contrary to what the literature suggests is a leading knowledge translation practice (see e.g., Canadian Institutes of Health Research, 2009; Graham et al., 2006; Lavis et al., 2003; Lavis, Lomas, Hamid, & Sewankambo, 2006). The literature suggests research organizations face many demands for time, resources, funding, and evaluation (Pittman et al., 2010; Tomlinson, 2000). It is possible that unless end user measurement is a contractually obligated component of a research study, it is unlikely research organizations will conduct evaluation activities. As identified in the Lavis et al. (2003a) study, other reasons for low evaluation activity might include lack of knowledge of how to conduct an evaluation, lack of infrastructure, or concerns with how the evaluation results might be used. This finding signals an area for development and further exploration, as evidence-based practices are increasingly

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becoming both standard practice and funder mandated (Best et al., 2008; Nutley et al., 2003).

Qualitative Analysis

The qualitative data analysis resulted in three key themes. The first, and most prominent theme, was funding. Respondents support and recommend funding for both knowledge translation research and knowledge translation activities. Specific examples of suggestions included providing small grants for dissemination activities with fast-tracked review and approval times and funders' doing more to publicize the work they fund. The second theme was involvement. In terms of the end users, respondents thought they could become more involved in the research process by, for example, the creation of patient councils or partnerships or by including key stakeholders at the beginning of a project to help facilitate knowledge translation efforts. Respondents thought funders could work toward including end users in research, but they did not cite any specific examples. The final theme was evaluation. Respondents suggested that end users provide feedback through surveys, discussions, and committees on what is and is not working regarding knowledge translation. One respondent suggested that funders require evaluation for knowledge translation efforts, while another recommended the dedication of funding to the evaluation of end users. What these data show is that research organizations see value in knowledge translation activities (e.g., investment, engagement, evaluation) even though they may not be conducting these activities on a regular basis because of a variety of challenges described earlier in this chapter.

Significance of Statistical Insignificance

For all other items not already noted, university affiliation, organizational size, and organizational specialty did not indicate a statistically significant difference among the knowledge translation practices of health services research organizations. It also was noted early on that geographic location in terms of rurality, originally a variable of interest, did not even warrant testing since the vast majority of research organizations are located in metropolitan areas. Despite the statistical insignificance, these findings remain new contributions to the field, as these relationships previously had not been examined to the extent known by the investigator. The data show us that research organizations generally tend to conduct knowledge translation activities in the same manner, regardless of university affiliation, organizational specialty, or size.

Main Research Question: What are the knowledge translation practices of health services research organizations in the United States?

To answer this question, the investigator first determined the degree to which research organizations translate knowledge in ways consistent with the empirical evidence, which was organized using the Lavis Knowledge Translation Framework described in Chapter II. The statistical data (summarized in Appendix K) indicate U.S. research organizations in this study, as in Canada a decade earlier, conduct knowledge translation activities throughout the course of their research projects, although in many cases there is a clear gap between what the literature suggests research organizations optimally should be doing and what they report doing. Research organizations most frequently tailor their approaches to their end users and send out electronic summaries of findings. They are much less likely to engage their end users, whether through the research development process, the use of social media tools, or by conducting evaluation

activities. Research organizations also are less likely to make investments in knowledge translation through dedicated staff, training, resources, or the use of incentives. While there is room for growth in each area of the framework, prior research shows that research organizations, and their researchers, may have limited time, funding, and resources to conduct knowledge translation activities; may have limited training and experience in knowledge translation; and may have competing demands for alternative knowledge translation activities (e.g., peer review publications and conference presentations), making it difficult for research organizations to conduct optimal knowledge translation activities (Glasgow et al., 2003; Glasgow et al., 2004). Table 46 contains a listing of all of the knowledge translation items from the survey ranked by overall mean score.

The investigator then examined university affiliation, organizational size, and organizational specialty to see if they explained any variation in responses (as noted earlier, one variable of interest, geographic location in terms of rurality, was not supported by data). The data showed that health services research organizations in the United States largely communicate about their research in the same manner, regardless of university affiliation, organizational size, or specialty; the variables only accounted for variation in 10 out of more than 100 knowledge translation items. University-affiliated research organizations dedicate resources to getting to know the research literature, and they develop messages for end users that specify action with a higher frequency than non-university affiliates. However, non-university affiliates translate research findings via blogs with more frequency than university affiliates. Small organizations provide full reports free upon request and target policymakers with a higher frequency than large

organizations. Large organizations work with end users to establish the overall direction of the research organization with a higher frequency than small organizations. Finally, organizations that specialize in health policy and economics target policymakers, dedicate resources to identifying opinion leaders, and work with them to translate research with a higher frequency than other research organizations. Organizations that specialize in quality improvement and performance target service providers with a higher frequency than do organizations with other specialties.

The data presented organizational characteristics that may indicate higher degrees of effective knowledge translation in particular situations: small size, no university affiliation, and specialties in health policy/economics or quality improvement. Small, non-university organizations may have elements of adaptability not found in larger, more bureaucratic organizations that allow them more easily to accommodate knowledge translation throughout the research process. This suggests that university-affiliated research organizations may not be taking advantage of campus resources (e.g., communications professionals, networking partners, access to policymakers, collaborative spaces) to reinforce or enhance their knowledge translation practices.

Implications

The findings from this study provide valuable implications for health services research organizations, university affiliates, and funding agencies.

Implications for Health Services Research Organizations

Research organizations, on average, reported dedicating resources only "occasionally" to the development of end users and knowledge translation capacity building, and almost three-quarters do not offer staff incentives for knowledge

translation. Organizational leaders may want to build knowledge translation expectations

into their organizational infrastructure, allocate time and resources for knowledge

translation into projects, add knowledge translation metrics to annual performance

appraisals, incentivize knowledge translation activities, and/or invest in resources to

support knowledge translation activities and to grow organizational capacity. There are

many tools and resources, some free, available from reputable experts to learn more

about knowledge translation, and activities can be scaled for small and large

organizations alike.

The second implication for research organizations is to improve engagement with

end users at all points of the research process (as the literature suggests), from working

with them to form relevant research questions to evaluating whether the research findings

have found their way into practice. Research organizations can be more proactive at

learning about their end users and sharing information about their end users with their

staff. They also can continue to adopt the use of social media tools to disseminate

research findings and connect with peers and end users. Literature presented in Chapter

II strongly suggests that social media tools are prominent modes of communication that

continue to grow at a rapid pace, but that health services researchers lag behind their

peers in terms of social media usage. When used correctly, social media tools can help

build a research organization's reputation, make the organization more accessible to end

users, engage stakeholders in the research development process, gather interest in the

research, and attract funders and other important stakeholders. The data tell us that staff

are not typically rewarded for conducting this sort of knowledge translation activity, and

the literature similarly suggests that staff are rewarded (e.g., promotion, tenure) for

conducting more traditional knowledge translation activities such as publishing journal articles and presenting at conferences. Again, this is an opportunity for organizational leadership to create an organizational culture that supports and facilitates an expanded repertoire of knowledge translation activities.

Research organizations are performing well by making research summaries available rather than or in addition to full research reports and making information available electronically in addition to or rather than on paper, in order to capture a wider audience, but they also might consider making the information freely available on their website, for example, rather than only distributing it when asked. Small organizations in particular should review their practices to see how they align with these leading practices.

Implications for University Affiliates

In addition to all of the implications outlined for health services research organizations, university affiliates may wish to take additional steps to enhance their knowledge translation practices using the resources available via their campus. One way to do this is to take advantage of the university's communications professionals who can assist with or provide training in tactical communications practices. Another way would be to partner with other departments or units to share a dedicated translation staff member or members if full funding is currently not available. End users may be available on campus for consultation throughout the research process. End users also may be available, along with other relevant stakeholders on and off campus, to participate in research collaboratives or networks, which have been determined to contribute to more effective knowledge translation. Participation in research networks may be an opportunity to extend the reach of research findings via partners who have ready access

to social media tools, blogs, or other items currently not used with a high degree of frequency by university-affiliated research organizations.

Implications for Funding Agencies

Respondents frequently cited funding as something they desired to increase their capacity for knowledge translation activities. Funders may wish to build expectations for knowledge translation into their grants and contracts so award recipients are required to conduct knowledge translation activities and can appropriate funding accordingly. They might consider providing funding or technical assistance for items such as research centers, knowledge broker mechanisms, and research collaboratives or networks.

Limitations

One limitation to this study exists with the selected sample. Only members of AcademyHealth were examined. Since this is a professional membership organization, the results may not be generalized beyond the scope of the organization.

A second limitation to the study is the respondents, limited to leaders of health services research organizations, so that they might answer from an organizational perspective. The results may not be generalized beyond the scope of the organizational level (e.g., to individual researcher or knowledge translation practitioner level).

A third limitation is how respondents interpreted the word "organization" in the item related to organizational size. The purpose of examining organizational size was to determine whether the size of the respondents' *entire* organization affected knowledge translation practices. Some respondents may have interpreted *organization* to mean *department* or *division*, whereas some may have interpreted it as *entire organization.*

There is no way to determine this, but the item was possibly not explicit enough, which could have affected responses.

The fourth limitation is the relatively low response rate of 15.3%. The investigator utilized systematic tactics to enhance the survey response rate, including clearly defining the purpose, administering the survey electronically, optimizing the timing and delivery of the participation requests, making two appeals for participation, and sending a letter of support from a well-known leader in the health services research community. Despite these efforts, the response rate remained low, which may be attributed to timing (i.e., the survey was administered in the summertime), lack of incentives for completing the survey, or self-selection of respondents. However, there were two opportunities to compare survey respondents with the full survey population and they were found to be similar. First, the percentage of respondents indicating a university affiliation was 25.5% ($n = 28$), whereas the percentage of the survey population with a university affiliation was 22.7% ($n = 138$). Second, of the respondents, 96.3% ($n = 105$) reported being located in a metropolitan area, whereas 97.5% ($n = 727$) of the survey population was found to be located in a metropolitan area. Thus, the sample was not substantially different from the population on affiliation status and geographic location in terms of rurality; however, no other sample-to-population comparisons were feasible due to unavailable information for non-responding organizations.

The final limitation relates to the use of the Likert scale and how respondents interpreted the Likert scale categories of never, rarely, occasionally, frequently, and always. The nature of a Likert scale is such that it may have been subject to distortion by

respondents who avoided using extreme response categories (central tendency bias), agreed with statements as presented (acquiescence response bias), or tried to portray themselves or their organization in a more favorable light (social desirability bias). Respondents also may have had varying views on what the scale categories (e.g., frequently, occasionally, or rarely) mean, which may have had an impact on how they answered the items.

Future Research Opportunities

One component of this research study was to examine research organizations' use of social media tools in a very general sense. Historically, research has focused on traditional tools for translating knowledge, such as paper-based reports or summaries on websites. However, little research has been done on the use and effect of social media tools to translate health services research findings. More than half of the respondents in this study indicated they were not making use of social media tools to translate research findings in an age where it seems that almost everyone makes use of at least one social media tool. More research is needed to understand this relationship and to make further generalizations. The data also showed that non-university-affiliated research organizations are more apt to use blogs to translate research findings, and further research is needed to understand the reason for this relationship.

Further research also should be conducted around the area of evaluation. With almost half of the research organizations never or rarely conducting end user evaluation, how can they be certain their actions are effective? The literature tells us that end user evaluation is an important component of the knowledge translation process, and evidence-based practices are increasingly becoming standard (APA Presidential Task

Force on Evidence-Based Practice, 2006; Institute of Medicine, 2001; Riemer et al., 2011), yet organizations are not making it a priority. Why? More needs to be studied to understand this relationship.

The literature alludes to the importance of dedicating resources and staff to translating research knowledge (Lomas, 2007b; Mueller et al., 2007; Robeson et al., 2010). However, the results of this study indicated that research organizations infrequently provide staff incentives and often do not dedicate resources for conducting translation activities, despite staff's indicating a desire for funding to increase their capacity for knowledge translation activities. The importance of understanding why organizations may be unlikely or unwilling to invest in knowledge translation resources must be understood. Further, the data suggest (with limitations) that Canadian health services research organizations dedicate staff and resources to knowledge translation more frequently than organizations in the United States and that further exploration of this area is warranted.

The data showed that research organizations affiliated with universities get to know the research literature about effective approaches to knowledge translation with a higher frequency than non-university-affiliated research organizations. It may be that universities have access to additional resources and infrastructure within the university environment, compared with non-university affiliates. Perhaps university-affiliated research organizations have access to or are partnering with schools of communication, marketing, health administration, or public relations and are aware of the research literature in this regard. This new finding may benefit from further exploration.

The purpose of examining organizational size was to determine whether the size of the respondents' *entire* organization affected knowledge translation practices. Some respondents may have interpreted *organization* to mean *department* or *division*, whereas some may have interpreted it as *entire organization*. There is no way to determine this, but the item was possibly not explicit enough, which could have affected responses. Further research is needed to understand more fully organizational size and its relationship to knowledge translation practices. In addition to size, it also may be worthwhile to examine organizational categories such as public, private, or non-profit.

Lastly, this research study did not determine reasons why health services research organizations do or do not conduct knowledge translation activities. Further research needs to be done to learn more about internal and external motivators in this area. The pilot study in particular unveiled provoking concepts such as promotion and tenure, online reputation, and the competition for resources.

Summary

The purpose of this study was to understand better how health services research organizations in the United States communicate their research findings to end users; determine the degree to which they translate research findings in ways consistent with the empirical evidence; and determine whether university affiliation, organizational specialty, or size explain any variation in responses.

The first important item to note is that the data indicate health services research organizations in the United States largely communicate about their research in the same manner, regardless of university affiliation, organizational size, or specialty. Certain organizational characteristics (i.e., small size, no university affiliation, and specialization

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in health policy/economics or quality improvement) signal higher degrees of effective knowledge translation in 10 particular situations.

The second important item to note is that, altogether, U.S.-based research organizations in this study, as in Canada a decade earlier, conduct knowledge translation activities throughout the course of their research project, although in many cases there are clear gaps between what the literature suggests research organizations optimally should be doing and what they report doing. The gaps indicate opportunities for improvement such as evaluating knowledge translation activities, utilizing social media tools to extend messaging to end users, engaging with end users throughout the research process, building expectations for knowledge translation into infrastructure, and investing in knowledge translation development at the organizational and funder levels.

Through the empirical testing of the Lavis Knowledge Translation Framework, we understand more about the knowledge translation landscape for health services research organizations throughout the country. Findings from this study expand the Lavis et al. (2003a) study by setting a baseline for knowledge translation practices, across the entire continuum of the research process, for health services research organizations in the United States. Importantly, the data also indicate areas that may benefit from bolstered attention, as indicated earlier.

As the information needs of health care leaders and stakeholders grow and change while the country continues to navigate health care reform, the ability of research organizations to communicate effectively and understand what it takes to do so remains of utmost importance. Through continued analysis of knowledge translation practices and the implementation of enhanced or new communications initiatives, more end users

will successfully receive research findings in ways that can be useful for decision

making, ultimately enhancing the quality of health care and improving patient outcomes.

APPENDICES

The University of North Dakota Survey on Knowledge Translation Practices in Health Services Research Organizations

Statement of Research

A research participant must give his or her informed consent to such participation. This consent must be based on an understanding of the nature and risks of the research. This document provides information that is important for this understanding. Research projects include only participants who choose to take part. If you have questions at any time, please contact the investigator.

What is the purpose of this study?

You are invited to participate in a research study about knowledge translation practices of health services research organizations. The present study will assess factors that impact knowledge translation activities at health services research organizations within the United States.

This study may identify trends of successful knowledge translation conducted by health services research organizations as well as key factors that influence knowledge translation activities. The findings may indicate gaps in practices, areas for improvement, or new methods of cost-effectiveness and accountability.

How many people will participate?

Approximately 800 participants from around the country will be asked to take part in this study.

How long will I be in this study?

Participation in this study will require approximately 10-20 minutes to complete an online survey.

What will happen during this study?

You will answer a series of questions related to knowledge translation. There will be some questions that ask you to rank something on a scale, some questions that ask for a yes or no answer, and some optional questions for you to compose a response. You will be free to discontinue participation in the survey at any time without penalty.

What are the risks of the study?

There are minimal potential risks to participating in this study. For example, participants may become embarrassed or uncomfortable with the survey questions. Participants may discontinue their survey response at any time without penalty. There are no treatments available through this study in the event of an injury or discomfort. You will have the right to withdraw at any time throughout the process without penalty.

What are the benefits of this study?

There are few direct benefits of this study. The interview is likely to raise your awareness of knowledge translation practices in your workplace.

Will it cost me anything to be in this study?

There is no cost to be in this research study.

Will I be paid anything for participating?

You will not be paid for participating.

Who is funding the study?

The University of North Dakota and the investigator are receiving no payments from other agencies or companies to conduct this research study.

Confidentiality

Names will not be collected during this survey. The records of this study will be kept confidential to the extent allowed by law. In any report about this study that might be published, you will not be identified. Your record may be reviewed by government agencies, and the University of North Dakota Institutional Review Board.

Any information that can be identified with you will remain confidential and will only be disclosed as required by law. Confidentiality will be maintained by means of keeping data in encrypted computer files in a private office. If the investigator writes a report or article about this study, you will not be identifiable.

Is this study voluntary?

Your participation is voluntary. You may choose not to participate or you may discontinue your participation at any time without penalty.

Contacts and questions

The investigator conducting this study is Wendy Opsahl, MA. You may ask any questions you have at any time. If you later have questions, concerns, or complaints about the research please contact her at (701) 610-8632 or wendy.opsahl2@my.und.edu. You also may contact the researcher's dissertation advisor, Dr. Jeffrey Sun, Associate Professor in the Department of Educational Leadership at the University of North Dakota, at 701-777-3452 or jeffrey.sun@email.und.edu.

If you have questions regarding your rights as a research subject, or if you have any concerns or complaints about the research, you may contact the University of North Dakota Institutional Review Board at (701) 777-4279. Please call this number if you cannot reach the investigator, or if you wish to talk with someone else.

Selecting "Yes" indicates that this research study has been explained to you, that your questions have been answered, and that you agree to take part in this study.

Q1. ❍ Yes, I have reviewed the informed consent information and agree to participate.

❍ No, I do not wish to participate

Please indicate the most appropriate answer for each item, and identify any questions or concerns at the end in the space provided.

Q2. Please indicate how often your organization translates research to each of the following categories of potential users of your research.

Never 1	Rarely 2	Occasionally 3	Frequently 4	Always 5				
a.	General public or service recipients (e.g., voters, patients, clients)			1	2	3	4	5
b.	Service providers (e.g., clinicians)			1	2	3	4	5
c.	Managers in publicly funded facilities or enterprises (e.g., hospitals), planning regions (e.g., regional health authorities) or private organizations / businesses			1	2	3	4	5
d.	Policymakers in municipal or federal governments			1	2	3	4	5

Hereafter I refer to the potential users of your research to whom you frequently or always translate research as your end users. Please answer all subsequent questions with these end users in mind.

Q3. Please indicate how often your organization performs each of these knowledge translation activities.

Never 1	Rarely 2	Occasionally 3	Frequently 4	Always 5				
a. Provides at cost and upon request *full reports* on research projects.				1	2	3	4	5
b. Provides free upon request *full reports* on research projects, either in hard copy or electronically.				1	2	3	4	5
c. Mails or emails *full reports* on research projects to your end users.				1	2	3	4	5
d. Provides free upon request *brief summaries* of research reports.				1	2	3	4	5
e. Mails or emails *brief summaries* of research reports to your end users.				1	2	3	4	5

*Messages mean stand-alone statements that, at minimum, summarize a research finding or body of research findings.

Q4. Please indicate how often your organization performs each of these knowledge translation activities.

Never 1	Rarely 2	Occasionally 3	Frequently 4	Always 5				
a. Dedicates resources to getting to know your end users.				1	2	3	4	5
b. Tailors mailings or emails to specific end users.				1	2	3	4	5
c. Tailors your knowledge translation approach to specific end users.				1	2	3	4	5
d. Spends time with your end users discussing your research reports.				1	2	3	4	5
e. Spends time with your end users discussing ideas[*] for possible action.				1	2	3	4	5

*Ideas must be based on research findings.

Q5. Please indicate how often your organization invests in knowledge translation in the following ways.

Never 1	Rarely 2	Occasionally 3	Frequently 4	Always 5				
a. Dedicates resources to getting to know the research literature about effective approaches to knowledge translation.				1	2	3	4	5
b. Dedicates resources to skill building amongst your research-translation staff[*] (e.g., pay for conferences or courses about knowledge translation).				1	2	3	4	5
c. Dedicates resources to learning about what constitutes a credible messenger for your end users (e.g., background and approach) and ensuring your knowledge translation staff[*] meet these expectations.				1	2	3	4	5

d.	Dedicates resources to identifying opinion leaders and working with them to translate research.	1	2	3	4	5
e.	Dedicates resources to developing relationships with print, radio, and/or television journalists.	1	2	3	4	5
f.	Knowledge translation staff* know of and interact with people performing similar roles in other research organizations.	1	2	3	4	5
g.	Knowledge translation staff* subscribe to and share information from listservs about knowledge translation.	1	2	3	4	5

*If you do not employ dedicated knowledge translation staff, please substitute research staff who perform knowledge translation activities.

Q6. Please indicate whether your organization makes use of any of the following

supporting infrastructure to translate research to your end users.

		No	Yes
a.	Website	1	2
b.	Newsletter	1	2
c.	Listserv	1	2
d.	Media releases	1	2
e.	Blogs	1	2
f.	Facebook	1	2
g.	Twitter	1	2
h.	LinkedIn	1	2
i.	Other - please specify:	1	2

Q7. Does your organization employ dedicated staff with knowledge translation duties?

Y/N

Q8. If yes, please estimate number of full-time equivalent staff employed: _____

Q9. Do you have knowledge translation duties within your organization?

Q10. Does your organization create explicit incentives for research staff to engage in

knowledge translation activities (e.g., performance objectives related to knowledge

translation)? Y/N

Q11. If yes, please describe: _____

Q12. Please indicate how often your organization engages in interactive processes (e.g.,

teleconferences, face-to-face meetings) with your end users in each of the following

stages of the research process.

Never 1	Rarely 2	Occasionally 3	Frequently 4	Always 5				
a.	Establishing the overall direction of the research organization (e.g., through an advisory board)			1	2	3	4	5
b.	Developing a specific research question, objectives or hypothesis.			1	2	3	4	5
c.	Establishing the preferred research design and methods.			1	2	3	4	5
d.	Developing research products (e.g., research reports or brief summaries).			1	2	3	4	5
e.	Translating the research findings to your end users.			1	2	3	4	5

Q13. Please indicate how often your organization performs each of these evaluation

activities related to knowledge translation.

Never 1	Rarely 2	Occasionally 3	Frequently 4	Always 5				
a.	Assess any changes in your end users' awareness of research results			1	2	3	4	5
b.	Assess any changes in your end users' knowledge of research results			1	2	3	4	5
c.	Assess any changes in your end users' attitudes toward research results			1	2	3	4	5
d.	Assess any changes in your end users' self-reported behavior			1	2	3	4	5
e.	Assess any changes in your end users' actual (i.e., objectively measured) behavior			1	2	3	4	5

Q14. What is your zip code? _____

Q15. Is your organization based at or affiliated with a university? Y/N

Q16. Please indicate the approximate number of individuals comprising your organization: 1-10, 11-20, 21-30, 31-40, 41-50, 51-75, 76-100, 101-150, 151-200, 201-300, 301-400, 401-500, 501-700, 701-900, and more than 900.

Q17. Please indicate your research organization's specialty: public health, international health, rural health, health equity, indigent populations, population health, policy, prevention, medicine, behavioral, health economics, and other (please list ____)

Q18. I recognize that the head of an applied research organization may delegate the task of completing this survey to someone else within the organization. If you are not the head of your organization, please tell me your job title: _____

OPTIONAL

Q19. Do you have any comments regarding any of the questions?

Q20. Do you have any suggestions about what your end users could do to facilitate your knowledge translation efforts?

Q21. Do you have any suggestions about what your funders (e.g., governments, peer-review granting agencies, foundations) could do to facilitate your knowledge translation efforts?

THANK YOU FOR PARTICIPATING IN THIS SURVEY.

For further information, please contact:

Wendy Opsahl, MA (Principal Investigator, the University of North Dakota)

Tel: (701) 610-8632; Email: wendy.opsahl2@my.und.edu

APPENDIX B
Permission from Survey Instrument Designer to Use Survey Instrument

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bestpractices_...

(📎) Attach files   1 of 1 uploaded (155 KB) ⌃

Subject: RE: survey instrument request
Date: Sun, 7 Aug 2011 17:39:13 -0400
From: lavisj@mcmaster.ca
To: wendy.opsahl2@und.edu

Dear Wendy,

Please call me John. I'm happy to share the survey instrument, which I've attached. I hope this helps.

Good luck with your research!

Best wishes,
John

From: Opsahl, Wendy [mailto:wendy.opsahl2@und.edu]
Sent: Sunday, August 07, 2011 4:16 PM
To: Lavis, John
Subject: survey instrument request

Greetings Dr. Lavis,

I would like to inquire about the possibility of obtaining the survey instrument that was used in your 2003 study, *"How Can Research Organizations More Effectively Transfer Research Knowledge to Decision Makers?"* I am interested in examining the knowledge transfer activities/strategies of university-based applied health research centers in the U.S., and possibly adding a line of inquiry about the use of social media tools (if it does not currently exist).

I am a doctoral student in the Educational Leadership program at the University of North Dakota, and my dissertation research interests include knowledge transfer of health services research, especially to policymakers. Many of your publications have informed and shaped my understanding of the field.
I am happy to provide further information if needed, and thank you very kindly for your consideration.

Sincerely,
Wendy Opsahl

wendyopsahl2@und.edu

McMaster University Survey on Current Practices in Research Transfer

Introduction

Many applied research organizations communicate their research findings to potential users in the hope that this will increase the chance that these findings will be considered and/or acted upon. Historically, these efforts have had a variety of titles including: research transfer, communications, dissemination, knowledge transfer, and technology transfer. We use the term research transfer for consistency but not to imply an endorsement of any one term or approach.

As a group of researchers and research-transfer practitioners in the health sector, we hope to learn more about how research organizations in Canada (both inside and outside the health sector) currently communicate their research findings to decision-makers. By decision-makers we mean individuals represented by the categories in question 1 below, not other research organizations. Our interest is in your organization's usual practices over the last year, not what you considered doing or planned to do.

Please circle the most appropriate number for each item. If you have specific comments on any issues raised in particular questions, please identify the question by number and add your comments in the space provided on the insert.

1. Please indicate how often your organization transfers research to each of the following categories of potential users of your research

		Never 1	Rarely 2	Occasionally 3	Frequently 4	Always 5			
a.	General public or service recipients (e.g., voters, patients, clients)	1	2	3	4	5			
b.	Service providers (e.g., clinicians)	1	2	3	4	5			
c.	Managers in publicly funded facilities or enterprises (e.g., hospitals), planning regions (e.g., regional health authorities) or private organizations / businesses	1	2	3	4	5			
d.	Policy-makers in municipal, provincial or federal governments	1	2	3	4	5			

Hereafter we refer to the potential users of your research to whom you frequently or always transfer research as your end users. Please answer all subsequent questions with these end users in mind.

2. Please indicate how often your organization performs each of these research-transfer activities.

		Never 1	Rarely 2	Occasionally 3	Frequently 4	Always 5			
a.	Provides at cost and upon request *full reports* on research projects.	1	2	3	4	5			
b.	Provides free upon request *full reports* on research projects, either in hard copy or electronically.	1	2	3	4	5			
c.	Mails or emails *full reports* on research projects to your target audiences.	1	2	3	4	5			
d.	Provides free upon request *brief summaries* of research reports.	1	2	3	4	5			
e.	Mails or emails *brief summaries* of research reports to your target audiences.	1	2	3	4	5			
f.	Develops messages* for your target audiences that transcend particular research reports (or the research projects on which these research reports are based).	1	2	3	4	5			
g.	Develops messages* for your target audiences that specify possible action.	1	2	3	4	5			

*By messages we mean stand-alone statements that, at minimum, summarize a research finding or body of research findings.

3. Please indicate how often your organization performs each of these research-transfer activities.

	Never 1	Rarely 2	Occasionally 3	Frequently 4	Always 5				
a.	Obtains and/or updates contact information on your target audiences.				1	2	3	4	5
b.	Dedicates resources to getting to know your target audiences.				1	2	3	4	5
c.	Dedicates resources to skill building amongst your target audiences (e.g., skills to critically appraise research reports).				1	2	3	4	5
d.	Tailors mailings or emails to specific target audiences.				1	2	3	4	5
e.	Tailors your research-transfer approach to specific target audiences.				1	2	3	4	5
f.	Spends time with your target audiences discussing your research reports.				1	2	3	4	5
g.	Spends time with your target audiences discussing ideas[*] that transcend particular research reports.				1	2	3	4	5
h.	Spends time with your target audiences discussing ideas[*] for possible action.				1	2	3	4	5

*Ideas must be based on research findings.

4. Please indicate whether your organization invests in research transfer in the following ways.

		No 1	Yes 2
a.	Employs dedicated staff with research-transfer duties.	1	2
	If yes, please estimate number of full-time equivalent staff employed: _____ FTE		
b.	Dedicates part of its budget to research-transfer activities.	1	2
	If yes, please estimate the percentage of your budget allocated to research-transfer activities: _____%		
c.	Creates explicit incentives for research staff to engage in research-transfer activities (e.g., performance objectives related to research transfer).	1	2
	If yes, please describe:		

5. Please indicate how often your organization invests in research transfer in the following ways.

		Never 1	Rarely 2	Occasionally 3	Frequently 4	Always 5				
a.	Dedicates resources to getting to know the research literature about effective approaches to research transfer.					1	2	3	4	5
b.	Dedicates resources to skill building amongst your research-transfer staff[*](e.g., pay for conferences or courses about research transfer).					1	2	3	4	5
c.	Dedicates resources to learning about what constitutes a credible messenger for your target audiences (e.g., background and approach) and ensuring your research-transfer staff[*] meet these expectations.					1	2	3	4	5
d.	Dedicates resources to identifying opinion leaders and working with them to transfer research.					1	2	3	4	5
e.	Dedicates resources to developing relationships with print, radio, and/or television journalists.					1	2	3	4	5
f.	Research-transfer staff[*] know of and interact with people performing similar roles in other research organizations.					1	2	3	4	5
g.	Research-transfer staff[*] subscribe to and share information from list-serves about research transfer.					1	2	3	4	5

*If you do not employ dedicated research-transfer staff, please substitute research staff who perform research-transfer activities.

6. Please indicate how often your organization engages in interactive processes (e.g., teleconferences, face-to-face meetings) with your target audiences in each of the following stages of the research process.

		Never 1	Rarely 2	Occasionally 3	Frequently 4	Always 5				
a.	Establishing the overall direction of the research organization (e.g., through an advisory board)					1	2	3	4	5
b.	Developing a specific research question, objectives or hypothesis.					1	2	3	4	5
c.	Establishing the preferred research design and methods.					1	2	3	4	5
d.	Executing the research.					1	2	3	4	5
e.	Analyzing / interpreting the research findings.					1	2	3	4	5
f.	Developing research products (e.g., research reports or brief summaries).					1	2	3	4	5
g.	Transferring the research findings to your target audiences.					1	2	3	4	5
h.	Responding to individual queries resulting from your research-transfer efforts.					1	2	3	4	5

7. Please indicate whether your organization makes use of any of the following supporting infrastructure to transfer research to your target audiences.

		No	Yes
a.	Website	1	2
	If yes, please answer questions A.1 – A.5.		
b.	Newsletter	1	2
	If yes, please answer questions B.1 – B.5.		
c.	List-serve	1	2
	If yes, please estimate the percentage of subscribers that are decision-makers: _____%		
d.	Media releases	1	2
	If yes, please estimate number per year: _____		
e.	Other - please specify:	1	2

A.1-A.5. If you answered yes to 7a, please indicate how often your organization's website offers the following options.

Never 1	Rarely 2	Occasionally 3	Frequently 4	Always 5				
a.1	Makes available full reports on research projects.				1	2	3	4	5
a.2	Makes available brief summaries of research reports.				1	2	3	4	5
a.3	Makes available messages[*] for your target audiences that transcend particular research reports (or the research projects on which these research reports are based).				1	2	3	4	5
a.4	Makes available messages[*] for your target audiences that specify implications for action.				1	2	3	4	5
a.5	Introduces research projects that may have important implications for your target audiences at different stages in the projects' life cycles (e.g., funding application, launch, data collection).				1	2	3	4	5
a.6	Provides a dedicated entry point (with dedicated text) for each of your target audiences.				1	2	3	4	5
a.7	Notifies target audiences when new material of potential interest to them has been posted.				1	2	3	4	5
a.8	Clearly identifies the specific individual(s) who can answer questions about a report or message.				1	2	3	4	5

*By messages we mean stand-alone statements that, at minimum, summarize a research finding or body of research findings.

B.1 – B.6. If you answered yes to 7b, please indicate how often your organization's

newsletter contains the following material.

	Never 1	Rarely 2	Occasionally 3	Frequently 4		Always 5			
b.1	Makes available brief summaries of research reports.				1	2	3	4	5
b.2	Makes available messages for your target audiences that transcend particular research reports (or the research projects on which these research reports are based).				1	2	3	4	5
b.3	Makes available messages for your target audiences that specify implications for action.				1	2	3	4	5
b.4	Introduces early and often any research projects that may have important implications for your target audiences.				1	2	3	4	5
b.5	Provides dedicated sections for each of your target audiences.				1	2	3	4	5
b.6	Clearly identifies the specific individual(s) who can answer questions about a report or message.				1	2	3	4	5

8. Please indicate how often your organization performs each of these evaluation

activities related to research transfer.

	Never 1	Rarely 2	Occasionally 3	Frequently 4		Always 5			
a.	Assess any changes in your target audiences' awareness of research results that may be attributable to your research-transfer activities.				1	2	3	4	5
b.	Assess any changes in your target audiences' knowledge of research results that may be attributable to your research-transfer activities.				1	2	3	4	5
c.	Assess any changes in your target audiences' attitudes toward research results that may be attributable to your research-transfer activities.				1	2	3	4	5
d.	Assess any changes in your target audiences' self-reported behaviour that may be attributable to your research-transfer activities.				1	2	3	4	5
e.	Assess any changes in your target audiences' actual (i.e., objectively measured) behaviour that may be attributable to your research-transfer activities.				1	2	3	4	5

ID #: _____ (Your responses will be kept confidential and data will not be reported in ways that could potentially identify you or your research organization.)

To assist your organization's future research transfer efforts, we will provide a confidential report to you after the survey data have been analyzed if requested. This report will provide your responses to each question as well as the average responses to each question for all participating research organizations. If you would like to receive a copy of this report, please tick the appropriate box below.

❍ I wish to receive a confidential report that provides my responses and the mean responses for all participating research organizations.

❍ I do not wish to receive the confidential report.

We recognize that the head of an applied research organization may delegate the task of completing this survey to someone else within the organization. If you are not the head of your organization, please tell us:

  a. your job title: _____

  b. whether you have research-transfer duties within your organization:

     _____

     THANK YOU FOR PARTICIPATING IN THIS SURVEY.

Please return the questionnaire in the stamped, addressed envelope.

For further information, please contact:

John Lavis, M.D., Ph.D. (Principal Investigator, McMaster University)

Tel: (905) 525-9140 ext. 22907; Email: lavisj@mcmaster.ca

Any Further Thoughts?

(Optional)

Do you have any comments regarding any of the questions?

(If the space provided is insufficient to accommodate all your ideas, please feel free to attach additional pages.)

Do you have any suggestions about what your target audiences could do to facilitate your research-transfer efforts?

(If the space provided is insufficient to accommodate all your ideas, please feel free to attach additional pages.)

Do you have any suggestions about what your funders (e.g., governments, peer-review granting agencies, foundations) could do to facilitate your research-transfer efforts?

(If the space provided is insufficient to accommodate all your ideas, please feel free to attach additional pages.

APPENDIX D
Pilot Study Details

For the first pilot study, the survey was emailed to 20 randomly selected members of health services research organizations in the United States, drawn from the AcademyHealth membership list, who met the selection criteria. They received an email asking for their participation and containing a web link to the survey. After one week, participants received a second email reminding them to complete the survey. Five participants responded to the first pilot study, administered on February 14, 2012. Four participants consented to participate, and the fifth skipped the consent question. Because of this, an adjustment was made to the second pilot study that forced participants to either agree or disagree to participate before being able to move forward. One participant answered the survey questions (a 5% completion rate) and four participants did not answer the survey questions. This was not enough data to analyze, so after a strategy discussion with the investigator's statistics advisor, the decision was made to shorten the survey (in order to encourage a higher participant rate) and administer a second pilot study to a focused group of known participants. Questions that did not directly answer the research questions were removed, and other questions were reworded to appear more concise. Please see Appendix A to review the final version of survey questions.

The second pilot study was administered on April 17, 2012. Five participants meeting the selection criteria were specifically selected by the investigator and asked to participate. This selection method was utilized to increase the response rate, as well as to

gain valuable feedback about the survey from the perspective of participants. Three

respondents completed the survey, yielding a 60% completion rate. One person reviewed

the survey and provided suggestions about the structure and composition of the

instrument, and one person did not participate.

It is important to note that because changes were made to the survey tool during

the pilot studies, the pilot study data was not added to the overall data set, so as to reduce

the chances for contamination. The following paragraphs discuss the results for each of

the 10 survey sections.

Section 2: End Users

The most frequently contacted end users, according to participants, are the general

public or service recipients (with a mean of 5) and policymakers (with a mean of 4.5).

Table 47.

End Users

Proportion Reporting Knowledge Translation to the Following End Users	Overall Mean
Targets policymakers	4.500
Targets service providers (e.g., clinicians)	3.000
Targets managers in publicly funded facilities or enterprises (e.g., hospitals), planning regions (e.g., regional health authorities) or private organizations / businesses	3.000
Targets eneral public or service recipients (e.g., voters, patients, clients)	5.000

Section 3: Knowledge Translation Activities, Part 1

In this line of questioning, which asked participants how often their organization

performs each of the research activities listed in Table 48, the most frequent activities

included providing free upon request full reports, and providing free upon request brief

summaries. One participant reported that his or her organization never provides at cost and upon request the full reports, and another participant reported that his or her organization never develops messages for their end users that specify possible action.

Table 48.

Knowledge Translation Activities

Knowledge Translation Activity	Overall Mean
Provides free upon request brief summaries of research reports	5.000
Provides free upon request full reports on research projects, either in hard copy or electronically	5.000
Mails or emails brief summaries of research reports to end users	3.500
Develops messages for end users that specify action	3.000
Mails or emails full reports on research projects to end users	3.000
Provides at cost and upon request full reports on research projects	3.000

Section 4: Knowledge Translation Activities, Part 2

Regarding knowledge translation activities, the most frequently utilized activity is tailoring the translation approach to specific end users. One respondent reported not spending time with end users discussing ideas (based on research findings) for possible action.

Table 49.

Knowledge Translation Activities

Proportion Reporting Investment in the Following Knowledge Translation Activities	Overall Mean
Tailors knowledge translation approach to specific end users	4.000
Tailors mailings or emails to specific end users	3.500
Spends time with end users discussing research reports	3.500
Dedicates resources to getting to know end users	3.500
Spends time with end users discussing ideas for possible action	2.500

Section 5: Investments in Knowledge Translation Activities

The most frequent investments made by organizations were dedicating resources to learning about what constitutes a credible messenger for end users, and dedicating resources to identifying opinion leaders and working with them to translate research findings. Participants indicated their organizations occasionally or frequently conducted all of the activities, which was slightly unexpected. The investigator hypothesized that these activities would have ranked lower, based on the empirical evidence. However, the survey population was very small and full conclusions cannot be drawn from the data.

Table 50.

Investments in Knowledge Translation Activities

Proportion Reporting Knowledge Translation Investment in the Following Ways	Overall Mean
Dedicates resources to identifying opinion leaders and working with them to translate research	4.000
Knowledge translation staff knows of and interacts with people performing similar roles in other research organizations	3.500
Dedicates resources to developing relationships with print, radio, and/or television journalists	2.500
Dedicates resources to learning about what constitutes a credible messenger for end users	4.000
Dedicates resources to getting to know the research literature about effective approaches to knowledge translation	3.500
Dedicates resources to skill building amongst knowledge translation staff (e.g., pays for conferences or courses about knowledge translation)	3.500
Knowledge translation staff subscribes to and shares information from listservs about knowledge translation	3.500

Section 6: Usage of Tools for Knowledge Translation

Two of four survey participants answered this question. Of the two, both utilized websites, Facebook, and Twitter to translate research findings to end users. Half of the

participants utilized newsletters, listservs, media releases, LinkedIn, and blogs. These results were not expected, as the investigator hypothesized that lower rates of social media tools would be employed. Again, because of the small sample size, no definitive conclusions can or should be drawn.

Table 51.

Usage of Tools for Knowledge Translation

Tool	Yes (Frequency/valid percent)	No (Frequency/valid percent)
Websites	**2 (100%)**	0 (0%)
Newsletters	1 (50%)	1 (50%)
Listserv	1 (50%)	1 (50%)
Media Releases	1 (50%)	1 (50%)
Blogs	1 (50%)	1 (50%)
Facebook	**2 (100%)**	0 (0%)
Twitter	**2 (100%)**	0 (0%)
LinkedIn	1 (50%)	1 (50%)

Section 7: Organizational Resources

Two participants employed dedicated, full-time (or equivalent) staff with knowledge translation duties. Two participants had knowledge translation duties within their organization. One organization did not provide incentives for research staff to engage in knowledge translation activities, and one organization did.

Section 8: Engagement with End Users

End user engagement most frequently was found when the research organizations translate research findings to the end users. End users sometimes were engaged when the research organizations established the overall directions of the research organization or

developed research products. They were less likely to be engaged during the development of the research questions, research design, and methodology.

Table 52.

Engagement with End Users

Research Organizations Engage in Interactive Processes with End Users in the Following Stages of the Research	Overall Mean
Translates the research findings to end users	4.000
Develops a specific research question, objectives or hypothesis	2.500
Develops research products (e.g., research reports or brief summaries)	3.500
Establishes the overall direction of the research organization (e.g., through an advisory board);	3.000
Establishes the preferred research design and methods	2.500

Section 9: Evaluation

Overall, evaluation activities related to knowledge translation activities took place rarely to occasionally, with the exception of evaluating changes in end users' awareness of research results, which took place frequently in one case.

Table 53.

Evaluation

Evaluation Activity	Overall Mean
Assesses any changes in end users' awareness of research results	3.500
Assesses any changes in end users' knowledge of research results	3.000
Assesses any changes in end users' self-reported behavior	3.000
Assesses any changes in end users' attitudes toward research results	2.500
Assesses any changes in end users' actual behavior.	2.000

Section 10: Additional Inquiry

Two organizations were based at or affiliated with a university. One organization had between 1 and 10 individuals, and one has more than 900. The two organizational specialties identified were rural health (1) and health policy (1). The two zip codes provided both came from urban areas, as defined by the U.S. Census Bureau.

To: [Email]

From: wendy.opsahl2@my.und.edu

Subject: Request for survey participation: Doctoral research regarding health

services research knowledge translation practices

Dear [CustomValue] [LastName],

I am writing to ask for your participation in my dissertation research study regarding knowledge translation practices of health services research organizations. You have been identified as the leader of a health services research organization from a listing received via AcademyHealth.

The present study is a research project to assess factors that impact knowledge translation activities at health services research organizations in the United States. The survey should take about 10-20 minutes to complete.

The survey is confidential. At no time will I release email addresses or names of people who completed the survey, nor will results of individual surveys be released. Your participation is voluntary, refusal to participate will involve no penalty, and you can discontinue participation at any time.

Here is a link to the survey. By clicking on the survey link, you are consenting to participate. http://www.surveymonkey.com/s.aspx

This study may identify trends of successful knowledge translation conducted by health services research organizations, as well as key factors that influence knowledge translation activities. The findings may indicate gaps in practices, areas for improvement, or new methods of cost-effectiveness and accountability.

I appreciate your consideration of participating in the study and providing valuable information about your organization's knowledge translation practices.

Sincerely,

Wendy Opsahl, Doctoral Candidate

The University of North Dakota, Department of Educational Leadership

If you do not wish to be contacted again, please click the link below:

http://www.surveymonkey.com/optout.aspx

Recruitment Letter #2

To: [Email]

From: wendy.opsahl2@my.und.edu

Subject: Survey reminder from AcademyHealth CEO Lisa Simpson

Dear Participant:

I encourage you to take the National Health Services Research Survey of Knowledge Translation Practices, which examines our field's collective activities surrounding the ever important act of effectively communicating research findings. http://www.surveymonkey.com/s.aspx

The survey, part of dissertation research conducted by AcademyHealth member Wendy Opsahl, a recipient of the Alice S. Hersh Student Scholarship in 2010, explores things such as our use of social media tools, our translation investments, and a number of factors that might contribute to our success, or lack thereof.

In a world of competing priorities and constrained resources, we must be able to demonstrate our impact. I urge you to take a few minutes to participate in this important survey, which will help us better understand what we do well and where we can do better.

Sincerely,

Lisa Simpson, M.B., B.Ch., M.P.H., FAAP

President and CEO, AcademyHealth

Organizational Specialty Recoding Map

Table 54.

Organizational Specialty Recoding Map

Original Code	Title	New Code	New Title
1	Public health	1	Public health
2	International health	3	Special populations
3	Rural health	3	Special populations
4	Health equity	3	Special populations
5	Indigent populations	3	Special populations
6	Population health	3	Special populations
7	Health policy	2	Health policy and economics
8	Prevention	6	Medicine and health systems
9	Medicine	6	Medicine and health systems
10	Behavioral health	1	Public health
11	Health economics	2	Health policy and economics
12	Other	4	Quality/performance
		5	Health services or clinical research

The original categories were combined with the self-reported categories to form the new codes. Participant responses are listed within the new categories below.

1. **Public health**

   - Public health and international/global health

   - Public health

   - Behavioral health

2. **Health policy and economics**

- Broad mix of health policy and health services research with applications within a delivery system

- I work in the health economics and outcomes research group

- Business implications of health policy and economic trends

3. **Special Populations**

- Children's health

- Long-term care

- Long-term care and aging services

- International health

- International health

- Rural health

- Health equity

- Disparities, Community Based Education and Prevention Strategies, Evaluation

- Mental health, genetics, obesity, diabetes, health equity

- Indigent populations

- Population health, policy, safety and quality improvement, consumer engagement, benefit design

- Education

4. **Quality/Performance**

- Quality and cost

- Quality improvement/comparative effectiveness

- Use of data to improve health system performance

- Pharmacoeconomic comparative effectiveness research

- Comparative effectiveness research

5. **Health Services or Clinical Research**

- Health services research, clinical epi

- health services research

- Health services research

- We are a membership organization with a small research department

- Developing capacity for health services research; substantive expertise in coordination of care for persons with mental illness; post-deployment health; care equity

- High performance health system; health system reform; payment reform; international health; health policy

- Custom research, including health and health policy

- Combines health care activity with policy, advocacy and research

- Outcomes (clinical) research

- Health outcomes research

- Clinical research

- Organization's primary specialty is providing business intelligence for the pharmaceutical industry; I work within the health economics and outcomes research team.

6. **Medicine and Health Systems**

- Biotechnology

- Workforce

- Health workforce and rural health

- Health insurance

- General health services

- Business

- Hospital system

- Employers (health benefits)

- Academic medicine

- Treatment

- Prevention

APPENDIX G
Organizational Incentives Recoding Map

Specific organizational incentives identified by participants categorized into six codes:

1. **Performance reviews/job requirements**

   - All personnel, including researchers, must have yearly goals that are aligned with the institutional mission of providing high quality health care through care, education, and research. Attaining goals is critical to retention. In that sense, yes, we create explicit incentives to do our jobs.

   - Translating research is a major objective of my group and is built into all our performance evaluations.

   - # reports produced, media quotes, downloads, page views, etc.

   - Performance objectives

   - Annual performance reviews are tied to the number of dissemination and communication tools and resources that stem from our research projects. Also, customer-facing colleagues have to track how many meetings they have with health plan decision makers, etc., and what information they shared during those visits

   - Nurses are required to do a translational research project. Pharmacy and medical residents also are required.

   - Described in the performance plans of staff who are expected to be engaged in reporting activities

   - Part of our performance reviews.

- Part of <u>annual performance reviews</u>

- <u>Publications</u>

- We set goals for the year and my <u>staff have goals</u> related to research translation. Their performance evaluation includes an assessment of performance on these goals.

- Within our <u>performance goals.</u> Part of our vision.

- One of the activities reported on and included in <u>faculty performance reviews</u>

2. **Dedicated staff and resources**

   - Most <u>of what we do holds the requirement that it be translated</u> into a form useful for policymakers.

   - <u>We provide significant resources for dissemination of data,</u> as well as tracking of impact which further helps researchers in securing future funding.

   - <u>Specific individuals who are noted researchers complete these tasks.</u>

   - Epidemiology and evaluation <u>staff have these duties,</u> as well as many public health educators.

   - <u>Primary duties for the 2 FTE</u>

3. **Compensation**

   - It's our job - the only incentive is <u>the salary</u>

   - Part of our all <u>staff bonus</u> from CEO to clerical staff includes measures of publications, presentations, media (including social media) judged by our trustees; we do not have quantitative metrics but use year-to-year comparison

   - <u>Incentive bonus plan</u>

   - <u>Compensation is tied to output.</u>

4. **Organizational goals**

   - <u>Organizational performance</u> goals are associated with effective research translation, but there are no specific goals for individual research staff.

   - Our <u>strategic initiatives</u> include translational research with specific targets/metrics

   - We <u>set goals for the year</u> and my staff have goals related to research translation. Their performance evaluation includes an assessment of performance on these goals.

   - Within our performance goals. <u>Part of our vision.</u>

5. **No staff goals**

   - Organizational performance goals are associated with effective research translation, but there are <u>no specific goals for individual research staff.</u>

6. **Promotion**

   - Translation of research into clinical practice is a formal <u>promotion criterion</u> for faculty at my institution

The six codes can be further organized into three categories:

1. **Performance reviews**

   Codes: 1, 6

2. **Compensation**

   Codes: 3

3. **Organizational goals**

   Codes: 4, 2, 5

APPENDIX H
Organizational Size Recoding Map

Table 55.

Organizational Size Recoding Map

Original Code	Response Count	New Code	New Response Count
1-10	21	1-20	33
11-20	12	21-100	28
21-30	10	101-900	18
31-40	1	901+	31
41-50	3		
51-75	8		
76-100	6		
101-150	0		
151-200	4		
201-300	2		
301-400	4		
401-500	3		
501-700	4		
701-900	1		
901+	31		

APPENDIX I
Qualitative Analysis Coding

QUESTION 1:

Do you have any suggestions about what your end users could do to facilitate your

research translation efforts?

QUESTION 1 CODES:

1. **Relevant topics**

   - Researchers need to <u>pick policy relevant topics</u>

2. **Get involved**

   - <u>Become more involved in the process.</u> Creation of patient councils or

     partnerships is one way to do this.

3. **Pay attention**

   - They could actually <u>read the materials we produce</u>.

   - <u>Pay better attention</u>!!!! To clarify, health care reports are complicated and

     difficult for a lot of people to engage with, no matter how well written. The

     lay consumer doesn't see this area as particularly interesting and often

     expresses that they don't have any choices to make anyway so why bother to

     research anything. Policymakers are similarly lacking in expertise in this area

     and often make requests that cannot be met with the available data and then

     question the utility of the data for any purpose.

4. **Use our data**

   - Our proximate target audience is hospitals and medical facilities, with public health authorities next in line. They fund our databases and special studies. However, these are very limited resources, and we work with users in the various operations to translate our research and facilitate their own conduct of research with our data.

   - "Garrido, Terhilda; Barbeau, Rosemarie, ""The Northern California Perinatal Research Unit: A Hybrid Model <u>Bridging Research, Quality Improvement and Clinical Practice</u>,"" The Permanente Journal Fall 2010, Vol 14, No. 3, pgs 51-56"

5. **Give feedback**

   - <u>Provide feedback</u> on what works and why.

   - We do little primary research- we continually monitor, translate and spread the research of others. We spend significant time <u>getting feedback from others in simple surveys, discussions and committees.</u>

QUESTION 2:

Do you have any suggestions about what your funders (e.g., governments, peer-review granting agencies, foundations) could do to facilitate your research translation efforts?

QUESTION 2 CODES:

1. **Fund Knowledge Translation Activity**

   - <u>Keep funding</u> these research & dissemination efforts

- Fund our work, and publicize more of it.

- They could include additional funding specifically devoted to dissemination and translation activities.

- See above.

- Add small grants ($5-10,000) for specific dissemination activities to be awarded near the end of project--with <30 review and approval times

- Fund KT activities, even though they are often time consuming and expensive

- Provide more funds focused on communications

- Provide core support for outreach efforts

- Funding is the key - most of our research is externally funded. We are affiliated with AHCs but do not have the infrastructure to do some of the activities suggested by your questions as they are often not within the scope of funding we are awarded.

- Dedicate funds specifically to translation and not just translation research.

- Include funding for general dissemination and communication activities.

2. **Fund Knowledge Translation Science**

- Provide more funding specifically dedicated to research rather than service delivery

- Fund more studies/projects/programs dedicated to pure translational research and implementation science

- Implementation science (i.e., how to make something work) is a key lever to help with research translation. This needs to be an active area of funding.

3. **Evaluate**

- We could always use funding to dedicate to <u>the assessment of our target audiences</u> to better understand their needs, interests, and level of understanding of the policy issues we aim to address.

- <u>Require evaluation</u>

4. **Include Stakeholders**

- <u>Including key stakeholders at the beginning of</u> a project help facilitate our research translation efforts.

- PCORI is a great example of a funder working toward <u>including target audiences in research.</u> Other funders should watch and follow suit.

APPENDIX J
Job Title Coding

Participants' self-reported job titles have been organized into the following seven

categories:

1. **President or Executive Director**

   - President

   - Executive Director, Research & Analysis Team

   - ED

   - Executive Director/Therapeutic Area Head

2. **Senior Vice President**

   - Senior VP for Research

   - Sr VP for Quality & Regulatory Affairs

   - SVP

   - Senior VP

   - Senior vice president, comparative data and informatics

3. **Vice President**

   - Vice President

   - Vice President, Health System Quality and Efficiency

   - VP

   - VP

   - VP, Evidence Based Medicine

- Vice President

- Vice President

- Vice president

- Vice President and Research Director

4. **Senior Director**

- Senior Director, Applied Research. Note that the title "applied research" rather than "research" was selected to underscore the integral nature of translation and application in practice to all research activities.

- Senior Director, Public Policy

- Senior Director, Research and Evaluation

- Senior Research Scientist

5. **Director**

- Director, Research & Regulatory Affairs

- Director of Stakeholder Relations

- Director of Health Outcomes

- Director

- Director of nursing research cardiovascular and critical care

- Director of Strategy and Impact

- Director of the Office of Health Care Statistics

- Director of Public Affairs

- Director, Analytic Services

- Director, Health Economics and Outcomes Research

- Director of Policy and Planning

- Director, Office of Health Reform

- Director, Maternal and Child Health Library

- Director of Research and Learning

- Director, Health Policy

- Director of Grants & Strategy for the System

- Director of Research and Analysis

- Director, department

- Deputy Director

6. **Assistant or Associate Director**

- Asst Director Health Services Research Information

- Assistant Director

- Associate Director

- Associate Director, Communications

- Associate Director

- Associate Director of Research

- Associate Director

- Associate Director for Science

- Associate Director, Health Research

- Program Director

- System Director, Grants

7. **Manager or Faculty Member**

- Senior Research Manager

- Project manager

- Chair of a health services research division and a research center.

- Chief External Affairs Officer

- Faculty, Assistant Professor

APPENDIX K
Summary of Research Findings

Table 56.

Summary of Research Findings

KT Activity	U-Affil	Size	Spec.
Research Sub-Question 1: What do research organizations translate to their end users, and at what cost?			
Provides free upon request full reports on research projects, either in hard copy or electronically	Not significant	**Significant. Small orgs = higher frequency. Contrary to evidence**	Not significant
Mails or emails brief summaries of research reports to end users	Not significant	Not significant	Not significant
Mails or emails full reports on research projects to end users	Not significant	Not significant	Not significant
Develops messages for end users that specify action	**Significant. U-Affil = higher frequency**	Not significant	Not significant
Provides at cost and upon request full reports on research projects	Not significant	Not significant	Not significant
Provides free upon request brief summaries of research reports	Not significant	Not significant	Not significant
Provides free upon request full reports on research projects, either in hard copy or electronically	Not significant	Not significant	Not significant
Research Sub-Question 2: To whom do research organizations translate research knowledge, and what investments are made to target end users?			

Table 56. Cont.

Targets policymakers in municipal or federal governments	Not significant	**Significant. Small org = higher frequency. Contrary to evidence.**	**Significant. Health policy/econ = higher frequency.**
Targets managers in publicly funded facilities or enterprises (e.g., hospitals), planning regions (e.g., regional health authorities) or private organizations / businesses	Not significant	Not significant	Not significant
Targets service providers (e.g., clinicians)	Not significant	Not significant	**Significant. Quality measurement = higher frequency.**
Targets general public or service recipients (e.g., voters, patients, clients)	Not significant	Not significant	Not significant
Tailors knowledge translation approach to specific end users	Not significant	Not significant	Not significant
Tailors mailings or emails to specific end users	Not significant	Not significant	Not significant
Spends time with end users discussing research reports	Not significant	Not significant	Not significant
Dedicates resources to getting to know end users	Not significant	Not significant	Not significant
Spends time with end users discussing ideas for possible action	Not significant	Not significant	Not significant
Research Sub-Question 3: By whom is the research knowledge translated, and with what investments in assisting them?			
Dedicates resources to identifying opinion leaders and working with them to translate research	Not significant	Not significant	**Significant. Health policy/econ = higher frequency.**

Table 56. Cont.

Knowledge translation staff knows of and interacts with people performing similar roles in other research organizations	Not significant	Not significant	Not significant
Dedicates resources to developing relationships with print, radio, and/or television journalists	Not significant	Not significant	Not significant
Dedicates resources to getting to know the research literature about effective approaches to knowledge translation	**Significant. U-affil = higher frequency. New.**	Not significant	Not significant
Dedicates resources to skill building amongst your knowledge translation staff (e.g., pays for conferences or courses about knowledge translation)	Not significant	Not significant	Not significant
Dedicates resources to learning about what constitutes a credible messenger for end users	Not significant	Not significant	Not significant
Knowledge translation staff subscribes to and shares information from listservs about knowledge translation	Not significant	Not significant	Not significant
Research Sub-Question 4: How do research organizations engage end users in the research process, and to what degree do they use supporting communications infrastructure to translate research knowledge?			
Translates the research findings to end users	Not significant	Not significant	Not significant
Develops a specific research question, objectives or hypothesis	Not significant	Not significant	Not significant
Develops research products (e.g., research reports or brief summaries)	Not significant	Not significant	Not significant
Establishes the overall direction of the research organization (e.g., through an advisory board);	Not significant	**Significant. Large orgs = higher frequency.**	Not significant
Establishes the preferred research design and methods	Not significant	New evidence	New
Websites	Not significant	Not examined	Not examined
Newsletters	Not significant	Not examined	Not examined

Table 56. Cont.

Media Releases	Not significant	Not examined	Not examined
Blogs	**Significant. No U-Affil = higher frequency.**	Not examined	Not examined
Facebook	Not significant	Not examined	Not examined
Twitter	Not significant	Not examined	Not examined
LinkedIn	Not significant	Not examined	Not examined
Research Sub-Question 5: To what degree do research organizations perform evaluation activities related to knowledge translation?			
Assesses any changes in end users' awareness of research results	Not significant	Not significant	Not significant
Assesses any changes in your users' self-reported behavior	Not significant	Not significant	Not significant
Assesses any changes in end users' actual (i.e., objectively measured) behavior.	Not significant	Not significant	Not significant
Assesses any changes in end users' knowledge of research results	Not significant	Not significant	Not significant
Assesses any changes in end users' attitudes toward research results	Not significant	**Significant. Medium and large orgs = higher frequency.**	Not significant

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