Interaction and linkage in the Canadian tobacco control community: Implications for the research process

by

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Authors' Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

Study Purpose: This research aimed to: (1) understand interactions between researchers and policy-makers in the Canadian tobacco control research community and, (2) explore the relationship between interaction and alignment of research and policy within tobacco control.

Methods/Analyses: Semi-structured, in-depth interviews were conducted by phone or in-person with a purposeful sample of Canadian policy-makers at the provincial and federal-levels (n=10) and tobacco control researchers (n=8). A grounded theory methodology was used to guide interview conduct and analyses. Sampling of policy-makers was based on leadership roles for tobacco control in their respective jurisdictions and nominations. Sampling for researchers was based on nominations. Interviews were audio-recorded with permission and transcribed. Transcripts were shared with participants for verification.

Results: The tobacco control context in Canada represents a mature field with a historically active policy agenda and an increasingly well-established research community. Through the analysis, nine data-driven categories emerged related to interactions between researchers and research users. The data were further examined to understand possible relationships between interaction and alignment. The nine major categories related to: (1) "two communities", including the nature of policy and the differential timeframes of research and policy; (2) structures to support interaction, including within or cross-provincial and/or national facilitative mechanisms for interaction between researchers and research users to occur; (3) relationship building between researchers and research users, including the deliberate nature of building and reinforcing relationships over time; (4) interaction in the research process by research users; (5) interaction in the policy process by researchers; (6) independence and credibility of researchers; (7) incentives and barriers to interactions; (8) relevance and timeliness of evidence relative to decision-making needs, and; (9) alignment, including the extent to which research and policy share priorities and objectives.

Significance: Results provide insight into the researcher and research user relationships in the Canadian tobacco control community. This study extends existing conceptual work in the area of knowledge exchange particularly from a public health perspective and has implications for other aspects of chronic disease prevention.

Acknowledgements

At some point as I was writing this thesis, I heard an interview on the CBC that Eleanor Wachtel was doing with an eminent author whose name I did not hear. He was discussing his tendency to procrastinate when writing. The interviewer asked whether he enjoyed writing and he replied, "I enjoy having written". I couldn't agree more.

The process of completing this doctorate has been, simultaneously, a solitary and collaborative effort. As those who have been through it know, there are many periods in your degree when the only person who can do what needs to be done is you. Although I worked independently, I was never alone. My solitary obligations could not have been completed without the love and support of so many - too many to mention by name for fear of forgetting someone whose kind words or smiles of encouragement made me want to keep on truckin'. That being said, there are a few people without whom – and I say this without hesitation – I would not have been able to finish.

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Dedication

I dedicate this work to my Mom, Barbara Viehbeck, and to my Nana, Donalda Murray. I am so fortunate to have them as family members and as friends. These two women embody strength, beauty, love, and faith in all that they do and they are the kind of women which I can only hope to grow into in time. My deepest gratitude goes to them for the support that they have always given me and, I know, always will.

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CHAPTER 1: INTRODUCTION AND OVERVIEW

1.1 Statement of the Problem

The gap between research generation and utilization in practice and policy has been recognized in a variety of disciplines, including public health (Beyer and Trice, 1982; Nutley and Davies, 2000; Green and Mercer, 2001; Walter, Nutley & Davies, 2005). Tobacco use not only remains a leading public health threat in Canada (Makomaski-Illing and Kaiserman, 2004), but tobacco control serves to illustrate the importance of linking research generation with policy and practice (Motsinger, Vollinger & Niemeyer, in National Cancer Institute, 2005), the value of best practices (Mueller, Luke, Herbers & Montgomery, 2006) and the importance of evaluation (Sweet and Moynihan, 2007).

In Canada, tobacco use remains the largest preventable cause of premature death and disability (Makomaski-Illing and Kaiserman, 2004). Smoking has been related to numerous chronic diseases ranging from cardiovascular respiratory diseases such as chronic obstructive lung disorder (United States Department of Health and Human Services [USDHHS], 2004) to many kinds of cancer (USDHHS, 2004). Smoking is also responsible for approximately "one-third of potential years of life lost due to cancer" (National Cancer Institute of Canada, 2004) and consequently, tobacco control should be "the highest priority for cancer prevention" (Miller, 2000, p.3).

Given the scope of the tobacco problem, population-level interventions, including policy approaches, are warranted. Such interventions consist of environmental or educational interventions aimed at the broader population rather than at individuals (Green and Kreuter,

2005). The impacts of population interventions are partially a function of intervention reach and effectiveness whereby small reductions in individual risk are spread across many people (Abrams, Orleans, Niaura, et al., 1996; Cameron, Bauman & Rose, 2006). In particular, the implementation of comprehensive, population interventions including a mix of policy and programmatic approaches have been vital to the public health gains made by tobacco control (ie. Centers for Disease Control, 1999; Sweanor and Kyle in de Beyer and Brigden, 2003; Farrelly, Pechacek, Thomas & Nelson, 2008), however much remains to be done. Though tobacco research has become a flourishing field of study, the vast majority of such research addresses the 'agent' (e.g., the cigarette) or 'host'(e.g., smoking behaviours and smoker characteristics) with far less (<10%) dealing with the 'environment' including research related to regulations and policy interventions (Cohen, Chaiton & Planinac, 2010) or the evaluation of population interventions (Rosen, Rosenberg, McKee et al., 2010; Kothari, Edwards, Yanicki, et al., 2007). While there has been a steady reduction in smoking prevalence in Canada, the rate of reduction has declined. Moreover, there are potential sub-populations who remain tobacco users and may demonstrate resistance to previously successful public policy measures (Bondy, Cohen & Rehm, 2000). Further reductions in tobacco use may not be possible unless we are able to apply what we've already learned from research and we conduct and use new, practice-based evidence in the development and evaluation of interventions.

As such, a deeper understanding of the strategies to support knowledge exchange to shorten the journey from evidence to impact will be a critical element in future tobacco control efforts, and subsequently cancer control and public health. Collaboration between research producers and users is thought to be a critical ingredient to this end (Best, Hiatt, Cameron, et al., 2003; Grunfeld, Zitzelsberger, Hayter, et al., 2004). Interaction between research producers and users

has been advanced as a primary facilitator of research utilization for policy (ie. Walter, et al, 2005; Innvaer et al., 2002) and, relatedly, interactive strategies are dominant in models of knowledge transfer and exchange (Belkhodja, Amara, Landry & Ouimet, 2007). Much remains to be understood regarding the influence of interaction between research and policy communities on the research process and whether these interactions may influence the alignment of research and policy agendas.

1.2 Study Purpose

The aim of this dissertation research was to extend the scope of previous studies of knowledge exchange by providing insight into the nature and meaning of interactions between key stakeholders, research producers and users (from policy), in a critical area for public health action: tobacco control. This study contributes to the current understanding of knowledge exchange processes by exploring the potential relationships between interaction and alignment of research and policy agendas by using a grounded theory approach to understand interaction between researchers and users (policy-makers) in tobacco control in Canada.

Specifically, this study sought to understand the role of research user and producer interaction and its possible relationship to the alignment of research and policy agendas in the Canadian tobacco control research community.

1.3 Overview

The dissertation presents an overview of pertinent research in the area of research producer and user interaction in health. This literature review (Chapter 2) is framed in the context of the evidence-based public health "movement" and current models of knowledge translation and exchange. The research questions and objectives, and methodology are presented in Chapters 3 and 4. The results (Chapter 5) are presented in the form of a grounded theory and domains of

possible interest for further research. The dissertation concludes with a discussion of research results and possible implications for research, policy, and practice (Chapter 6).

CHAPTER 2: LITERATURE REVIEW AND STUDY RATIONALE

The purpose of this literature review was to bring focus and rationale to the area of study (Patton, 2002) and served to identify and enhance understanding of sensitizing concepts that were relevant to the questions under study and considered prior to data collection (Charmaz, 2006). This literature review was revisited following data collection and analysis to assist with the interpretation of findings and place them in the context of the broader literature. As such, the present review: (1) contextualizes the importance of evidence-based (or evidence-informed) action in public health in Canada; (2) synthesizes reviews of pertinent research in the area of facilitators and barriers to research utilization in policy, specifically, health policy, (3) discusses models of knowledge translation and exchange between research and policy/practice, and (4) examines models by which research user and producer interaction may occur, including research funding arrangements and commissioning and participatory approaches to public health research.

2.1 From EBM to EBPH

In an effort to bridge the gap between evidence and action in health, principles of evidence-based medicine have been developed as one strategy to transfer the best available clinical evidence to clinical practice decisions. Evidence-based medicine has been defined as the "conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients" (Sackett, Rosenberg, Muir-Gray, et al., 1996, p. 71). The principles of evidence-based medicine, including: identification of information needs, finding and critically appraising evidence, application of best evidence to clinical practice and evaluation of performance, have had great appeal and create an opportunity to increase the influence of scientific evidence on decision-making. The general foundation of these ideas has been transferred to other fields of health and health care (Sackett and Rosenberg, 1995).

In contrast to the individual-focused approach of clinical medicine, public health has generally taken a population-based approach to disease prevention (Brownson and Kreuter, 1997). This is most frequently accomplished through collaborative efforts aimed at health promotion and disease prevention through policy and environmental-level interventions (Schmid, Pratt & Howze, 1995). Given the rise of interest in evidence-based approaches to practice and policy, EBM has been advanced as a transferable concept with modifications for the unique aspects of a public health system (ie., Kohatsu, Robinson & Torner, 2004).

Evidence-based public health (EBPH) has been defined as "…the development, implementation, and evaluation of effective programs and policies in public health through application of principles of scientific reasoning, including systematic uses of data and information systems, and appropriate use of behavioural science theory and program planning models" (Brownson, Baker, Leet & Gillespie, 2003, p. 4). However, applications of EBPH occur in the complex public health context which extends past individuals to complex systems and populations. Accordingly, recent adaptations of the EBPH concept have acknowledged that evidence-*informed* (rather than evidence-based) public health may be an even more appropriate conceptualization as it more suitably captures the complex nature of and multiple inputs into public health decision-making beyond research (Sweet & Moynihan, 2007; Ciliska, Thomas & Buffett, 2008).

2.2 Implications for research generation

Public health is one area where there are significant gaps in evidence and capacity to conduct and use research (Kiefer, Frank, DiRuggiero, et al., 2005) and issues related to 'what counts' in the evidence base for public health is a matter of great debate in the literature (ie. Raphael, 2000; Rychetnik, Hawe, Waters, et al., 2004). With the adaptation of EBM for public

health has come a considerable discourse regarding the "gold standard" of evidence for public health. The randomized controlled trial, widely accepted in the medical model, has been debated in terms of its applicability or lack thereof in the complex public health environment or to complex policy and programmatic interventions such as those used in public health and health promotion (Nutbeam, 1999; Victora, Habicht & Bryce, 2004). Quantitative evidence of effectiveness with high internal validity is of paramount importance to EBM. Factors related to intervention implementation and research with strong external validity are considered critical to the evidence-base for public health (ie., Green and Glasgow, 2006).

In spite of the rising demand to implement evidence-informed approaches to public health action, the supply of evidence may not exist. Even if evidence of effectiveness were available, there may be misalignment between what is available and what is actually required to inform public health decision-making. Nutbeam (2001) argues that much public health research is policy-free in that it is focused on the description of public health problems rather than potential solutions. He suggests that the public health evidence base needs to be refocused on testing interventions, measuring outcomes, and understanding implementation processes. This relative dearth of intervention research has been highlighted in recent reviews (Sanson-Fisher, Htun, Campbell, et al., 2008; Millward, Kelly & Nutbeam, 2003).

Within intervention research, there may be a failure to provide implementation information of critical importance to decision-making by end users such as who should deliver a given intervention and under what conditions (ie. Manske, Miller, Moyer, et al, 2005). Decision-makers apply a range of criteria when considering implementation of a policy or practice. These may include: the magnitude of the problem and preventability, intervention effectiveness, costs and benefits, appropriateness, acceptability (to community, culture, values, etc.), feasibility,

equitability, potential side effects, and sustainability (Anderson, Brownson, Fullilove, et al., 2005; Glasgow, 2008; Swinburn, et al., 2005). These considerations suggest that the relevance of evidence to decision-making may relate more closely to external validity—to whom the results apply and under what circumstances—than to internal validity (Sanson-Fisher, Bonevski, Green, et al, 2007; Mercer, DeVinney, Fine, et al., 2007).

Working toward a balance of rigour (internal validity) and relevance (external validity) presents new opportunities for both the conduct and reporting of research (Potter, Quill, Aglipay, et al., 2006; Glasgow, 2008; Crosby, Salazar, DiClemente & Lang, 2009). An editorial has highlighted the importance of external validity and the responsibility to conduct and report intervention research that addresses concerns of practical importance to users of information (Glasgow, Green, Klesges et al., 2006), including information on reach and representativeness, implementation and adaptation, outcomes related to decision-making (i.e. adverse events and costs), and maintenance and institutionalization (Green and Glasgow, 2006).

Extending work by Green (2006), a recent review by Potter and colleagues addresses "practice-based research for public health". The authors conceptualize practice-based research to consist of "systematic inquiry into the systems, methods, policies, and programmatic application of public health" (Potter, et al., 2006, p. 2). Increasingly, this solution-orientation is appearing in the applied health research literature (Robinson and Sirard, 2005; Kalmuss and Armstrong, 2008; Finegood, Karanfil & Matteson., 2008). Based on this definition, practice-based research seems consistent with the Mode II research paradigm (cf. Section 2.3) where research production is done with application in mind (Gibbons, Limoges, Novotny, et al., 1997).

Such alignment of research with the needs of end users (Cameron, Riley, Campbell., et al., 2009) or strategic health policy issues (Franklin, Wickizer, Fulton-Kehoe & Turner, 2004) is

thought to be a strategy to increase relevance and timeliness of evidence (Butler-Jones, 2009). Collaborative relationships (Atienza and King, 2002) and joint priority setting of agendas within the research and policy communities (Gritz, Sarna, Dresler & Healton, 2007; Kottke, Solberg, Nelson, et al., 2008) may be key strategies to enhance alignment. Such efforts to support alignment need to be deliberately fostered (Green, Orleans, Ottoson, et al., 2006) and need to be supported by organizations with a mission to build capacity for linkage of science, policy, and action (Butler-Jones, 2009) as well as particular approaches to research. Given this momentum toward evidence-informed approaches and linking evidence and action, it is clear that more research is warranted into strategies that can facilitate knowledge exchange between producers and users of evidence in order for research evidence to be generated with application in mind.

2.3 Incentives from research funders and universities

In a manner consistent with the broader movement toward evidence-informed practice, research funders are beginning to call for a partnership approach involving researchers and users of research to "accelerate the translation of research" to action (Kerner, 2006, p. 77). Key funding bodies for health research in Canada have placed high and strategic importance on linking evidence generation to action and related knowledge translation through integrated approaches (Tetroe, Graham, Foy, et al., 2008). This interest toward aligning research and application is consistent with the generation of "Mode II research" or research that is focused on contributing to practical outcomes and societal impact (Denis, Lehoux & Champagne, 2004, p. 31-32; Gibbons, et al., 1997). Further, "Mode II research" has been advanced as an approach to knowledge production that differs from research that is produced in a discipline-specific context for the purposes of generating "new knowledge" (Denis et al, 2004; Gibbons et al., 1997).

To that end, Table 1 summarizes selected examples from written documentation of major Canadian health research funding agencies as an illustration. The very recently released CIHR Roadmap which presents strategic directions for Canada's largest research funder for the next five years (CIHR, 2009) is one example of a funding agency linking research excellence with relevance. In so doing, the Roadmap builds on the CIHR Knowledge Translation (KT) Strategy. The KT Strategy, implemented from 2004-2009 was intended to "(1) significantly increase and accelerate the benefits flowing to Canadians from their investments in health research; (2) establish Canada as an innovative and authoritative contributor to health-related knowledge translation" (CIHR, 2004).

A further example can be gleaned from broader chronic disease prevention strategy. The Canadian Strategy for Cancer Control aims to "prevent cancer, cure cancer, and increase survival and quality of life for those who develop cancer, by converting the knowledge gained through research, surveillance and outcome evaluation into strategies and actions" (Canadian Strategy for Cancer Control, 2007). The Canadian Partnership Against Cancer (CPAC) is stewarding this aim into reality by stimulating the explicit linkage of evidence and action through their work which includes both "the generation of new knowledge and accelerating the implementation of existing knowledge about cancer control across Canada" (CPAC, 2009). A recent funding initiative by CPAC, the Coalitions Linking Action and Science for Prevention (CLASP), provides multi-year funding to pan-Canadian teams with the aim of supporting enhanced integration of research and policy/practice for cancer prevention interventions across Canada.

Within tobacco control specifically, the Canadian Tobacco Control Research Initiative (CTCRI) operated from 1997 to 2009 as a strategic initiative of the Canadian Cancer Society, CIHR, National Cancer Institute of Canada, Health Canada, and other partners. The CTCRI

strove to catalyze, coordinate and sustain research with a direct impact on programs and policies aimed at reducing tobacco abuse and nicotine addiction. The CTCRI facilitated a range of activities and funding programs which enabled and, in the case of its funding programs, required relationships between researchers and research users from tobacco control advocacy, policy, and practice (CTCRI, 2010).

In order to support knowledge translation, funders are increasingly supporting the ongoing development and implementation of innovative funding mechanisms to enable funding of research and knowledge translation activities in a timely way (DiRuggiero, Rose & Gaudreau, 2009). A recent international study by Tetroe and colleagues (2008) examined the practices of thirty-three applied health funding agencies from seven countries in relation to a range of KT-related expectations, funding opportunities, services, and linkage activities. While the study succeeded in describing these areas, it found that, across funding agencies, there was lack of evaluation of KT practices and approaches.The increased emphasis on linking research with a range of possible knowledge translation activities has resulted in a need to understand and measure the downstream impacts in a rigorous way (Lavis, Ross, McLeod & Gildiner, 2003; Kuruvilla, Mays, Pleasant & Walt, 2006; Frank and Nason, 2009).

To fill this gap in research evaluation, twenty-three health research funding and health professional organizations sponsored an assessment intended to identify outcomes of health research and related indicators (Canadian Academy of Health Sciences [CAHS], 2009).The resulting comprehensive report includes five categories in which health impacts could be tracked, including “informing decision-making” (CAHS, 2009). Table 1 suggests that linking evidence and action is a valued ideal by some health research funders and the CAHS (2009) report goes further by stating that the role of research to support decision-making and policy

development should be considered an explicit indicator by which the impact of health research be judged. The influence of these and other calls for measuring the impacts of health research are also echoed within the CIHR Roadmap which calls for accelerating the capture of health and economic impacts of health research (CIHR, 2009). The increasing expectations on the part of health research funders in Canada also places increasing strategic importance on understanding the relationship between those who generate research and those who may use it to inform decision-making.

In contrast to the support from research funders, the primary environments for many health researchers, universities, have not kept pace with commensurate reward structures to recognize the investment in knowledge translation activities. While not much empirical work exists in this area, a study of deans and promotion committee members from applied faculties at universities across Canada suggests that promotion practices differ according to assessments of traditional and non-traditional scholarship (Phaneuf, Lomas, McCutcheon, et al., 2007). This research conceptualized traditional scholarship in terms of the generation of disciplinary-based outputs, including peer-reviewed articles which are highly cited or appear in high-impact journals and scholarly conference presentations. Non-traditional scholarship included working with decision-makers, producing reports specifically commissioned by end users or intended to influence public policy, and interactions between researchers and users of research. The study went on to find that traditional scholarship was consistently rated as being more important than non-traditional forms and that peer-reviewed journal publications and grants were the most important determinants of promotion (Phaneuf et al, 2007).

While universities do not have a "robust tradition" of engaging with public service institutions, there is a need for this to change (Presidents' National Dialogue, 2009). Indeed, a

recent workshop co-hosted by Presidents of five large Canadian universities and several federal government departments tackled the subject when examining the role of universities in public policy processes in Canada. A main theme of the conference discussion was the importance of having the value of policy-relevant scholarship and engagement in research with policy-makers recognized by universities (Presidents' National Dialogue, 2009). The disconnect between the incentives and expectations of research funders and the reward structures in place at many universities suggests that there is a need for change in order to enhance the relevance of universities to society and reward diverse forms of scholarship (Hofmeyer, Newton & Scott, 2007).These broader systems-level influences on knowledge translation activities of researchers may influence their engagement in those activities.

Table 1. Selected examples of the importance of evidence-informed action and knowledge exchange placed within the Canadian health research funding landscape

Agency	Source Document	Context	Reference to linking evidence and action? (**bold** emphasis added)
Canadian Health Services Research Foundation	CHSRF Mission http://www.chsrf.ca/about/do_statement_purpose_e.php	The CHSRF Strategy	"Our programming is grounded in ongoing interaction, collaboration, and exchange of ideas and information – at the individual or population level – between those who study how to improve health and those who make decisions that improve health."
Canadian Institutes of Health Research	CIHR Mandate http://www.irsc.gc.ca/e/30240.html#slide1_e	The mandate of the CIHR	"To excel, according to internationally accepted standards of scientific excellence, in the **creation of new knowledge and its translation** into improved health for Canadians, more effective health services and products and a strengthened Canadian health care system."
	CIHR Overview http://www.cihr-irsc.ca/e/30253.html#slide21_e	The first five years of CIHR has demonstrated an emphasis on creating partnerships	"CIHR is working with a wide cross-section of partners to set research priorities, reduce duplication, share funding and **accelerate the translation of knowledge** into improved health for Canadians and people worldwide."
Canadian Tobacco Control Research Initiative	CTCRI – Description http://ctcri.ca/en//index.php?option=com_content&task=view&id=16&Itemid=35	From the CTCRI Mission, Objectives, and Values statement	"The Mission of the Canadian Tobacco Control Research Initiative (CTCRI) is to provide strategic leadership in Canada and internationally to catalyze, coordinate and sustain research that has a direct impact on programs and policies aimed at reducing tobacco abuse and nicotine addiction. **Our objectives:** - to increase research that informs decision making regarding tobacco control policies and programs - to increase the use of research in decision

Agency	Source Document	Context	Reference to linking evidence and action? (**bold** emphasis added)
			making regarding tobacco control policies and programs **Our values:** - excellence and relevance of research - increased capacity in tobacco-related research - strategic linkages and collaborations - partnerships between researchers, practitioners and decision makers - active dissemination and use of research results - innovation in research topics, methods and funding mechanisms"
Heart and Stroke Foundation of Canada	Research Programs- Mission http://www.hsf.ca/research/mission.html	The mission statement of Heart and Stroke Foundation of Canada	"The Heart and Stroke Foundation, a volunteer-based health charity, leads in eliminating heart disease and stroke and reducing their impact through the **advancement of research and its application**, the promotion of healthy living, and advocacy"
	Federation Research Fund Overview-Vision http://www.hsf.ca/research/fund/about.html	"The Federation Research Fund is an important part of the Heart and Stroke Foundation of Canada's research enterprise. The Fund has supported multidisciplinary, strategic research in partnership with other organizations and health charities since 2000."	"Cardio/cerebrovascular health of Canadians is improved through the synergistic alignment of the research and strategic mission priorities of the Heart and Stroke Foundation and the **accelerated translation of research results into policy and practice**."

2.4 Models to understand relationships between users and producers

Evidence-based (or evidence-informed) approaches to public health require an understanding of the models that can be used to understand the relationship between those who produce research and those who might use it. Four general models of knowledge transfer and exchange have been used to characterize relationships between researchers and users such as policy-makers (Landry, Amara & Lamari, 2001; Lavis, Lomas, Hamid, et al., 2006; Lawrence, 2006). Figure 1 visually depicts each of these models.

The first model, the "science push", is a linear and unidirectional representation of the flow of research to users (Jacobson, Butterill & Goering, 2003) with the supply of research considered sufficient to result in use (Landry, et al., 2001). In this model, the research and policy communities operate distinctly from each other with the researchers as "senders" of information and the policy community as "receivers" (Lawrence, 2006). "User pull" is the second of the linear models, and more closely resembles a commissioning model of research whereby users identify an area for which they require research and contract researchers to conduct the work (Landry, et al., 2001; Jacobson, et al., 2003).

The third model referred to as translation, improves upon the science push model by recognizing that some active effort must be made on the part of researchers to disseminate their results to intended users (Landry, et al., 2001; Lawrence, et al., 2006; Armstrong, Waters, Roberts, et al., 2006). Knowledge brokers or other linkage mechanisms may be one source of support by which dissemination of research findings can be support for translation (Orlandi, Landers, Weston, et al., 1990; Lawrence, 2006). The linkage and exchange model is consistent with some older models of dissemination of research to support practice which characterize it as a two-way process (King, Hawe & Wise, 1998) or linkage between resource groups and user

groups (Robinson, Elliott, Driedger, et al., 2005). In two-way linkage and exchange, interaction is critical.

Interactive models of linkage and exchange assume knowledge translation to be an "ongoing process of collaboration between knowledge producers and knowledge users directed at identifying, investigating, and solving real world problems" (Jacobson and Goering, 2006, p. 154). In these models, exchange does not have to be limited to after the research is complete, but can occur by way of collaboration throughout the research process (Lawrence, 2006; CHSRF, 2006). However, there is not an expectation that the same stakeholders be involved at every stage of the knowledge creation to action process (Graham, Logan, Harrison, et al., 2006). In contrast, a more interactive and ongoing approach has been called 'integrated knowledge translation', which emphasizes the engagement of stakeholders or potential research knowledge in the entire research process (CIHR, 2009).

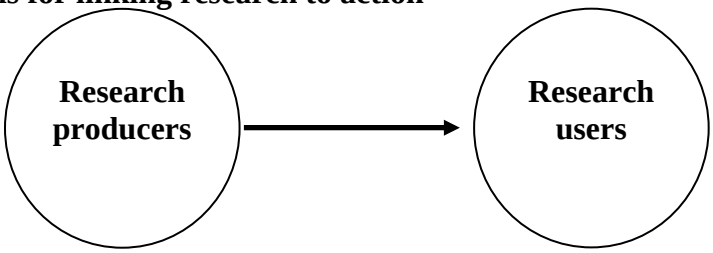
The first two models have significant limitations. Linear models have been criticized for not being reflective of the complexities of policy making and for their unidirectional communication. Linear models suggest that researchers and/or users are passive receptors of knowledge to be transferred as a product from the other group and that the presence of that information alone will be sufficient to result in the use of evidence. Linear and translation models both fail to ensure research is properly aligned with the priorities and resources of program providers and policy-makers (McDonald and Viehbeck, 2007; McDonald, Viehbeck, Robinson, et al., 2009). Linkage and exchange models are more recent and hold particular promise for advancing evidence-based public health (McDonald et al, 2009), facilitating research utilization (Innvaer, et al., 2002), and contextualizing knowledge (Davis, Nutley, and Walter, 2008).

"Communities of practice" (CoPs) have been advanced as a linkage and exchange strategy to bring together researchers and users to share and construct knowledge (Wenger, 1998). This is accomplished through the development of three essential elements: (a) *mutual engagement* through regular, ongoing interaction amongst community members; (b) *joint enterprise* through the collective negotiation of community purpose and meaning; and (c) *shared repertoire* through the development of shared stories, language, and experiences (Wenger, 1998). Communities of practice may be a promising approach to operationalizing the linkage and exchange models of knowledge translation and exchange (Bartunek, Trullen, Bonet, et al., 2003; McDonald and Viehbeck, 2007).

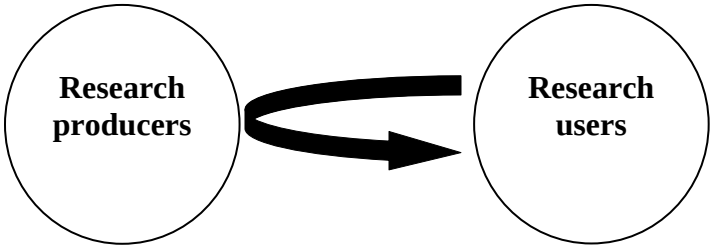
Most recently, the term "knowledge integration" (not diagrammed in Figure 1) has been introduced as a new conceptualization in the evidence to action literature (Best, Hiatt, Norman, et al., 2008; Best, Terpstra, Moor, et al., 2009). Knowledge integration presents a systems science perspective to research application and is defined as "the effective incorporation of knowledge into the decision, practices, and policies of organizations and systems" (Best et al., 2008, p. 322). This newer approach is reflective of the complex decision-making and relational factors associated with knowledge exchange, by situating individuals within their organizational and structural contexts and considering the relationships between those contexts. While evidence for knowledge integration has yet to accrue, it is reflective of a broader movement within the public health literature toward systems thinking and models as a means to develop, implement, and evaluate public health interventions (Green, 2006; Leischow and Milstein, 2006; Best, Clark, Leischow, et al., 2007; Finegood, Karanfil & Matteson, 2008). The systems perspective captures the dynamic complex nature of multi-levelled environments (individual, organizational,

community) and the critical importance of relationships and feedback loops (Best and Holmes, 2010).

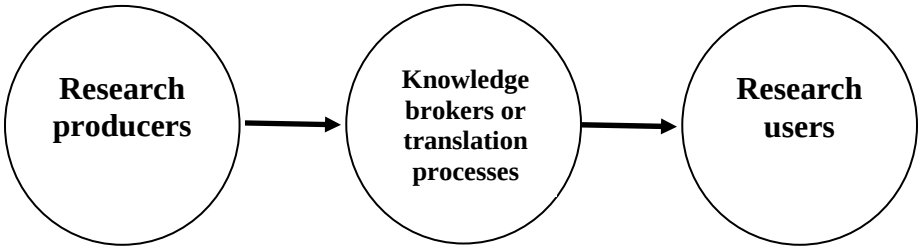
Figure 1. Models for linking research to action



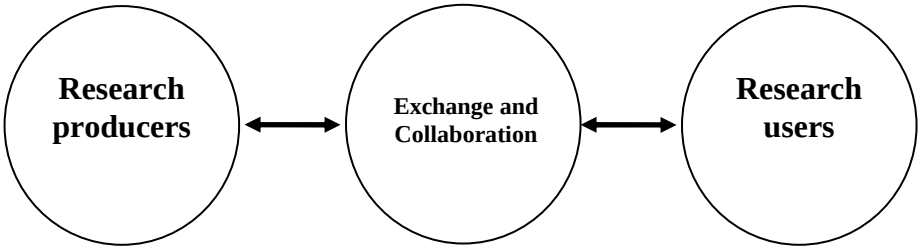
LINEAR "SCIENCE PUSH" MODEL



LINEAR "USER PULL" MODEL



TRANSLATION MODEL



LINKAGE AND EXCHANGE MODEL

Adapted from: Landry, R., Amara, N. & Lamari, M. (2001). Utilization of social science research in Canada. *Research Policy, 30,* 333-349; Lavis, J.N., Lomas, J., Hamid, M. & Sewankambo, N.K. (2006). Assessing country-level efforts to link research to action. *Bulletin of the World Health Organization, 84(8),* 620-628; and Lawrence, R. (2006). Research dissemination: Actively bringing the research and policy worlds together. *Evidence & Policy, 2(3),* 373-384.

2.5 Research utilization in policy

Similar to knowledge translation and exchange, the literature on research utilization in policy can be contextualized in the range of utilization models that have been put forth (Table 2). These models stem from seminal work conducted by Weiss (1979) regarding the range of possible uses of research by policy-makers, and they remain the dominant concepts in related literature.

Table 2. Types of and models for research utilization.

Type of Knowledge Utilization	Process for Research Utilization
Instrumental use- the direct and specific application of research results	***a) Knowledge-driven model*** (basic research → applied research → development → application) ***b) Problem- solving model*** (policy problem arises → preexisting research is identified or new research is commissioned → solution is determined)
Conceptual Use- the use of research results to influence ways of thinking and action in an indirect or diffuse way	***a) Interactive model*** (research findings are combined with experience, political insight, and input of multiple stakeholders in a non-linear manner and through an interactive search for knowledge) ***b) Enlightenment model*** (policy-maker thinking is shaped by the diffuse presence of concepts, theoretical perspectives, and research throughout society)
Symbolic or Strategic Use- the use of research results to support, add credibility or legitimacy to a predetermined position or decision	***a) Political model*** (research is used to selectively offer support for a predetermined policy or course of action) ***b) Tactical model*** (research is used to enhance the credibility of policy action (or inaction)) ***c) Promotional model*** (research serves to promote the implementation of policies to individuals who may not have had a role in the decision making process)

Adapted from: Weiss, C. (1979). The many meanings of research utilization. *Public Administration Review, 39,* 426-431; Beyer, J.M. (1997). Research utilization: Bridging the gap between communities. *Journal of Management Inquiry, 6(1),* 17-22.; Ginsburg, M.B. and Gorostiaga, J.M. (2001). Relationships between theorists/researchers and policy-makers/practitioners: Rethinking the two-cultures thesis and the possibility of dialogue. *Comparative Education Review, 45(2),* 173-196.

Several systematic (Hemsley-Brown, 2004; Innvaer, Trommald & Oxman, 2002; Lavis, Davies, Oxman, et al., 2005; Walter, et al., 2005; Mitton, Adair, McKenzie, et al., 2007) and selective reviews (Almeida and Bascolo, 2006; Hanney, Gonzalez-Block, Buxton & Kogan,

2003) have been conducted to examine the factors associated with research utilization in policy[1]. The main findings of these reviews are summarized in tabular form in Appendix A. While a range of individual and organizational barriers and facilitators to research utilization were synthesized, these reviews all converge in the finding that interaction between researchers and users of research (policy-makers and/or practitioners) is a leading factor associated with utilization. The findings of these reviews are consistent with the interactive model of knowledge translation and exchange presented earlier (cf. Section 2.4).

Several specific features related to interaction were described in varying degrees in the reviews. Interaction was noted as being important at multiple points throughout the research and policy processes (Almeida and Bascolo, 2006; Hanney, et al., 2003). Differential timeframes of research and policy contexts was noted as a barrier to interaction (Almeida and Bascolo, 2006; Walter, et al., 2005). However, the timeliness and relevance of research may be enhanced through engagement of policy-makers in the research process (Hanney, et al., 2003). Time also emerged as important insomuch as the sustained nature of interactions (Hanney, et al., 2003; Walter, et al., 2005) and a process of long-term linkages (Hemsley-Brown, 2004). Enhanced trust and fostering of mutual understanding were also noted as a being facilitated through interaction (Hemsley-Brown, 2004; Innvaer, et al., 2002; Lavis, Davies, Oxman, et al., 2005). In their review, Mitton and colleagues (2007) examined both the facilitators and barriers to knowledge translation and also strategies to support knowledge translation and exchange in health policy. The strategies included a range of face-to-face events and meetings to bring research and policy communities together, the role of networks and communities of practice, and organizational structures to support knowledge translation and exchange.

[1] Due to the extensive number of primary studies in this area, the decision was made for the present literature review to take a "review of reviews" approach to understanding research utilization in policy.

Two review-style commentaries gave particular attention to evidence-based policy in public health. Choi (2005) presents the twelve "essentials" of science-based policy for public health. The essentials are divided into three main phases. The author suggests that during phase one, knowledge generation, evidence for policy should be the product of credible design, accurate data, sound analysis, and comprehensive synthesis. Phase two, knowledge exchange, should contain relevant content, appropriate translation, timely dissemination, and modulated release. Phase three, knowledge uptake, will involve the provision of accessible information and readable messages coupled with a motivated user and rewarding outcome (Choi, 2005). In knowledge generation, it seems that much of the responsibility to create conditions or science-based practice rests with scientists, whereas in knowledge exchange and uptake, the responsibility is shared between scientists and policy-makers.

The notion that public health researchers and policy-makers both have roles in the translation of science to action is explored in a recent article by Brownson and colleagues (2006) who suggest that members of both communities travel in "parallel universes". This is consistent with the "two communities" hypothesis (Lin, 2004; Caplan, 1979). The complexity associated with policy making and the multiple influences on it, including public support and competing policy issues, results in a "clash of cultures" (Brownson, Royer, Ewing & McBride, 2006). Factors such as the timing of research relative to the policy process, ambiguous findings or lack of relevant data, and information overload for policy-makers may all play a role. Some of the possible solutions to this divide are resonant of the "essentials" proposed by Choi (2005) and include making investments in capacity building for users of research information and training initiatives for researchers on effective communication and understanding the policy environment

and effective communication of locally relevant data and synthesis through analytic tools (Brownson, et al., 2006).

Brownson and colleagues (2006) also raise the matter of the role of scientists in policy making and the related responsibility of scientists to be objective. The distinction between the role of research in policy-making versus the role of research*er* in policy-making through advocacy has been a debated issue in commentaries on the subject (i.e. Chapman, 2001; Higgins, Chan & Porder, 2006; Loue, 2004; Savitz, Poole & Miller, 1999), though has generally not been directly studied. Krieger (1999) challenges the discussion by Savitz et al (1999), who argue that it is wrong for researchers (in their case, epidemiologists) to mix science and advocacy roles, by creating a place for what she calls socially responsible science. Krieger's (1999) general proposition is supported by Higgins et al (2006) who suggested that scientists have a role to play as champions for science within public policy debates and, in so doing, serve to bridge the divide between the 'strictly objective' and 'citizen' scientist roles.

In contrast, within public health research (Chapman, 2001) and tobacco control specifically (Chapman, 2007) it has been argued that advocacy of some sort is a near imperative to having research be a factor in policy dialogue. The distinction made by Chapman (2001; 2007) is that data should be the basis for advocacy and the starting assumption for his arguments is that public health researchers *want* their research to be influential and, as such, should partner with advocacy to ensure that research can be used. Though conflicts of interest can arise, it has been argued that ensuring use is an ethical approach to research (Quigley, 2004).

2.6 Orientation of research

Research utilization is clearly linked with the availability of evidence to be used and hence, research generation (Champagne, Lemieux-Charles & McGuire, 2004). Conceptually, this is

consistent with the notion put forth by Green (2006) who argues that "if we want more evidence-based practice, we need more practice-based evidence".

In essence, this shift in orientation suggests that rather than focusing on evidence to action as strictly a knowledge translation problem, there may also be a role for altering the manner in which research is produced (Van de Ven, 2007). Accordingly, new and existing collaborative relationships between researchers and research users must be fostered in order for Mode II and practice-based research to be facilitated (Denis, et al., 2004; Robinson and Sirard, 2005; Potter, et al., 2006). These relationships may take a range of forms (Ginsburg and Gorostiaga, 2001) and apply multiple relevant research paradigms (Potter, et al., 2006) in order to promote true dialogue between the researchers and policy-makers. The following section will discuss one model for such dialogue to occur -- participatory research -- as well as offer an overview of primary studies examining interactions between researchers and policy-makers.

2.6.1 Approaches to research

Participatory research has been advanced as being particularly relevant for public health (Green and Mercer, 2001), and can serve as a formal mechanism by which researchers and end users can be mutually engaged throughout the research process. Participatory research has been defined as "systematic inquiry, with the collaboration of those affected by the issue being studied, for purposes of education and taking action or effecting social change" (George, Daniel & Green, 1999, p. 184) and can be enabled through academic and community partnerships (Baker, Homan, Schonhoff & Kreuter, 1999; Green, 2007).

Criteria, developed by George and colleagues (1999), highlight the elements necessary to classify a piece of research as participatory and suggest that the alignment of the research and community action should be reflected in the research process. In this context, alignment of

research and research use relates to the opportunities to address an issue of interest to the given community and to link the research process with the potential for learning and the potential for action (Green, George, Daniel, et al., 1995, p. 49). Interaction is key to enhancing this alignment. The core elements of participatory research come back to the relational dimensions between partners and collective investments in the partnership. Cargo and Mercer (2008) outline mutual respect and trust, capacity building, empowerment, and ownership, and accountability and sustainability as being central to its practice.

By their very nature, participatory research approaches work to blend "the researcher and the researched" (George, Green & Daniel, 1996, p. 7). The lower bounds of participation may involve engagement at the front-end of research in defining the research question and at the back-end in the interpretation and application of findings (Cargo and Mercer, 2008), however the nature and extent of participation is likely to vary considerably across projects (Cargo and Mercer, 2008; Green and Mercer, 2001) and be dependent upon the interests, expertise, time, and the terms of what is negotiated between partners (Cargo and Mercer, 2008).

Although interactions between researchers and policy-makers have been found to influence research utilization processes, less empirical evidence exists to examine how interactions between researchers and policy-makers influence the research process (Ginsburg and Gorostiaga, 2001; Champagne, et al., 2004). As such, more understanding is required of processes to support interaction from the perspective of both researchers and partners (policy-makers and/or practitioners).

Several studies (summarized in Appendix A- Table 2) have examined the perspective of both researchers and policy-makers regarding interaction through the research process and collaborative research projects (Bowen, Martens, et al., 2005; Denis, Lehoux, Hivon, et al., 2003;

Ferlie and Wood, 2003; Golden-Biddle, Reay, Petz, et al., 2003; Ross, Lavis, Rodriguez, et al., 2003; Smith, 2007), fostering interaction through collaborative networks (Kothari, Edwards, Brajtman, et al., 2005), and engagement throughout the research process (Campbell, Redman, Jorm, et al., 2009; Adily, Black, Graham & Ward, 2009; Kothari, McLean & Edwards, 2009). Three studies examined interaction processes between researchers and users as an intervention to support research utilization (Kothari, Birch & Charles, 2005; Ginsburg, Lewis, Zackheim & Casebeer, 2007; McWilliam, Kothari, Ward-Griffin, et al., 2009).

Interestingly, several of the themes that appeared in the study of how interactions may influence research utilization (Section 2.5) also emerged in the few studies that looked at interactions through collaborative research mechanisms. Most notably, trust (Bowen, et al., 2005; Goering, et al., 2003; Golden-Biddle, et al., 2003), the importance of communication at multiple points throughout the research process (Lavis, et al., 2003; Ross, et al., 2003) and around dissemination of progress and results (Goering, et al., 2003; Ferlie and Wood, 2003; Golden-Biddle, et al., 2003; Ross, et al., 2003; Newton, Estabrooks, Norton, et al., 2007), and time (Bowen, et al., 2003; Ross, et al. 2003) were identified as important factors associated with interactions.

Of the studies that examined researchers, many focused on university-based researchers (ie. Landry, et al., 2001a; Landry, et al., 2001b; Ferlie and Wood, 2003; Jacobson, Butterill & Goering, 2004; Newton, et al., 2007; Kothari, et al., 2009). These studies generally focused on engagement of researchers in Mode II research and knowledge translation activities throughout and following the research process. University-based researchers may experience unique constraints on their ability or willingness to interact with research users (ie. Jacobson, et al., 2004) including maintaining academic freedom and independence (Ferlie and Wood, 2003;

Kothari, et al., 2005; Kothari et al., 2009), maintaining boundaries (Goering, et al., 2003), and also academic reward structures for engagement in "non-traditional" scholarship activities (Phaneuf, et al., 2007; Waddell, Sheppard, Lavis, et al., 2007). Recent work has specifically examined researcher experiences in engaging (or not) in policy-relevant research to support knowledge translation (Kothari et al., 2009). A range of factors was identified at the researcher (ie, social skills and personal factors; influence of policy interactions on research), researcher-setting (ie, university reward structures; access to opportunities for interaction), policy (ie, government structures and processes), and political levels.

Landry and colleagues modified a scale of knowledge utilization to understand, from the perspective of researchers, the stage of utilization of their research by practitioners and professionals (2001a) and also to study predictors of factors that allow researchers to "climb" the ladder of research utilization (2001b). While their approach in both studies begins to explore the perspective of researchers and includes a range of possible explanatory variables, including dissemination strategies and linkage mechanisms, the model for utilization seems to assume that researchers will be aware of and accurately report on all instances of the research being used and details of its utilization.

This body of research is limited in several ways. For example, Newton, Estabrooks, Norton, and colleagues (2007) speculated about reasons for the responses regarding engagement in Mode I or Mode II activities, but did not study reasons for possible differences in terms of barriers to interacting with policy-makers during the research process. Similarly, in their study, Lavis, Robertson, Woodside, et al. (2003) did not examine the influence of interaction with intended research users had on the research process or in ways of thinking about research. While these studies make important contributions to understanding the role of policy-makers in the research

process, they leave unanswered questions about how researchers may be influenced through interactions with intended users. Expressed in a different way, although much evidence exists to understand the utilization of research in the policy process (ie. Innvaer, et al., 2002), with few exceptions (ie, Kothari et al, 2009), we understand much less regarding the utilization of knowledge from policy in the research process.

2.7 The Canadian tobacco control research context

The Canadian tobacco control community represents a context where structures and mechanisms exist to support interaction between research and policy communities (Green, Orleans, Ottoson, et al., 2006). Given the importance of interaction, it would seem that these structures could be facilitative of knowledge translation within tobacco control.

Looking historically, an explicit role for research within Canada's tobacco control policy landscape was mentioned in Canada's *National Strategy to Reduce Tobacco Use* -- a policy framework for action on tobacco (Health Canada, 1999). Amongst other priorities, the strategy contains directions related to increasing research and building (research and tobacco control) capacity and outlines roles for government (to support research on effective interventions), private sector (to support NGOs and government by providing access to research), and CTCRI (to support collaborative mechanisms) (Health Canada, 1999). While this strategy has not been renewed or re-written since, the basic tenet remains salient to contemporary tobacco control – "effective tobacco control requires a diverse array of strategies including research, policy, and programmatic components" (Health Canada, 1999, online) – by suggesting comprehensive approaches and roles for multiple stakeholders. Since that time, numerous provinces have adopted strategies to reduce tobacco use and many follow best practices for comprehensive tobacco control (CDC, 1999; 2007) by explicitly mentioning research, surveillance, evaluation,

and/or monitoring as being important components (ie, Alberta; British Columbia; Nova Scotia; Prince Edward Island Strategy for Healthy Living). When setting new objectives for the Federal Tobacco Control Strategy, nearly 10 years after this National Strategy, Health Canada recognized the considerable achievements by these many stakeholders and acknowledged the contribution of federal, provincial and territorial governments, non-governmental organizations (NGOs), tobacco control researchers, academics, and community organizations toward achieving tobacco control objectives in Canada (Health Canada, 2007). This suggests both an important role for research within an evidence-informed tobacco control agenda nationally, but also provides evidence that Canada's research capacity has contributed to the achievement of public health impact by reducing tobacco use in Canada.

These research achievements were enabled, at least in part, through the Canadian Tobacco Control Research Initiative (CTCRI), discussed earlier (c.f. section 2.3). For example, one of the early activities facilitated through the CTCRI was a research priority-setting exercise which engaged a broad range of tobacco control stakeholders from the areas of research, policy, practice, and advocacy in the creation of a 10-year research agenda for the field in Canada. The funding priorities of the CTCRI were set according to several strategic research themes identified through the Canadian Tobacco Control Research Summit (Strachan-Tomlinson Consulting, 2002). It also created funding mechanisms to enable the study of rapidly evolving natural experiments, such as policy interventions (Green, Orleans, Ottoson, et al., 2006), and other policy-relevant research opportunities which emerged from the Summit report as being critical to advancing progress on tobacco control in the country. Toward that end, the CTCRI also invested in research capacity building activities to foster the development of a tobacco control research community, facilitated stronger linkages between research and end user groups, and developed

innovative research funding mechanisms which enabled research on emerging policy issues (Cameron, Riley, Campbell, et al., 2009).

The work of the CTCRI was complemented by other investments in tobacco control research capacity building efforts. These initiatives have taken a variety of forms and reflect leadership from different individuals and organizations, however, key initiatives seem to share some broad underlying assumptions about the manner which research capacity could be generated (CTCRI, 2009). Events such as the National Conference on Tobacco or Health [www.ncth.ca] and the Annual Invitational Symposium for Tobacco Control Research, Policy, and Practice [http://www.ice-rci.org/research_ops/symposia.cfm]) bring together researchers, policy-makers and practitioners to dialogue around current and future issues in tobacco control research and policy. As such, they serve a knowledge exchange and networking function, and have also supported research training for graduate student trainees funded by the CIHR-Strategic Training Program in Tobacco Research and the CIHR- Strategic Training Program in Tobacco Use in Special Populations. These training programs, funded from 2002-2003 to 2009, collaborated with other partners to invest in training a generation of researchers who value collaboration across research, policy, and practice sectors (Leatherdale, Viehbeck, Schultz, et al., 2007). One of the two has been renewed with an expanded focus on chronic disease prevention of which tobacco use is a part (www.propel.uwaterloo.ca/training).

Three Interdisciplinary Capacity Enhancement (ICE) grants were also funded in the same general time period (2005-2010) to advance the science of nicotine addiction through building research capacity for tobacco control. While the approach and focus of each of the grants has differed, all share a common interest in generating knowledge that will reduce the burden of tobacco-related disease (CTCRI, 2009), ideally through connecting researchers and policy-

makers and program providers in tobacco control to create alignment (McDonald, Viehbeck, Robinson, et al., 2009).

National research capacity building efforts complement existing, long-term research and evaluation Centres and associated tobacco control networks (e.g., the Ontario Tobacco Research Unit and Propel Centre for Population Health Impact [formerly the Centre for Behavioural Research and Program Evaluation]), councils (e.g., the Canadian Council for Tobacco Control), and Communities of Practice which exist to support interaction in tobacco control through coalitions (ie. Diemert and Manske, 2002).

A third significant component to the tobacco control community in Canada is the role of interest groups or advocates. A number of provincial (ie, Ontario Campaign for Action on Tobacco) and national (ie, Physicians for a Smoke-Free Canada; Non-Smokers' Rights Association) advocacy organizations exist to advance the tobacco control policy agenda in Canada. Tobacco control interest groups also have a role to play in bridging the research and policy communities and in conveying research, however, scientists may not be directly involved within the communication of evidence to policy-makers (Hastie and Kothari, 2009).

Given the public health success story of tobacco control, in terms of changing behaviour and integrating research into practice and policy (Oldenburg, French & Sallis, 2000; Green, et al., 2006), it presents an ideal community of research producers and users in which to study interaction as a potential model for chronic disease prevention.

2.8 Summary of Literature Review

In summary, evidence-based approaches to (public health) policy and practice have been the subject of much study in the academic community and momentum in the funding and governmental communities. Studies of evidence-based approaches or the role of evidence in

action, however, need to be grounded in an understanding of what constitutes evidence (Davies and Nutley, 2002).

The use of research in policy has been a focus of study and the subject of several systematic reviews. These syntheses converge on the finding that interaction between research producers and users is an important facilitator of research utilization and identify a range of interaction-related variables that may be important to research utilization including: timing, the sustained nature, long-term linkages, and mutual understanding and trust.

The influence of interaction between research producers and users on the research process has been widely purported as a useful strategy to support alignment (ie. Butler-Jones, 2009; Green, et al., 2007) and an approach to supporting the production of practice-based or policy-relevant research for public health (Green and Mercer, 2001; Potter, et al., 2006). The experiences of those involved have only recently been given attention in the empirical literature and primarily in the context of health services research. While interactions are likely to be influenced by the context (organizationally; reward structures) in which researchers and end users function, few studies exist that examine this issue from the perspective of both researchers and users (ie. Bowen, et al., 2005).

2.9 Study Rationale

Models of knowledge transfer and exchange have highlighted the importance of interaction between producers and users of research (ie. Lawrence, 2006). Reviews of research utilization have consistently highlighted the role of interaction as a strategy to facilitate uptake of research findings into policy (ie. Innvaer, et al., 2002). Few studies have examined, from both research and policy perspectives, the interaction between these communities and how those interactions may not only influence research utilization, but also the research process. This study is

positioned in the movement toward evidence-based public health policy and within the context of models linkage and exchange relationships between research producers and research users. It was designed to make a theoretical contribution by working towards a theoretical understanding of the relationships between interaction and the alignment of research and policy agendas; by adding to the understanding of both the research producer and research user experiences in the interaction process in the public health field which very few previous studies have examined and by conducting the research in the context of a community, tobacco control, which is known for its leadership in policy achievements, research-policy/practice collaboration, and supporting interaction through a range of structures. As such, the study may glean lessons that can be applied in other areas of public health importance.

CHAPTER 3: CONTEXT FOR THE STUDY

3.1 Study Purpose

Personal contact between researchers and users (such as policymakers) has been widely established in the health services literature as being a key facilitator of research utilization in policy-making (Innvaer, et al., 2002; Lavis, et al., 2005). While examined in the health services research literature, the public health literature has been further behind in understanding how interaction between research producer and users may facilitate knowledge exchange. Specifically, literature is lacking on the nature and meaning of interactions between research producers and users, and how that may influence the alignment of research and policy agendas. Given the public health success story of tobacco control, both in terms of changing behaviour and also in integrating research into practice and policy (Oldenburg, French & Sallis, 2000), it seems an ideal community of research producers and users to study and to guide implications for the broader public health community.

The purpose of this dissertation was to explore the influence of research user and producer interaction on the alignment of research and policy agendas, including the features of and conditions of such interactions. Of particular interest was the influence of research users on the research process.

3.1.1 Research Questions

The specific research questions examined and associated objectives include:

Table 3. Research questions and objectives

Research Question(s)	Research Objective(s)
(1) How do research producers and users in the Canadian tobacco control research community interact?	➢ To explore and understand the potential influence of research producer and user interaction (and the nature, extent, and formality of those interactions) ➢ To explore and understand the predisposing,

Research Question(s)	Research Objective(s)
	enabling, and reinforcing factors associated with the interactions.
(2) How might interactions influence the research and/or policy processes within the Canadian tobacco control community?	➢ To understand whether and how interactions may have influenced those involved
(3) How might these interactions relate to the alignment of research and policy agendas? Is alignment of the research and policy agendas within the Canadian tobacco control community desirable and, if so, for what purpose and under which conditions?	➢ To explore and understand the views of research producers and users regarding the desirability of alignment and why it may or may not be so

3.2 Definition of Terms

Research producers were defined as those persons who conduct research or perform synthesis research in the area of tobacco control. Research users were defined as policy actors who, in the context of their primary role, might use research evidence to inform the development or implementation of tobacco control policy from within the provincial or federal levels of government[2]. For the purposes of this study, legislators (political office-holders) were not included in this group. It is acknowledged that those who produce research will also be users of research and those who use research may also be involved in its production. The dissertation researcher remained open to the possibility that over the course of the study, the definitions could be subject to further refinement as greater understanding was gleaned from data analysis; however initial definitions were established to assist with the development of the initial sampling frame for the interviews.

For the purposes of this research, the Canadian tobacco control research community includes both research producers and users whose work focused on tobacco control. Tobacco control

[2] These definitions are modified from those put forth by Kiefer and colleagues (2005) in their needs assessment of infrastructure to support evidence-based population and public health decision-making in Canada.

relates to the regulation of tobacco through "laws, orders, and agreements concerning individual and corporate behaviour" and also finance through taxation and subsidies (Studlar, 2002, p. 18).

3.3 The researcher as instrument

In qualitative research, the researcher serves as the instrument for data collection and analysis. Accordingly, the researcher brings his or her history and context forward into the investigation (Tong, Sainsbury & Craig, 2007). While some have argued that researchers should have an intimate familiarity with the study area (Charmaz, 2004), it is an important marker of qualitative study quality for the researcher to do a thorough self-examination and, through this reflexivity, discuss how his/her previous knowledge and experience may influence his/her research (Patton, 2002; Tong, et al., 2007). Patton (2002) offers a summary of reflexive screens that may influence this process, including factors such as age, sex, social class, education, culture, and values. This section is intended to orient the reader to the researcher's history with and interest in the area of study and to identify how, if at all, this may have influenced the study (Daly, 2007). Given the personal nature of this information, the researcher chose to present it written in the first person.

I am a 31-year old woman who was born and raised in Thunder Bay, Ontario, Canada. Since the age of 15, I have been engaged in personal and professional activities that relate to improving the health and well-being of Canadians through population-based prevention of chronic diseases. The majority of these activities have been focussed in the area of tobacco control and within the province of Ontario. My personal timeline with tobacco includes several key punctuations along my personal history in the area of tobacco control generally and research specifically. I will highlight some of those experiences to illustrate how they may have influenced my approach and interest in the present research.

My initial encounter with the area of tobacco control took place in 1995 when I became a Core facilitator for the Heart and Stroke Foundation of Ontario program "*Fly Higher!"* The program took a peer-to-peer approach and was designed to support young women (among whom smoking prevalence was at a high) in leading healthy lifestyles, including being smoke-free. This program was my first exposure to the notion that something should be 'done' to help youth become and remain smoke-free and also to the idea that context mattered to intervention. "*Fly Higher!"* led to my involvement in the Federal Ministerial Youth Advisory Committee on Tobacco which caused me to realize that tobacco could be both a policy and political issue. In my capacity as a committee member, I attended the 2nd National Conference on Tobacco or Health in 1996. Prior to my attending that conference, it had not occurred to me that many people in Canada were working in the field of tobacco control. At that conference, then Minister of Health David Dingwall was challenged by a leading physician on his postponed action on key policy issues related to tobacco. I had not previously witnessed such a direct approach to advocacy – that soon changed.

Later that same year, I participated in the planning and implementation of an advocacy campaign to make Thunder Bay smoke-free, including offering a deputation at City Council. This was my first encounter with "policy change" and I was struck by the fact that so much "evidence" was needed by City Council for them to consider legislation that made so much sense to me and others – the bylaw did not pass. That was about more than the quality of scientific evidence for a healthy public policy. Many years later, a decision was made by the Thunder Bay City Council to put the matter before the electorate and in a voter plebiscite held in November 2003, the proposed bylaw passed by an overwhelming margin. I supported the plebiscite

campaign from a distance through regular contact with leaders at Thunder Bay District Health Unit.

My tobacco control work continued after I had moved away from Thunder Bay to begin my undergraduate training at Brock University. While at Brock, I became involved with a university-sponsored project called "Leave The Pack Behind". Intended to provide comprehensive smoking prevention and cessation resources on university campuses, "Leave The Pack Behind" embedded research and evaluation data collection into programming which was used to inform decision-making. My undergraduate experience led me to consider myself as a researcher and, specifically, a researcher who valued linking research with practice decisions.

Following this introduction to applied research and evaluation, I decided that I had more to learn and chose to begin my Master's degree at the University of Waterloo. As a part of my Master's training, I took a course related to "Tobacco: From cells to society" and conducted research in a policy-relevant area of tobacco control. The course provided foundational training and also highlighted the complexity of tobacco control as a health and policy issue. I became affiliated with the Ontario Tobacco Research Unit and the CIHR-funded Strategic Training Program in Tobacco Research and attended a symposium that brought together mentors (from research and policy) and trainees in the area of tobacco. The symposium focused on why generating "relevant" evidence was important to informing tobacco control policy and program decision-making. I learned about CTCRI and targeted research funding for tobacco. My Master's training enabled me to understand the 'field' of tobacco control research and to develop my own 'community' of mentors and colleagues.

It was as a direct result of interaction with these influential colleagues that I decided to pursue a Ph.D. and continue in the Department of Health Studies and Gerontology at the

University of Waterloo. The University of Waterloo prides itself on being focused on linking research with 'real world' application, generally through the commercialization of research findings, but also through innovative partnerships. My coursework and a comprehensive exam related to knowledge exchange in population health and evidence-informed public health. As a result, I became grounded in the history and theories of knowledge translation and exchange and communities of practice. I continued to be surrounded and mentored by researchers and research teams who valued the generation of research that is aligned with the needs of end users. I became integrated as a research assistant in an applied, interdisciplinary research group (Population Health Research Group), worked with a pan-Canadian research and evaluation enterprise affiliated with the Canadian Cancer Society (CBRPE, now Propel Centre for Population Health Impact), and collaborated on projects with colleagues from the Ontario Tobacco Research Unit, Health Canada and CTCRI among others.

My supervisor, Dr. Paul McDonald, invited me to join a team of 17 investigators on an Interdisciplinary Capacity Enhancement (ICE) grant. The investigators shared the notion that evidence can be generated to have impact on tobacco control policies and programs in Canada. I was involved in efforts to build research capacity and also in the evaluation of those efforts. As a result of involvement in this project, I developed an increasing interest in the relationship between evidence and decision-making and an appreciation that the capacity to generate such evidence is not distributed equally across Canada. I grew a particular interest in the evidence 'supply' issue and the generation of practice-based (or policy-relevant) research. Through this process, interactive models of knowledge exchange became a foundation and I was increasingly sensitive to the 'climate' around knowledge translation, applied research, and evidence-based decision-making in the funding, conduct, and use of research. These interests fed directly into the

selection of this area for my dissertation. A presentation to an interdisciplinary audience of (new and seasoned) tobacco control researchers and policy-makers at an ICE-sponsored Summer Learning Forum in Saskatoon in 2007 further informed my thinking for this dissertation as did my involvement as a co-Investigator within the grant.

As a student funded through a National Cancer Institute of Canada Research Fellowship, a CIHR-STPTR fellowship, and an Ontario Tobacco Research Ashley Studentship for Research in Tobacco Control, I was required to conceptualize research projects that had a planned "real world" impact or was linked to the broad mission or priorities of the funding agency. The link between investigator-driven research and "real-world" relevance has been a requirement of my doctoral research funding. Further, funding for this research project was provided by the CTCRI and potential to impact tobacco control research and policy was part of the evaluation criteria for this funding opportunity.

My research training has been influenced by the setting in which I conduct my work, those with whom I collaborate and by those who serve as mentors. My motivation and commitment to work in this area has fostered a belief that research has the potential to, and should, make positive contributions to society. I also realize that the instrumental use of research in decision-making is influenced by a myriad of complex issues.

I have chosen to conduct research 'within' my own research community. This lens and familiarity has resulted in the application of a constructivist [or co-constructionist (Daly, 2007)] perspective to the interpretation of data (Charmaz, 2004). The co-constructionist perspective suggests that researchers bring forth their own experience and knowledge into the research process and hence influence the manner in which data are generated, analysed and interpreted

(Daly, 2007). As such, it is thought that both the researcher and participants are meaningfully engaged in the research and bring meaning to it (Charmaz, 2003).

CHAPTER 4: METHODS

4.1 Overview of Approach

In order to meet the research objectives, the dissertation employed an interpretive paradigm to studying the research questions at hand. This occurred through the use of qualitative methods. Specifically, semi-structured, in-depth interviews were conducted with key informants from both the research and policy fields to explore interactions and the possible influence on the alignment of research and policy agendas in the Canadian tobacco control community. Interviews were conducted and analyzed using a grounded theory approach (Charmaz, 2006; Strauss and Corbin, 1998). The methodology and procedures are described in subsequent sections.

4.2 Purpose of interviews

Interviews were selected as a data collection method to gather in-depth qualitative information on the nature and meaning of interactions between research users and producers. Interviews are a useful data collection method to collect information "about their experiences, opinions, feelings and knowledge" and allow for theory generation (Patton, 2002, p. 4). In order to allow for greatest freedom and to gain in-depth understanding, the questions were open-ended, semi-structured (Kvale, 1996; Patton, 2002) and directed at understanding the experiences of participants related to their respective interaction practices (see Appendices B and C for interview guides). The findings from the interviews contributed to grounded theory development and identification of pertinent domains and variables that may be suitable to use as a starting point for the development of quantitative measures and eventual theory testing in subsequent studies.

4.3 Interview protocol

In-depth, semi-structured, digitally (audio) recorded interviews were conducted one-on-one with key informants by the dissertation researcher (sample described in Section 4.4). All interviews were conducted in English. In addition to digital recording, hand-written field notes were taken by the dissertation researcher to record reflections immediately following the interview (see section 4.3.1). Prior to each interview, the recording equipment (a Sony Digital Voice Recorder) was tested and batteries were replaced. Following each interview, digital recordings were uploaded to a password-protected computer and backed up to disk before clearing the Digital Voice Recorder.

While it was possible for interviews to be conducted in-person, interviews were primarily conducted over the phone at the choice of interviewees. Interviews were scheduled via email or telephone conversation at a time and location that was most appropriate and convenient for the interviewee. When the interviews were conducted by phone, they were conducted privately in the dissertation researcher's office. When in-person, they were conducted either in the participant's office or in a private office within the Population Health Research Group. While the phone interview format limited the dissertation researcher's capacity to observe body language and focus, the trade-off was cost-effectiveness and the preference of interviewees (Novick, 2008). The interviews conducted in-person did not seem to differ in either length or content from those conducted by phone.

The interview guides (see Appendices B and C) were designed with the intention to allow for a balance between standardized content that could be compared across interviewees while at the same time allowing for some flexibility to expand upon particular lines of responses with the

use of probes (Patton, 2002; Flick, 2009). For example, different, but comparable questions were asked of research users and producers.

All interviews began with introductory remarks, including details related to research ethics, and some questions to get to know the participant's roles and areas of responsibility related to tobacco control. Open and honest responses were encouraged and it was made clear that there were no "right" or "wrong" answers to the questions being asked. Participants were invited to ask questions prior to the start of the interview and also at the close of the interview. Some conversational elements occurred either at the beginning or end of the interview, with participants asking about my future plans or related research. These were unplanned, but assisted in setting a comfortable tone. The interview closed with a discussion of next steps.

To inform the development of the final interview guides, and to determine the suitability and clarity of questions and content and make necessary modifications to the scripts, the interview guides were shared with the dissertation advisory committee and a qualitative researcher with expertise in the area in the area of research and policy relationships in tobacco control for their feedback. The interview guides were also pilot tested and minor adjustments were made following (see Section 4.4.1 for details). Consideration was given to making modifications to the research producer interview guide following conduct and preliminary analyses of the research user interviews. Because the research user interviews were conducted prior to the research producer interviews, it was natural to expect that the experience of having done so could alter the approach and interaction with the research producer interviewees. In order to ensure that the process was not biased due to that exposure, while at the same time using what was learned to support theory development, only minor modifications were made to the interview guide. Probes,

in the form of sub-questions, were designed to explore particular insights gained from the research user interviewees (Kvale, 1996; Charmaz, 2006).

Upon completion of the interviews, recordings were saved and then transcribed verbatim by a professional transcription service (Centretown Corporate Services, Ottawa[3]) using transcription guidelines (McLellan, et al., 2003) and following completion of a confidentiality agreement provided by the dissertation researcher.

Transcripts were verified for accuracy against the original recording by the dissertation researcher to identify and correct any possible errors between the two (such as identified inaudible statements or discrepancies) and also to re-familiarize the interviewer with the interview (Poland, 1995). Based on the review, modifications were made to the transcript for accuracy, to clarify "inaudibles" identified by the transcriptionist, and to replace identifiers with transcription codes. Content was not modified in any other way (Kvale, 1996; Bazely, 2007). Verbatim transcripts of interviews were electronically forwarded to each participant for member checking. An email invited participants to review the transcript to ensure that responses were properly represented and also to give the option to add to responses or revise their statements. This process was intended to triangulate the findings through verification with the participants and to increase the credibility of the process to participants (Tong, et al., 2007). The final, verified transcript was used for analysis.

4.3.1 Reflexivity: Field notes

Pre-interview, detailed process notes were maintained to document timelines and notes associated with interactions with the participant related to recruitment and the scheduling of the interview itself (Kirby and McKenna, 1989). During the interview, using a standard

[3] This transcription service has been used on multiple occasions by the Population Health Research Group and has a track record of preparing research quality transcripts from audio-recordings.

documentation sheet (Appendix E) (per Flick, 2004), information was completed for each participant, including: the participant identification code, data and time of interview and attribute details. In addition, focused notes were taken during the interviews in order to record main points made by interviewees, serve as a back-up in the event of a technical issue with recording, clarify transcripts, and assist with early analyses (Patton, 2002). Initial reactions about the interview process and content were captured on the documentation sheet immediately following each interview. All field notes were maintained in hard copy in each participant's file and were referred to throughout the analytic process to remind the researcher of the interview context and also to serve as a means of documenting the recruitment and interview process. Ongoing documentation in the form of field notes and memos were maintained throughout the research project to assist with interpretation of data and offer a lens on the researcher's experiences through data collection and analysis. These included lines of inquiry to question the data and also related to the evolution of the coding structure, including in developing code descriptions and exploring relationships between codes. Such notes were selectively considered in the analysis, based on their relevance to theory development and interpretation in a manner consistent with a constructivist perspective (cf. Section 3.3).

4.4 Sample

Over the course of the study, three sampling techniques were used: (1) non-probability, purposeful sampling of research users; (2) snowball sampling of additional research users and research producers; and (3) sampling of additional participants on the basis of theory development needs. Each of these stages will be described in turn, followed by the recruitment protocol (Section 4.4.2).

As previously stated, the initial sample of interest were research users who, in the context of their primary role, might use research evidence to inform the development or implementation of tobacco control policy from within the provincial or federal levels of government[4].Initially, a non-probability, purposeful sample of research users was generated on the basis of document review of current and/or former members of the Federal/Provincial/Territorial Tobacco Control Liaison Committee (FPT-TCLC). At the time of potential sample generation, the membership list of the FPT-TCLC was not posted publicly and so was obtained as a result of an email request to Health Canada.

The FPT-TCLC is a collaborative advisory committee formed by the Advisory Committee on Population Health and Health Security for the purposes of advising on and monitoring the progress of New Directions for Tobacco Control - A National Strategy. The FPT-TCLC also plays a role in facilitating collaboration with non-governmental organizations involved in tobacco control (Health Canada, 2005- for a full description of the FPT-TCLC see Appendix D for a descriptive excerpt taken from the Health Canada website). The representatives (N=16) involved in the FPT-TCLC are from the federal, provincial, and territorial governments (Health Canada, 2005).

The FPT-TCLC has the advantage of being composed of a defined membership and consists of research users who are likely to be able to comment on the role of interaction with researchers as it relates to alignment at the provincial and national levels of policy. The membership of the FPT-TCLC changes as staff turns over, however it should be noted that the composition remained quite stable over the time of the present study. In grounded theory work, the robustness of the theory is enhanced by the extent to which it can represent variable perspectives (Mays and

[4] These definitions are modified from those put forth by Kiefer and colleagues (2005) in their needs assessment of infrastructure to support evidence-based population and public health decision-making in Canada.

Pope, 1995; Charmaz, 2006). At the outset of the study, it was thought that there may be variability in experiences based on geography and jurisdiction. To allow for variation in perspectives (Patton, 2002), the sample deliberately included multiple jurisdictions (Federal/Provincial/Territorial) and geographical locations. Within each of the jurisdictional levels and geographic regions, subjects were selected based on the pre-set criteria and iterative conversations with the dissertation supervisor. Such purposeful sampling allows for the intentional selection of information rich cases that are likely to be able provide in-depth insight in a given area of study (Patton, 2002).

As a part of the interview guide, research users were asked:

- What Canadian tobacco control research producers have influenced their (research-based evidentiary needs throughout their) policy (development, implementation, and evaluation) processes?
- Are there any other [tobacco control] colleagues from their organizations who would be knowledgeable in the area and should be interviewed?

These questions served as the basis for snowball sampling of additional research users and defining a sample of research producers. Snowball sampling allows for the selection of information-rich cases on the basis of nomination by key informants (Patton, 2002). The tobacco control researcher nominees that were identified by the policy-makers were invited to participate on the basis of duplicate nomination across the initial sample of research users (ie. any name that was mentioned by more than one research user) and also based on being representatives from key tobacco control research organizations, as identified by research user interviewees.

Table 4 illustrates sample for research users, broken down by jurisdiction.

4.4.1 Recruitment and consent protocol

Initially, participants were invited to participate in interviews through email invitation (Appendix F). The invitation included a brief note within the email text and a complete

information letter in an attachment. Potential participants were asked to reply to the email if they would be interested in participating. When a response had not been received within one week[5], the dissertation researcher contacted the potential participant by telephone, where necessary making up to three follow-up calls, to establish his/her interest in participating in the study (Appendix G). At the time that a participant offered email or verbal interest in participating, a time and location for the interview was set and the consent form was emailed with a request to fax back in advance of the interview.

Interview recruitment for the research users took place in three waves from November 2007 to January 2008 with interviews conducted between November 2007 and March 2008, according to the schedules and availability of interviewees.

For research producers, recruitment followed the same protocol. Recruitment took place in two waves between July and September 2008 and interviews were conducted between July and October 2008.

4.4.2 Researcher relationship to participants

The researcher had a collegial relationship with one of the interviewed research users and had previously met three others in the context of other work in tobacco control. In the case of research producers, the researcher had a pre-existing relationship with all of the interviewees. To minimize the potential for these previous interactions to alter the study procedures, all interviewees were conducted using standard protocols and discussion within the interviews remained focused on matters related to the dissertation. Protocols included audio-recording of interviews, preparation prior to interviews including the purpose of the study and interview

[5] In the initial research user pilots (n=2), a two week time frame was given for a response. This was thought to be too long a delay between initial contact and follow-up and so was shortened to one week for the remaining interviews.

guide, careful reflection post-interview regarding use of prompts and content covered, transcript review and comparison to audio-recording for accuracy and to support the generation of field notes with an aim of reflexivity, and microcoding of data (line-by-line coding) to ensure that the data were appropriately questioned (Charmaz, 2006).

To minimize demand characteristics, participants were asked to feel at ease to contribute whatever they felt was relevant to the researcher's understanding and it was made clear that there were not any "right or wrong" answers, only their experiences. In many cases, the researcher's knowledge of the tobacco control community and context was an asset (cf. Section 3.3) and assisted in building rapport. If interviewees understood that the researcher was familiar with the field, they may have felt free to use language, acronyms, and terminology that were common within the field without extensive explanation. There was some evidence of this within the interviews themselves through, for example, the use of acronyms common to those actively engaged in tobacco control. That being said, the researcher was careful not to assume meanings when unsure and asked questions of clarification as necessary.

As a part of the research process, the dissertation researcher reflected on the advantages and disadvantages of being a part of the community which was under study. This reflection was consistent with reflexivity and also co-construction (Daly, 2007). Some noted advantages included: having familiarity with and in-depth knowledge of context, key players (individuals and organizations), history; shared understanding of language and acronyms; passion for the issue area, and; having a working relationship with some of the interviewees. Disadvantages included proximity to the issue area and perhaps wanting to seek out things that may or may not be there. In order to balance the possible advantages and disadvantages, several methodological protocols were used to enhance rigour, specifically: audio recording and verbatim transcription

(including member checking for verification), careful reflection regarding the use and nature of prompts, ongoing dialogue with supervisor and committee members throughout the research process, careful review of transcripts following each interview to reflect on the researcher's neutrality as an interviewer, and repeated coding checks and comparisons to ensure that theory development was grounded in the data.

4.5 Pilot interviews

Following the full interview recruitment, pilot interviews were conducted with research users (n=2) in September and October 2007 and two additional pilot interviews were conducted with research producers in July 2008. The pilot interviews were planned to achieve multiple purposes related to the interview protocol and demand characteristics, including to determine the suitability of the interview guide, including potential gaps in data and whether participants seemed to understand the questions in the manner intended; to test the recruitment mechanism and protocol; to compare the estimated time of interview, relative to the actual time; and to provide an opportunity for the researcher to engage in critical reflection on interviewing style and areas for improvement.

Following the research user pilot interviews, two members of the dissertation advisory committee (McDonald and Riley) were consulted to discuss the process and findings and to make a decision about proceeding with the remaining interviews. This preliminary analysis of pilot data led to minor modifications to the interview guide (addition of two questions relating to alignment, no deletions) and also to the recruitment protocol (the original plan to give two weeks between the initial invitation and telephone follow-up proved to be an excessive amount of time and consequently was adjusted to one week). The remaining interviews were completed as

planned. Given the similarity of findings between the pilot interviews and the remaining interviews, they were treated similarly in the analysis.

The same procedure and consultation was applied for the two research producer pilot interviews. In the case of the research producer pilots, both pilot interviewees indicated that they may have chosen not to specify names of particular individuals as I might know them. Both also indicated, however, that they did not feel that this altered the content of the interview (field note).

4.6 Data management

Complete analyses were conducted by the dissertation researcher using NVivo7 software for data management. Procedures of data management within NVivo were established according to those recommended by Bazeley (2007). Each participant was coded as a case and descriptive information was associated with the case (participant) file. This information included date of recruitment email, date and time of interview, mode of how the interview was conducted (in-person or by phone) and participant identification number. Following verification (member checking) by participants (cf Section 3.3), transcripts were uploaded into NVivo as 'Source Documents'. The transcripts were linked to the "case" nodes for each participant.

Following upload, attribute data were associated with each of the participant cases. Attributes included: geographic location of the participant, number of years working in tobacco control (and, for researchers, number of years in tobacco control research), and whether the participant was primarily a researcher or a research user. These attributes were drawn from both the documentation sheet and the interview transcripts and allowed for analytic matrices to be generated for the purpose of comparing differences in data according to characteristics of participants (Bazeley, 2007).

4.7 Data analysis

Data collection and analyses were conducted using a grounded theory approach which seeks to create and explain a phenomenon grounded in inductive analysis of qualitative data and experiential knowledge (Patton, 2002). According to Charmaz (2004), grounded theory methods highlight six key processes: (1) interplay between data collection and data analysis; (2) data-driven, analytic coding and category development; (3) ongoing theory development; (4) memo-making to track rationale for coding and analysis; (5) theoretical sampling of data to support category elaboration and theory construction; and (6) delay of the literature review. These processes were adapted for use in the present study and the data analysis procedure is documented visually in Figure 2.

4.7.1 Initial coding: 'On' transcript

The data collection and subsequent analyses began with two pilot interviews with research users. These transcripts were the point of departure for coding and subsequent data analyses while at the same time providing insight into implications for subsequent data collection. Following receipt of transcripts, the researcher compared the verbatim transcript to tape to re-familiarize with the interview content (cf Section 4.4). After member checking of transcripts, hard copies of the transcripts were read and highlighted in hard copy. The researcher made notes in the margins about the interview content (and conduct) and began to draft potential codes. The hard copies of the interview transcripts were kept in each participant file and served as the basis for transferring all analyses into NVivo for data management. While "offline coding" can be discouraged (Bazeley, 2007), it was an important step for the researcher toward developing a closeness to the data and to assist with beginning the coding process.

4.7.2 Coding: Line-by-line and initial coding

Following the initial review and coding on the hard copy of transcripts, line-by-line coding was used to microscopically examine the data and to associate data-driven codes with text. Charmaz (2006) suggests that such an examination of the data is a key component to understanding the fit and relevance of data. This process was conducted within NVivo using the coding toolbar to code and name selected text as free nodes. In a couple of cases, nodes were given *in vivo* names inspired from the language used by interviewees. The initial coding was completed for all transcripts and for all text within the transcript, regardless of the pertinence to the specific research questions. While this was a time-consuming and laborious process, it was regarded by the researcher as being an appropriate investment and an important step in preparing the data for subsequent analyses. In addition to the line-by-line coding, more focused coding of the data was done to refine the free nodes. Free nodes were related to very specific concepts within the data and, over time, were questioned in terms of their relevance to the research questions and also the distinctiveness of codes from each other. When appropriate, codes were combined if significantly overlapping concepts had been coded separately as free nodes.

To support this analysis, text search queries were conducted in NVivo for keywords that related to initial free nodes. A list of text search terms is listed in Appendix H. While this strategy increased confidence in the original coding, there were many instances where the same words were used in different contexts or with different meaning and as such, did not result in any significant alterations to the coding scheme, though did, in some cases increase the number of passages coded within specific codes.

4.7.3 Axial coding: Category development and coding structure

Following open coding, axial coding was used to arrive at data-driven categories and, in some cases, sub-categories (Charmaz, 2006). This involved grouping and sorting of free nodes into tree nodes and sub-tree nodes. Initially, this was once again done 'offline' by printing all free nodes and related property descriptions and grouping according to broad thematic areas. The coding structure took a simple category, sub-category, and free node form. At this stage, some codes were combined as there were not sufficient or substantive differences between codes to maintain distinct free nodes. In some other cases, this stage served as a validation to check sections of text that had been coded under more than one free node. Theoretical sampling was also used to return to transcripts to sample for additional text that fit with categories and to further elucidate properties of the categories (Strauss and Corbin, 1998; Charmaz, 2006).

Two specific strategies were used to further describe categories. The first involved using coding matrices in NVivo to check for overlap across codes of pieces of coded text. Through running coding queries, the researcher examined where sections of text overlapped across multiple codes and reviewed the specific codes to better understand the areas of overlap and how relationships between categories might be further elaborated. The second strategy involved examining coding by the assigned attributes of interviewees. Of central interest to the research questions were areas of convergence or divergence between the sets of researcher and policy interviewees. A specific coding matrix was conducted in NVivo to examine the coding structure according to the presence or absence of data included within the code by researcher and policy interviewees to further elucidate possible properties of categories. This investigation led to the detection of similarities and differences and then allowed for strategic questioning of the data. For example, Did some codes appear in both sets of interviews and not in others? Were the same

issues discussed differently by researchers and research users? What does this tell me about the category?

4.7.4 Relationships between codes and theoretical elaboration

The final phase of analysis was to relate the major categories to each other and to explain the relationships between. The major categories generated by the axial coding served as the basis for theoretical coding (Charmaz, 2006). To support this process, diagramming was undertaken to map out the possible relationships between codes and to connect codes with relational arrows. Charmaz (2006) suggests that diagramming is an effective strategy to outlining possible relationships between categories and then returning to the data to verify and further understand the properties of categories and the contingencies under which they may relate to each other. Memos were a critical component to helping to document clues about possible relationships (see Section 4.7.6).

The categorical structure was thought to be a key part to theory building, however, following consultation with the dissertation supervisor and an expert in grounded theory methodology, the rigidity of this framework was questioned and was subsequently refined and streamlined in accordance with the research questions and in order to be able to examine the categories for clues and to articulate the potential relationships between categories.

The relationships between codes were determined through repeated questioning of the data and related thematic groupings. Once a draft of the theory was completed, it was reviewed by the dissertation researcher for internal consistency and density of categories (ie. the extent to which categories have been well-developed by supporting data) (Strauss and Corbin, 1998). The resulting theory is a rich, data-driven understanding of whether and how interaction between research producers and users relates to the alignment of research and policy agendas.

4.7.5 Constant comparison

The constant comparative method was used to ensure that coding and themes were refined across cases and that the process was systematic, and sensitive to theoretical issues such as new concepts, categories and relationships (Lincoln & Guba, 1985). Constant comparison occurred within interviews, across interviews, and across groups (researchers and research users) (Boeije, 2002). Specific constant comparison procedures included coding several interviews and then running a coding summary report in NVivo to check consistency in coding across interviews. The Code Summary reports were exported and reviewed for the coding structure, linkages across codes, and consistency in coding. These reports and related hand written notes informed the return to the data for subsequent analyses. At multiple points throughout the project, lists of codes were printed and dated to track evolution of coding structure and, as necessary, codes were consolidated.

4.7.6 Memos

Memo-making was a particularly critical step to providing a clear rationale and thought pattern behind the coding of themes and categories (Charmaz, 2006). Memos were expanded in an ongoing way throughout data analysis and included a combination of information relating to the codes themselves, pieces of data within the codes, interpretations, and also contingencies and possible linkages between codes. Memos served as an important documentation of the coding process and also as a touchstone to guide theory development, particularly relationships between codes and the manner in which different concepts were discussed by interviewees.

4.8 Credibility and Trustworthiness

In addition to member checking regarding verbatim transcripts (described in Section 4.3), which assists in enhancing the credibility and trustworthiness in the data by participants (Lincoln

and Guba, 1985) additional steps were taken. An additional member checking process was included by sharing a written summary of findings back with a sub-set of participants for comment (see Appendix I) and followed up with a brief phone call. On the call, participants involved in member checking were asked to what extent the summary was an adequate representation of their own personal experience at the time of the interview. If it was not, participants were asked to draw attention to any substantive differences or any key issues missing from the findings. Participants were also asked to reflect on how the current tobacco control environment in Canada might be considered in the implications of the findings.

Further, criteria such as the fit, relevance, workability, and modifiability were considered throughout theory development as guiding principles for sources of credibility in the work (Sousa and Hendriks, 2006).

While no second coder was used, validity was checked through multiple reviews of the transcripts and coding summary reports on multiple occasions during the project. Emerging categorical groupings (tree nodes and free nodes) were discussed with supervisor, other committee members, and another faculty member advisor to assist with the analytic process and questioning of the data.

4.9 Saturation

It was hoped but not expected that theoretical saturation would fully occur following the analyses. The research was expected to make a contribution to theory development using grounded theory methods and achieve theoretical sufficiency (Charmaz, 2004; Dey, 2006). Dey (2006) indicates that saturation is about the "capacity of data to generate new ideas" and not the accumulation of evidence to support those ideas. In the present analysis, there were indicators throughout the data collection and analysis processes to provide evidence of saturation.

Specifically, a saturation analysis (see Appendix J) yielded evidence to suggest that the free nodes had been well-covered across interviews. Further, evidence of the major categorical codes was found for nearly each interviewee. Secondly, the frequency with which new free nodes were created decreased significantly throughout the coding process suggesting that new themes were no longer emerging from the data.

4.10 Research Ethics

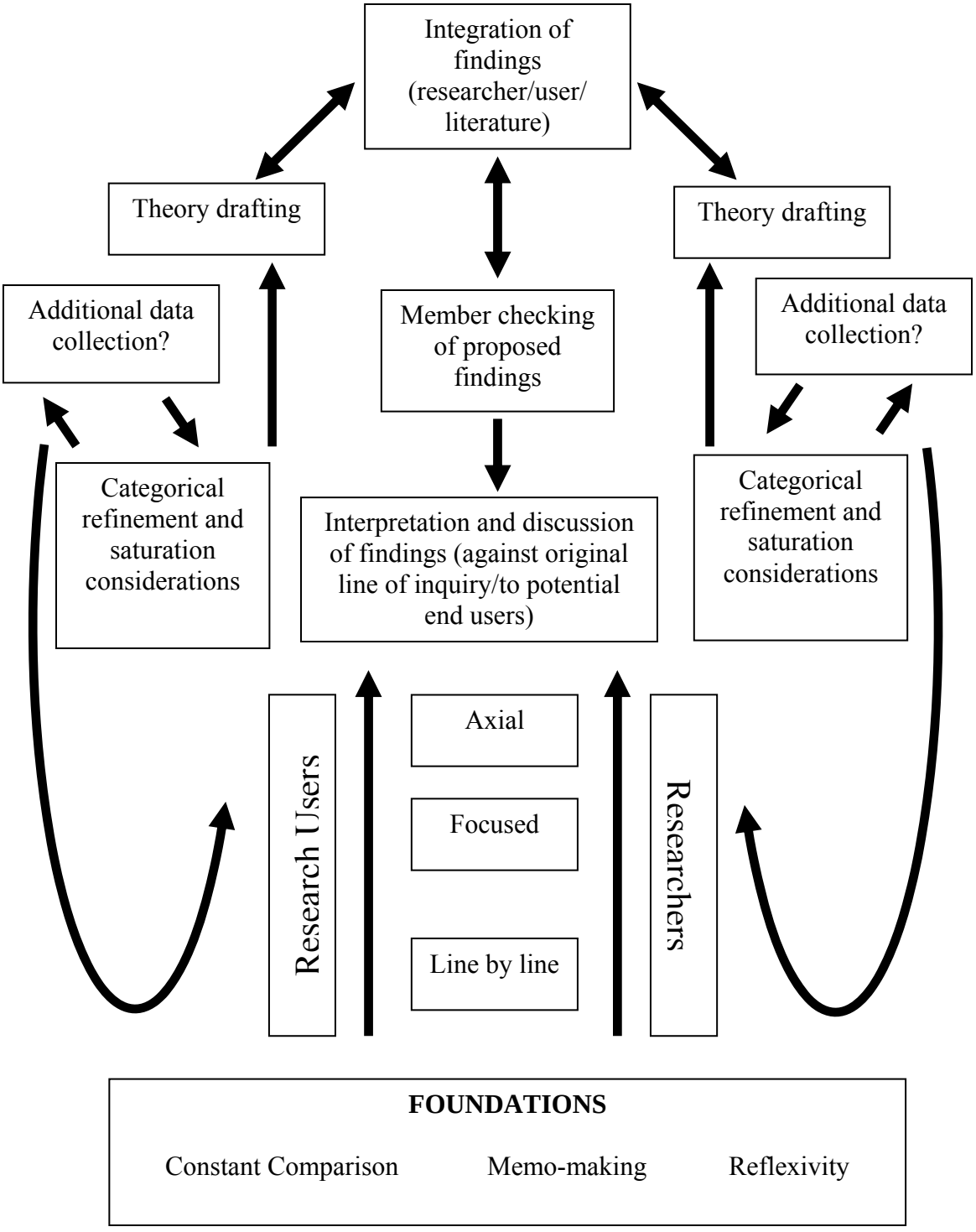
All data collection for the interviews was conducted only after receiving approval from the University of Waterloo's Research Ethics Board (ORE # 14126) in accordance with protocols for research with human participants, including informed consent. Full ethics approval was received on September 9, 2007 with approval of modifications to procedures following pilot interviews (Form 104 approved on November 12, 2007).

Table 4. Audit trail of key methodological decision points

Methodological Area	Summary	Decisions points and rationale
Study design and research questions	Developed study rationale, research questions, and protocol	Made modifications following thesis proposal and committee input. Presented about study rationale and approach to ICE Summer Learning Forum in Saskatoon
Interview guides	Developed interview guides	Obtained committee input regarding initial interview guide – deemed suitable and proceeded with research user pilot interviews
Developed preliminary sampling frame for research users	Reviewed documentation to generate preliminary sampling list and considered in relation to research questions and potential sources of variability (ie, geography, jurisdictions)	Issued invitations to 17 research users based on criteria
Pilot interviews with research users	Conducted two pilot interviews with research users to test appropriateness of the interview guide and determine if any changes needed to made following pilot	Interviews proceeded as planned, no significant issues raised by pilot interviewees. Made minor adjustment to the recruitment protocol (originally planned to give two weeks between initial invitation and telephone follow-up, but this was too much time and so settled on one week).Following consultation with supervisor and committee member, proceeded with remaining interviews
Preliminary analyses	Conducted preliminary analyses on research user interview data	Interviews yielded data in line with questions asked and preliminary analyses proceeded as expected. Added two interview questions related to alignment to ensure that the concept was adequately explored.
Research user interviews	Conducted interviews	Research user interviews proceeded as planned with flexibility allowed for sampling (see Section 5.1), field notes were maintained to guide areas for analysis. Transcripts shared with participants for verification.
Developed preliminary sampling frame for researcher interviews	Reviewed the nominations from policy interviewees	Following review of nominations and discussion with supervisor, a decision was made to invite all those with dual nominations and one with a single nomination, but who had been identified

Methodological Area	Summary	Decisions points and rationale
		through the research user interviews as having a structure in place for research user engagement (theoretical sampling)
Revisiting of interview guide	During transition between research user and researcher interview sets, assessed whether the interview guide required modification	Sought input of supervisor and faculty member with methodological expertise re: any potential changes to the interview guide for researcher interviews – none were made beyond the additional of several probes
Researcher pilot interviews	Conducted two pilot interviews with researchers to test appropriateness of the interview guide and determine if any changes needed to made following pilot	Interviews proceeded as planned, encouraged to consider potential demand characteristics. Decided not to leave two weeks between recruitment email and follow-up to expedite scheduling of interviews. Following consultation with supervisor and committee member, proceeded with remaining interviews
Researcher interviews	Conducted interviews	Researcher interviews proceeded as planned. Transcripts shared with participants for verification.
Analyses	Conducted analyses as described	Met with committee to discuss all interviews and analysis plans Ran saturation analysis to support sense that saturation had been reached and that no further interviews were required at this time Consulted with supervisor, methodologist, and committee members as needed regarding analyses and results – modified rigidity of approach, proceeded with questioning data to look for key areas of divergence/convergence between researchers and research users
Presentation of results	Presented results at the National Conference on Tobacco or Health	Received positive feedback on results-to-date. Encouraged through questions at the presentation to think through implications for policy audiences as well as research
	Conducted member checks with a sub-set of interviewees	Member checks suggested that findings were appropriate and credible to those contacted

Figure 2. Diagram of Analytic Process



CHAPTER 5: FINDINGS

5.1 Process description: Research Users

A total of 17 research users were invited to participate, and 10 agreed to participate in the study (58.8%). Of the originally invited 17, two people were on extended leave and one was recently retired, thus rendering them ineligible to participate and increasing the response rate (10/14 eligible = 71.4%). An additional two respondents communicated initial interest in participating, however did not respond to multiple (3 calls and/or emails each) follow-up attempts to schedule a time and as such, did not participate.

Two of the 10 research user interviewees were not those originally invited to participate in the study. In both of these cases, the original contact person was expected to participate in the interview and plans changed due to scheduling conflicts. The secondary people were nominated by the original contact person as being the most appropriate person from their organization to participate in the study given a combination of availability of the original contact person and also the nature of the research. While this was not intended to be a part of the initial sampling, it remained consistent with the snowball sampling techniques intended for later in the data collection process. The interviewees capably responded to the interview questions in a manner as expected based on prior interviews.

5.1.1 Recruitment and scheduling considerations with research users

The recruitment and interview process with research users resulted in some slight deviations from the intended protocol. In addition to the last minute cancellations, some flexibility needed to be built in to the overall project timelines to accommodate lengthy delays due to scheduling of the research user interviews. In some cases, several weeks passed between the original point of contact to the conduct of the interview due to the multiple scheduling demands on their time.

Further, once interviews were scheduled, there were 4 cases when interviews did not start on time as a result of last minute changes in their schedules. This did not influence the total time that the interviewees were willing to commit to the interview (for example, if they committed 90 minutes, they were willing to maintain that commitment even though the interview may have started late).

Of the 10 interviewees, one interviewee did not consent to audio-recording of the interview. In this case, detailed hand-written notes were recorded by the dissertation researcher and written up as a pseudo-transcript. It was sent to the interviewee for member checking and some small modifications were made by the interviewee. The analyses were conducted on the modified version of the transcript.

Two interviewees expressed particular concerns regarding the anonymity associated with their participation. In particular, one interviewee agreed to participate only after receiving assurance that data and quotations would be anonymized for any identifiers (including name, province and/or agency). A second interviewee requested that the interview be used for context and pooled analyses and that personal approval be sought prior to the use of specific quotations from said interview. Given the politically sensitive environment surrounding tobacco control in many provinces, including court cases regarding appeals to existing legislation by the tobacco industry, and also the fact that there may only be one provincial lead for tobacco control (hence easily identifiable if data were reported by title or province) it was not surprising and, indeed understandable, that interviewees wanted additional information regarding procedures for reporting.

Following some introductory questions regarding roles and responsibilities, participants were asked to give a picture of how they might interact with researchers. Interactions with

researchers were generally not top of mind for most policy interviewees. As interviews proceeded, however, participants tended to recall different examples of interactions which they referred to during the interviews as they came to their minds (field notes).

5.1.2 Sample description

As planned, interviewees represented variability in terms of geographic and jurisdictional representation. Table 5 summarizes the breakdown by jurisdiction and the number of interviews completed relative to the number planned. These data are not reported by geography to protect the anonymity of participants.

Table 5. Sample description for key informant interviews with research users

Jurisdiction	Number of Interviews Completed (Planned)
Federal	2 (2)
Provincial/Territorial	8(5)
Total	**10 (7)**

Interviews lasted an average of 75.5 minutes (Range = 66-87 minutes) and resulted in 270 pages of type-written transcripts (transcripts averaged 27 pages each). See Table 6 for a full description by participant.

Table 6. Description of interview timing and lengths of transcripts (Research Users)

Participant ID	Date	Length of Interview (minutes)	Transcript Word Count	Transcript Page Length
1	October 4, 2007	71	10552	27
3	October 27, 2007	68	9925	27
5	November 23, 2007	82	11426	31
8	December 3, 2007	67	2926	6
9	January 31, 2008	77	11687	30
10	March 25, 2008	87	10327	27
11	January 4, 2008	83	11130	31
14	March 7, 2008	79	10044	32
15	February 4, 2008	75	10917	35
16	February 11, 2008	66	8736	24
Minimum		**66**	**2926**	**6**
Maximum		**87**	**11687**	**35**
Average		**75.5**	**9767**	**27**
Total		**755**	**97670**	**270**

All interviewees represented bureaucratic positions in their respective federal, provincial, or territorial governments, most at a senior level within their portfolios. Their positions related to tobacco control primarily or active involvement in tobacco control through broader health, health promotion, and/or chronic disease prevention portfolios. The nature of their positions, including seniority and/or having a dedicated tobacco control focus versus having a broader focus on chronic disease prevention (with a partial focus on tobacco control), seemed to influence the amount of time spent on tobacco control relative to other parts of their portfolios. Accordingly, interviewees estimated spending between 10% and "175%" on tobacco control relative to other aspects of their portfolios. Most stated that tobacco control was a 100% focus (7/10 interviewees). Several who spent less time on tobacco control stated that the amount of time spent on tobacco control was likely to be influenced by policy priorities and, as such, could vary over time.

With the exception of one interviewee who had been in the position for less than one year and was on a term appointment (Participant 16), all others had been working in positions, usually related to health or tobacco control, in government for over two years. Two interviewees possessed nearly 20 years of experience in government roles, not always related to tobacco control. One interviewee was no longer playing a provincial government role at the time of the interview, but had an ongoing working relationship with the person currently fulfilling that post and responded from the perspective of what transpired while in the governmental position (Participant 3).

All research user interviewees described the main task of their respective organizations as being related to policy and/or strategy development, including provision of policy advice, and policy implementation. In some cases, regulatory and coordination functions were mentioned by some, particularly as they related to linking with other departments in government. Several interviewees (n=4) reported that their roles were related to evaluation, research, or monitoring responsibilities. Only two interviewees' organizations have responsibility for direct programming or service delivery (such as smoking cessation services), although three others indicated having roles related to mass media and/or public education/information-related programs. Two interviewees were from organizations that had distributed funding arrangements with regional authorities for direct service provision as related to tobacco. Policy interviewees located in provincial government contexts seemed to have greater variability in terms of their range of responsibilities than interviewees in other jurisdictions.

5.2 Process description: Research Producers

The first phase of interviews (with Research Users) yielded a total of 30 nominations for researchers who could be interviewed (see Section 4.4 for sampling). Of those nominated

researchers, 9 received nominations from more than one research user interviewee. One was deemed ineligible to participate due to the role that the person holds in relation to the dissertation researcher. Of the remaining 8, all were invited to participate and seven agreed (88%). One declined participation due to being on extended medical leave. In addition, one researcher who had received a single nomination was also invited and agreed to participate. This decision was made for theoretical sampling purposes as the dissertation researcher was aware that the individual convenes a research advisory group and as such, may have a unique contribution to make to theory development.

5.2.1 Recruitment and scheduling considerations with research producers

In contrast to the experience with interviews in the first phase, the recruitment and interview process with research producers was quite straightforward. Once interviews were scheduled, there were two cases when interviews did not start on time or had to be rescheduled as a result of last minute changes in their schedules. Once again, this did not influence the total time that the interviewees were willing to commit to the interview. All interviewees agreed to audio-recording.

5.2.2 Sample description

This set of interviews lasted an average of 87 minutes (Range = 52-103 minutes) and resulted in 195 pages of type-written transcripts (transcripts averaged 24 pages each). See Table 7 for a full description by participant.

Table 7. Description of interview timing and lengths of transcripts (Research Producers)

Participant ID	Date	Length of Interview (minutes)	Transcript Word Count	Transcript Page Length
18	July 17, 2008	100	11988	23
19	July 21, 2008	103	15008	29
21	September 17, 2008	79	8705	21
22	August 15, 2008	99	12787	31
23	August 19, 2008	52	7273	18
24	September 3, 2008	80	11193	26
25	October 8, 2008	90	12243	27
26	September 5, 2008	96	9785	20
Minimum		**52**	**7273**	**18**
Maximum		**103**	**15008**	**31**
Average		**87.375**	**11122.75**	**24.375**
Total		**699**	**88982**	**195**

Seven of the eight researcher interviewees were based in Ontario. All researcher participants had considerable experience working in tobacco control - two interviewees had between 7-10 years of experience and six had more than 10 years of experience in the field. All but one researcher had a university affiliation and the majority conducted their work in the context of a research centre or unit that was associated with a university.

Researcher interviewees discussed the nature of their work in tobacco control. Most spent the majority of their time doing tobacco-related research and this was balanced against other research priorities, administrative or clinical duties, and, in some cases, teaching responsibilities. The nature of research conducted had evolved for many of the researchers over time and some reflected on the evolution of their respective areas of study. General areas of interest ranged from policy-related research, tobacco control data and surveillance systems, smoking cessation, and multi-risk factor behavioural research.

One participant in this set of interviewees did not consider himself a 'researcher' and expressed the role as someone who had continually worked at the interface between knowledge generation and use. The participant remarked on this in the following way:

> "What is research? I mean I've always been at the interface between research and practice and I've always been a consumer of research and I think I've been an intellectual and a theoretician and practitioner." – *Participant 25[R]*

Several of the researcher interviewees asked questions about the place of tobacco control advocates within the scope of the present study. When asked, I reiterated the definitions that I was using for research users as being those based in government and asked that they consider this when describing their interactions. These interviewees were invited to comment on the role of advocates within this picture, should it be relevant from their perspective.

5.3 Initial coding

Transcripts were analyzed line-by-line to generate preliminary coding categories in the form of free nodes per methods described above (see section 4.7.2). The result was 186 free nodes. At the broadest level, free nodes could be classified into three main categories: (1) Descriptive codes about interviewees, their position(s), the length of time they had acted in their respective roles, etc. These descriptive codes were re-coded as attributes associated with each participant (each participant was coded as a case in NVivo) and the specific details were considered in the explanation of findings, but not given separate codes; (2) Characteristics of nominated researchers and the influential research were initially coded separately, however this was deemed unhelpful as it created an artificial distinction between these parts of the transcripts and the rest. Text coded in these initial codes was merged with the more substantive codes to keep similar concepts together and; (3) Substantive codes of relevance to the research questions. Some of the initial codes were tangential to the research questions and deemed not relevant by the researcher

and so not considered part of the final set of free nodes. Further, in order to achieve parsimonious codes, all free nodes were compared for potential duplication or incidents where data were not sufficiently different to merit separate codes (ie, the data did not represent new concepts) and combined as needed. For example, the role of researchers as experts and researchers' expertise had been coded separately and were combined under a single node; credibility and academic neutrality and credibility were combined under the node "Credibility"; and interests of policy-makers in research was merged with "personalities". The purpose of this exercise was not to ensure that each piece of text was coded only once, but rather to ensure that each code that remained did not duplicate conceptual meaning.

Table 8 presents the final list of initial free nodes and related descriptions (n=121).

Table 8. List of initial codes (free nodes) and descriptions

Node name	Description	Sources coded (n=18)
Funding from policy including contracting or commissioning research	Nature of funding arrangements from policy for research - when funding comes to researchers from policy, it may include contracting or commissioning models	18
Relevance of research	General mentions of relevance of research or relevant research	18
Research relevant to priorities of government	Potential for research that is aligned and relevant to priorities of government make a difference and/or inform decision-making	17
Timeliness of research	Timeliness of research relative to needs of research users - use of research can be enhanced if timely	17
Personalities	Personality traits that contribute to positive interactions between researchers and research users; including interest in research	17

Node name	Description	Sources coded (n=18)
Face-to-face conferences or meetings	Opportunities for researchers and research users to interact face-to-face at a general level (conferences) and at a specific level (targeted meetings with a particular purpose) and the role of such opportunities in facilitating and maintaining relationships between researchers and research users	16
Interaction in the research process	Research user engagement in the research process generally	16
Independence of researchers	Independence or arm's length relationship of researchers from research users	15
Outputs of research - publishing	"Traditional" research outputs, including peer-reviewed publications	15
Interaction ongoing or sustained	Ongoing and/or sustained interaction between researchers and research users	15
Ideas exchange and dialogue	Opportunity for ideas exchange and dialogue between researchers and policy-makers. Opportunities to bounce things off of each other.	14
Relationship history	Long-term relationships and historic pattern of interaction between researchers and research users	14
Role of research - Investigator-driven research	Pure research", "pure science" or "hypothesis-driven" research that is investigator-driven	14
Previous working relationships - demonstrated capabilities	Previous working relationships between researchers and research users. If there had been demonstrated capabilities then those who have worked together previously may be more likely to work together again (demonstrated capabilities and reputation)	14
Intervention - impact	Research or evaluation evidence relating to the impact of policy or other interventions	14
Time to invest in interaction	Time required to invest in interactions and related barriers and opportunity costs to investing time in interaction. When a priority, time will be found to invest.	14
Initiating interactions	Initiation of interactions between researchers and research users - initiating interactions can be done by the researcher or research user	14

Node name	Description	Sources coded (n=18)
Role of research - strategy development and evaluation	Role of research to support tobacco control strategy development and evaluation as part of government policy	14
Tension between findings and politics	The tension between presenting research and/or evaluation findings and having them be in conflict (or disconnected) with the views of government	14
Role of researchers – expertise	Role of researchers as experts in a given field and expertise of researchers to issues at hand and ability to bring that expertise to bear	14
Research agenda	Development or existence of a research agenda at the individual and/or tobacco control community levels	14
Role (value) of research to action	Role for research and evidence to inform decision-making and improve the decisions that are made	14
Mutual benefit - Meet dual purposes	Relationships where the needs of both researchers and research users can be advanced (dual purposes can be met) and where there is relevance and benefit to both through interaction	14
Convening function - committees	Role of committees in creating interaction opportunities for researchers and research users - could be policy committees, research committees, or other committees (ie, those convened through CTCRI)	13
Intervention - implementation issues	Research or evaluation evidence relating to factors associated with the impact of policy or other interventions	13
Health Canada as a convenor	Health Canada's convening role in tobacco control and stimulating research - policy interactions	13
Funding research - directing research or having input	When policy-makers fund research, they are able to direct and/or have input on the nature of the research and how it gets done	13
Importance of comparative research	Understanding policy approaches and differences in other jurisdictions according to context, including understanding the impacts of interventions in other jurisdictions - similar to importance of local data	13
Mutual learning through interaction	Researchers and research users learn from each other through interactions creating shared relevance of the interaction	13

Node name	Description	Sources coded (n=18)
Advice - policymakers providing input to increase relevance	Research user engagement in the research process through providing input and advice	13
Ongoing knowledge of trends and issues	Role for surveillance and monitoring as well as researchers feeding information to policy re: trends and issues	13
Ability to communicate - Reporting of research - information needs of research users	Nature and manner in which research is communicated, with particular attention to the information needs of research users, both in terms of the written word and verbal communication in both a public forum and one-on-one.	13
Knowledge synthesis	Literature reviews, knowledge syntheses, and compilation of existing information and data	13
Building a relationship	Deliberate efforts to put into building relationships between researchers and research users, including both working relationships and being able to relate as individuals	12
Importance of local data - Relevance	Local data and having access to local data and also the difficulties in applicability of non-local data or extrapolated evidence and relevance to local context. Local refers to jurisdiction of relevance to research user.	12
Role of research - justification or confirmation or support	Role for research in terms of support for (or justification or confirmation for) taking a particular course of action. Could be *a priori* or after decisions are made.	12
Nature of Policy - multiple inputs beyond research	Complexity of policy decision-making environments and the multiple inputs to policy decision-making beyond research.	12
Benefits - increase understanding	Interactions and relationship building between researchers and research users can increase understanding of the others' work and environment	12
Research - policy issue as starting point	The influence of ideas from policy on what researchers consider to be important research directions - policy issue is seen as a starting point or inspiration for research	12
Role of evaluation	Evaluation evidence - evaluation is specifically tied to interventions (programs, policies or initiatives)	12

Node name	Description	Sources coded (n=18)
Understand needs	Researchers being able to understand the research need of research users - interaction as part of that process	12
Researchers – applied research and want to make a difference	Part of applied orientation of researchers - researchers can see applicability of their work to the real-world; Part of an applied orientation of researchers - wanting their research to make a difference	12
Barriers - staff turnover within government	Turnover in government bureaucratic staff and/or reorganization of government units/personnel which can disrupt relationships	11
Funding - tied to needs	Funding for research associated with needs or interests of research users	11
Currency of research	Interest of policy-makers and researchers in research that is new or up-to-date. Interacting with researchers provides an opportunity for policy-makers to gain access to the most up-to-date research to potentially consider in relation to current priorities.	11
Role of research - anticipation of policy issues	Anticipation of future policy issues which could be informed by research	11
Intervention – cost effectiveness and economics	Research or evaluation evidence relating to factors associated with the cost, cost-effectiveness, or economic impacts of policy or other interventions	11
Role of research - planning	Role of research to inform policy planning in terms of priorities for the future and future action	11
Nature of policy - the political	Intersection between policy and the 'political'. Policy occurs within a political context and evidence to inform policy, therefore, may also be used within a political context	11
Alignment – Shared priorities	Broadly shared priorities between researchers and research users, including overall purpose	11
Research approaches that will meet a specific need	Specific research approaches that may be suitable (or not) to meet an evidence need in policy	11
Role of research - stimulate thinking	Interactions and exposure to research causing research users to think differently or think about an issue	11

Node name	Description	Sources coded (n=18)
Research or Evaluation Capacity or Expertise - Internal	The capacity within government to conduct research or evaluation	11
Credibility	Credibility of researchers (being credible) and accuracy of research (credibility through accuracy). Research that maintains a neutrality and is without bias - potentially more credible. Closely related to independence	11
Research Takes Time	Research is perceived to take a long time to conduct and accrue. Its utility may be limited if not timely.	10
Timing of government planning	Timing of government planning cycles - general pattern of timing for planning cycles	10
Nature of policy - pressure cooker atmosphere	The policy environment can be very fast-paced and necessitate quick responses to issues as they emerge. The political interface can also be a factor in the urgency.	10
Organizational mandate	Organizational roles to generate research that is linked to priorities of government. This role involves interactions between those who generate research and research users	10
Candid exchange of realities and opportunities	Exchange of realities between researchers and policy-makers of their current challenges and work issues in a candid and trustful way.	10
Lack of understanding about 'needs' and 'worlds'	Researchers and policy-makers function in different 'worlds' and there is a lack of understanding between the two, which can create a barrier to interaction.	10
Responsiveness of researchers	The extent to which researchers are responsive to the evidence needs of policy-makers (or should be).	10
Workable or practicality of research	Practical research - research that can be used and workable, perhaps as opposed to more theoretical or pure research	10
Role of researchers - generate share evidence	Role for researchers to generate and then share that evidence. The connection to sharing evidence and (as exists in other codes) to engage with users around the use of evidence and related interpretation suggests a connection to facilitating use.	10
Interest of researchers	Interests of individual researchers and what they are interested in researching	10

Node name	Description	Sources coded (n=18)
Research centres as connecting points	Research centres as supportive research environments and places which can facilitate interaction with research users	9
Trust	Trust between researchers and research users - key precursor and outcome of relationships	9
Networks	Networks and networking, which serve as a resource and linking mechanism to support interaction	9
Advice about action	Researchers offering advice to policy-makers regarding action	9
Exposure to other sector - boundary spanning	Researchers who have actually worked in the policy context may have a good understanding of the history - value of exposure (and resulting understanding) of the 'other sector'.	9
CTCRI - funding	The Canadian Tobacco Control Research Initiative as a research funder within tobacco control	9
Articulation of policy needs and expectations	Research users having the opportunity to express their needs and expectations - could relate to the relationship with researchers or the research.	9
Researchers presenting research	Researchers presenting research to research user audience - suggests more one-way communication	9
Role of researchers - context and interpretation of evidence	Interaction between researchers and research users around interpretation of evidence, including gathering contextual information to explain results	9
Locating researchers	Relationships to "local" (geographically local) researchers and having familiarity with who researchers are	9

Node name	Description	Sources coded (n=18)
Funding structures rewarding collaboration	Funding structures increasingly require (and reward) researcher and end user collaboration on proposals. This is an incentive to building relationships and interaction.	8
Researcher - knowledge of government	Researchers having knowledge of government and how it "works"	8
Role of research - issue framing	Researchers framing issues and research with and for research users - research users may use research to frame issues	8
Outputs of research - non traditional products	Non-traditional outputs of research may be important to facilitating use of research - such products may not be in line with academic reward structures, but may have more of an impact with research users	8
Alignment - Shared objective	Researchers and research users working toward a common goal - within tobacco control, a strong mission reference	8
Feedback loops and mutual influence	Potential for research to inform policy and for policy to inform research. Role for a system to facilitate this sort of mutual influence	8
Advocacy - NGO 'agenda'	Role of NGOs and advocacy/lobbying in the policy process - positioned as being 'different' from research	8
Interaction - work through issues	Researchers and policy-makers having the opportunity to jointly work through issues as an important component to interactions	8
Interaction in the research process - research planning with end users	Researchers working with research users to plan research	8
Interaction - early in research process	A deliberate effort to interact on the part of researchers and research users to jointly define some aspect of what should be studied however, there is a time dimension that comes into the text coded here	8
Role of research - agenda setting	Place of research (perhaps alongside other issues) to be able to set or inform policy agendas	8

Node name	Description	Sources coded (n=18)
Role of research - facilitating use of research	Role for researchers in facilitating use of research evidence with research users	8
Language	Language as an aspect to knowledge translation and use - can be a barrier or facilitator - may be related to shared language	8
Academic rewards - Tenure and Promotion	Reward structures within academia. Academics based in universities are evaluated for tenure and promotion, at least in part, based on productivity.	7
Face-to-face interaction-tobacco conferences	Opportunities for researchers and research users to interact face-to-face at conferences related to tobacco control, including the National Conference on Tobacco or Health	7
CTCRI - convening function	Role of Canadian Tobacco Control Research Initiative in playing a convening function for researchers and research users, including interactions through the CTCRI board	7
Parameters - Confidentiality of evidence	Parameters on what can be shared - from the research perspective this seems to relate to data and related implications for publishing. From the policy perspective, there may also be a confidential element to the data (in terms of what is publicly available)	7
Respect for each other	Respectful relationships between researchers and research users and respect that researchers and research users have for each other	7
Quality of research - peer review	Standards ensured by the peer review process and also the time required for peer review. While peer reviewed publications represent an assurance of quality/credibility, but there may not be time for policy-makers to 'wait' for the peer review process.	7
Nature of policy - competing priorities	Multiple, competing priorities that exist in the policy setting	7

Node name	Description	Sources coded (n=18)
Conduct of research - consulting regarding implementation	Consulting with research users in the conduct of research, researchers may get a clearer idea of implementation issues and researchers may also offer technical assistance to research users	7
Tobacco control as a government priority	The extent to which tobacco control is (or is not) a government priority	7
Availability of researchers	The accessibility/available of researchers and the willingness of researchers to be available to research users	7
Face-to-face interaction-training	Training opportunities within tobacco control provide a platform for interaction for those involved, including references to a tobacco-related training grant	6
Parameters - re publishing	Challenges or parameters which may occur with researchers regarding publishing	6
Independence of researchers - funding influences and COI	Declaration regarding source of funding for research - conflicts of interest issues as a sensitivity, particularly in terms of any influences on results	6
Role of research - policy options	Consideration and presentation of policy options or policy alternatives, may emerge from research but not necessarily	6
Interaction through supporting applications	Policy-makers being asked to provide or providing letters of support for grant applications	6
Barriers- grants	Traditional grant funding mechanisms may not facilitate the timely generation of research or research that is aligned with needs of policy-makers.	6
Nature of policy - moving target	Shifting priorities within the policy environment - part of the nature of policy	6
Role (value) of research - innovation	Role for research in terms of innovation	6
Tobacco control capacity - stimulates research or evaluation	Tobacco control capacity within government can stimulate research and evaluation activity and may be an incentive to interact with researchers.	6
Academic rewards - institutional support	The environment in which research is conducted and the support of the institution for applied research and knowledge exchange activities may influence the researcher's ability to engage.	5

Node name	Description	Sources coded (n=18)
Interaction opportunities - ICE	Interaction between researchers and research users through an Interdisciplinary Capacity Enhancement (ICE) grant and through ICE-sponsored events	5
Interaction- TCLC	Interaction between researchers and research users and across research users through the Health Canada Tobacco Control Liaison Committee	5
Funding - Research areas where funding is easier to obtain	Funding as an incentive to research - research may be undertaken in areas where funding is easier to obtain	5
Independence of researchers - academic freedom	Independence of researchers to be able to pursue research of their choosing and related benefits and importance of academic freedom	5
Building a relationship - insider knowledge	Strategic relationships that are formed and can be beneficial between researchers and those with an insider knowledge of government.	5
Future of tobacco control	Researchers and research users are both interested in the future of tobacco control in Canada and the role of research in shaping the future of tobacco control and related priorities	5
Face-to-face interaction- annual symposium	Opportunities for researchers and research users to interact face-to-face at the Annual Symposium for Research to Inform Tobacco Control	4
Interaction- tobacco coalitions or alliances	Interaction between a researcher and research users (from policy and also NGOs) through tobacco control coalitions or alliances - primarily at the provincial level	4
Parameters -re data ownership	Parameters regarding data ownership	4
Mutual responsibility for the relationship	Both researchers and research users have a responsibility for maintaining relationships	4
Ideas new	Research users needing to have access to new ideas to feed into the policy process - researchers having new ideas	4
Interaction - helping researchers think differently	Researchers having their thinking influenced by interactions with research users	4

Node name	Description	Sources coded (n=18)
Interaction- research advisory committee	Interaction between a researcher and research users (from policy and also NGOs) through a formal research advisory committee to inform research	3
Interaction - infrastructure - Rapid response	Interaction mechanism between a research unit and a government ministry to enable evidence-based rapid responses to policy questions	3

5.4 Axial coding

Initial codes (free nodes) were grouped according to major categories and, in some cases, sub-categories within. When deriving categories, consideration was given to the extent to which they could relate to each other when thinking ahead to theory development and close consideration was given to the research questions. Charmaz (2006) suggests that axial coding allows large amounts of data to be organized in following open coding. Axial coding involves the creation of categories and sub-categories and grouping according to relationships (Charmaz, 2006).

Initially, 14 major categories were created. This included separate categories for "nature of research" and "nature of policy". Upon closer examination of the data, a single category was created relating to "Two Communities" to capture the differences between the research and research user communities. Also, separate categories had been created for "history and longevity of relationships" and "reciprocity and shared understanding". These were grouped within the category of "Building a Relationship" to enable that category to capture both the processes and outcomes of relationship building between researchers and research users. Lastly, "parameters of interaction" had been created as a separate category to capture some parameters associated with joint endeavours between researchers and research users, for example, parameters regarding confidentiality, publishing results, or data ownership agreements. This was grouped into the

"Incentives and Barriers" category as these parameters were most frequently discussed as barriers to potential collaboration.

A final set of nine major categories were constructed from the data. These are briefly summarized in Table 9 and described in greater detail, including descriptions of related sub-categories in the text that follows. Throughout the text, the term research user, policy-maker, and policy interviewee are used interchangeably to describe the perspective of interviewees. Quotes have been selected to illustrate the nodes and for the manner in which they portrayed different aspects of the node properties. Quotes were taken verbatim from the member-checked transcripts. The quotes are attributed to participants by identifier number and a letter to denote whether they were a research user [P] participant or researcher [R]. To give a sense of scope for the text coded within particular nodes, Table 10 (Section 5.4.10) is a summary table of the coding structure for categories, sub-categories, and free nodes.

Table 9. Summary of major categories (n=9)

Category	Brief description
Two-communities	Differences between the research and research user 'communities' and the systems in which they conduct their work
Structures to facilitate interaction	Deliberate, (tobacco control) community-level structures to facilitate interaction between researchers and research users. Primarily face-to-face and variable in intensity of the interaction opportunities
Relationship building	Aspects of the relationships between researchers and research users - such relationships need to be deliberately built and reinforced
Interaction in research process	Incidents of policy-maker interaction in the research process
Interaction in policy process	Incidents of researcher engagement or interaction in policy processes
Independence and credibility of researchers	Independence of researchers from policy-maker influence and credibility of researchers

Category	Brief description
Incentives and barriers	Incentives and barriers to interaction and, in some cases, alignment. Incentives and barriers occur at the academic, policy, and funding levels
Relevance and timeliness	Relevance of research to policy priorities and/or decision points and the timeliness of research to same
Alignment	The alignment of research and policy agendas – shared priorities, objectives, and relevance

5.4.1 Two communities

The "Two communities" category relates to differences between the research producer and research user 'communities' and the systems in which they conduct their work. Evidence emerged from the interviews that is quite consistent with the "two communities" hypothesis whereby there is a lack of understanding regarding the respective needs and 'worlds' in which the 'other' functions and the cultures of research and policy. These challenges are captured under the free node "Lack of understanding about 'needs' and 'worlds'". Both researcher and research user interviewees noted that there can be a disconnect between research and policy in terms of understanding each others' contexts.

> "I also don't think that researchers understand the environment that policymakers are put in, particularly public servants" – *Participant 3 [P]*

Within text coded here, several interviewees also expressed a desire or intention to build understanding between the research and policy communities. For example,

> "…we need to build that understanding of you know what are the challenges that policymakers face in terms of research and using it, just like we need to understand why they [researchers] might not be able to do exactly what we [policymakers] want." – *Participant 15[P]*

"Two communities" has two main sub-categories. First, "Nature of policy", which includes aspects of the policy environment which relate to the decision-making context and atmosphere in

which policy work is conducted. The free nodes grouped here pertain to the political aspects of the policy context and to the multiple inputs into policy, including competing and rapidly changing priorities and factors beyond research. "Nature of policy – competing priorities" includes competing priorities to taking a particular course of action (or not) and most frequently related to resources and financing. Also noted was competition between health and other policy issues, competition with political considerations, and competition with urgent or crisis priorities.

Regardless of what research 'says', pragmatic considerations seem to be critical. This acknowledgement of the role of factors and inputs beyond research is captured in the node "Multiple inputs beyond research" within the sub-category "Nature of policy". Specifically, interviewees reflected on the multiple inputs into the policy process and needing to gather those inputs to inform decision-making. In the words of one policy interviewee:

> "…there's a lot more to policymaking than just research" – *Participant 15[P]*

One researcher noted this complex mix of input beyond research, which includes the political dimension that exists in policy:

> "…you can't always have them [policy-makers] see things your way because there are other factors other than research evidence that go into policymaking decisions and the political factor." – *Participant 23[R]*

The node "Nature of policy– moving targets" relates to the shifting priorities within the policy environment, which seems to be a feature of the policy context. This was an issue that was raised mostly from the perspective of researchers, which may relate to the role that policy-makers have in delivering on priorities, regardless of what they may be and also because they are accustomed to having to deal with the shifts. A policy interviewee discussed the shifting

priorities of government and the participant's language was the source for this *in vivo* code (Charmaz, 2006):

> "You know start with something, move it a little bit forward, take five steps back and three steps forward, go over to the side you know up ten flights of stairs, down three and you know. So it's [policy] constantly a moving target" – *Participant 9[P]*

Also captured within this sub-category is a node related to the political nature and realities of policy (node "Nature of policy – the political"). This relates to the political environment and context in which policy is developed or made, including the role of the media and general public within the political dimensions of policy and the policy agenda. This code was closely related to the "Multiple inputs beyond research".

While a separate, comparable category could have been created for "nature of research", the data did not seem to support it. The most significant issue related to the nature of research was the time that it takes to do research (captured within the second sub-category for "Two communities", "Research and Policy – Differential timeframes"). While other issues emerged relating to the academic context (such as reward systems, outputs of research, and granting systems), these were discussed primarily from the perspective of being incentives or barriers to building relationships and are captured within that major category (see Section 5.4.7).

The second sub-category within "Two communities" is "Research and policy – Differential timeframes" which relates to the different timeframes for research and policy. The free nodes grouped here pertain to the notion that research takes time and the time-related issues of working within government. "Research takes time" relates to reflections from participants on the time that it takes for research to be generated, sometimes two, three, or four years. The text coded here seems to relate more to the conduct of primary research. Knowledge syntheses or literature

reviews may be different[6]. Some, such as Participant 18, reflected that this time horizon is not shared with the timeframe for policy[7].

> "…the time that researcher takes, the time that it takes to get funding for research, the time it takes to publish is just not on the time horizon of policymakers, everything is yesterday." – *Participant 18[R]*

The time-related issues of working within government are captured in two free nodes. The first is the *in vivo* code, "Nature of policy – pressure cooker atmosphere", which came from the following piece of text:

> "It's hard to describe the pressure cooker atmosphere until you're in it." – *Participant 3[P]*

Both research and research user interviewees observed the pace at which policy moves and the pressure associated with the pace. Policy issues can arise quickly and there may be an urgency or "crisis mode" associated with action. This pace may influence the urgency with which evidence is required and, when linked to the evidence in the previously described node about the time it takes for research to be generated, presents a possible reason for the gap between research and policy communities. This code can interface with the political nature of policy whereby time sensitivities may exist due to a government minister's wanting to make announcements or needing information quickly. For example,:

> "I would get calls from people within government who are wanting a specific answer right then on a particular topic and it is because the minister has been asked a question and the minister in turn says to his or her staff give me an answer and it can't wait until tomorrow, it has to be today." – *Participant 26[R]*

[6] Knowledge synthesis is captured under the major category "Relevance and Timeliness" whereby knowledge related to particular issues areas or interventions may be of relevance to the priorities of government

[7] Incidents related to the timeliness of research relative to the opportunity to inform policy or policy decisions are coded within the major category "Relevance and Timeliness"

Interestingly, while there can be significant pressures and an urgency associated with working in government, the node "Government planning cycles" suggests an element of predictability to the timeline for government planning. Examples provided by interviewees related to policy consultations, work planning, budget cycles, and the fiscal year (particularly year-end) all of which follow a more regular pattern than some of the crises or pressures described above.

5.4.2 Structures to facilitate interaction

"Structures to facilitate interaction" relates to the deliberate, (tobacco control) community-level structures to facilitate interaction between researchers and research users. These interaction structures go beyond the efforts of individuals to interact with each other one-on-one. They are primarily face-to-face and vary considerably in terms of the intensity of interaction. This category was further divided into three sub-categories: (1) "Joint work"; (2) "Organizational leadership and mandate"; and (3) "Shared fora". Each is described in turn, including the free nodes which contribute to the sub-categories.

"Joint work" relates to committees, coalitions, or response mechanisms where researchers and research users work together. Within the interviews, committees were discussed at a general level, as described in the node "Convening function – committees". A range of committees, originating from research, policy, or other sources, were mentioned as being important convening structures for researcher and research user interaction and for relationship building.

According to one researcher (Participant 18[R]), committees can provide an opportunity to gain influence with policy-makers through the advice that you give as an expert as opposed to involvement with a single study. This notion of role delineation (ie, being an 'expert') was also mentioned in terms of committee names, such as expert advisory groups and implies that the

expert status is required to be a member. A range of language was used to describe what is being captured within this node, such as: groups, working group, advisory groups, task groups, steering committees and so on. While there is nuance associated with the functions that each of these groups might serve, the main point seemed to be that there is a common space for researchers and policy-makers to sit together. As described by one researcher:

> "…working group meetings where there are researchers and end users in the room. So just developing, you know having an opportunity to be together in the same room over time is certainly helpful…for interaction" - *Participant 18[R]*

Coded separately were a number of specific types of committees mentioned by interviewees including the Health Canada-convened Federal/Provincial/Territorial Tobacco Control Liaison Committee (node "Interaction – TCLC). This committee provides an opportunity for policy-makers of comparable levels of responsibility to interact and, for researchers, allows an opportunity to work with a group of tobacco control policy-makers simultaneously. In some cases, this committee can provide access to tobacco control research and researchers. In one specific case, the committee has enabled a shared evaluation effort around tobacco cessation quitlines (Smokers' Helplines). This involved the collection of common data/indicators related to a common intervention approach and allowed for comparisons to be made across jurisdictions which have different delivery/intervention models (including cost, effectiveness, reach, etc).

The TCLC also provides a forum for dialogue, information sharing and broader TC strategy agenda setting at the National level. While not every province may have access to a provincial research unit such as the Ontario Tobacco Research Unit, the TCLC can provide access to such resources through a common table. The TCLC structure was noted as a valuable structure to facilitate progress on tobacco control:

> "There is some effort now being made at the FPT level to talk about where we go from here." – *Participant 5[P]*

In four different provincial contexts, provincial tobacco coalitions and alliances provide a setting for multi-sectoral interaction including NGOs (node "Interaction – tobacco coalitions or alliances), research, and policy. These provincial structures were noted from the perspectives of both researchers (Participant 24[R]; Participant 21[R]) and research users (Participant 5[P]; Participant 14[P]). In at least two provinces in Eastern Canada, tobacco control coalitions involve researchers and have resulted in research, policy, and NGO collaboration around issues of shared importance.

From the research perspective, some interviewees described a formal committee structure which was initiated to inform a researcher's research program and to engage with research users from policy and advocacy (node "Interaction – research advisory committee")[8]:

> "…set up to help advise our research agenda and on that committee I have some end users who are on that committee to help advise sort of up front as well. So someone from the federal government, one or two people from advocacy organizations that would use research evidence to lobby the government, so I also get information and input through that process" – *Participant 18[R]*

To provide a mechanism for researcher interaction with policy in relation to specific needs, a rapid response (scientific consulting) mechanism was also described (node "Interaction infrastructure – rapid response")[9]. The context for this mechanism to be established is important – a formal link existed between a research organization and provincial government ministry with

[8] While the structure of the Research Advisory Committee is described in this node, the notion of seeking input from research users early is discussed and captured under nodes in the "Interaction in the Research Process" category

[9] While the rapid response mechanism is described here, the notion of responsiveness of researchers to policy needs is captured under nodes within the major category "Interaction in the research process", sub-category "policy-driven research", node "responsiveness of researchers"

responsibility for tobacco control. The mechanism was implemented as part of the research functions to support the provincial tobacco strategy.

The second sub-category, "Organizational leadership and mandate", pertains to the role that some organizations play to enable interaction. This may be facilitated through organizational mandates or provision of resources. Four free nodes underpin this sub-category. The role of the Canadian Tobacco Control Research Initiative (CTCRI) in convening researchers and research users emerged from the data (node, "CTCRI convening function). The CTCRI convening function was discussed in terms of workshops, committees and granting mechanisms.

Health Canada was also discussed as a national-level organization that has brought researchers and research users together in a range of ways (node "Health Canada as a convenor"). Many interviewees suggested different ways in which Health Canada played a convening role and stimulated interactions between researchers and policy-makers, including through the sponsorship of meetings and events and outreach to researchers for policy consultations. Some other examples included Health Canada's role in funding tobacco control capacity building, research, and evaluation, Health Canada as a key partner in CTCRI, the role Health Canada has for conducting national-level surveillance, the associated research infrastructure (including the Canadian Tobacco Use Monitoring Survey and Youth Smoking Survey), and support for analysis or interpretation needs of same.

The third node within this sub-category is "Organizational role or mandate". Text coded here relates to the manner in which organizations enable interaction either through their mandate or through their resources. Several interviewees discussed the role of their organizations in facilitating linkages between researchers and policy-makers. For example, one interviewee reflected on his organizational context, which is a research centre funded by an NGO. The

organizational environment in which he conducts his work enables him to link with research users at the NGO on their priority issues which are tied to the mandate of his organization.

Other interviewees reflected on the relationship between researchers and policy-makers from different, but related organizations. Provincial-government funded research units were noted as resources for policy to access research and evaluation. The Ontario Tobacco Research Unit was specifically mentioned due to its arm's length relationship to the provincial government and its responsibility for monitoring and evaluation of the Smoke-Free Ontario Strategy.

This sort of organizational relationship can also occur when researchers and research users are based within the same organization. Two interviewees based in the same work environment noted that research and policy could work jointly together in the same 'shop' due to the internal research and evaluation capacity made possible through the organization's role.

The specific role of research centres as settings for research users to access and work with researchers was coded under the node "Research centres as connecting points". Policy interviewees noted that they had interacted through specific research centres. In contrast, researchers who mentioned research centres did so from the perspective of the role of centres as being supportive environments for knowledge exchange. One researcher discussed this from the perspective of the benefits of having a centre-like structure to broker relationships. This organizational structure could lend credibility and be a better approach to facilitating relationships than that of individual researchers.

The final sub-category in the "Structures to facilitate interaction" category is "Shared fora". This sub-category relates to events or fora where researchers and research users may interact. One-off meetings were not seen as being valuable on their own. Repeated exposure and interactions over time can create familiarity and support relationship building. Tobacco-specific

or more general conferences (nodes "Face-to-face conferences or meetings" and "Face-to-face interaction – tobacco conferences) create a space for knowledge exchange and learning. This events-based approach to interaction can expose researchers and policy-makers to each others' work and concerns, provide opportunities to ask questions, and stimulate follow-up. These "shared fora" require financial resources to support attendance and also hosting the events. The National Conference on Tobacco or Health was specifically noted as being an important setting for presentation of research and current issues. These opportunities seem to vary in terms of intensity of interaction and may be isolated events. Interdisciplinary Capacity Enhancement (ICE) grant forums were regionally-focused events designed for tobacco control knowledge exchange and capacity building between researchers and policy-makers (node "Interaction opportunities – ICE). These events were sponsored through CTCRI and CIHR-funded ICE grants. Interviewees who had specifically attended these events or were linked with ICE grants mentioned the events as interaction opportunities. While conferences or forums, such as those mentioned here were valuable, there was also a need for events to have focus and not be meetings for the sake of meetings. Funding support to attend events such as conferences enables participation.

The Annual Symposium for Research to Inform Tobacco Control (node "Face-to-face interaction – annual symposium) was specified by a few interviewees as being a key event for bringing people together. The Symposium started as part of the Strategic Training Program in Tobacco Research (STPTR) with support from CTCRI and the annual event expanded to include many other organizational partners and also grew in size (field notes). Other training-related interactions between researchers and research users may occur through courses and training grants (such as CIHR funded training grants). One interviewee with a leadership role in such a

grant reflected not only on the importance of the training piece in terms of linking decision-makers with researchers, but also in building the next generation of leaders and fostering a sense of community:

> "…the CIHR training program that was at one level about training the next generation of leaders and that's been a very important focus, but at another level in my mind what that's about is helping to put people on the same team. Students get to know each other, they see each other as potential collaborators, they get to know some of the decision makers, there is this sense of community that can grow out of that and a sense of shared mission." – *Participant 19[R]*

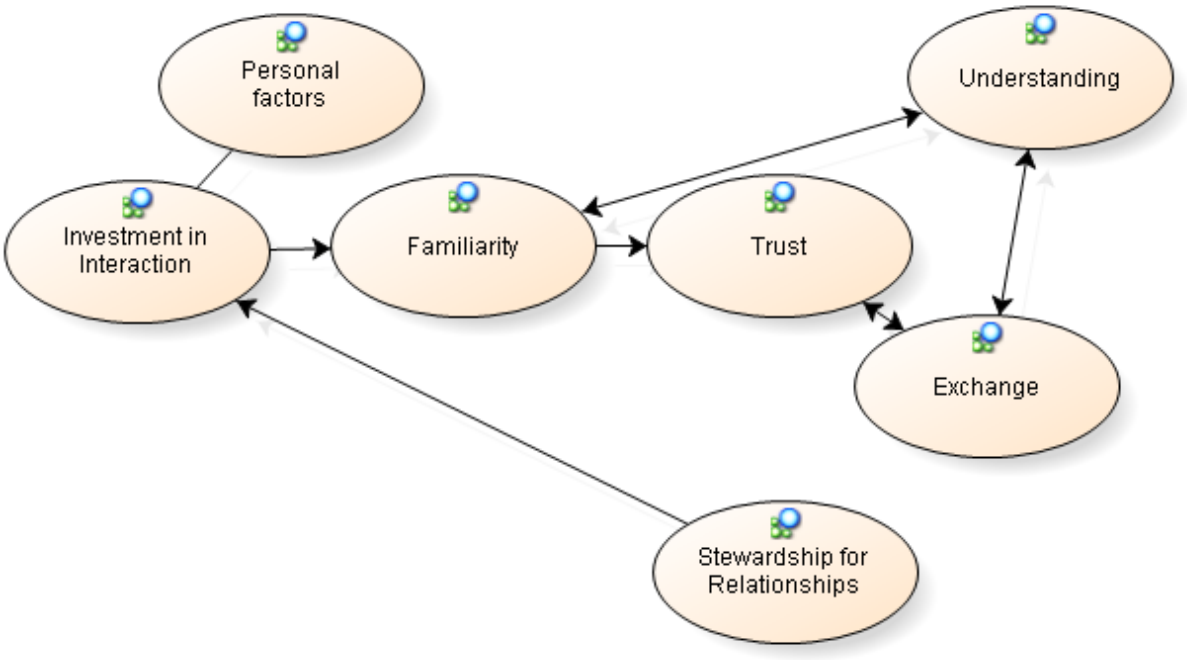
In light of these numerous structures to support interaction, it is not surprising that networks emerged from the data (node "Networks"). Networks and networking were discussed as mechanisms to support interactions, but having a network was also discussed as an outcome of interactions. In many ways, the structures mentioned in this category involve researchers and research users who could be considered as part of a broad tobacco control network. Networks do require effort to be maintained and at least two interviewees remarked on somewhat failed attempts to build networks of researchers and policy-makers at the provincial and international levels.

5.4.3 Relationship building

"Relationship building" relates to aspects of the relationships between researchers and research users. This includes the deliberate nature of building and reinforcing these relationships which occurs through interactions. The factors associated with relationship building here are, for the most part, between individuals. Organizational-level connections and relationships are captured within "Structures to facilitate interaction". While structures may bring individuals together and enhance likelihood of developing relationships, the investment in building these relationships may rest primarily with individuals. This code contains seven sub-categories related

to different aspects of relationship building. (1) “Investment in Interaction”; (2) “Personal factors”; (3) “Familiarity”; (4) “Exchange”; (5) “Trust”; (6) “Stewardship for relationships”, and; (7) “Understanding”. Figure 3 depicts the data-driven relationships between these sub-categories. Each of these is described in turn, along with a description of nodes within.

Figure 3. Connections between sub-categories of “Relationship Building”



“Investment in Interaction”, relates to the deliberate investment in interaction by researchers and policy-makers and has four nodes. Included in this sub-category is a general node (“Building a relationship”) which covers the process of building working and personal relationships between researchers and research users. Though building relationships can be about developing working relationships through specific projects, several interviewees noted that it is about building broader or bigger relationships.

The node “Initiating interactions” pertains to who initiates the interaction and also how this is done. It seems that either the researcher or the policy-maker can initiate the interaction and may do so. Initiating interactions may occur after an event as follow-up or could be needs-

driven. Reaching out and approaching people from the 'other' community is possible, however does require an element of effort. Some policy-makers observed that they are able to just 'pick up the phone' and contact researchers and the ability to do so was valued. Once relationships have been established, easy, ongoing, and informal interactions amongst researchers and policy-makers can be repeatedly initiated.

"Time to invest in interaction" pertains to the time and effort required to invest in interactions. The time to invest in interactions was frequently mentioned as a barrier to doing so[10], but was also discussed from the perspective of time it takes for relationships to build. The deliberate effort to invest in interaction requires time and while structures may facilitate interactions, the investment of individual time remains important to building relationships. Further, there is an opportunity cost associated with time spent on interactions whereby time on that is time away from something else. Even if time is found to interact, the lasting benefits of the interaction may be fleeting once people return to their offices and regular work responsibilities. When research is relevant to a policy priority and when researchers value relationship building, time will be found to invest.

The final node within this sub-category is "Interaction ongoing or sustained". Text coded here relates to the ongoing or sustained nature of interaction. The notion of 'one off' or 'one shot' interactions was spoken as being insufficient to support relationship building and ongoing links were favoured as a way to support relationships and foster trust. Some interviewees noted the value of 'regular' communication and 'keeping up connections', speaking to the importance of 'frequency' or 'duration' as properties of ongoing or sustained interactions.

[10] Organizing the "Time to invest in interaction" node could have been coded within the "Barriers and Incentives" category, however since it was about time required for interaction and relationship building it seemed to be a feature associated with making an investment in interaction and organized here instead.

The second sub-category, "Personal factors", relates to personal characteristics of researchers and policy- makers and both sets of interviewees suggested a number of personality characteristics which may influence relationship building. Goodwill, being easy to deal or work with and likeable, having humility, being collegial, being committed to the field, possessing leadership abilities, and being engaged were all mentioned as characteristics of researchers or research users that may influence interaction. Research users' interest in research was also noted as a factor which may influence interest in relationship building.

"Familiarity" is the third sub-category within "Relationship building" and pertains to the familiarity of researchers and research users with the "other" communities and of people within the relationship to each other. The first set of nodes within this sub-category cluster around the notion of contextual knowledge related to the other sector. "Researcher knowledge of government" relates to the extent to which researchers understand the government context and the way that it 'works', in particular, having knowledge of policy development processes. Knowledge of government was thought by at least one policy-maker to be less present amongst younger researchers.

Familiarity can also be gained through insider knowledge as a result of interactions with those based in or proximal to government (node "Building a relationship – insider knowledge"). Having such relationships can enable researchers to be well-briefed for their interactions with policy-makers, learn about what the issues are, and develop an understanding of the timing for policy issues. When such relationships do not exist directly, it may be possible to work with and through individuals who have that level of familiarity.

Some researchers gained knowledge of government by having worked in it and similarly, some policy-makers gained knowledge of research by having been researchers themselves. These

examples were coded within the node “Exposure to the other sector – boundary spanning” which relates to the value of exposure (and resulting understanding) of the 'other sector'. Researchers who have actually worked in the policy context may have a good understanding of the history - value of exposure (and resulting understanding) of the 'other sector'. For some interviewees, this was about longevity and being exposed to the other sector and gaining familiarity. For others, the range of experiences over their careers and wearing more than one ‘hat’ or sitting in more than one role resulted in having a better familiarity and understanding of both contexts.

The second set of nodes within the “Familiarity sub-category” relates to the history and longevity of relationships between researchers and research users. The “Relationship history” node addresses this and relates quite closely to the notions of ongoing and sustained interaction and building a relationship raised earlier. Beyond having known each other, it seems that having had a history of working together with success is an important component to future interactions (node “Previous working relationships – demonstrated capabilities”). Policy interviewees suggested that researchers who had demonstrated through previous work that they were capable and generated relevant and high quality products would be more likely to work together again in the future. Repeat collaborations and relationships which last over time support this. It seems that there may be some contingency associated with these previous experiences. For example, if "past reports have not been usable or relevant" it might influence future work together. From both the research and policy-maker perspectives, building a positive reputation for doing good work and being able to deliver what one promises can be very important to building credibility. Specialized expertise may also influence the decision to return to a particular researcher for assistance.

From the researcher perspective, several interviewees mentioned the investments that they have made in fostering working relationships with research users and in demonstrating their capabilities over time, including potential rewards for doing so. For example, building trusted relationships and gaining influence over time may mean that your work as a researcher is not "wasted" which may imply that time spent working with policy-makers is an investment toward applied outcomes.

Staff turnover within government due to shifting roles or portfolios, may strongly impact familiarity and may disrupt long-standing relationships (node “Barriers - staff turnover within government”). Staff turnover was described as a significant barrier to interaction - trust, tobacco-related content knowledge, and history were related factors. The longevity of relationships can breed familiarity and also provide a considerable knowledge of government. Staff turnover can also have the implication of shifting priorities and a loss of corporate knowledge (for example, about policy context) that can be obtained through these relationships which take time to develop. This disruption of continuity can negatively impact the researcher and policy-maker relationships. While the previous two nodes illustrated the importance of relationship history and demonstrated capabilities, those aspects to interaction may be contingent on some level of stability amongst the individuals involved if only individual-level relationships are fostered.

Just as staff turnover within government may be disruptive to relationships, it may also be that researchers are not familiar to or easy to locate for research users (node “Locating researchers”). Several policy interviewees noted that a challenge to interaction is having a knowledge of who researchers are and which researchers are working on different issue areas. There is not a database for tobacco control researchers and so referrals from colleagues can assist in pointing researchers in the right direction. Clearly, if researchers are not known, it can be

difficult to build a relationship. This may be particularly challenging from the perspectives of provinces or territories with few academic institutions or with limited tobacco control research capacity. Drawing on expertise from elsewhere, including the Federal government or other provinces with greater research capacity, was an approach taken by some to mitigate this challenge.

The fourth sub-category, “Exchange”, covers knowledge exchange between researchers and research users, including the exchange of ideas (node “Ideas exchange and dialogue”). Such exchanges may stimulate thinking for both. The exchange piece suggests an element of reciprocity or mutual learning or sharing as evidenced through the use of 'dialogue' where all parties are involved in the conversation as opposed to just researchers presenting research. Some participants discussed an extended role for researchers whereby they can assist with sense-making by connecting points of intersection that go beyond what may be found in a published research paper. In a related vein, researchers have the capacity to make linkages from their work to areas of relevance to policy makers - this is particularly important in terms of drawing out the pieces that are salient to decision-making needs and the implications.

A connected node within this category is “Interaction – work through issues”. The ability to work through a problem or issue was discussed by both researchers and research users. There seemed to be value in jointly tackling an issue, including “hashing things out” or really discussing ways of being able to work together to address a problem.

Another node within this sub-category relates to the “Candid exchange of realities and opportunities”. The ability for researchers and policy-maker to have an open, honest, and candid exchange emerged in a number of interviews. This ability to be open was valued, particularly by policy interviewees. There is also a dimension here to actually set up situations where

researchers and policy makers are able to have the opportunity, through trusted relationships, to be honest about the context and decisions and issues. Openness was a key component to negotiation between researchers and policy-makers and contributed to building understanding for both sides. Trust is an important dimension to openness and candour here and is an enabling condition to exchange between communities.

This type of exchange can contribute to mutual learning (node "Mutual learning through interaction") so that while research has something to contribute to policy, the reverse can also be true. The nature of, linkages to, and implications of researchers' work to policy are likely to benefit from a true exchange with those who may use the information. Policy can learn from research and research can learn from policy.

"Trust" is the fifth sub-category within "Relationship building". Though a complex concept, trust was discussed simply and was advanced by both researchers and research users as a facilitator and benefit of relationship building. Trust can underpin relationships and candid exchange; can be built through relationships over time and, through positive experiences, can be gained. Trust can also enable the sort of candid exchange discuss in the previous sub-category.

The sixth sub-category in "Relationship building" is "Stewardship for relationships". This relates to the mutual responsibility and respect within relationships between researchers and research users. Just as an investment is required to build relationships (as suggested by nodes described earlier in this section), an investment is also needed to maintain relationships. The responsibility for maintaining relationships was described as being shared or mutual between researchers and research users (node "Mutual responsibility for the relationship"). Mutual respect was another component to building and stewarding relationships (node "Respect for each other").

The final sub-category relates to "Understanding" which is a key benefit to interactions whereby understanding can be built between researchers and research users. While a lack of understanding was raised within the "Two communities" category, here understanding is conceptualized as being a possible outcome or benefit of interactions. Such understanding can contribute to overcoming the divide between the two communities.

5.4.4 Interaction in the research process

"Interaction in the research process" is a category of codes which captures all aspects of researcher and research user interaction in different aspects of the research process. For the most part, these interactions are between individual researchers and research users. This is in contrast to the community-level structures to facilitate interaction which are captured within that category.

This category is further divided into four sub-categories. The first, "Investigator-driven", includes research where research users may not have been engaged at all. This sub-category includes references to "pure science" or "research for research sake" that may not be collaborative or relevant to priorities of government. One policy interviewee described this is in the following way:

> "So you can have research for research sake but you know if you're not answering a question that is in the public policy environment you're just doing research for research sake." –*Participant 9[P]*

That being said, it is possible for investigator-driven research to be relevant. An example was offered where an interviewee was asked to be involved in the implementation of a research project. Although the research was investigator-driven, it was a study that was relevant to policy needs. Further, as discussed earlier in "Structures to facilitate interaction", a researcher invited

input on her investigator-driven research program by engaging research users through a research advisory committee.

The need for original, investigator-driven research was not discounted entirely by interviewees. One researcher suggested that there is perhaps a need to redress the balance between original research and research that is more collaborative:

> "I think we need original research there is no question, we need to continue people's creative thought, we need to go in depth and yet one area that we've ignored has been what kind of information, what kind of research is needed by practitioners and policymakers in their day-to-day decision making." – *Participant 24[R]*

Research users may interact in the investigator-driven research process by providing letters of support for grant applications. In this context, while the investigator is 'driving' the research in the sense that he or she is applying for a grant to do a study, there may be outreach to research users for support. A researcher interviewee suggested that, although in some cases this approach is necessitated to fulfill grant requirements, it may not always reflect a process of meaningful engagement:

> "…we need a decision maker, here's what we're doing, here's a letter I've drafted, will you sign it, you'll be our adviser, this is a good project and by the way I need it back in five hours." – *Participant 19[R]*

The interests of researchers play a role within investigator-driven research (node "Interests of researchers). This code is more reflective of the individual's program of research and interests[11]. The text coded here suggests that the interests of researchers may be malleable or open, however this may be a challenge due to strongly held research programs and there may be a mismatch between researchers' interests and the needs of end users. The process by which

[11] As opposed to the node related to 'research agendas' which discussed research interests at a broader level

researchers go about setting their priorities was not clear to several policy interviewees. Even if a mismatch exists between researcher interests and those of end users, researchers may not always want to base their research priorities on the needs of policy-makers/end users. One researcher suggested that the work needs to be personally interesting or she would not be able to maintain the focus on the work - the ability to set her own research program has been earned.

In contrast to "Investigator-driven" research, the second sub-category relates to "Policy-driven" research which includes research that originates from policy and/or research that is being conducted in direct response to a policy need. The category "Policy-driven research" could have been considered as an aspect to the major category "Interaction in the Policy Process", however since the funding arrangements and interactions related primarily to the compilation or generation of research, it was placed here.

One key way for policy to drive research is to pay for it. All interviewees discussed funding arrangements for policy to pay for research, including commissioning and contracting. Such arrangements represent a common way for research users to have research conducted that is aligned with their needs. The text coded in "Contracting and commissioning" relates to the function of paying for a particular piece of research (or evaluation) to be done and suggests a number of dimensions. Research supported through government funding arrangements is tied to a very specific set of needs or issues, and background papers or literature reviews of evidence were commonly noted as being funded. Researchers and/or consultants may be contracted and there may be a call for proposals to ensure adherence to the contracting procedures and guidelines which governments must follow. Differences were described between grants and contracts with grants being more flexible and without a specific deliverable, unlike with a contract. An advantage is that contracts or commissions provide an opportunity for iterative

dialogue about the project and deliverables between the contractor and the one being contracted to do the work. This exchange can assist with refining the scope of what work is being done and is captured under a second node related to funding, “Funding research – directing research having input”.

Also captured within “Policy-driven” is the notion of researcher responsiveness. The two nodes here relate to the extent to which researchers are available to interact with research users (“Availability of researchers”) and whether they are responsive to research user requests (node “Responsiveness of researchers”). There seems to be an importance placed on researchers being both available and responsive for research users. Several specific examples were offered of researchers responding to specific data requests from policy-makers. This is also consistent with the "research as retail" model.

Responsiveness and availability of researchers may be dependent on capacity to respond. One researcher remarked:

> “If you’re going to respond effectively you have to be organized enough and have the time to sort of drop everything else and give them the best evidence.” – *Participant 26[R]*

It is also possible that, in some jurisdictions in Canada, there are not researchers available nor responsive due to a lack of research capacity within the province or a lack of relationships with researchers beyond the province. One policy interviewee (Participant 16[P]) based in a remote location noted that geography may play a role as there is not access to a university, for example, where researchers are based and yet another reflected that being able to call on researchers based at Health Canada for assistance with data was a significant benefit (Participant 5[P]).

The third sub-category that describes a different facet to researcher and research users interaction in the research process relates to “Policy-relevant” research. This broad category

includes research that has relevance or applicability to policy and may be informed by policy needs or undertaken in a collaborative way. Nodes were created around a number of points within the research process. Even before a research topic is decided upon, there is a role for interactions between researchers and research users to assist with understanding needs of research users (node “Understand needs”). Doing so can serve as a source of ideas whereby there is a negotiated process to determine what should be studied/research questions (Participant 21[R]) and what the policy needs are (Participant 23[R]). Being open to a process of engagement around what actually gets studied seems to be particularly important and enables greater understanding of the decision-making environment and the context in which to "place" or situate the research. In a closely related vein, the applied orientation of some researchers may mean that research develops around a policy issue as the basis (node “Policy issue as starting point). Having an openness to pursuing research in areas of policy importance fits in here whereby research can be grafted on to “natural experiments” such as the policy and program interventions developed by social actors.

The importance of early engagement in the research process was noted as an important factor (node “Interaction – early in the research process”). This code, as with others in this sub-category, suggests a deliberate effort to interact on the part of researchers and policy-makers and to jointly define some aspect of what should be studied. However, there is a time dimension that comes into the text coded here (ie, "from beginning"; "from the start"; "from conception"). A benefit to early interactions may be that policy-makers can provide input to increase relevance. These processes may help researchers think differently about what they want to study or how they would like to go about studying it (node “Interaction – helping researchers think differently”).

In terms of the conduct of research, different research approaches may be used to meet particular needs (node “Research approaches that will meet specific needs”). A range of data collection approaches may be used depending on the research question and the timeframe for the study. In some cases, this may mean conducting implementation research to understand how an intervention is working. In others, it may mean diverting away from the gold standard randomized controlled trial to conduct research on “natural experiments”, which may not be suited to randomization.

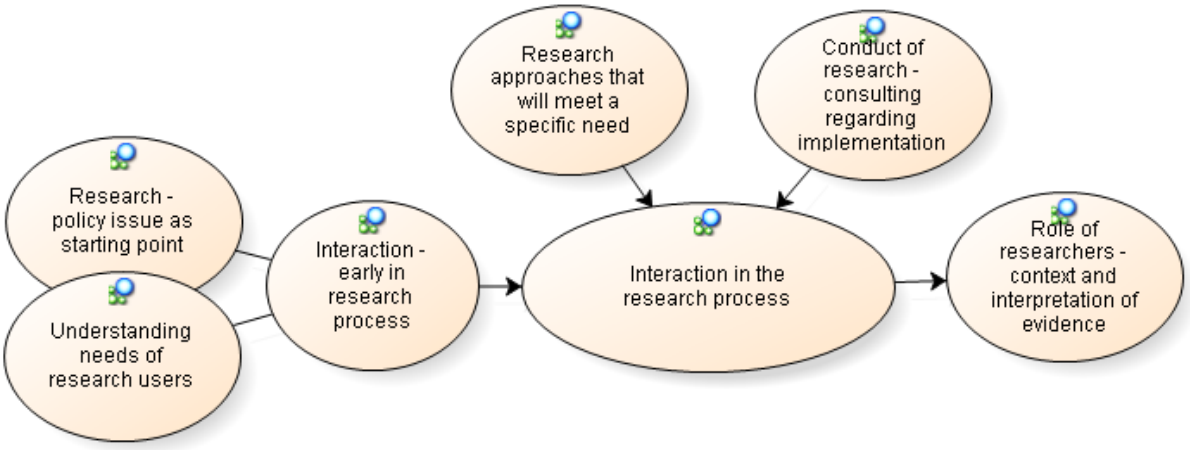
When consulting with policy-makers in the conduct of research, researchers may get a clearer idea of implementation issues faced by those in the field who can provide guidance about what might work in their communities (node “Conduct of research - consulting regarding implementation”). Researchers also expressed the value in consulting regarding their research, particularly in terms of implementation and gaining an understanding of context. One researcher spoke about the benefits of having such exchange when considering the timing of research, coordination of projects, and capacity “on the ground”. A benefit of 'local' stakeholder engagement may also be realized in terms of spin-off projects or increased participation in the research (ie, gaining access to study participants). Researchers can also be engaged to offer technical assistance regarding implementation of research or evaluation projects conducted by research users.

Finally, there is also a role for interaction around the context and interpretation of evidence. Once data are collected, researchers may work with research users to share the data, understand the role of context on explaining results, and develop interpretations of what the data mean. The process of exchanging knowledge and answering questions about results seems to be an important component to making the research meaningful and understandable to research users.

This process of sense-making of data and shared interpretation relates very closely to the sub-category "Knowledge translation and use".

While all of these aspects of interaction through the research process may mean that the same researchers and research users are interacting around a specific research project, it may not. Figure 4 depicts a visual representation of the relationship between the different nodes within this sub-category.

Figure 4. Connections between nodes in sub-category "Policy-relevant research"



The final sub-category in the "Interaction in the research process" category relates to "Knowledge translation and use". While this could arguably be captured within the "Policy-relevant" research process, there was sufficient data to suggest that it should stand alone as a separate sub-category. This sub-category pertains to researcher and research user interaction to facilitate use of research, including "end-of-grant" knowledge translation.

References to researchers presenting research were coded separately (node "Researchers presenting research") since dissemination of research through presentations was seen as a function of research, as opposed to the next code which relates more to the attributes of communication. The ability of researchers to communicate was highly valued by policy

interviewees (node “Ability to communicate – reporting of research”). This node really represents the nature and manner in which research is communicated, with particular attention to the information needs of decision-makers. Multiple references were made across and within the policy interviews with regard to the importance of communication skills of researchers - particularly in terms of being able to communicate with 'non-experts' in a meaningful and appropriate way. Appropriateness, accessibility (of language and messages), understandability, clarity, conciseness, and relevance all emerged as features of communication which were important to research users. Written and verbal communications were both identified as being important, as was the ability to communicate effectively publicly and one-on-one.

This code relates closely to language (node “Language”), also classified within this sub-category. Language was discussed in terms of the ability of researchers to communicate (for example, use of plain language) and the manner in which data are presented or interpreted in an understandable way. While the technical language that can be associated with communication of research was noted as a challenge, one policy interviewee suggested that there is a shared responsibility to build a language interface between researchers and policy-makers to facilitate knowledge translation:

> “So there is a you know kind of like a language interface that has to happen between the two areas so that you know researchers can understand that they may have to put things in extremely plain language for us and as policy people from the policy perspective we really need to stop talking in bureaucratize.” – *Participant 9[P]*

Also grouped within this sub-category is text related to the “Role of researchers – generate and facilitate use of evidence”. While some interviewees suggested that a primary role for researchers was to generate evidence, many closely linked this to sharing and facilitating the use of the evidence that has been generated with end users. Although the previous codes within this

sub-category relate closely to facilitating use, the text coded here is really about the role of researchers within that process of knowledge generation and knowledge sharing. Some felt that there was an imperative on the part of researchers to go beyond producing knowledge. As a researcher remarked:

> "You just can't be producing knowledge. I think that's probably the most frustrating right at this point in my career. If we're going to produce knowledge and it's going to sit and it's going to sit and nothing is going to happen with it then that just seems to be such a waste of time and effort." – *Participant 24[R]*

Similarly, a relational dimension came through from the data around the process of facilitating knowledge use. A policy interviewee from the federal government felt particular openness about sharing research from the tobacco control community:

> "…willingness is there to help and talk and discuss and share information. In this issue I have not found a single researcher in tobacco control that is not open to sharing broadly." – *Participant 9[P]*

Though not tied to a sub-category, research agendas are also included as an aspect of "Interaction in the research process" in a broad category by the same name. While a minority of interviewees referred to agenda in terms of individual research agendas, the bulk of the text coded here pertains to broader-level research agendas. While some interviewees were aware of a national tobacco control research agenda (CTCRI Research Summit from 2002) there was some scepticism about the role that it played in aligning research and policy and the process itself (Participant 18[R]; Participant 26[R]). Many did not mention it and suggested that a national-level research agenda could be helpful in setting priorities, provided it is updated regularly and involves discussion and exchange of multiple perspectives.

5.4.5 Interaction in the policy process

"Interaction in the policy process" includes codes which pertain to researcher interaction in policy processes. Four nodes were grouped within this category. First, "Advice about action" relates to the role of researchers to offer advice to policy. Both researchers and policy-makers identified a role for researchers in terms of providing evidence-informed, timely policy advice. Such advice seems to be in addition to sharing the results of particular studies, though the provision of evidence is also important and captured elsewhere[12]. There may be different entry points for science to be infused into policy discussions and this may occur through consultations sought by government (Participant 22[R]; Participant 23[R]), through provision of evidence-informed expert opinion (Participant 19[R]), evidence-informed communication (Participant 25[R]), involvement in briefing note preparation (Participant 18[R]; Participant 25[R]) or through sitting on policy advisory committees (Participant 21[R]).

Both research and policy interviewees suggest that there is a space for research and evidence to inform decision-making and improve the decisions that are made (node "Role of evidence to guide action"). Consideration of the implications of research seems to be an important factor to making this possible whereby researchers consider not only their findings but also possible uses for findings in decision-making.[13]

The development and evaluation of tobacco control strategies may provide a specific window of opportunity for researchers to engage in the policy process (node "Role of research – strategy development and implementation"). Unlike some areas of health, tobacco control

[12] Captured within the major category "Interaction in the research process", sub-category "knowledge translation and use"

[13] Closely linked here is the relevance of research to interventions – text relating specifically to interventions has been coded under major category "Relevance and Timeliness", sub-category "Relevance to priorities of government – to interventions"

strategies exist in many jurisdictions (federally and provincially). Interactions may involve researcher participation in strategy-related consultations to inform current and future plans and setting goals and priorities. The Ontario Tobacco Research Unit, noted earlier as a structure to facilitate interaction, is directly linked to the Smoke-free Ontario Strategy and its role for research, monitoring, and evaluation is captured here.

The final node in the category relates to the advocacy and NGO agenda (node "Advocacy – NGO agenda"). Tobacco control has a well-organized advocacy structure through NGOs including health charities and tobacco control interest groups such as the Ontario Campaign for Action on Tobacco, the Non-Smokers' Rights Association, and Physicians for a Smoke-free Canada. Some participants identified NGOs as having an agenda related to their specific interests and a greater focus on advocacy. The related concern is that such organizations may conduct research, but are actually more about advocacy (Participant 9[P]) and therefore information from NGO sources was thought to be biased in some way. That said, NGOs were recognized for being able to communicate about evidence in a manner far more useful and relevant than much academic research (Participant 8[P]). The implication was that researchers may be more objective and should retain their independence. One researcher (Participant 23[R]) expressed a divergent view of the relationship between research and advocacy by being a registered lobbyist with the federal government. This role allows the researcher to gain access to the Minister of Health and infuse evidence into a policy discussion.

Several researchers mentioned the importance of their interactions with the NGO community such as working with and through NGO intermediaries to conduct research or distribute research findings to policy audiences. Interactions with NGOs can also offer insights into research needs or issues from the 'field' which, one researcher noted, can spark questions for potential research.

Similarly, insider knowledge can come from advocates of "what's cooking" in terms of policy agendas can assist in identifying important policy issues.

5.4.6 Independence and credibility of researchers

The "Independence and credibility of researchers" category relates to the credibility of researchers as a reliable source for research, and independence of researchers from research users. This category is divided into three sub-categories: "Credibility"; "Independence", and "Expertise".

"Credibility" has two nodes within it. "Credibility and accuracy" refers to the quality and accuracy of research in terms of its being solid evidence that is technically valid and methodologically and ethically sound. It also pertains to the proper interpretation of data, integrity, and commitment to data. Reputation emerged from some interviewees as being related to credibility. One researcher reflected on the importance of this:

> "To be able to produce credible scientific evidence. So we have to do good research and maintain our credibility because as scientists if credibility gets undermined then we're in a very bad place." – *Participant 18[R]*

Also captured within this node is the objective or neutral role of scientists in their approaches to research. This was discussed most frequently in terms of research without bias. While objectivity was thought to be important, one interviewee remarked that straight reporting of research results is not sufficient to make the results useable (Participant 8[P])

"Quality of research – peer review" is a closely related node. While the peer review process was thought to take a long time (ie, time to get published), having research be peer-reviewed was also noted as an important marker of quality and may lend credibility to the research that's been done. That said, there may not be time for policy-makers to 'wait' for peer-reviewed papers to be published.

"Independence", the second sub-category, relates to the independence of researchers from policy. Independence of researchers is very closely related to credibility and appears to be important on at least two levels. First, independence lends credibility to the matter under investigation in terms of being external or at an arm's length from government and also being objective (Participant 5[P], Participant 8[P], and Participant 9[P]). The neutrality and objectivity brought by independence bring enhanced credibility to the findings - there is also a value to government to be able to point to an 'external' finding whereby it may be more persuasive (Participant 11[P]).

Secondly, independence was also discussed in terms of a valuing or respect for academic freedom (code "Independence of researchers – academic freedom). This was sometimes expressed with a modest amount of frustration in the sense that it could impact the relevance of the research. Independence does not seem to mean complete separation from the context in which the findings may be used, but just an arm's length relationship from undue influence.

That said, there was some mention in the interviews that a caveat to alignment of research and policy agendas should be that academic freedom and the independence of researchers not be compromised. The distance can assist with looking at the overall issue rather than just furthering the aims of a particular policy or program (Participant 16[P]), rather than simply telling the policy-maker what the researcher thinks he or she wants to hear (Participant 9[P]). This suggests that independence can allow for honesty and direct communication.

Funding influences and conflicts of interest were coded separately under the node "Independence of researchers – funding influences and conflicts of interest". The source of funding for research can damage the credibility of results, regardless of the source (industry and government included). The affiliated funding is important to declare if accepted. A distinction

was made between grants and contracts. Grants were viewed as being more independent (even when they come from government).

Maintaining integrity in the relationship between researchers and funders, including appropriate mechanisms for independence to ensure that results are not compromised, is critical. Conflicts of interest were raised particularly in terms of political influence on results. This was mentioned from the perspective of researchers and also by policy interviewees in terms of being aware of potential conflicts of interest which may bias the results of research.

The third sub-category related to "Independence and Credibility" is "Expertise". This pertains to the expertise of researchers (node "Role (value) of research – expertise) in relation to content, technical and disciplinary expertise, and the role of researchers as experts.

5.4.7 Incentives and barriers

"Incentives and barriers" relates to incentives and barriers to interaction. Incentives and barriers may occur at the academic, policy, and funding levels and exist for both researchers and research users. For the most part, these incentives and barriers are at the level beyond the individual. Four sub-categories reflect the range of incentives and barriers. The first, "Academic context", includes aspects of the academic setting in which many researchers work, as well as the reward structures and outputs in those contexts, which may influence their interaction with research users. The first dimension of this sub-category concerns the applied orientation of researchers which was expressed through the node: "Researchers – applied research and want to make a difference". This node includes text about the interest of researchers in generating research with applicability to "real world" problems or situations and desire to make a difference. While this may not be an approach shared by all researchers, being based in an applied field such as public health and tobacco control or being based in an applied faculty can

foster this orientation by wanting to produce research that can be of relevance and utilized. Some suggested that making a difference through their research was the 'point' to the exercise and a moral obligation, particularly for applied fields.

Engaging in such applied research can influence interests in building relationships whereby the applied orientation is exemplified through deliberate efforts to inform policy and make change in the real world. As one researcher reflected:

> "Well I've always been very applied, I'm not an ivory tower academic and we're very real world. We know that making changes you don't sit in your office and just do research to influence policy" – *Participant 22[R]*

This concept was extended by contrasting applied research or research that is "real world" against fundamental discovery research:

> "…my assumption has always been the reason you do tobacco research is to stem an epidemic, to prevent deaths. It's about making change in the real world more than it's about fundamental discovery, at least the kind of research I do; that was my mission." – *Participant 19[R]*

Policy interviewees also discussed the fact that there are advantages to having researchers who want to make a difference and have their work applied in the sense that it can advance policy priorities and provide evidence to inform action. Some reflected that it can also be an advantage to researchers to work with policy-makers to see their work applied and to have benefit to someone other than themselves. For some, this orientation means doing "more than" publishing research by wanting it to be used or play a role within decision-making. A policy interviewee reflected on this in the following way:

> "I have tremendous respect for researchers and for thinkers but there is also a group of people who are saying you know I don't want my research to sit on a shelf. I want it to be alive in the world. And those are the individuals that I've seen – it is deep thinking individuals who understand that you know it's actually good to have your research play a role in decision making." – *Participant 11[P]*

Closely related to the applied orientation of researchers are the environments in which they do their work and the outputs of their research. The academic rewards structure was raised by both researchers and research users as being an incentive and a barrier to interactions (node "Academic rewards – tenure and promotion"). Text within this node relates to the challenges and barriers of the academic rewards structure and related tenure and promotion procedures/policy. The long-term knowledge exchange or ongoing interaction that may be required to support applied research opportunities and related knowledge translation is not recognized in many of the current academic rewards policies. Having tenure, however, may provide an element of freedom to be able to spend time interacting with research users and engaging in applied research activities. Although these challenges were voiced by more researchers than policy-makers, there was still a demonstrated awareness on the part of some policy-makers of the academic rewards structures. Applied research, though, might have an element of risk, whereby since projects are linked to the 'real world', the focus, priority or individuals might change and leave the researcher without a project (Participant 21[R]).

Interestingly, some interviewees juxtaposed making a contribution to the 'real world' against career enhancement. Not all did so, however. It seems like the culture or organizational context of where the researcher is based may be a factor that mediates this barrier. For example, being based in an applied research faculty (as noted in the earlier code) or in a university or institution which values the applied contributions of its faculty member may be facilitative rather than a barrier (node "Academic rewards – Institutional support"). Further, being in a position where time can be bought out to focus on research or where knowledge exchange activities are valued can also assist.

The final dimension related to the "Academic context" sub-category within "Incentives and Barriers" relates to the nature of outputs generated by researchers. This is linked closely to the academic rewards structure in which many researchers function. While peer-reviewed publications may be a necessary product to the research enterprise, they alone may not be sufficient to be relevant and the production of a peer-reviewed paper alone does not seem to be "enough" to influence policy. While peer-reviewed publications are a marker of quality and credibility (as discussed in Section 5.4.6), the time associated with such publications may be a barrier for research users as is accessibility of such publications. A related node pertains to "Outputs - non-traditional products". While peer-reviewed publications do have an important role, they may need to be enhanced by different communication methods about research to be more useful to a policy audience. Interactions and relationships with policy-makers may present opportunities for non-traditional outputs to be generated by researchers such as products and tools to support programming, policy briefs, background papers, and consultation documents. Few institutions may recognize these products in the tenure and promotion process, however some do which links these three sets of nodes (applied orientation of researchers, academic rewards, and outputs) together.

While the above sub-category related to aspects of the academic context, the second sub-category relates to the "Policy environment", including aspects of the (tobacco control) policy environment that may influence interaction and relationship building with researchers. The first nodes within this sub-category relate to the extent to which tobacco control is a government priority and, if so, the research and evaluation that can be stimulated through additional tobacco control capacity. If a jurisdiction has tobacco control as a priority or if tobacco control strategies

exist, both of these may present research opportunities and incentives to interactions with researchers.

Another driver for interactions with researchers is the extent to which the policy environment contains (or not) internal research and evaluation expertise (node "Research or evaluation capacity or expertise – Internal). When such capacity does not exist internally, there may be greater incentive (and perhaps necessity) to build relationships with and rely on external expertise. Capacity in this sense can relate to not having enough people or sufficient time to do the work. A further dimension here is the nature of the capacity that may exist internally. For example, surveillance and monitoring capacity or analytic capacity (ie, epidemiologists) for tobacco may exist in some provinces and does exist federally, but specialized research capacity may not exist internally in many provinces. Given this, provincial research units which operate at an arm's length from government may be able to fulfill some roles in an 'internal-external' capacity. At the federal level, research capacity does exist. While external researchers may be engaged, there is a strong internal research "shop" which may be available and able to respond to policy needs.

When interactions do occur between researchers and research users, particularly around specific projects, some "Parameters of interaction" may need to be in place to set boundaries of the researcher-policy relationship and related products. While important, these parameters may facilitate or impede how interactions proceed. Parameters are captured in three nodes which relate to data ownership, publishing, and confidentiality of evidence.

Issues related to data ownership and publishing could be prevented through clarity of expectations from the outset. Data ownership, similarly, should be worked out in advance to avoid being a barrier to relationships. When research is being funded through policy, this is

particularly important. Doing research with policy may mean that a researcher may need to compromise his or her ability to publish unless an agreement is reached in advance. If researchers publish policy-funded research without permission, it may damage relationships and partnerships. That being said, the independence and credibility of researchers to do so, provided the publication process is agreed to with partners, may address this concern. Within the academic context, there may be some hesitancy to release results in advance of peer-reviewed publication so as not to damage the chance to be published in the future.

In terms of "Parameters - confidentiality of evidence", from both the research and policy perspectives, there may be parameters on what can be shared. From the research side, this seems to relate to data and related implications for publishing. From the policy side, there may also be issues related to confidentiality of the data in terms of what is or can be made publicly available. In addition, from the policy perspective, there is an element of discretion and 'secrecy' in terms of the policy-making process whereby requests may be made for data and/or information, but the full reasons behind why it is needed may not be disclosed. A researcher who frequently responds to policy requests (Participant 18[R]), expressed modest frustration at this since she felt it was a limiting factor in terms of what she would then be able to provide in terms of evidence where knowing the full context of the request would have better equipped her to answer the question(s) at hand (the question behind the question).

The final sub-category, "Funding incentives and barriers", includes funding-related incentives to do research in particular areas or in ways that facilitate collaboration. Barriers related primarily to grant-related funding. Funding may offer a particular incentive to engaging in research with end users and pursuing research in a particular area. The first node within this sub-category, "Funding – incentive and tied to needs" suggests that funding can be used as an

incentive to encourage research in a particular area. Strategic research funding for research that is related to the needs or issues of relevance to end users was viewed as important, particularly from the perspective of demonstrating value for money invested in research.

While funding may be a facilitator to collaboration, research grants may be a barrier (node "Barriers – grants"). Two main challenges related to grants emerged from the data. The first relates to the timing of grant cycles relative to the timing of policy research opportunities and the information needs of decision-makers. For example, the length of time from application to notification or the timing of grant deadlines being misaligned with the policy need. Secondly, the considerable investment of time and teamwork that goes into a grant, particularly if policy partners are brought to the table, and the frustration that comes if the project is not funded. Given the time that it takes to establish buy-in and partnerships, this may be damaging or bad for morale. Relatedly, the kind of research that may be needed by policy may not be highly valued by peer review panels or may be difficult to get funded. Some interviewees noted that research may be conducted in areas where funding may be easier to obtain (node "Funding – research areas where funding may be easier to obtain"). Funding can provide an incentive to researchers to do research in a particular area. While some of these areas may be of interest to end users, it may be that that is not the topic for which research is being funded. This was supported by examples of great relevance to policy interviewees within the provincial level who may have research interests that do not fit with federal funding opportunities or other research funding.

Even when an effort is made to structure funding opportunities to overcome these challenges, it is not always successful. An example relates to CTCRI (node "CTCRI – funding"). The CTCRI was established and tried to bring forward not just opportunities of funding tobacco control research, but some unique ways of funding research so that it could be done differently.

The structure of the CTCRI funding mechanisms had several features of note by interviewees, including: the availability of funds directly related to tobacco control and CTCRI's role as a main source of funding for tobacco control research; the responsiveness of funding calls pertaining to issues of policy relevance such as tobacco taxation and contraband (even if there were timing challenges associated with 'rapid review', as noted by some interviewees); the required engagement of policy-makers/decision-makers in the research itself; nimbleness to offer special case funding for projects which required a rapid need for support, and; the strategic nature of the funding to support a defined set of priorities. While there were many positive features to the CTCRI approach to funding, there were also challenges associated with encouraging innovative research. A policy interviewee also mentioned the challenges with funding timelines relative to the time frames of government policy-making.

The CTCRI was not the only funding agency that rewarded collaboration and this notion is captured in the node “Funding structures rewarding collaboration”. The Federal granting councils (CIHR, SSHRC, and NSERC) were noted by interviewees as placing increasing emphasis on collaborative research or research that may have applied impact. This speaks to not just having funds available for research, but then the use of funds to influence how research is conducted.

5.4.8 Relevance and timeliness

“Relevance and timeliness” captures codes related to the general relevance of research to policy priorities and the timeliness of research to same. Relevance clearly emerged as the most important factor related to the alignment of research and policy agendas. Relevance is a major and multi-faceted code, closely related to (and some overlap with) alignment of research with priorities of government. Relevance of research was conceptualized in a variety of ways from the

policy-maker perspective such as relevance to: the individual's day to day work and interests, the government's present need and activities, policy questions/issues at hand and leading edge questions, programming, strategy development, implementation, and evaluation. These general aspects of relevance are captured within a sub-category relating to "Relevance to priorities of government" which includes: (1) relevance of research to current priorities; (2) relevance to future priorities; (3) ongoing trends and issues; (4) relevance to interventions. Each of these has multiple nodes within.

"Relevance to current priorities" relates to research that can address a present policy need. Included within this is having access to research that is current and up-to-date (node "Currency of research"). Interacting with researchers provides an opportunity for policy-makers to gain access to the most up-to-date research. Policy interviewees expressed an interest in research that is current (for example, most recent surveillance data) and also noted that decisions based on old data can be fraught with issues, particularly when it comes to youth. One policy interviewee provided a specific example of 'out-of-date' survey data being published and having negative consequences in the policy context.

A second node within this sub-category, "Research related to priorities of government", may make a difference and/or inform decision-making. Research that is related to current priorities may be more valued than other research due to its timeliness (see node Timeliness at the end of this section) and relationship to a 'present need'.

Research may pertain to a current need by being able to offer justification or confirmation for a particular course of action taken by government (node "Role of research – justification or confirmation"). The policy interviewees highlighted an important role for research in terms of support for (or justification or confirmation for) their taking a particular course of action. This

could be *a priori*, but was more frequently discussed as being used after a decision was made, the role of research to provide support for a given direction or to defend a policy. It may be that in these cases, policy makers will interact with either research or researchers. This suggests a time dimension to relevance and alignment whereby research can be aligned with policy to support taking a particular policy agenda (in advance) or research that is aligned can be sought out after the fact to justify why a particular policy direction was undertaken.

The second sub-category within "Relevance and Timeliness" relates to the "Relevance to future priorities". This forward-looking orientation includes future dimensions of tobacco control. Several interviewees expressed concern regarding the future of tobacco control as a policy priority and the role that research can (and perhaps should) play in shaping that future - "what do we do now?" was a question asked by one. Some examples here included understanding more about what new interventions might play a role in decreasing smoking prevalence and assisting smokers to quit. There was a feeling that there is a need to press on with tobacco as an issue and an ongoing need for evidence that can be used to inform future policy directions.

"Innovation and new ideas" are also relevant to informing future priorities. From the policy perspective, having access to new ideas and innovation was seen as valuable (nodes "Ideas new" and "Role (value) of research – innovation") and a way to stimulate thinking ("Role of research – stimulate thinking"). Innovation was singled out as an important feature to some research, particularly when it comes to leading edge research that is being conducted.

While the future was not described as being easy to predict, a number of interviewees discussed the need for "Anticipation of policy issues" by researchers and, correspondingly, conducting research in areas where policy might not be right now, but could or should go in the

future. By anticipating future or emerging issues, research might exist when needed, thus having enhanced relevance and timeliness. This, however, was not described as an easy task. Given the issues described earlier (Section 5.4.1) related to the nature of policy and the shifting priorities and the potential barriers to long-term planning in government, it is challenging for researchers to assess what issues may be emerging or on the horizon that may require evidence. Ongoing tracking of trends and issues (node "Ongoing knowledge of trends and issues") may be one way in which future policy needs can be anticipated. Canada has established a robust, national-level surveillance system to track tobacco use over time through the Canadian Tobacco Use Monitoring Survey (CTUMS). The Youth Smoking Survey was also mentioned as a resource for surveillance. Several policy participants discussed surveillance as being a component to their internal research activity - federally and provincially, there is the capacity to conduct surveillance and to monitor patterns related to tobacco use over time. Surveillance is a type of research that appears aligned with the policy agenda to understand on a regular basis what is happening in terms of tobacco use within the population as well as any changes that are occurring which may require greater understanding or, potentially, interventions.

There is a range of other ways in which research may play a role in terms of having relevance to future policy. This can include issue framing, agenda setting, and the provision of policy options. Research can also assist with planning ("Role of research – planning"). In one province, a planning infrastructure has been established for tobacco control; however, this was not the case in other provinces. Federally, there also seems to be a mechanism to engage researchers in planning processes for example, in consultations about the renewal of the Federal Tobacco Control Strategy.

This leads into the final dimension of relevance – "Relevance to interventions". Nodes categorized here pertain to the interest of policy interviewees in having research that was relevant to current or potential interventions, including tobacco control policies, programs, and strategies. Knowledge syntheses, literature reviews, and compilation of existing data/information may be used to bring together data on interventions and approaches (node "Knowledge synthesis"). Research related to interventions was valued and described as being more relevant to policy-makers. For example:

> "Research that tends to identify more questions or more challenges but without providing some insight into what sort of intervention might be most promising is not as helpful" – *Participant 14[P]*

Intervention research may be most likely to align because the interventions described were those which research users had responsibilities for developing, implementing, and/or evaluating.

Within the scope of intervention research was research on: (1) implementation issues (node "Intervention – implementation issues") to understand how interventions work and for whom; (2) cost-effectiveness, cost, and economic considerations (node "Intervention – cost-effectiveness and economics") which are of considerable importance to policy decisions, and; (3) impact (node "Intervention – impact"), including "what works" or effectiveness data and any differences that the intervention made relative to intended or unintended outcomes.

Intervention research may be compelling to research users as it may provide evidence for a particular course of action, demonstrate the value of particular approaches or investments, and provide guidance for where to go with interventions in the future. The importance of understanding how interventions are working or being adopted in other jurisdictions and being able to compare the effectiveness of interventions across jurisdictions also emerged (node "Importance of comparative research"). There seem to be two important dimensions to this node.

First, having knowledge of policy interventions in other jurisdictions including which jurisdictions are moving the policy "yardstick" or showing leadership in a policy area and being able to understand what can be learned from their experiences. Secondly, gathering evidence on how their province is doing on the tobacco file relative to others.

The value of local data was also described as having enhanced relevance (node "Importance of local data – relevance"). "Local" refers to the jurisdiction of relevance to the policy-makers' decision-making, therefore local could be provincial or it could even be at the local 'school' level (for example, researchers generating local "school-specific" data). This was thought to be important in order to be able to consider the local context and also the lack of applicability or relevance of non-local data. For example, data from the US may not have applicability to a province in Canada. That said, while non-local data might not be applicable, it might be what is available and so that is what might be used (node "Best available evidence").

Local data may also be helpful for contextualizing results. For example, drilling down in data may enhance context-sensitivity and context for understanding. Given the interest in more local data, it can be an opportunity to facilitate use of research. Examples provided by participants included the production of tailored feedback reports (Participant 26[R]) or facilitated dialogue around data (Participant 24[R]).

In spite of the general appetite for local data, several research user interviewees acknowledged that there are limitations in the sense that there is potential for a great deal of duplication and that, for cost and resourcing reasons, it may not be feasible to collect. However, local data may also be more persuasive to the politicians - the ultimate decision-makers. Unlike provinces, territories are excluded from some large-scale tobacco control surveillance surveys,

which makes it even more difficult to access local data (Participant 16[P]) - the uniqueness of the territories may limit the applicability of research even further.

Closely related to these various types of intervention research is the node "Role of evaluation". Evaluation emerged as an important node for policy-makers - evaluation is specifically tied to programs, policies or initiatives and thus is more likely to be relevant as it attends to a specific need - evaluation is, by its very nature, intended to be aligned. It may also relate to different types of evidence that are of use to decision-makers. Funding for particular government programs may be contingent on doing a certain amount of evaluation and so evaluation data may be available.

The time dimension comes through in the titles of some of the sub-categories (ie, current, future, ongoing) used to categorize different aspects of relevance. There was considerable interest on the part of the policy interviewees about the role of research to inform both the priorities of today (present needs and issues) and also to guide the priorities for the future and future action. This relates closely to the other significant code within – "Timeliness". Timeliness was discussed as it related to research and the time that it takes to do research is one aspect[14]. However, this node makes more explicit the timeliness of research relative to decision-maker needs for that research (ie, relative to decision points, needs for advice and input, and so on). Research may be well-aligned with policy, however, if it is not timely it may not be able to be used.

5.4.9 Alignment

"Alignment" relates to the extent to which the research and policy agendas are shared, including shared objectives, shared priorities, and shared relevance. The text coded within the

[14] Notion of "research takes time" is captured under "Two communities" category, "Differential timeframes" sub-category

"Shared objectives" node relates to the extent to which researchers and research users are working toward the same goal. For some interviewees, this was discussed broadly in terms of the tobacco control field whereby having a shared objective seemed to make interactions between researchers and policy-makers easier. For example,

> "the one thing I've discovered with the tobacco file is there is just not a lot of negatives because everyone is working towards the same end." – *Participant 9[P]*

This participant went on to say:

> "You know from the advocates to the researchers to the provinces to federal government, we're all working toward the same goal to reduce death and disease in Canada." – *Participant 9[P]*

For others, the alignment of objectives was more specific to a project:

> "we've encouraged a national infrastructure for [surveillance and feedback reports] working all provinces, working together for a common objective and I think that has been very good for us as well." – *Participant 10[P]*

"Shared priorities" relates to the importance of broadly shared priorities, including overall purpose, as being closely related to alignment of research and policy agendas. One interviewee put this concept simply by stating:

> "…it's purely coming to this point of finding common ground and what is mutual" – *Participant 23[R]*

If priorities are to be shared, then some interviewees also mentioned the importance of having a process in place for setting and updating priorities on a regular basis. This may occur at the level of the interests of researchers or policy-makers, there may be some cases where

common ground can be reached for shared or joint priorities, and there may be broader priority setting processes such as setting a broader research agenda[15].

"Shared relevance" captures areas of research and policy which are of shared interest between researchers and research users and the mutual influence of researchers and research users regarding the same. Three nodes were included within this category. "Mutual benefit – meet dual purposes" pertains to text where the needs of both researchers and policy-makers can be advanced (dual purposes can be met). This can take the form of enhancing the work of both or benefitting both (mutually beneficial) and if the benefit, a benefit that matters to those involved in the relationship, can be experienced by those involved then there is value added. In the case of these interviewees, the benefit to policy is that the research meets the needs of decision-makers and the benefit to researchers is that their work may be applied, the direction of research may be influenced (thus making it more relevant), and researchers may be able to achieve their academic agenda at the same time. Interviewees from both research and policy perspectives remarked on the opportunity to create multiple "wins" through a mutually beneficial approach:

> "…essentially we were funders so again I mean this is where it's important for us to you know fund things that are going to help us with policy down the road and the researchers, this is an important part of what they want to do as well. So it was almost like creating sort of a win, win, win situation….And that's ultimately what you hopefully want to be able to do with these kinds of things where everybody sees some benefit." – *Participant 5[P]*

> "…what's in it for them and so looking at it that way I think that's been the biggest success is that it has to, so we operate from the basis if there are any losers in this then it's not a good idea. If people can see what's in it for them and it's a win all around then it happens … So I think that has been one, keeping a win all around, it has to be a win/win situation all around." – *Participant 23[R]*

In addition to mutual benefits, participants reflected on opportunities for mutual influence (node "Feedback loops and mutual influence"). Interviewees from both sets noted the potential

[15] The "research agenda" is captured as a node within the major category "Relevance and timeliness"

for research to inform policy and for policy to inform research. While some interviewees noted this at a fairly general level, several suggested that in order for this to occur, there needs to be a system in place (data and relationship infrastructure and planning infrastructures) to integrate research with interventions. For example, collecting data, intervening, and then conducting evaluations/further research (plan, act, learn). This sort of data system was suggested as being a mechanism to provide evidence that is linked to interventions and also provide opportunities for continuous improvement.

The final node coded within "Shared relevance" is "Workable or practicality of research". While research may be of outstanding quality, research that is aligned is also likely to be practical in orientation. While this issue was discussed primarily in terms of the research, one policy interviewee remarked about differences between researchers and those using the research:

> "So it [an evaluation] made good sense and it wasn't too academic…. everyone's heart goes a little fluttery when we have to talk to academics because sometimes you know there they tend to be more theoretical….And we [policy-makers] are a bit more practical sometimes, not always, but we hope we are a little bit in terms of what's in the field." – *Participant 15[P]*

A researcher interviewee commented about how this practical orientation influences how the research is undertaken:

> "So me interacting with the government, you have to understand that the research that I'm doing needs to be practical" – *Participant 23[R]*

5.4.10 Linkage of major categories with free nodes

Table 10 provides a summary of all sub-categories and free nodes within the nine major coding categories. This table represents the final category coding structure and the basis for theoretical development and elaboration.

Table 10. Final coding structure

Sub-category	Free nodes
MAJOR CATEGORY: TWO COMMUNITIES	
Nature of policy	Nature of policy – multiple inputs – competing priorities
	Nature of policy – multiple inputs – moving targets
	Nature of policy – multiple inputs beyond research
	Nature of policy – the political
	Tension between findings and politics
Research and policy – Different timeframes	Nature of policy – pressure cooker atmosphere
	Research takes time
	Timing of government planning
Lack of understanding about "needs and worlds"	
MAJOR CATEGORY: STRUCTURES TO FACILITATE INTERACTION	
Joint work	Convening function – committees
	Interaction infrastructure – rapid response
	Interaction – research advisory committee
	Interaction – TCLC
	Interaction – tobacco coalitions or alliances
Organization leadership and mandate	CTCRI – convening function
	Health Canada as a convenor
	Organizational role or mandate
	Research centres as connecting points
Shared fora	Face-to-face conferences or meetings
	Face-to-face interaction – annual symposium
	Face-to-face interaction – tobacco conferences
	Face-to-face interaction – training
	Interaction opportunities – ICE
	Networks
MAJOR CATEGORY: RELATIONSHIP BUILDING	
Investment in interaction	Barriers – time to invest in interaction
	Building a relationship
	Initiating interactions
	Interaction ongoing or sustained
Personal factors	Personalities
Familiarity – (a)Contextual knowledge	Building a relationship – insider knowledge
	Exposure to other sector – boundary spanner
	Researcher – knowledge of government
Familiarity – (b)History and longevity of relationships	Barriers – staff turnover within government
	Locating researchers – local researchers

Sub-category	Free nodes
	unknown
	Previous working relationships – demonstrated capabilities
	Relationship history
Exchange	Candid exchange of realities and opportunities
	Ideas exchange and dialogue
	Interaction - work through issues
	Mutual learning through interaction
Trust	
Stewardship for relationships	Mutual responsibility for the relationship
	Respect for each other
Understanding	Benefits – increase understanding
MAJOR CATEGORY: INTERACTIONS IN THE POLICY PROCESS	
	Advice about action
	Advocacy – NGO 'agenda'
	Role (value) of research to guide action
	Role of research – strategy development and evaluation
MAJOR CATEGORY: INTERACTIONS IN THE RESEARCH PROCESS	
	Research agenda
Investigator-driven	Interaction through supporting applications
	Role of research – investigator driven
	Interests of researchers
Policy-driven - (a)Funding arrangements	Funding from policy including commissioning or contracting
	Funding research – directing research or having input
Policy-driven - (b)Responsiveness of researchers to policy needs	Availability of researchers
	Responsiveness of researchers
Policy-relevant	Interaction in the research process
	Benefits – advice – policymakers providing input to increase relevance
	Research - policy issue as starting point
	Understanding of needs of research users – Articulation of policy needs and expectations
	Understanding of needs of research users – research approaches that will meet a specific needs
	Understanding of needs of research users – Understand needs
	Interaction - early in research process
	Conduct of research - consulting regarding implementation

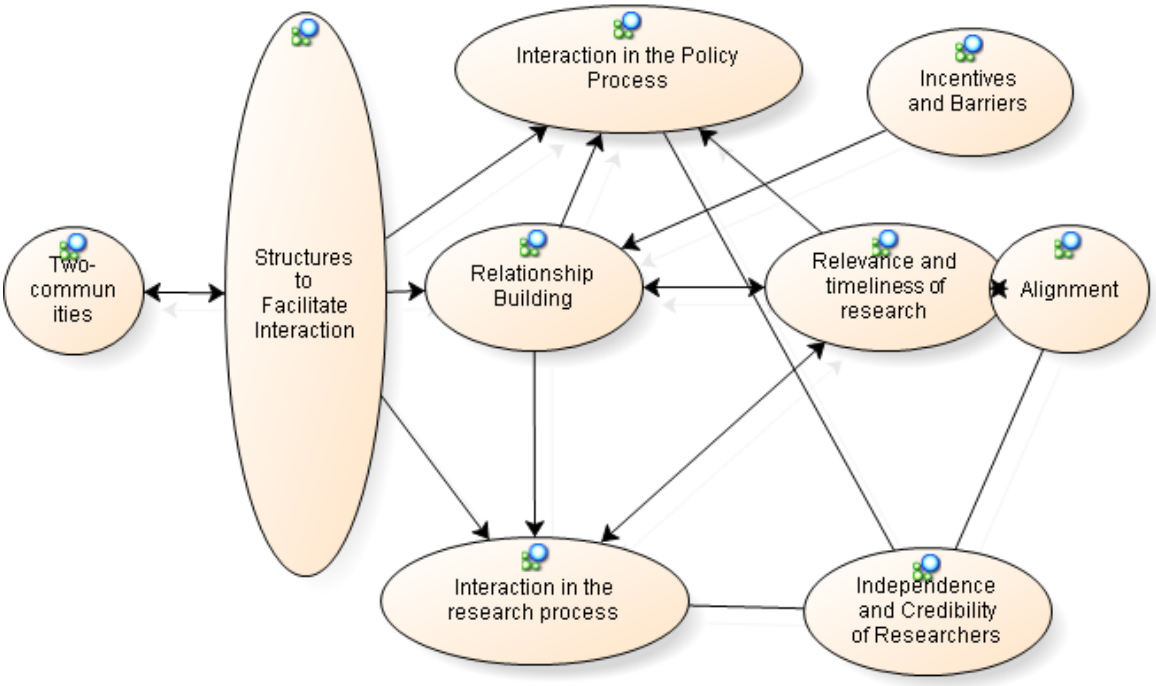
Sub-category	Free nodes
	Role of researchers - context and interpretation of evidence
Knowledge translation and use	Ability to communicate – reporting of research
	Language
	Researchers presenting research
	Role of research – facilitating use of research
	Role of researchers – generate and share evidence
MAJOR CATEGORY: INDEPENDENCE AND CREDIBILITY OF RESEARCHERS	
Independence	Independence of researchers
	Independence of researchers – academic freedom
	Independence of researchers – funding influences and conflicts of interest
Credibility	Credibility and academic neutrality
	Credibility and accuracy
	Quality of research – peer review
Expertise	Researchers as experts
	Role (value) of research – expertise
MAJOR CATEGORY: INCENTIVES AND BARRIERS	
Academic context	Academic rewards – institutional support
	Academic rewards – tenure and promotion
	Outputs of research – non-traditional products
	Outputs of research – publishing
Academic context – (a) Applied orientation of researchers	Researchers – applied research and want to make a difference
Policy environment	Research or evaluation capacity or expertise within government
	Tobacco control as a government priority
	Tobacco control capacity – stimulates research or evaluation
Funding incentives and barriers	Barriers – grants
	CTCRI – funding
	Funding – research areas where funding is easier to obtain
	Funding – ties to needs
	Funding structures rewarding collaboration
Parameters of interaction	Parameters – confidentiality of evidence
	Parameters – data ownership
	Parameters – publishing
MAJOR CATEGORY: RELEVANCE AND TIMELINESS	
	Relevance of research
	Timeliness of research
Relevance of research to priorities of	Research relevant to priorities of government

Sub-category	Free nodes
government – Current	
	Currency of research
	Role of research – justification or confirmation
Relevance of research to priorities of government – Future	Role of research – issue framing
	Role of research – agenda setting
	Role of research – planning
	Role of research – policy options
	Role of research- Anticipation of policy issues
	Future of tobacco control
Relevance of research to priorities of government – Future - (a)Innovation and new ideas	New ideas
	Role (value) of research – innovation
	Role of research – stimulate thinking
	Ongoing knowledge of trends and issues
Relevance of research to priorities of government – To interventions	Best available evidence
	Importance of comparative research
	Importance of local data – relevance
	Intervention – implementation issues
	Intervention - cost effectiveness and economics
	Knowledge synthesis
	Role of evaluation
MAJOR CATEGORY: ALIGNMENT	
	Alignment – Shared priorities
	Alignment – Shared objective
Shared relevance	Feedback loops and mutual influence
	Mutual benefit – meet dual purposes
	Workable or practicality of research

5.5 Theory development

The final phase of analysis was to relate the major categories to each other and to explain the relationships between. Figure 5 presents a graphical representation of the overall theory emerging from these data. Each 'bubble' corresponds to one of the major categories described in Section 5.4. The placement of 'bubbles' within the diagram was intended to illustrate the direction and proximity of connections. The explanation of the relationships between categories has been written to flow from left to right across Figure 5.

Figure 5. Overall theory



"Relationship building" emerged as the central category in these data. Criteria such as those presented by Strauss and Corbin (1998) were considered when selecting the category. The personal interactions and relationships between research users and researchers were linked as a solid foundation to many other categories and explained variability in the extent of interactions.

"Two communities" is linked with a bi-directional arrow to "Structures to facilitate interaction". While the data suggest that there are distinct differences between the cultures of research and policy communities, vis-à-vis the interface of policy and political environments and the different timeframes for research and policy, it is clearly possible for the two communities to come together. Having the opportunities to do so may be individually-driven, however, seemed to be heavily influenced through structures that enable or facilitate interactions to occur. Within the tobacco control community, there were a number of structures that were deliberately created to allow researchers and research users to interact in different ways and at varying levels of intensity. These structures may originate out of research, out of policy, or may have been specifically created to bring these communities together. Structures are supported through financial resources from research funders, health charities, government, and the private sector.

"Structures to facilitate interaction" is linked by a one-way arrow to "Relationship building". The relationship building processes may be supported through structures to bring researchers and research users together such as committees, conferences, and meetings. These structures may create initial familiarity and create opportunities for follow-up and future exchange. In addition, organizational mandates and the role of research centres can serve to create supportive environments for individuals to spend time on relationship building. While the community-level structures seem to provide a mechanism for the two communities to come together, individual investment and effort is also required to build and foster relationships over time. One-off meetings or conferences alone are insufficient to create meaningful interactions. The sustained or ongoing nature of interactions between individuals assists to this end.

"Structures to facilitate interaction" is connected to "Interaction in the research process" by a uni-directional arrow. Structures to facilitate interactions may serve to bring research users

into the research process. For example, at the federal level, the Tobacco Control Liaison Committee provides the opportunity for policy-makers from across the country to have access to research and to work with researchers on joint projects such as outcome indicators for tobacco control strategies or evaluations of interventions (such as Quitlines). At the provincial level, structures such as a research advisory committee or tobacco control coalitions of alliances may allow research to be informed by the needs of end users. "Structures to facilitate interaction" is also connected to "Interaction in the policy process" by a uni-directional arrow. Just as structures may provide research users an opportunity to interact in the research process, they may offer researchers an opportunity to engage in policy processes through the provision of advice and engagement around strategy development and evaluation.

"Relationship building" is connected to "Interaction in the research process" and "Interaction in the policy process" by uni-directional arrows. Within relationship building a sub-category relates to contextual knowledge, which includes familiarity with other sectors and relationship history. Relationship building, including trust and building understanding, creates pre-conditions for engagement in the research and policy processes. Further, being able to have candid exchange and familiarity may provide a basis for moving forward within research and policy processes.

"Interaction in the research process" is connected by a bi-directional arrow to "Relevance and timeliness" of research. Interaction in the research process may take a variety of forms. In investigator-driven research, it may only occur in a limited way and the greatest concern for relevance and timeliness may be to the researcher alone. In policy-driven research, there is sure to be relevance and timeliness for the research user, particularly if it is research that is supported through a funding arrangement from policy (such as commissioned or contracted work) or if

researchers are responding directly to a policy need. In policy-relevant research, interactions may occur at any or multiple points through the research process. In some cases, research is co-created with research users, in others it may be informed through interactions aimed to understand needs of research users, particularly before or early in the research process. The engagement and advice of research users may enhance relevance and timeliness. Processes of knowledge translation and use were also designed to facilitate use of evidence by end users. Research can be made more relevant through effective communication, shared language, and active efforts to facilitate its use.

"Relationship building" is connected by a bi-directional arrow to "Relevance and timeliness of research". The many opportunities for research to have enhanced relevance to current and future priorities of government can be informed through familiarity and insider knowledge. Conversely, if research is relevant, it may serve as an incentive for research users to build relationships with the researchers who are generating the relevant research.

"Incentives and barriers" connects to "Relationship building" by a uni-directional arrow. Incentives such as research funding which rewards collaboration and the applied orientation of researchers may stimulate relationship building. Similarly, barriers such as the grants review process and academic reward structures may impede interactions.

"Independence and credibility of researchers" is linked in a non-directional, associative manner to each of: "Interaction in the research process", "Interaction in the policy process" and "Alignment". Independence of researchers was noted as lending credibility. When researchers engage in policy, they may provide advice based on the best available evidence and independence allows this advice to be grounded in data as opposed to what policy-makers may want to hear. Likewise, researchers may engage with research users through the research process.

In cases of policy-driven research, when research is conducted in direct response to a policy need, independence is also important to ensuring that a balanced perspective can be brought forward based on evidence. While alignment of research and policy emerged as being of value, researchers' retaining a degree of independence was seen as an important caveat and an important dimension to credibility.

"Relevance and timeliness of research" was so closely related to "Alignment" that there is an element of overlap and the star-like shape in the area of overlap represents a two-way connection between the categories. Relevance clearly emerged as the most important factor related to the alignment of research and policy agendas. The properties associated with relevance of research, including relevance to current and future priorities of government and relevance to interventions, illustrate the nature of research that is pertinent to the needs of end users. Alignment goes further by not only relating relevance to the needs of end users, but also relating relevance that is shared by both research users and researchers.

CHAPTER 6: DISCUSSION

The overarching purpose was examined through four related research questions and objectives (presented in Section 3.1.1). The results presented in Chapter 5 are discussed here in relation to these lines of inquiry and pertinent literature. The strengths and limitations of the study are described and areas for improvement are reflected. The chapter closes with considerations of implications, including areas for future study.

6.1 Summary of key findings: Addressing research questions

The purpose of this dissertation was to explore the influence of research user and producer interaction on the alignment of research and policy agendas within the Canadian tobacco control community, including the features and conditions of such interactions. This study was positioned in the movement toward evidence-based public health policy and within the context of models linkage and exchange relationships between research producers and research users. Many studies in the knowledge translation literature have been approached from the perspective of policy-makers. Using a grounded theory approach, the study involved interviews with key informants from researchers and research users to gather insights on the research questions. The study was conducted in the context of the Canadian tobacco control context - a mature field with a historically active policy agenda and an increasingly well-established research community.

Findings suggest that, while a divide between researchers and research users does exist, it can be bridged through interaction. Interactions are enabled, at least partially, through structures and individual relationships fostered over time and reinforced through factors such as mutual understanding, trust, and respect. A number of incentives and barriers at the individual, organizational, and system levels can serve to predispose, enable, or reinforce relationships.

Researcher interaction in the policy process can be facilitated through structures and relationships and can include the provision of advice and evidence to guide action. If research is relevant and timely to policy needs, interaction in the policy process is more likely, however deliberate efforts are required to engage. Researchers also provided evidence of interacting in the policy process through structures such as policy advisory committee, expert panels, and consultations.

Research user interaction in the research process can enhance relevance and timeliness and, accordingly alignment of research and policy agendas. Alignment, in the form of shared priorities, shared objectives, and shared relevance, was generally viewed as desirable, however, not at the expense of researcher independence and credibility. Independence and credibility were also important to interactions in the research and policy processes.

6.1.1 Researcher and research user interaction within the Canada tobacco control community

The first research question was: How do research producers and users in the Canadian tobacco control research community interact? This question was intended to explore and understand the potential influence of research producer and user interaction (and the nature, extent, and formality of those interactions) and to explore and understand the predisposing, enabling, and reinforcing factors associated with the interactions.

Not all research users interviewed had had extensive interactions with researchers, nor was doing so considered to be part of normal practice for all. Interactions were described with researchers based at the same or a different level government (ie, internal researchers or provinces interacting with researchers based in federal government), consultants, researchers based at universities, and/or researchers based in research centres/units. All researchers provided examples of their interactions with research users based in government through collaborative

activities, research, contracting arrangements, or structures that facilitate interaction. Deliberate investments of time and effort were important facilitators to interaction and numerous face-to-face mechanisms to support interaction were evident within tobacco control from the perspectives of those interviewed.

The data herein suggests that there are multiple levels of influence at the individual, organizational, and system-levels, which may relate to interactions between researchers and research users within the Canadian tobacco control context. This perspective, where there is interplay across multiple actors and levels, is consistent with the calls for systems approaches in public health (ie, Leischow, Best, Trochim, et al., 2008) and, more specifically, systems approaches to understanding knowledge translation (Best, et al., 2009; Best and Holmes, 2010). Systems thinking for knowledge-to-action assumes that relationships are influenced by structures, priorities, culture, and context (Best et al., 2009).

At the individual level, processes of relationship building were a critical component to interactions. Generally speaking, these individual-level factors were consistent with previous research on interactions between research and policy communities (Kothari et al., 2009; Lomas, 2000) and related knowledge translation and exchange (Mitton, et al., 2007). Although building relationships at the individual level may occur through specific projects or settings, the notion of building broader or bigger relationships which are more ongoing also emerged as important. The applied orientation of researchers and researchers wanting to make a difference through their work may result in placing more value on the process of interacting with end users and predispose them to doing so. Research users having a need for evidence may also predispose them to interact with researchers, for example by paying for research to be done or by seeking out researchers with expertise aligned with their needs. The responsiveness of researchers to such

requests may enable interactions. Researchers, however, may not be known to research users or readily available within their jurisdiction.

The familiarity of researchers with the policy environment and vice versa may also make individuals more attuned to the potential value of interactions. An understanding of the respective contexts may assist researchers and research users in overcoming the barriers related to coming from different communities. Some interviewees had been exposed to working within the 'other' community which made them particularly able to span the research and policy 'boundaries'.

Over time, a relationship history can develop between researchers and research users and, through past working relationships, capabilities can be demonstrated and the value of interactions can be reinforcing and enable subsequent interactions. Opportunities for mutual learning and exchange reinforced the value of interactions. The enabling conditions for such exchanges to be candid were related to a number of individual-level factors including personalities, trust, and mutual respect.

Although having ongoing and sustained interactions was described as a facilitator, time to invest in interactions and the associated opportunity cost was seen as a barrier. Another significant individual-level barrier that surfaced in interviews was the staff turnover within government. When much time and investment goes into building relationships with individuals, the value of those relationships can be greatly disrupted when people leave their positions. While researchers may not remain in the tobacco control fields for their whole careers, the turnover of researchers was not mentioned as a barrier by any interviewee. This may be because the researchers that were interviewed had been working in tobacco control for quite a long time,

particularly when compared to the length of time which research users had been working in the field.

Researchers and research users are based in organizational and environmental contexts and those contexts influenced interactions. Previous literature has suggested that the organizational environments within which researchers and research users function is an important dimension to understanding knowledge translation and exchange (Mitton, et al., 2007; Jacobson et al., 2004). The nature of the policy environment, including the political/policy interface and the competing priorities may limit capacity to interact with research users. Further, the multiple inputs to policy beyond research may limit the capacity for evidence-informed action, even if research is aligned with a potential need. Of note were the different timeframes within which researchers and research users operate. This is consistent with previous research which has noted the mismatch between the timeframes of research and policy (Brownson, et al., 2006; Bensing, Caris-Verhallen, Dekker, et al., 2004) "Research" as an entity was thought to take time and this may be in conflict with the 'pressure cooker' atmosphere that exists in policy and the rapid evidentiary needs. This creates a barrier to interaction and, points to the importance of timeliness of research as a dimension to alignment.

While the "two communities" included in the study exemplify differences and experience challenges for interactions, a number of enabling structures were identified to facilitate interactions. Being based in a research centre or an organization which values interaction can enable it to occur. Such a supportive organizational context may allow researchers to be appropriately rewarded for the time that it takes to invest in interactions and also for the generation of outputs of relevance to policy. Previous research has drawn attention to the potential value of research centres in providing infrastructure to enable collaboration (Coen,

Bottorff, Johnson & Ratner, 2010), creating supportive environments for applied research (Langille, Crowell & Lyons, 2009) and stimulating research that meets the evidence needs of end users (Cameron, et al., 2009).

Federally, the leadership role of Health Canada was discussed in many interviews. Health Canada was noted as a research funder, a facilitator for cross-jurisdictional communication through the Tobacco Control Liaison Committee, a linkage agent for this committee to researchers, and a resource for tobacco control research, particularly through its national-level surveillance structures. Provincially, research units were valued for their potential to generate policy-relevant research. Coalitions and alliances created conditions for bringing multiple stakeholders, including some researchers and policy-makers, around a common table to address tobacco control in a given jurisdiction. In some cases, interactions with advocacy organizations occurred outside of the context of a formal coalition or alliance, but also influenced researchers and research users.

At the system-level, there are a number of additional factors which may influence researcher and research user interactions and interest in aligning research and policy agendas. The extent to which tobacco control was a provincial, territorial, and/or federal government priority is part of this picture. Tobacco control strategies seemed to be opportunity points for stimulating interactions and for developing and implementing interventions. This included holding consultations with researchers to inform strategy development or renewal and also creating opportunities for interactions with researchers around evaluation of strategies overall or particular components within. There was an expressed sense that the future for tobacco control in Canada was somewhat uncertain and that there was a role for research to play in terms of highlighting opportunities for future directions. The role for research within the future of tobacco

control, particularly in light of the changing patterns of tobacco use in developed countries, has been noted elsewhere (Morgan, Backinger & Leischow, 2007).

Participants also noted the role of research funding as a system-level influence on the nature of research that is conducted. Some general observations were made about the movement of research funders toward supporting research with societal relevance. Within the Canadian context, this included having a dedicated research funding body for tobacco control in the form of the CTCRI. The CTCRI was a partnership of "research, government and not-for-profit organizations committed to strategic funding of tobacco control research" (CTCRI, 2010) and was specifically focused on enabling research with likelihood of impact and on bringing together these diverse stakeholder groups. In addition to supporting events and workshops, the CTCRI convened committees around the development of better practices for tobacco control and a National Advisory Group for Monitoring and Evaluation. Early on in its mandate, the CTCRI also developed a national research agenda for tobacco control research which, in spite of some observed flaws by some interviewees in the process and product, was seen as a touchstone for those who knew about it. While many interviewees did not mention the CTCRI research agenda specifically, several commented on the potential value of a research agenda setting process for tobacco control research and policy in general. The role of the CTCRI in stimulating policy-relevant research has been noted elsewhere (Green, et al., 2006) and the value of its approach has been suggested as a possible model for funding such research in areas other than tobacco.

The broader system-level reward structures can serve to incentivize or impede interactions. Within these interviews, the academic reward structures were noted as being a particular barrier. These findings confirm what has been suggested elsewhere about the challenges of the academic reward structures in facilitating knowledge translation activities (Phaneuf, et al., 2007;

Hofmeyer, et al., 2007). While funding can be enabling under the right set of circumstances, grants may also be a barrier to collaboration and supporting partnerships – the length of time that it takes to get funded and the disappointment and partnership consequences to not being successful can be particularly problematic to momentum and the generation of policy-relevant research. Further, some interviewees discussed the challenges of tenure and promotion requirements, including the emphasis on peer-reviewed publications. While these considerations were noted as a challenge, they could be overcome in certain institutional contexts such as being based in applied faculties or universities that place a high value on research with relevance and reward both traditional and 'non-traditional' research outputs. The importance of peer-reviewed publications was not dismissed and was noted for enhancing the credibility of research, however, the utility of peer-reviewed publications for informing decision-making in the absence of other approaches to facilitate knowledge use was thought to be insufficient.

6.1.2 Influence of interactions on research and policy processes

The second research question was: How might interactions influence the research and/or policy processes within the Canadian tobacco control community? This question aimed to understand whether and how interactions may have influenced those involved.

The influence of research on policy was described particularly in terms of the relevance and timeliness of research. These factors have been previously described as leading facilitators of research utilization in policy (Innvaer, 2002). These data suggest that relevance of research can be enhanced through policy-maker interaction in the research process. Researchers may also be able to bring relevant research to bear through interactions in the policy process through participation in expert committees or working groups and through interaction mechanisms to respond to urgent policy needs such as the "rapid response" mechanism described earlier.

Within these data, relevance was conceptualized in terms of relevance to current and future priorities, relevance to interventions, and knowledge of ongoing trends and issues. The data present an interesting juxtaposition between research that is able to respond to current policy needs and the concurrent need for research that is more anticipatory or forward-looking to be able to inform future decisions. Previous research in tobacco control noted a similar need for 'real-time' evidence to inform decision-making and current priorities of end users (Bickford and Kothari, 2008), however, the need for a forward-looking research agenda for tobacco control has also been articulated (Morgan, Backinger & Leischow, 2007).

Research of relevance to interventions was also of great interest to research users. Interventions were considered quite broadly here to include policies, programs, or tobacco control strategies. Since evaluations are frequently tied to interventions, evaluation and research on interventions were sometimes discussed interchangeably. A range of types of research related to interventions, including data on costs and economic issues, intervention impacts or outcomes, and implementation considerations were all noted as being of relevance. The linkage of research to interventions was discussed in terms of examples of where this had occurred, for example, in the cases of tobacco warning labels or Smokers' Helplines, or could occur in the future by grafting research onto rapidly unfolding natural policy experiments. Within tobacco control there is a history of research following interventions implemented in policy or programmatic contexts by mobilizing to analyze the approach and impact of interventions (Sweet and Moynihan, 2007). There have been many recent calls for more intervention research within tobacco control (Kothari, Edwards, Yanicki, et al., 2007) and beyond (ie, Sanson-Fisher, et al., 2007; Millward, et al., 2003), suggesting its potential relevance to evidence-informed decision-making.

The interviews suggested that research evidence had been used in policy in a number of ways consistent with previously established models for knowledge utilization (Beyer, 1997). For example, research was described as having stimulated thinking and provided new ideas to policy, which is consistent with conceptual knowledge utilization. In these data, conceptual use of research seemed to be linked to thinking ahead to future needs and how research may play a role in terms of future policy. While research may not be readily used, it may provide insights which can be used at a later time. Weiss (1980) has compared this gradual accumulation to "knowledge creep and decision accretion". In essence, knowledge can accrue over time and may eventually influence a course of action at some future point. There was evidence of symbolic or strategic use of research in order to provide justification or support for a particular decision or course of action. There was also evidence for instrumental use of research in policy. Some specific examples included being able to use research to guide intervention development or service delivery.

Finally, there was evidence in the data of researchers actively trying to influence the policy process through approaches to knowledge translation. Researcher and policy interviewees alike suggested that researchers had endeavoured to not only generate research, but also share it and actively facilitate its use.

Just as research may influence the policy process, the present study sought to understand how policy-makers may influence the research process. The data were categorized around three varying articulations for how research users may be engaged in and influence (or not) the research process. The first, investigator-driven research, presented very little opportunity for research user engagement. Investigator-driven research was characterized as being most like research for research's sake or "pure research". Some interviewees suggested that investigator-

driven research may not be as relevant to policy, however, many acknowledged an important ongoing need for it. The data captured in this category may be most consistent with what has been termed in the literature, "Mode I research" or traditional science that may be curiosity-driven (Estabrooks, Norton, Birdsell, et al., 2008).

The second category that emerged from the data, policy-driven research, suggested that policy-makers may influence the research process as funders of the research. Researchers may also conduct research or interact with research users in direct response to an identified policy need. This category resonates with the "research as a retail store" view as proposed by Lomas (2000). In this view, research users may closely resemble clients and may be able to purchase a research product. The data suggested that funding arrangements from policy can greatly influence the research process in terms of what research or knowledge synthesis was undertaken, in what timeframe, and what deliverables resulted. The opportunity to direct research or have input ensured relevance.

Policy-relevant research was the third category emerging from the data and suggested several opportunities for policy to influence the research process. Interactions with research users could provide a starting point for a research interest and consequently influence the research direction. In some cases, researchers worked with research users to generate an understanding of the research needs, gather input on research implementation, or seek to get research user insights on the interpretation and meaning of data. Policy-relevant research, as it was captured in these data, was consistent with "Mode II research" or research with societal relevance and that involves relationships with end users (Denis et al., 2004; Estabrooks, et al., 2008). Previous literature has suggested that engagement with research users in the production of research can be

considered participatory research with a range of bounds for participation on the part of research users (Cargo and Mercer, 2008).

While the majority of research has examined the application of "types" knowledge utilization in policy, this study also found evidence of conceptual and instrumental knowledge use of policy knowledge by researchers. For example, interactions in the research process may stimulate thinking of researchers about what to study and policy evidence needs in a manner that is consistent with conceptual use. Instrumentally, researchers may use policy-based knowledge and resources in order to conduct research as was the case in "policy-driven" research.

When engaging in research with research users, there may be some parameters which need to be established with regard to the nature of the data and research products generated as a result of the interactions. Some specific examples from the data related to issues of confidentiality of evidence, data ownership, and publishing agreements.

6.1.3 Alignment of research and policy

The final research question was: How might these interactions relate to the alignment of research and policy agendas? Is alignment of the research and policy agendas within the Canadian tobacco control community desirable and, if so, for what purpose and under which conditions? This question aimed to explore and understand the views of researchers and users regarding the desirability of alignment and why it may or may not be so.

In these data, there was a very close relationship between relevance and timeliness of research (to policy) and alignment. Alignment was further characterized in terms of the extent to which the research and policy agendas are shared. Participants described that the end goal or objective within tobacco control is shared between researchers and policy-makers. Shared priorities related to the coming together of government and research priorities. Shared relevance

was discussed in terms of the opportunity for mutual influence and mutual benefit for both researchers and research users. Unlike the previously discussed category related to relevance which anchors the relevance of research to the needs of policy, shared relevance suggests that the needs and interests of researchers and research users can both be met when there is alignment.

Previous discussions of alignment have suggested the potential to bring communities together toward a shared outcome. Alignment of research and research use has been framed in terms of the potential to focus on issues of shared interest (Green et al., 1995). Green and colleagues (2006) have suggested that research funding incentives can be re-designed in order to better support the alignment of research with policy. In terms of research agendas, it has been proposed that aligning tobacco control and lung cancer research agendas may serve to advance both (Gritz et al., 2007). Butler-Jones (2009) has extended the concept into strategic alignment across organizations as a way to advance shared agendas for chronic disease prevention.

While alignment was generally thought to be positive by participants, an important caveat to the alignment of research and policy agendas and to interactions emerged from the data. Both researchers and research users noted the importance of maintaining researcher independence and credibility. In these data, independence did not mean that researchers and research users should not interact. It related moreso to the importance of maintaining a relationship free from undue influence. During member checking, one participant re-phrased the notion of independence to 'autonomy'. A degree of independence or maintaining an arm's length from government was thought to enhance the credibility of research and enable researchers to offer data-driven results that are not subjected to what policy-makers 'want to hear'. Hanney (2004) suggests that independence is also important from the perspective of being able to offer a critique of current thinking.

6.2 Strengths and limitations

To the author's knowledge, the present study is the first to examine researcher and research user interactions in tobacco control from the perspective of both sets of individuals. Interaction between researchers and end users of research has been established as an important strategy for knowledge translation (Innvaer, et al., 2002). This study extends previous research in knowledge translation by both establishing the importance of interactions between researchers and research users as a knowledge translation, and exploring the nature of those interactions. The result is an understanding of how they not only influence the policy process, but also how they may influence the research process – an area that is far less understood.

This study, just as any other, also has limitations. The first set of limitations relates to the sample. The study was focused on Canada only and did not include interviewees from advocacy groups or NGOs, an arguably important perspective to consider within the tobacco control environment. While many of those approached did agree to participate, it is possible that those who declined would have brought a different perspective to bear than those who accepted.

Amongst those who were interviewed, the sample of research users had both jurisdictional (ie, federal/provincial/territorial) and geographic (multiple provinces/territories represented) breadth, not all provinces or territories were represented in the sample. Research users had varying degrees of experience in their respective roles.

For the sample of researchers, with the exception of one interviewee, all were Ontario-based. The basis for the sample was dual nominations whereby the researchers who were selected had been nominated by at least two research user interviewees (with one exception for theoretical sampling purposes). Given the size of Ontario, the number of universities, and the tobacco control research capacity in the province, this was not terribly surprising. That said, it may limit

the breadth of perspectives brought to bear given that researchers have been exposed to a similar provincial context. All researcher interviewees had a university affiliation. While some had experience working on commissioned or contracted work with government, none were full-time independent consultants at the time of the interview. Finally, a profile of the 'typical' tobacco control researcher in Canada does not exist. The researcher participants in this study were senior and had worked in tobacco control for many years. All were affiliated with a research centre, group, or unit and conducted their research through that environment. None conducted basic research. The researcher sample was generated based on nominations from research users and the nominations were based on researchers having influenced policy. It is possible that research users nominated researchers who shared their worldview in some way or nominated researchers who specifically had an orientation toward applied research. The extent to which their level of seniority, applied orientation, and the environment in which they conducted their work makes them similar or different than other tobacco control researchers in Canada is not known.

Another limitation relates to the timing of the study. Data for this study were collected during a period of heightened investment in tobacco control and tobacco control research in Canada. Many of the structures that were found to facilitate interaction within tobacco control described in Section 5.4.2 have now sun-setted or changed form in one way or another as noted earlier (Section 2.7). While the data present an understanding of researcher and research user interaction at a single point in time, they are limited for the same reason. In addition, these data are based on self-reported experiences of interactions and, accordingly, could have been subject to demand characteristics or issues of recall. The interview protocol encouraged open and honest responses to minimize demand characteristics and participants were given the opportunity to

review transcripts after the fact and could have made changes if they had not expressed their experiences accurately – only minor changes were made.

The research was conducted in the author's "own" research community and as such, a constructivist approach guided the analysis. The familiarity with the community and language was an asset to the conduct of the study. In reflexive manner, the author gained valuable insights from conducting this research about her own research practice. At the same time, the author put in place several methodological safeguards in order to ensure that the results remained grounded in the experience of participants (Section 4.4.2).

The data were analyzed by the author only. While input was sought from committee members, all of whom have experience working within tobacco control, presentations were made about the data to the tobacco control community, and a member checking process was put in place, it is possible that having a second analyst may have resulted in a more robust validation of the coding and category structure. Member checking of findings with a subset of participants suggested that the findings resonated and reflected their experience at the time of the interview. These member checking procedures enhance the credibility of findings. The broad applicability of the theory will require testing in future research.

6.3 Significance and potential implications

There were several novel findings in the present study. The study provides elaboration to the concept of interaction by going further 'upstream' than only looking at research utilization in policy to understand interaction in the research generation process and on the alignment of research and policy. To the author's knowledge, it is the first time that such research has been conducted. While the research was conducted in the context of the Canadian tobacco control community, findings have implications for tobacco control research and also other areas.

Findings suggest that structures to support interaction are an important facilitator and the study revealed a number of tobacco-specific mechanisms which existed to this end. These data were collected at the virtual peak of investment in tobacco control research in Canada with multiple large-scale investments occurring simultaneously (CTCRI, 2009). Since the data were collected, however, the context for Canadian tobacco control research has shifted. One significant change relates to the ending of many tobacco control research capacity building initiatives which were designed, at least in part, to promote interactions and collaborations between researchers and research users. Some of these initiatives noted in the data included funding for the Annual Symposium for Research to Inform Tobacco Control, tobacco-related Interdisciplinary Capacity Enhancement grants, and two tobacco-specific CIHR-funded Strategic Training Initiatives in Health Research. These data may be of interest to informing the next generation of tobacco control research capacity building efforts in Canada, whatever they may be, particularly from the perspective of how to create enabling structures for research user and producer interactions to occur.

A further shift in the Canadian tobacco control research landscape relates to the CTCRI, which was not renewed for its third phase. There was an announcement to this end in March 2009 and, as of June 2009; the organization had closed its doors. Based on the understanding gained from interviews, this research has implications for the former funders of CTCRI such that they may understand the role of CTCRI and its approach to funding research from the perspectives of these interviewees – including researchers who were nominated as having been influential to policy. The findings also have implications for other research funders about the properties of funding mechanisms which may enable the conduct of policy-relevant and, ultimately, improved alignment of research and policy agendas. These data suggested that

funding mechanisms which could enable the timely review of applications and be responsive and nimble to evolving policy priorities held much promise. The data suggested that relevance of research to policy was influenced by current and future priorities of government, as well as having research linked to interventions. Given recent calls to increase intervention research in Canada (Di Ruggiero, Rose & Gaudreau, 2009) and within tobacco control specifically (Kothari, et al., 2007), the findings from this research may be of interest to those interested in stimulating such research.

This research was conducted in the Canadian context – arguably one of the most successful countries in the world in terms of tobacco control efforts (Studlar, 2002) and one of the leading producers of tobacco control research (Kusma et al, 2009). Given the opportunity presented by the implementation of the Framework Convention for Tobacco Control and the need to build global tobacco control research capacity (Lando, Borrelli, Klein, et al., 2005), the findings have implications for other countries who may be considering implementing interventions to support researcher and research user interaction. In the same way, these findings may also have implications for areas outside of tobacco control. As governments in Canada shift toward interest in integrated chronic disease prevention and strategies which may address multiple risk factors (ie, Canadian Strategy for Cancer Control; Healthy Living Strategy), there is potential to learn from the approaches evident in the present data to promoting interactions between research and policy communities. The data suggested that a systems perspective – one that gives consideration not only to individual interactions, but the structures, incentives, and barriers which may influence those interactions – is important. In so doing, the results have implications for creating incentives to individual interactions and removing barriers to same and also for creating strategies to support interaction.

Further, the findings may also have implications for training. A number of the individual-level factors related to relationship building may be amenable to training opportunities for researchers and policy-makers alike. For example, familiarity and contextual knowledge were noted as being facilitators to relationship building. In some cases, this was achieved through having had exposure to the 'other' sector. Interchange mechanisms which allow researchers to have experience in policy contexts and vice versa may be one possible approach to consider. Others may include the ongoing engagement of research users through existing training mechanisms. Those mentioned in the data included training grants and graduate courses. These interaction opportunities may benefit research users through exposure to research and graduate students and may also serve to sensitize young researchers to issues within the policy sphere.

These data have implications for the role of researchers and the research process. The researchers that participated in this study were identified by research users as having influenced their research-based evidentiary needs. One approach taken by these researchers is engaging with research users before or during the research process and also to facilitate use of research. As noted earlier, although the data were not consistent with the strictest definition for participatory research, they do suggest that engaged approaches to scholarship can support the conduct and use of research that is relevant to the needs of end users while at the same time benefitting the researchers conducting the work. Researchers reflected on the importance of seeing their work applied in the "real world" and wanting to make a difference. Accordingly, these findings have implications for researchers who would like to work in ways that can enhance the relevance and timeliness of research to policy and possibly the alignment of research and policy agendas.

6.4 Recommendations for future research

The area of research on knowledge utilization has expanded rapidly over the last 50 years (Estabrooks, Derksen, Winther, et al., 2008). Interactive approaches have been identified as key strategies to support knowledge translation (Lavis, 2006) and as a leading facilitator to research utilization (Innvaer, et al., 2002). The present study contributes to that growing literature by understanding both individual and broader systems-level factors associated with interaction and exploring the relationship to alignment. There are a number of interesting opportunities for future research emerging from these results.

While this study presents a qualitative understanding of the relationship between interaction and alignment, the hypothesized relationships between variables could be empirically tested in future research. Categories or sub-categories that were found in these data could be developed into quantitative measures and tested in a larger sample of researchers and/or research users to determine whether and to what extent the relationships exist in a broader sample of tobacco control researchers and research users.

The theoretical categories and relationships could be examined in further research in other substantive areas of chronic disease prevention or in tobacco control in other countries. Given the need to build global research capacity within tobacco control, future research could be conducted in other countries to understand the extent to which theoretical insights gained from the Canadian experience may apply to tobacco control elsewhere. Beyond tobacco control, there have been other areas for chronic disease prevention that have gained prominence and become the focus of national and provincial strategies. As such, there will be a commensurate need to build a relevant evidence base to inform decision-making and evaluate the effectiveness of intervention approaches. Lessons from the tobacco control experience may be relevant to other

areas, such as obesity prevention. Future research could examine the extent to which the categories that emerged from the present grounded theory hold true in other research and policy communities.

As previously noted, the researcher participants in this study were fairly senior in their career stage and very experienced within tobacco control research. Given the barriers noted in terms of academic incentives and reward structures on the ability of researchers to interact, it may be that senior researchers or researchers that have tenure may be in a better position to engaged in interactive research processes and relationship building activities than more junior researchers. Exploratory research suggests that this is the case (Estabrooks, et al., 2008). Future research could explore how the present findings hold in a more junior community of researchers.

Given the importance of individual and organizational relationships that emerged from these data, social network analyses of researchers and policy-makers within the Canadian tobacco control community could be a promising area for future research. Similar research has been conducted to understand the social networks in tobacco control at the individual (Norman and Huerta, 2006) and organizational levels (Leischow, Luke, Mueller, et al., 2010; Krauss, Mueller & Luke, 2004). Such analyses describe the extent and strength of relationships and activities, reciprocity, and potential network weaknesses. In addition, the present study did not specifically seek to examine the role of tobacco control advocacy community as a possible intermediary between researcher and research users. There was some suggestion from these results that the advocacy community, through insider knowledge and/or through organized tobacco control coalitions/alliances present another dimension to be understood. Future research within tobacco control should examine the role of advocates within the researcher and research user interface.

Beyond individual relationships, the results of this study clearly suggest a role for broader structures to support interaction between researchers and research users in tobacco control. Although it was not mentioned in these interviews, it may be that research centres or units can provide an element of sustainability to interactions. Having organizational connections between research centres and government departments may mitigate some of the disruption created by the high staff turnover within government. The institutionalization of research and policy connections through organizational structures could be a possible area for examination.

Interviewees suggested that an important caveat to alignment and interactions was independence and the credibility of researchers. One dimension of credibility was specifically related to being free from conflicts of interest which may arise through sources of research funding, Although it was not explicitly mentioned in the interviews, it is possible that the tobacco control community is particularly sensitive to issues related to funding influences and compromised independence of scientists given past experience with tobacco industry and science. Cohen and colleagues (2009) proposed a set of criteria to evaluate funding models for tobacco research. Although the criteria were primarily aimed at guiding funding arrangements between researchers and the tobacco industry, their utility for other research funding arrangements, including funding from policy could be an interesting area for future research given the importance placed on researcher autonomy as a caveat to alignment in the present data.

These and other structures to support interaction required investment by research funders, health charities, the private sector, and governments to enable them to occur. Future research should examine the impact of investment changes on researcher and policy-maker interactions since these data were collected. Have changes in investments had unintended negative consequences on the relationships between researchers and research users in tobacco control?

Have the benefits of these investments been sustained over time? Have researchers altered their approaches to conducting research as a result? Has alignment been compromised?

This study was not designed to directly examine the relationship between alignment and research utilization. Future research should explore the extent to which alignment may enhance the use of research in policy and, ultimately, the extent to which alignment contributes to better public health policy. If an ultimate objective of public health policy is to improve health outcomes for target populations, it would be interesting to explore the role that the alignment of research and policy agendas may play in creating "better" public health policy.

CHAPTER 7: CONCLUSIONS

The tobacco control context in Canada represents a mature field with a historically active policy agenda and an increasingly well-established research community. The present research used a grounded theory approach to look within this community to understand the extent and nature of interactions between research and research users. The study also examined the relationship between interactions and alignment of research and policy. In so doing, it makes a worthwhile and interesting contribution to our understanding of the researcher and research user relationships in the Canadian tobacco control community. This study extends existing conceptual work in the area of knowledge exchange, particularly from a public health perspective, and has implications for the future of tobacco control and for other aspects of chronic disease prevention.

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Appendix A: Literature Review Search Description and Summary Tables

Search Strategy

The literature included in this review was strategically selected based on the relevance to the research questions at hand. The literature was drawn from a variety of sources, including previous literature reviews conducted by the author, and searches of academic databases including SCOPUS and Medline (PubMed). Search terms such as: research, evidence, public health, health promotion, health, policy, health policy, policy making, network, communities of practice, knowledge translation, knowledge exchange, collaboration, and evidence-based were used singularly or in combination. In addition, reference list scanning, cited reference searching, and the "relevant articles" search function were used as supplementary search techniques. Articles were deemed most relevant if from the health sector, particularly population and public health, beyond the clinical setting and pertaining to developed countries.

Table 1. A review of reviews: Facilitators of knowledge transfer and utilization between research and policy (Presented alphabetically).

Reference	Purpose	Methods	Findings	Findings Related to "Interaction"
Almeida, C. and Bascolo, E. (2006). Use of research results in policy decision-making, formulation, and implementation: A review o the literature. *Cad. Saude Publica, 22(S),* 7-33.	To examine the theoretical literature on the relationship between production of research and its use in the policy process. Three areas of focus: 1) models to explain research and policy 2) the use of research in policy 3) interaction between research and policy	Selective literature review based on seminal authors in the field	Overview of main models of knowledge transfer between research and policy (by author), including: 1) Weiss (knowledge driven, problem solving, political, tactical, interactive, enlightenment, and intellectual enterprise) 2) Trostle (rational, strategic, and enlightenment /diffusion) 3) Instrumental, conceptual and symbolic use 4) Rich (information pick-up, processing, and application) 5) Kirkhart (use and influence models-influence is a function of source, timing, and intention) 6) Patton (utilization-focused evaluation with an emphasis on processes rather than products) Consideration of the range of possible uses and acknowledgement of complexity/non-linear nature of the research to policy connection.	Barriers to research utilization in policy include: i) ideology, ii) **historical separation between the communities**, iii) uncertainty due to conflicting results, iv) differential concepts of risks across sectors, v) media interference, vi) **marketing and circulation of research**, vii) **research timeframes**. Interactions between researchers and decision-makers- can occur at **multiple points during the research process** (from problem formulation to presentation to circulating results) and is a **dynamic relationship** that may change over time and depending on needs
Hanney, S.R., Gonzalez-Block, M.A., Buxton, M.J. & Kogan, M. (2003). The utilization of health research in policy-making: Concepts, examples, and methods of assessment. *Health Research and Policy Systems. 1(2).* Electronic resource, no	To review meanings of research to policy, the scope of research utilization in different research and policy environments, and to offer a conceptual framework for research utilization in policy.	Selective literature review	Presented models of policy making: rational (linear model), incrementalist (decision accretion of many sources of knowledge), networks (relational models of the policy community), and "garbage can" (lingering solutions with new applications). Presented models of research: i) social science vs. basic, ii) international vs.	Interaction is receiving increased attention in the literature, and has relates to **many stages of the research and policy processes**. There may be **different values and interests between research and policy communities** with **different timeframes**.

Reference	Purpose	Methods	Findings	Findings Related to "Interaction"
pagination.			national, iii) domain-based (mode 1 which is discipline centred vs. mode 2- which is knowledge generation in the context of application Incentives may be an important consideration both in the generation of useable research and the interest in using it.	**Mechanisms to support** interfaces between communities need to be developed, including capacity building for understanding contexts. **Relevance** and **timeliness** of the research to policy are key issues and can be influenced by **engagement** of policy stakeholders **in the research process- Mode 2 research**. "Independent research can provide critical commentaries and alternative perspectives…for health policy-making in the long-term" (p. 15- web pagination) **Long-term linkages** between communities are important to supporting interaction "Good" interaction can be achieved informally, deliberately or by chance Histories of interaction may be important to understanding. For example, policy-makers with a prior understanding of research may place greater value on connections.
Hemsley-Brown, J. (2004). Facilitating research utilization: A cross-sector review of research evidence. *The International*	To determine: i) barriers to research utilization and recommendations from research to address	Cross-sector, systematic literature review. Searched 10 research	- 150 studies were eligible for inclusion Barriers to research utilization include: 1) Inaccessibility of research including language and physical access	**Trust** can be enhanced through interaction and collaborative approaches to research. Interaction and linkage

Reference	Purpose	Methods	Findings	Findings Related to "Interaction"
Journal of Public Sector Management, 17(6), 534-552.	these barriers, and ii) the most effective strategies to facilitate the use of evidence by managers. Managers were defined broadly and included public and private sector. Practice was primary focus, but it seems like policy could be considered a practice.	databases (from healthcare, business, and education). English language articles and conference papers were included. Selection criteria for inclusion: 1) relevance to research questions, 2) appropriateness of design, 3) quality of research, 4) reviewer judgement.	2) Relevance of research to issues in decision making including implications of research and realistic claims from findings 3) Trust and mistrust of the research design including the features of the design and the credibility of and trust in the source of the research 4) Organizational factors including structures, interactions between researchers and managers, and organizational culture. Organizational setting and time also emerged as important in the health sector literature. Facilitators to research utilization include: 1) Provision of support and training to understand, use, and value research 2) Collaboration, partnerships, and links including mechanisms for involving users in the research and the development of communication networks between users and producers-opinion leaders are a possible source of influence 3) Dissemination strategies with a focus on social processes for dissemination 4) Communication networks which include both research producers and users can encourage collaboration and learning 5) Leadership to increase motivation and commitment to research utilization.	mechanisms emerged as important in multiple facilitators and barriers to research utilization in this cross-sector review.
Innvaer, S., Vist, G., Trommald, M. & Oxman, A. (2002). Health policy-makers' perceptions of	To examine facilitators and barriers of research utilization in health policy-making.	Systematic review of studies of health policy-makers.	24 studies were eligible for inclusion. The included studies represented a range of study designs and	Personal contact between researchers and policy-makers was a dominant facilitator (13/24 studies) alongside timeliness and

Reference	Purpose	Methods	Findings	Findings Related to "Interaction"
their use of evidence: A systematic review. *Journal of Health Services Research & Policy, 7(4),* 2329-244.		Searched 8 databases, hand-searched, and contacted investigators. Inclusion criteria related to studies with health policy-makers related to perceptions of research utilization in policy at multiple levels (national, regional, and/or organizational). Excluded studies of clinical decision-making.	methodological quality. Key facilitators of the use of research evidence in policy making (taken from p. 241): - Personal contact between researchers and policy-makers (13/24 studies) - Timeliness and relevance of research (13/24) - Research that included a summary with clear recommendations (11/24) - Good quality research (6/24) - Research that confirmed current policy or endorsed self-interest (6/24) - Community pressure or client demand for research (4/24) - Research that included effectiveness data (3/24) Key barriers of the use of research evidence in policy making (taken from p. 241): - Absence of personal contact between researchers and policy-makers (11/24 studies) - Lack of timeliness and relevance of research (9/24) - Mutual mistrust, including perceived political naivety of scientists and scientific naivety of policy-makers (8/24) - Power and budget struggles (7/24) - Poor quality of research (6/24) - Political instability or high turnover of policy-making staff (5/24)	relevance (13/24) and absence of personal contact was the most dominant barrier (11/24 studies). The review recommends "personal two-way communication" as a promising facilitator of research utilization in health policy. They suggest that it may increase trust and mutual understanding.

Reference	Purpose	Methods	Findings	Findings Related to "Interaction"
			Clear and consistent definitions of 'use of evidence' will be important for further studies in this area.	
Lavis, J., Davies, H., Oxman, A., Denis, J-L., Golden-Biddle, K. & Ferlie, E. (2005). Towards systematic reviews that inform health care management and policy-making. *Journal of Health Services Research and Policy, 10(S1),* 35-48.	"To identify ways in which researchers and research funders could improve the usefulness of systematic reviews for health care managers and public policy-makers" (p. 36)	An exploratory study that combined a systematic review of literature with interviews of managers and policy-makers and website review. Built on search strategy and approach taken by Innvaer, et al. (2002) but with inclusion criteria geared toward the purpose of the present review. Conducted semi-structured interviews with health care managers and health policy-makers. Reviewed websites of funders, producers or research, and journals to determine how systematic reviews are presented.	Review yielded 17 studies reported in 20 articles. After considering study design and quality the following factors were most consistently demonstrated in the literature: - "interactions between researchers and health care policy-makers increased the prospects for research use by policy-makers; - timing and timeliness increased (and poor timing or lack of timeliness decreased) the prospects for research use by policy-makers; - policy-makers' negative attitudes towards research evidence decreased the prospects for research use by policy-makers; - policy-makers' lack of skills and expertise decreased the prospects for research use by policy-makers; - policy networks, conflicts and rivalries and trust in the researcher increased the prospects for research use by policy-makers, while lack of perceived relevance, use of jargon, and only publishing for a scholarly audience decreased the prospects for research use by policy-makers; and - relationships with or involvement of health care staff in the research process increase the prospects for	Interactions between researchers and health care policy-makers **increased the prospects for research use** by policy-makers;

Reference	Purpose	Methods	Findings	Findings Related to "Interaction"
			research use by managers, whereas the (lack of) support of the management and front-line staff who had influence in the area where change was required decreased the prospects for research use by managers." (taken from p. 39) Conducted 29 interviews regarding research and how systematic reviews can be positioned to inform policy making and management decisions. - approach to evidence was varied and inconsistent and research evidence was rarely an explicit requirement - managers and policy-makers did have questions that *could* be informed by literature (or systematic) reviews and many have used literature reviews - local applicability of evidence emerged as a concern- specifically around similarity of environment, ethno and demographic groups, and recency - most interviewees thought that systematic reviews should contain references to information about a) benefits, costs, and risks, b) uncertainty of the estimates, and c) variability of estimates by subgroups - presentation of evidence from systematic reviews in a 1:3:25 format was positively received by	

Reference	Purpose	Methods	Findings	Findings Related to "Interaction"
			interviewees Reviewed 25 websites (14 funders, 14 producers, 17 journals)	
Mitton, C., Adair, C.E., McKenzie, E,, Patten, S. & Perry, B.W. (2007). Knowledge transfer and exchange: Review and synthesis of the literature. *The Milbank Quarterly, 85(4),* 729-768.	"To examine and summarize the current evidence base for knowledge translation and exchange (KTE) for health care policy, resulting in an evidence-based resource for planning KTE processes" (p. 731)	Systematic review focused on health policy. Searched eight databases; English language; 1997-2005 Selection criteria related to KTE studies that could impact health care policies at the organizational, regional, provincial, and/or federal levels. All included studies were given a quality assessment rating.	34 non-implementation studies met inclusion and 10 implementation studies met inclusion Numerous facilitators and barriers noted at the individual and organizational levels, others related to communication and time or timing. Suggests importance of factors beyond the individual	Table 4 (p. 744) suggests the following interactive KTE strategies: - Face-to-face exchange (consultation, regular meetings) between decision makers and researchers - Education sessions for decision makers - Networks and communities of practice - Facilitated meetings between decision makers and researchers Interactive, multidisciplinary workshops - Capacity building within health services and health delivery organizations - Web-based information, electronic communications - Steering committees (to integrate views of local experts into design, conduct, and interpretation of research)
Walter, I., Nutley, S. & Davies, H. (2005). What works to promote evidence-based practice? A cross-sector review. *Evidence & Policy, 1(3),* 335-363.	To present the findings of a cross-sector review of the effectiveness of strategies to promote evidence-based policy and practice.	Systematic cross-sector literature review. Searched 11 databases (from health, social care, criminal justice, and education) for English language articles published after 1990.	93 articles met criteria for inclusion. Very little consistency in definitions of research use, and a range of methods and measurement tools were evident. Five key mechanisms were seen to promote the use of evidence in policy and practice:	Interaction- stronger links and collaborations between researchers and policy/practice communities Interactive approaches relate to: - the active construction of research meaning - sustained interaction and increased linkages - partnership approaches seem effective

Reference	Purpose	Methods	Findings	Findings Related to "Interaction"
		Selection criteria pertained to evaluations of interventions to enhance research utilization for policy and practice. All types of studies were included. All articles were subjected to a quality assessment protocol.	1) Dissemination- sharing findings 2) Interaction- stronger links and collaborations between researchers and policy/practice communities 3) Social influence- opinion leaders or influential others to inform and persuade regarding the value of research 4) Facilitation- support systems to enable use 5) Reinforcement- rewards and incentives	Barriers to interactive approaches (p. 344): - time and investment to establish effective working relationships - range of differences between communities - issues of project control Informal interactions may also hold potential such as through networks

Table 2. Summary of literature review on interaction between research users and producers: Primary studies involving researchers (Presented alphabetically).

Reference	Purpose	Design/Measures	Sample	Selected Relevant Findings
Adily, A., Black, D., Graham, I, & Ward, J. (2009). Research engagement and outcomes in public health and health services research in Australia. *Australian and New Zealand Journal of Public Health, 33(3),* 258-261.	To explore the role of research users in the research process through a retrospective examination of research outcomes.	Self-administered survey sent to funded Nominated Principal Investigators on public health and health services research grants funded through three major Australian research funding agencies Assessed nature of engagement in research process, user groups engaged, and research utility	n=187/245 projects returned questionnaires (75.1% response rate)	- Findings suggest limited evidence for full engagement of research users within research projects (~35% of projects) - Full engagement was not significantly associated with research value or with research utility
Bowen, S., Martens, P. & The Need to Know Team. (2005). Demystifying knowledge translation: learning from the community. *Journal of Health Services Research & Policy, 10(4),* 203-211.	To evaluate the *Need to Know* project, and to explore the characteristics of successful knowledge translation from the perspective of community partners.	Qualitative, one-one-one interviews (conducted by phone or in person)- as a part of the broader participatory evaluation for the *Need to Know* project.	101 interviews conducted with 62 participants in the *Need to Know* project, including: regional health authority team (n=45), Manitoba Centre for Health Policy research unit (n=32), Manitoba health staff (n=10) and advisory committee members/CEOs (n=14)	- Trusting relationships, ongoing, multidirectional information exchange, and creation of research relevant to users all emerged as important themes. - Trust was seen as a barrier to initial participation. Researchers expressed some anxiety about trusting that research results would be understood by community partners. Structured and unstructured opportunities for interaction were seen as important venues for developing trust. Trust was also important when developing research areas. - Researchers developed a new appreciation for the time and (financial) constraints for community partners as a result of their

Reference	Purpose	Design/Measures	Sample	Selected Relevant Findings
				participation in the collaborative research initiative. - Shared language became a key ingredient to project activities and interactions. - Time investment is a key factor in developing trust, language, and priorities - Relationship development was seen as a pre-condition to the completion of deliverables" (p. 207)
Campbell, D.M., Redman, S., Jorm, L., Cooke, M., Zwi, A.B. & Rychetnik, L. (2009). Increasing the use of evidence in health policy: Practice and views of policy makers and researchers. *Australia and New Zealand Health Policy, 6(21),* online.	To examine the perspectives of researchers and policy-makers about the use of research in policy.	Structured interviews with closed and open-ended questions	Senior researchers from public health and health services research groups and senior policy-makers were invited to participate 38 policy-makers (response rate= 79%) and 41 researchers (response rate=82%) participated	- Interaction was identified as a key strategy to increase the use of research in policy - Interactions took a range of forms from dissemination opportunities to engagement in the research process
Denis, J-L., Lehoux, P., Hivon, M. & Champagne, F. (2003). Creating a new articulation between research and practice through policy? The views ad experiences of researchers and practitioners. *Journal of Health Services Research & Policy, 8(Suppl 2),* 44-50.	To examine the perspectives of researchers and practitioners of their experiences in a collaborative research grants program.	Cross-sectional, self-administered mail survey- quantitative measures (5-point Likert scales used to examine a variety of domains, such as skills required for collaboration, nature and obstacles of exchanges, and practitioner influence over and roles in the research process where 1=completely disagree and 5= completely agree)	n= 90 practitioners (response rate=44.1%) and n=114 researchers (response rate= 78.1%) from 21 collaborative research teams funded through the Quebec Social Research Council	Skills such as communication, consultation, and negotiation can be learned through partnerships Collaboration was thought to be mutually beneficial from the perspective of researchers and practitioners with few obstacles impeding it. Collaborative practice could be a positive influence on research through relevant, high quality research.
Ferlie, E. & Wood, E. (2003).	To study the type of	Case studies which led	n=4 purposively selected	Four over-arching themes emerged:

Reference	Purpose	Design/Measures	Sample	Selected Relevant Findings
Novel mode of knowledge production? Producers and consumers in health services research. *Journal of Health Services Research & Policy, 8(Suppl 2),* 51-57.	knowledge production that reflects health services research in the UK, how researchers link to users, how research is influenced by funding, and how research is disseminated (p. 52)	to semi-structured interviews to generate propositions for testing which occurred through a structured, self-administered mail survey	UK (clinical) research units case studies n= 70 interviews n= 199 surveys (53% response rate)- non-probabilistic sampling Sample consisted of several categories: academics, clinicians, CEOs, nurses, public health, social services, and clinical managers/directors.	1. **Mix of outputs** for Mode I (ie. peer-reviewed journal articles) and Mode II research (ie. liaison with users) 2. Building **external relationships** with stakeholders to promote evidence-based services and contribute to academic knowledge 3. The role of **external funding :** Mode II research results in greater external control of funding, including commissioning models of research 4. **Dissemination** and **development** activities which can result in different reports of findings.
Ginsburg, L.R., Lewis, S., Zackheim, L. & Casebeer, A. (2007). Revisiting interaction in knowledge translation. *Implementation Science,2(1),* available online.	To examine the impact of a interaction-based approach to knowledge translation	Single case study – semi-structured interviews with participants; field observation	Single case study design of an interaction approach (forums and webconferences) to knowledge translation related to data from the Canadian Adverse Events Study 33 interviews conducted with a random sample of forum participants	- Through two forums and two webconferences researchers aimed to increase the instrumental use of data from the Canadian Adverse Events Study - Interaction-based approach was successful in stimulating conceptual use and focusing stakeholder attention on an issue - Instrumental use was not as evident - Targeted interactions may be more appropriate when linked to release of study results
Goering, P., Butterill, D., Jacobson, N. & Sturtevant, D. (2003). Linkage and exchange at the organizational level: a model of collaboration between research and policy. *Journal of Health Services Research & Policy, 8(Suppl 2),* 14-19.	To describe an example of an organizational-level initiative to promote linkage and exchange between policy and research.	Single case example	Single case example of linkage and exchange between the Health Systems Research and Consulting Unit and the Ontario Ministry of Health and Long-Term Care (Mental Health and	Advanced four tier approach to linkage and exchange in the research and policy processes: - inter-organizational relationship (trust as critical and is understanding of procedural and cultural differences) - interactive research projects

Reference	Purpose	Design/Measures	Sample	Selected Relevant Findings
			Reform Branch)	(relationships can become complex and issues of boundary maintenance must be considered) - dissemination (sharing of research results through policy forum) - policy formation (researchers must understand that the outcome does not override the importance of the process)
Golden-Biddle, K., Reay, T., Petz, S., Witt, C., Casebeer, A., Pablo, A. & Hinings, B. (2003). Toward a communicative perspective of collaborating in research: the case of researcher-decision maker partnership. *Journal of Health Services Research & Policy, 8(Suppl 2),*20-25.	To present a case study of a research decision-maker partnership from a communicative perspective.	Single case study of a change management process	n=1 case consisting of a partnership in a rural regional health authority in Alberta.	Key findings related to four key elements: a) the **relational stance** of partners toward each other and each other's work (trust, respect, differences in culture) b) engaging in the development and use of knowledge through a **shared purpose** (shared interest in studying and implementing change) c) enacting **knowledge sharing practices** (sharing relevant articles, sharing findings along the way, providing resources to support change, sharing observations, but not advice) d) identify forums for **accessing** and **sharing knowledge** (forums for all involved)
Jacobson, N., Butterill, D. & Goering, P. (2004). Organizational factors that influence university-based researchers' engagement in knowledge transfer activities. *Science Communication, 25(3),* 246-259.	To study the barriers and solutions for the engagement of university-based researchers in knowledge transfer activities	Focus groups	Mostly doctorally-prepared researchers with appointments in a Faculty of Medicine * Number of focus groups and individual participants were not reported.	Activities associated with knowledge transfer (outreach, partnerships with non-academics, and plain language communications) are not widely accepted as forms of scholarships. Drawing on relevant literature and focus group findings, the authors suggest that organizational policy and practice changes may support knowledge transfer: 1. Promotion and tenure guidelines 2. Resources and funding 3. New internal structures such as

Reference	Purpose	Design/Measures	Sample	Selected Relevant Findings
				research units and knowledge brokering 4. Knowledge transfer orientation as a priority and part of the university's mission 5. Documentation of knowledge transfer activities to offer as evidence during performance reviews.
Kothari, A., Edwards, N., Brajtman, S., Campbell, B., Hamel, N., Legault, F., Mill, J. & Valaitis, R. (2005). Fostering interactions: the networking needs of community health nursing researchers and decision makers. *Evidence & Policy, 1(3),* 291-304.	To determine the current linkages among researchers and decision makers in the community health nursing community in Canada in the context of a needs assessment for networking infrastructure.	Focus groups, invitational workshop, and telephone or in-person interviews	n=3 focus groups n=31 individual participants in focus groups n=19 workshop attendees n=11 interviews Community health nursing researchers and decision-makers	Informal networks exist to support interaction, but were more for personal satisfaction. Formal networks usually relate to a specific purpose and are at an organizational level (which allows for longevity). Time, funds, lack of academic rewards, and unease with compromising research questions emerged as barriers to interaction for researchers. Networks were seen as a support to advancing science and translating research into policy. Funding agencies were viewed as a key facilitator of networking interactions.
Kothari, A., Birch, S. & Charles, C. (2005). "Interaction" and research utilization in health policies: does it work? *Health Policy, 71,* 117-125.	To assess whether research user and producer interaction is related to research utilization in the design and delivery of a breast cancer prevention program among health units in Ontario, Canada	Comparative multi-case study approach	Interacting teams (n=3) were selected based on a pool of 6 teams who had been involved in the commissioning of the research. These teams had been giving the findings in writing and at a presentation during a meeting. Comparison teams (n=3) were selected from the remaining 31	Overall, the final report that had been presented to the interaction teams was felt to have reflected the feedback offered to the researchers during the interaction process. Comparison teams expressed questions regarding decisions made regarding methodology and how data were presented in the final report. Interacting teams did not make comments of this nature "suggesting that participation in

Reference	Purpose	Design/Measures	Sample	Selected Relevant Findings
			public health units. Interaction and comparison teams were matched based on team size, education level, capacity and/or orientation to use research	the research process helped the teams understand the report they commissioned" (p. 122). The findings were mixed regarding the interaction strategy since it was not associated with increased research utilization, but interacting teams described occasions when they expect to use the report in the future. Comparison teams did not mention future use.
Kothari, A., MacLean, L. & Edwards, N. (2009). Increasing capacity for knowledge translation: Understanding how some researchers engage policy makers. *Evidence & Policy, 5(1),* 33-51.	"To explore the experiences of health services researchers engaging in (or not able to engage in) policy-relevant research." (p. 33)	Qualitative study – guided by phenomenology. Semi-structured interviews with senior researchers who held grant or other funding	Interviews with 23 researchers – all senior, most with PhDs, eight in leadership roles for research institutes	Explored the meaning of 'policy-relevant' research and how policy-related research questions are developed Challenges associated with the academic environment and the ability to conduct policy-related research from that environment The fit between government structures and university-based research was also discussed – most commonly mentioned were the short time frames associated with government; turnover also mentioned as a challenge Personal relationships are key and personal and professional qualities are a significant part of being able to interact around policy-relevant research
Landry, R., Amara, N. & Lamari, M. (2001a). Utilization of social science research in Canada. *Research Policy, 30,* 333-349.	To assess what use has been derived from social science research in Canada	Cross-sectional, self-administered mail survey- quantitative measures Dissemination was measured according to an index of scales of	n=1229 faculty members from 55 Canadian universities- identified through website review Response rate= 42% gross response rate, but 38% net after accounting for	"Use of quantitative methodologies, adaptation of research results, dissemination efforts, linkage mechanisms, users' context, publication assets, and external funding" were all found to be positively and significantly associated with research utilization (p. 343).

Reference	Purpose	Design/Measures	Sample	Selected Relevant Findings
		importance placed on a range of activities from 0= does not apply to 5 decisive importance Interactions were measured according to an index of scales regarding the intensity of several linkage mechanisms/activities from 0= does not apply to 5 decisive importance Modified Knott & Wildawsky (1980) scale of knowledge utilization to understand from the perspective of researchers the extent of use by practitioners/professionals	retirements, sabbaticals, ineligibility, health problems, and refusals	Nearly half of all social science research reported by researchers in the study is transmitted to users.
Landry, R., Amara, N. & Lamari, M. (2001b). Climbing the ladder of research utilization: Evidence from social science research. *Science Communication, 22(4),* 396-422.	To assess what factors determine researchers ability to "climb" the ladder of research utilization.	Cross-sectional, self-administered mail survey- quantitative measures Modified Knott & Wildawsky (1980) scale of knowledge utilization to understand from the perspective of researchers the extent of use by	n=1229 faculty members from 55 Canadian universities- identified through website review Response rate= 42% gross response rate, but 38% net after accounting for retirements, sabbaticals, ineligibility, health problems, and refusals	According to their models, each step on the ladder of research utilization is dependent on having reached the previous step. "Use of quantitative or qualitative methodologies, adaptation of research results, dissemination efforts, linkage mechanisms, users' context, publication assets, and external funding" were all found to be positively and significantly associated with climbing from no transmission to the first step on the ladder

Reference	Purpose	Design/Measures	Sample	Selected Relevant Findings
		practitioners/professionals		and focus on advancement of scholarly knowledge was found to be significantly but negatively associated with climbing from no transmission to the first step on the ladder (p. 409).
Lavis, J.N., Robertson, D., Woodside, J., McLeod, C., Abelson, J. & the Knowledge Transfer Study Group. (2003). How can research organizations more effectively transfer research knowledge to decision makers? *The Milbank Quarterly, 81(2),* 221-248.	To assess the extent to which Canadian research organizations were transferring research knowledge and to examine whether sector or intended audience contributed to variability in response. (p. 229)	Cross-sectional, self-administered mail survey – quantitative measures Each of several interactive process domains was measured on a 5-point likert scale- never to frequently	n=175 directors of applied research organizations in Canada (both health and economic/social research) Response rate= 66% Applied research organizations were defined as those "producing research that could be acted on by any one of four target audiences: general public, service providers, managerial decision-makers, or policy decision-makers- identified through website review	Between 1/3 and 2/3 of all research organizations interact with target audience members at different stages in the research process Reported only as frequencies (no significance tested reported between types of interactive processes), but **interactive domains relating to the research process as opposed to transfer alone represented a lower proportion of responses** ("developing a specific research question, objective, or hypothesis" received the greatest proportion (0.53) and "establishing the preferred research design" received the lowest (0.36).
McWilliam, C., Kothari, A., Ward-Griffin, C., Forbes, D., Leipert, B. & the South West Community Care Access Centre Home Care Collaboration. (2009). Evolving the theory and praxis of knowledge translation through social interaction: A social phenomenological study. *Implementation Science, 4(26),* online.	To understand the "nature of the process of implementing knowledge translation through social interaction"	Analysis of meeting recording transcripts and observation field notes Guided by social phenomenology	203 home care program personnel, divided across nine multidisciplinary action groups	Results draw attention to the importance of social processes in interaction Importance of understanding not only research, but also respecting tacit and experiential knowledge of end users Social interaction can allow for knowledge translation to be integrated into everyday work
Newton, M., Estabrooks, C., Norton, P., Birdsell, J., Adewale, A.J. & Thornley, R. (2007).	"To report differences in characteristics and knowledge production	Cross-sectional telephone survey – quantitative measures	240 health researchers from three Alberta universities	Mode I research activities were measured according to the number of peer-reviewed publications

Reference	Purpose	Design/Measures	Sample	Selected Relevant Findings
Health researchers in Alberta: an exploratory comparison of defining characteristics and knowledge translation activities. *Implementation Science, 2(1),* online.	activities across health researchers in Alberta from different research domains and faculties" (p. 5)	Each of several dissemination domains measured on a 5-point likert scale from never to very often)	Response rate= 60.34% Health researchers were defined according to the amount of time (at least 10%) conducting research- identified through document review.	Mode II research activities were measured according to "plain dissemination" (non-technical presentation of results) and "engaged dissemination' (involving research users in defining research questions or on advisory committees) Applied researchers were significantly more likely to report more plain and engaged dissemination than basic scientists ($p<0.001$) and significantly more likely to place importance on both Mode I ($p<0.01$) and Mode II (<0.001).
Ross, S., Lavis, J., Rodriguez, C., Woodside, J. & Denis, J.-L. (2003). Partnership experiences: Involving decision-makers in the research process. *Journal of Health Services Research & Policy, 8(Suppl 2),* 26-34.	To describe the experience of researchers of involving managers and policy-makers in the research process **and** to describe the experience of decision makers as participants in the research process.	Semi-structured interviews	Principal investigators (n=5), co-investigators (n=1) and research staff (n=1) of the programmes (n=7) funded by the Canadian Health Services Research Foundation, and the decision-makers involved in the programmes.	Types of involvement activities included written updates on research or briefing notes, standing meetings, consultations, informal exchanges, site visits, and forums. Levels of decision-making involvement in research process were summarized into three models (Table 1- p 29): a) **Formal supporter**- not actively involved in research process; b) **Responsive audience**- involved through responses to presented ideas, information, and; c) **Integral partner**- involved in all stages and actively shapes the research process. Factors associated with decision-maker involvement included **time**, **alignment between needs and expertise**, existing **relationships**, and **nature of the research**.

Reference	Purpose	Design/Measures	Sample	Selected Relevant Findings
				An extensive list of costs and benefits to the research being conducted, the participating researcher, and participating decision-maker Decision-maker involvement may have the added benefit of **leveraging** the involvement of more decision makers.
Smith, K.E. (2007). Health inequalities in Scotland and England: the contrasting journeys of ideas from research into policy. *Social Sciene & Medicine, 64,* 1438-1449.	To contribute to the understanding of researchers and policy-makers of the processes of research evidence in health inequalities policies.	Semi-structured interviews	n=58 interviews with key actors in health inequalities policy and research in the UK n=29 with researchers from a variety of research areas and theoretical perspectives n=29 policy-makers from various sectors	Examined a common research and policy topic area (health inequalities) Traced theme of **ideas/concepts** rather than specific sources of research evidence into policy- this may be successful, partial, or fractured journey of ideas into policy. Policy windows may be helpful for researchers to understand Influential researchers can be considered policy entrepreneurs or earn the privileged **term of expert- can be based on the clarity of communication, the promise of solutions, policy relevance, and academic integrity.**

Appendix B: Interview Guide- Research Producers

To begin with, thank you for taking the time to be interviewed. I expect that the interview will take about 90 minutes. I have received your consent form, thank you for completing it. As you know, I wish to tape record the interview to be certain that I capture your own words rather than have to paraphrase. I will also be taking some notes in the event that there are technical problems. The only people who will have access to the tapes and your transcribed data are me, and the four members of my dissertation advisory committee. Although I will be using quotes from the interviews in my thesis, your name will be kept confidential.

My study seeks to examine the relationships between researchers and policy makers in tobacco control. The questions that I am going to ask revolve around the interactions that you have with research users, specifically federal, provincial, and territorial policy-makers. During the interview, please feel at ease to contribute what you feel is relevant to my understanding. There are no right or wrong answers - I am interested in your experiences around this topic. The following interview questions should be seen as a guideline. You may decline to answer any of the questions.. You may also stop your participation in the study or interview at any time.

Do you have any questions for me before we start?

1) Thinking about tobacco control, tell me about your area of research (eg. is tobacco control a primary or secondary focus)?

2) How long have you been working in tobacco control research?

3) How does tobacco control research 'fit in' relative to your full research portfolio?

.

4) I would like to get a picture of how you work with research users (such as policy-makers). Please tell me **how** you interact with research users.
   - PROMPT: What organizations or sectors do the research users that you interact with typically come from (eg. federal or provincial levels of government, NGOs, civil servants, advocacy groups)?
     - PROMPTS: How do these interactions come about? What are the origins of the interactions? Who usually initiates? How frequently do you interact?
     - FOLLOW-UP: Would you consider it to be part of your 'normal' practice to interact with research users?
       - PROMPTS: In the context of… meetings, conferences, research projects, email, policy development …?
       - Are interactions usually formal (ie. around a specific research project) or informal (at a meeting)?
       - Generally, what has been your experience interacting with research users?
       - Can you give an example of a particularly effective interaction that you've had with a research user, what made it so?
       - Can you give an example of a particularly ineffective interaction that you've had with a research user, what made it so?

5) What is the main purpose of your interactions with research users? Why do you interact with them?

   a) PROMPT: Requirement of funding? To increase uptake of results, To change your thinking? To influence your approach to research?

6) What influences your interactions with research users?

   ****Consider probing here for **individual level** factors (ie. personal needs/preferences), **organizational** factors (ie. your organization requires it), and **environmental** factors (ie. broader context toward evidence-informed action)****

   - FOLLOW-UP: What are the structures that facilitate your interaction with research users?
   - FOLLOW-UP: What are the structures that hinder your interaction with research users?

7) In your experience, where has there been the most use in interacting with research users?

*** Probe here for types of use (**conceptual** – changed way of thinking, **instrumental** – to make a specific decision, **symbolic** – to support a particular position)

   - FOLLOW-UP: What were the conditions that contributed to making the interaction useful?
   - FOLLOW-UP: At which stages in the research and policy processes do you see the greatest / least value in interaction? For what purpose?
   - FOLLOW-UP: What are the greatest benefits from these interactions? (ie. what do you hope to gain?)
     - PROBE: Benefits to you / your organization AND benefits to the research
   - FOLLOW-UP: What are the 'costs' to you of interaction? What about costs to research users?

8) How have interactions with research producers influenced or contributed to your approach to (tobacco control) research and your research process?

*** Probe here for types of use (**conceptual** – changed way of thinking, **instrumental** – to make a specific decision, **symbolic** – to support a particular position)

   - PROMPT: At which stage(s) of the research and policy processes?
   - FOLLOW-UP: Please tell me about how these interactions add to your work in (tobacco control) research?
   - FOLLOW-UP: Please tell me about how these interactions detract from your work in (tobacco control) research?

9) What do you think that the role of researchers is or ought to be in the tobacco control community?

   - FOLLOW-UP: How are those roles being fulfilled (or not)?

10) Can you think of an example of a time when research was particularly well-aligned with your policy agenda and needs?

   - FOLLOW-UP: What do you think contributed to this?
   - PROMPTS: Timing, topic, opportunities, etc ***AGAIN – probe at **individual, organizational, and environmental levels**

- What was the outcome of this? (ie. just because it was aligned, doesn't mean that it was used)

11) Can you think of an example of a time when you believe that your research has made an impact on policy?
    - FOLLOW-UP: What do you think contributed to that research making an impact?

12) Can you please describe how the interaction that you've had with research users may have contributed to the alignment of your research with policy?
    - FOLLOW-UP: How do you think that interaction can contribute to the alignment of research and policy?
    - FOLLOW-UP: Under what conditions?

13) How have interactions with research producers influenced your approach to conducting research?
    a) PROMPT: At which stage(s) of your work in tobacco control?
    b) How do you think that your interactions may have influenced the research users that you've interacted with?

14) Do you think that it's possible for the policy community to shape the research agenda?
    a) FOLLOW-UP: How?
    b) FOLLOW-UP: Under what conditions?

15) Tell me about how you think about the alignment of research and policy?
    a) FOLLOW-UP: How desirable is it for research and policy to be aligned?
    b) FOLLOW-UP: What are the advantages of alignment of the research and policy agendas?
    c) FOLLOW-UP: What are the disadvantages to alignment of the research and policy agendas?

16) A later phase in the research will be informed by nominations that you and other policy actors offer on researchers that have influenced policy.
    a) What **Canadian** tobacco control research users have influenced your research processes, including which questions you ask? How you think? How you communicate?
    b) Why these research users?
    c) What characteristics do they / their work possess that you have found most valuable [in your interactions]?

17) Are there any other [tobacco control] colleagues from their organizations who interact with research producers and should be interviewed?

18) Is there anything that you might not have thought about before that occurred to you during this interview?

19) Is there anything else that you think I should know to understand the researcher and user interaction process better?

20) Is there anything you would like to ask me?

Appendix C: Interview Guide- Research Users

To begin with, thank you for taking the time to be interviewed. I expect that the interview will take about 90 minutes. As you know, I wish to audio record the interview to be certain that I capture your own words rather than have to paraphrase. I will also be taking some notes in the event that there are technical problems. The only people who will have access to the recordings and your transcribed data are me, and the four members of my dissertation advisory committee. Although I will be using quotes from the interviews in my thesis, your name will be kept confidential.

My study seeks to examine the relationships between researchers and policy makers in tobacco control. The questions that I am going to ask revolve around the interactions that you have with researchers. During the interview, please feel at ease to contribute what you feel is relevant to my understanding. There are no right or wrong answers - I am interested in your experiences around this topic. The following interview questions should be seen as a guideline. You may decline to answer any of the questions.. You may also stop your participation in the study or interview at any time.

Do you have any questions for me before we start?

1. Thinking about tobacco control, what is the main role of your organization?
2. Please describe your role within this organization, and how long have you been with the organization?
3. How much time do you spend on tobacco control relative to other parts of your portfolio?
4. I would like to get a picture of how you work with research producers. Please tell me **how** you have interacted with research producers.
   - PROMPT: In what organizations are they based? (eg. universities, internal departments, consulting firms, etc.)?
   - PROMPTS: How do these interactions come about? What are the origins of the interactions? Who usually initiates? How frequently do you interact?
   - FOLLOW-UP: Would you consider it to be part of your 'normal' practice to interact with research producers?
     - PROMPTS: In the context of… meetings, conferences, research projects, email, policy development …?
     - Are interactions usually formal (ie. around a specific research project) or informal (at a meeting)?
     - Generally, what has been your experience interacting with research producers?
     - Can you give an example of a particularly effective interaction that you've had with a researcher, what made it so?
     - Can you give an example of a particularly ineffective interaction that you've had with a researcher, what made it so?
5. What is the main purpose of your interactions with research producers?
   - PROMPTS: for example, decisions you had to make or exploring policy options, etc.
6. What influences your interactions with research producers?

Consider probing here for individual level factors, organizational factors, and environmental factors (ie. broader context toward evidence-informed action)

- FOLLOW-UP: What are the structures that facilitate your interaction with research producers?
- FOLLOW-UP: What are the structures that hinder your interaction with research producers?

7. In your experience, where has there been the most use in interacting with research producers?

*** Probe here for types of use - FOLLOW-UP: What were the conditions that contributed to making the interaction?

- FOLLOW-UP: At which stages in the research and policy processes do you see the greatest / least value in interaction? For what purpose?
- FOLLOW-UP: What are the greatest benefits from these interactions? (ie. what do you hope to gain?)
  - PROBE: Benefits to you / your organization AND benefits to the research
- FOLLOW-UP: What are the 'costs' to you of interaction? What about costs to research producers?

8. How have interactions with research producers influenced or contributed to your approach to (tobacco control) policy?
   *** Probe here for types of use
   - PROMPT: At which stage(s) of the research and policy processes?
   - FOLLOW-UP: Please tell me about how these interactions add to your work in (tobacco control) policy?
   - FOLLOW-UP: Please tell me about how these interactions detract from your work in (tobacco control) policy?

9. What do you think that the role of researchers is or ought to be in the tobacco control community?
   - FOLLOW-UP: How are those roles being fulfilled (or not)?

10. Can you think of an example of a time when research was particularly well-aligned with your policy agenda and needs?
    - FOLLOW-UP: What do you think contributed to this?
    - PROMPTS: Timing, topic, opportunities, etc– probe at individual, organizational, and environmental levels
    - What was the outcome of this? (ie. just because it was aligned, doesn't mean that it was used)

11. Can you please describe how the interaction that you've had with researchers may have contributed to the alignment of research and policy agendas?
    - FOLLOW-UP: How do you think that interaction can contribute to the alignment of research and policy?
    - FOLLOW-UP: Under what conditions?

12. How have interactions with research producers influenced your approach to using research?
    - PROMPT: At which stage(s) of your work in tobacco control?
    - How do you think that your interactions may have influenced the researchers that you've interacted with?

13. Do you think that it's possible for the policy community to shape the research agenda?
    - FOLLOW-UP: How?
    - FOLLOW-UP: Under what conditions?

14. How have you had the opportunity to shape the research agenda?
    - FOLLOW-UP: How did that come about?
    - FOLLOW-UP: Was your impact limited? How?

15. Tell me about how you think about the alignment of research and policy?
    - FOLLOW-UP: How desirable is it for research and policy to be aligned?
    - FOLLOW-UP: What are the advantages of alignment of the research and policy agendas?
    - FOLLOW-UP: What are the disadvantages to alignment of the research and policy agendas?

A later phase in the research will be informed by nominations that you and other policy actors offer on researchers that have influenced policy.

16. What **Canadian** tobacco control research producers have influenced your (research-based evidentiary needs throughout their) policy (development, implementation, and evaluation) processes?
    - Why these researchers?
    - What characteristics do they / their work possess that you have found most valuable [in your interactions]?

17. Are there any other [tobacco control] colleagues from their organizations who interact with research producers and should be interviewed?

18. Is there anything that you might not have thought about before that occurred to you during this interview?

19. Is there anything else that you think I should know to understand the researcher and user interaction process better?

20. Is there anything you would like to ask me?

Appendix D: Description of the Tobacco Control Liaison Committee

This excerpt was taken directly from the Health Canada website (Health Canada, 2005, http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/about-apropos/role/pt/nat-strateg/com/index_e.html on July 15, 2007.

"The Tobacco Control Liaison Committee was created in 2000 by the federal/provincial/territorial Advisory Committee on Population Health and Health Security (ACPHHS) to enable collaboration around implementation of the *New Directions for Tobacco Control - A National Strategy*. Each jurisdiction (federal / territorial / provincial) is represented on the Committee. The Federal government is represented by officials from Health Canada's Tobacco Control Programme and First Nations and Inuit Health Branch. The Committee is co-chaired by a federal and a provincial/territorial representative.

The role of this f/p/t committee is to monitor progress against achievement of the objectives of the National Strategy, and to provide a forum for discussion directed at improving the policy coherence and programming efficiency of tobacco control in Canada. The TCLC provides advice to the ACPHHS in this regard, which in turn advises the Conference of Deputy Ministers of Health. The TCLC also facilitates ongoing collaboration with non-governmental organizations active in tobacco control." (Health Canada, 2005)

Appendix E: Recruitment and Interview Documentation Sheets

Interview Aspect	*Documentation Information*
Participant ID	
Recruitment Email Sent	
Recruitment Follow Up	
Final Recruitment Status	
Date of Scheduled Interview	
Date Consent Form Emailed	
Consent Received?	
Date Recording Posted for Transcription	
Date Transcription Received	
Date Letter of Appreciation Sent	

Information	*Notes*
Identifier for the interviewee	
Date of interview	
Time of interview	
Location of interview	
Title and position of interviewee	
Geographical Location	
Jurisdiction	
Additional Notes:	

Appendix F: Electronic Information Letter
(to appear on Population Health Research Group (PHR) Letterhead)

Re: A study of interaction and linkage in the Canadian tobacco control research community: Implications for the research process

Date

Dear ***(insert participant's name):***

I would like to invite you to participate in a study I am conducting as part of my Ph.D. dissertation in the Department of Health Studies and Gerontology at the University of Waterloo under the supervision of Professor Paul McDonald at the Population Health Research Group. This letter is intended to provide you with more information about this project and what your involvement would entail if you decide to take part.

The aim of this research is to provide insight into the nature and meaning of interactions between key stakeholders, researchers and policy actors, in the Canadian tobacco control research community and whether and how those interactions may influence the alignment of research and policy agendas.

In order to understand the possible influences of interactions between these stakeholder groups, it is important to hear from representatives from both the researcher and policy communities. An earlier stage of this research identified you as someone who has been actively involved in tobacco control research or policy. As such, I believe that you will be able to offer an important perspective to this research. For example, you will be asked about your background in tobacco control research and policy. You will also be asked about your interactions with the research and policy communities in general and to describe whether and how those interactions have influenced your approach to the research or policy process.

Participation in this study is voluntary. It will involve an interview of approximately 90 minutes in length to take place in a mutually agreed upon location or over the phone. You may decline to answer any of the interview questions and you may decide to withdraw from this study at any time without any negative consequences. With your permission, the interview will be audio-recorded to facilitate collection of information, and later transcribed for analysis. Shortly after the interview has been completed, I will send you a copy of the transcript to give you an opportunity to confirm the accuracy of our conversation and to add or clarify any points that you wish. All information you provide is considered completely confidential. Your name will not appear in any thesis or report resulting from this study, however, with your permission anonymous quotations may be used and attributed based on your general "position" (for example, "researcher"). Data collected during this study will be retained for 7 years in a locked office in my supervisor's lab. Audio recordings and other electronic data will be kept for 7 years in a password protected format and transcripts will have personal identifiers removed. All data will be confidentially destroyed or deleted after 7 years. Only researchers associated with this project will have access. There are no known or anticipated risks to you as a participant in this study.

If you have any questions regarding this study, or would like additional information to assist you in reaching a decision about participation, please contact me at 519-888-4567 ext. 36396 or by email at smviehbe@ahsmail.uwaterloo.ca. You can also contact my supervisor, Professor Paul McDonald at 519-888-4567 ext. 35839 or email pwmcdona@healthy.uwaterloo.ca.

This study has been reviewed and received ethics clearance through the Office of Research Ethics at the University of Waterloo. However, the final decision about participation is yours. If you have any comments or concerns resulting from your participation in this study, please contact Dr. Susan Sykes of this office at 519-888-4567 Ext. 36005.
It is hoped that the results of this study will be of benefit to those people and organizations directly involved in the study, as well as to the broader tobacco control and chronic disease prevention research and policy communities.

I very much look forward to speaking with you and thank you in advance for your assistance in this project. Please **reply to this email if you would be interested in participating** and we can book an interview at a time and location that is convenient for you. If I do not hear from you **within one week**, I will call to follow-up and determine your interest in participation.
Yours Sincerely,

Yours Sincerely,

Sarah Viehbeck

Appendix G: Telephone Recruitment Follow-Up

Telephone recruitment as a follow-up 1-2 weeks after emailed information letter

Re: A study of interaction and linkage in the Canadian tobacco control research community: Implications for the research process

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P = Potential Participant;
I = Interviewer

I - May I please speak to [name of potential participant]?

P - Hello, [name of potential participant] speaking. How may I help you?

I - My name is Sarah Viehbeck and I am a Ph.D. student in the Department of Health Studies and Gerontology at the University of Waterloo under the supervision of Professor Paul McDonald. As a part of my research, I will be conducting interviews with researchers and policy actors involved in tobacco control in Canada. I would like to provide you with more information about this project and what your involvement would entail if you decide to take part. An earlier stage of this research identified you as someone who has been actively involved in tobacco control research or policy. As such, I believe that you will be able to offer an important perspective to this research. Would this be a convenient time to give you further information about the interviews?

P- No, I am not interested (end call)

OR

P - No, could you call back later (agree on a more convenient time to call person back).

OR

P - Yes, could you provide me with some more information regarding the interviews you will be conducting?

I - Background Information:

- I will be undertaking interviews starting in [insert date].
- The interview would last about one hour to 90 minutes, and would be arranged for a time convenient to your schedule.
- Involvement in this interview is entirely voluntary and there are no known or anticipated risks to participation in this study.
- The questions are quite general (For example, you will be asked about your background in tobacco control research and policy. You will also be asked about your interactions with the research and policy communities in general and to describe whether and how those interactions have influenced your approach to the research or policy process.)

- You may decline to answer any of the interview questions you do not wish to answer and may terminate the interview at any time.
- With your permission, the interview will be digitally-recorded to facilitate collection of information, and later transcribed for analysis.
- All information you provide will be considered confidential.
- The data collected will be kept in a secure location and disposed of in 3 years time.
- If you have any questions regarding this study, or would like additional information to assist you in reaching a decision about participation, please contact me at 519-888-4567 ext. 36810 or by email at smviehbe@ahsmail.uwaterloo.ca. You can also contact my supervisor, Professor Paul McDonald at 519-888-4567 ext. 35839 or email pwmcdona@healthy.uwaterloo.ca.
- I would like to assure you that this study has been reviewed and received ethics clearance through the Office of Research Ethics. However, the final decision about participation is yours. Should you have any comments or concerns resulting from your participation in this study, please contact Dr. Susan Sykes in the Office of Research Ethics at 519-888-4567, Ext. 36005.
- After all of the data have been analyzed, you will receive an executive summary of the research results.

With your permission, I would like to email/fax you another copy of the information letter which has all of these details along with contact names and numbers on it to help assist you in making a decision about your participation in this study.

P – No, I am not interested in participating (end call).

OR

P - Sure (get contact information from potential participant i.e., mailing address/fax number).

I - Thank you very much for your time. May I call you in 2 or 3 days to see if you are interested in being interviewed? Once again, If you have any questions regarding this study, or would like additional information to assist you in reaching a decision about participation, please contact me at 519-888-4567 ext. 36810 or by email at smviehbe@ahsmail.uwaterloo.ca.

P - Good-bye.

I - Good-bye.

Appendix H: List of Text Search Terms Used in NVivo

- Agenda
- Align*
- Coalition
- Collab* (to capture collaborate(s), collaboration(s), collaborating)
- Commun*
- Conference
- CTCRI
- Evaluat*
- Forum
- Health Canada
- ICE
- Interact* (to capture interact, interaction(s))
- Relevan* (to capture relevance, relevant, relevancy)
- Respons* (to capture response(s), responsiveness)
- TCLC
- Tim* (to capture time, timing, timeliness)
- Train*

Appendix I: Member Checking Summary

Re: A study of interaction and linkage in the Canadian tobacco control research community: Implications for the research process

RESULTS SUMMARY

Study Purpose: This research aimed to: (1) understand interactions between researchers and policy-makers in the Canadian tobacco control research community and, (2) explore the relationship between interaction and alignment of research and policy within tobacco control.

Methods/Analyses: Semi-structured, in-depth interviews were conducted by phone or in-person with a purposeful sample of Canadian policy-makers at the provincial and federal-levels (n=10) and tobacco control researchers (n=8). A grounded theory methodology was used to guide interview conduct and analyses. Sampling of policy-makers was based on leadership roles for tobacco control in their respective jurisdictions, nominations, and theory development. Sampling for researchers was based on nominations. Interviews were audio-recorded with permission and transcribed. Transcripts were shared with participants for verification.

Results: The tobacco control context in Canada represents a mature field with a historically active policy agenda and an increasingly well-established research community. Findings suggest that research funding mechanisms (both traditional grants and commissioning/contracting), relationship history, policy needs (relevance), timing of policy and research cycles, and organizational and political climates are critical elements in the nature of interactions. Deliberate effort and structures to support interaction emerged as important factors, particularly within or cross-provincial and/or national facilitative mechanisms for interaction to occur. Capacity for tobacco control and for research created differential conditions for interactions and related structures. The roles of research users within the research process, relevance of different 'types' of evidence and related timeliness, funding, and relationship boundaries, including independence and academic freedom, were related to alignment.

Significance: Results provide insight into the researcher and research user relationships in the Canadian tobacco control community. This study extends existing conceptual work in the area of knowledge exchange particularly from a public health perspective and has implications for other aspects of chronic disease prevention.

Summary of major categories

Nine major categories emerged from the data analysis. Here is a brief description of each of the major categories.

Category	Brief description
Two communities	Differences between the research and research user 'communities' and the systems in which they conduct their work
Structures to facilitate interaction	Deliberate, (tobacco control) community-level structures to facilitate interaction between researchers and research users. Primarily face-to-face and variable in intensity of the interaction opportunities
Relationship building	Aspects of the relationships between researchers and research users - such relationships need to be deliberately built and reinforced
Interaction in research process	Incidents of policy-maker interaction in the research process
Interaction in policy process	Incidents of researcher engagement or interaction in policy processes
Independence and credibility of researchers	Independence of researchers from policy-maker influence and credibility of researchers
Incentives and barriers	Incentives and barriers to interaction and, in some cases, alignment. Incentives and barriers occur at the academic, policy, and funding levels
Relevance and timeliness	Relevance of research to policy priorities and/or decision points and the timeliness of research to same
Alignment	The alignment of research and policy agendas – shared priorities, objectives, and relevance

Expanded Description of Major Categories

Two communities

The "Two communities" category relates to differences between the research producer and research user 'communities' and the systems in which they conduct their work. Evidence emerged from the interviews that is quite consistent with the two-communities hypothesis whereby there is a lack of understanding regarding the respective needs and 'worlds' in which the 'other' functions. This category has two main sub-categories: (1) "Nature of policy", which includes aspects of the policy and political environments which relate to the decision-making context in which policy work is conducted, and (2) "Research and policy – Differential timeframes" which relates to the different timeframes for research and policy. Research takes time and policy windows may open and close before the research is 'in'.

Structures to facilitate interaction

"Structures to facilitate interaction" relates to the deliberate, (tobacco control) community-level structures to facilitate interaction between researchers and research users. These interaction structures are primarily face-to-face and variable in intensity in terms of the interaction opportunities. This category was further divided into three sub-categories: (1) "Joint (committee) work" which relates to federal, provincial, or other committee structures where researchers and research users work together; (2) "Organizational leadership and mandate" pertains to the role that some organizations play to enable interaction either through their mandate or through their resources, including research units or centres; and (3) "Shared fora" relates to tobacco-related or general conferences, meetings, and/or symposia held face-to-face.

Relationship building

"Relationship building" relates to aspects of the relationships between researchers and research users, including the deliberate nature of building and reinforcing these relationships over time. This code contains seven sub-categories relating to different aspects of relationship building: (1) "Investment in Interaction" relates to the deliberate investment in interaction by researchers and policy-makers; (2) "Personal factors" relates to personal characteristics of researchers and policy- makers which may influence interaction; (3) "Familiarity" pertains to the familiarity of researchers and research users with the "other" community and of people within the relationship to each other; including contextual knowledge related to the other sector and the history and longevity of relationships; (4) "Exchange" relates to knowledge exchange between researchers and research users, including the exchange of ideas and candid exchange of realities and opportunities; (5) "Trust" as related to the interactions between researchers and research users as a facilitator and benefit of relationship building; (6) "Stewardship for relationships" which relates to the mutual responsibility and respect within relationships between researchers and research users, and; (7) "Understanding" which pertains to a key benefit to interactions whereby understanding can be built between researchers and research users and can contribute to overcoming the divide between the two communities.

Interaction in the research process

"Interaction in the research process" is a category of codes which captures all aspects of researcher and research user interaction in the research process. This category is further divided into four sub-categories: (1) "Investigator-driven" which includes research where research users may not have been engaged and includes references to "pure science" or "pure research" that may or may not be collaborative in nature – the idea for the research comes from the researcher; (2) "Policy-driven" which includes research that originates from policy and/or research that is

being conducted in direct response to a policy need. Also included in this sub-category are codes relating to funding arrangements (such as commissioning or contracting) and the responsiveness of researchers to policy needs.; (3) "Policy-relevant" which includes research that has relevance or applicability to policy and may be informed by policy needs or undertaken in a collaborative way at any point along the research process, and; (4) "Knowledge translation and use" which pertains to researcher and research user interaction to facilitate use of research, including dissemination of results.

Interaction in the policy process

"Interaction in the policy process" includes codes which pertain to researcher interaction in policy processes, including provision of advice, providing evidence to guide action, engagement through consultations regarding strategy development and evaluation, and the role of advocates and NGOs.

Independence and credibility of researchers

The "Independence and credibility of researchers" category relates to the credibility of researchers as a reliable source for research and independence of researchers from research users. This category is divided into three sub-categories: (1) "Credibility"; including the credibility of researchers in terms of the quality and accuracy of research and the role of academic neutrality or "bias-free" research; (2) "Independence", which includes codes related to researchers' having an arm's length relationship from government, funding influences, conflicts of interest, and academic freedom, and; (3) "Expertise", includes codes related to the expertise of researchers and the role of researchers as experts in a given area.

Incentives and barriers

"Incentives and barriers" relates to incentives and barriers to interaction and, in some cases, alignment. Incentives and barriers may occur at the academic, policy, and funding levels. Four sub-categories reflect the range of incentives and barriers: (1) "Academic context", including aspects of the academic context in which many researchers work, including the reward structures and outputs, which may influence their interaction with research users; (2) "Policy environment", including aspects of the (tobacco control) policy environment that may influence interaction with researchers; (3) "Parameters of interaction", including certain parameters which may need to be in place to set boundaries of the researcher-policy relationship and related products, and; (4) "Funding incentives and barriers", including funding-related incentives to do research in particular areas or in ways that facilitate collaboration and barriers to grant-related funding to support working in alignment.

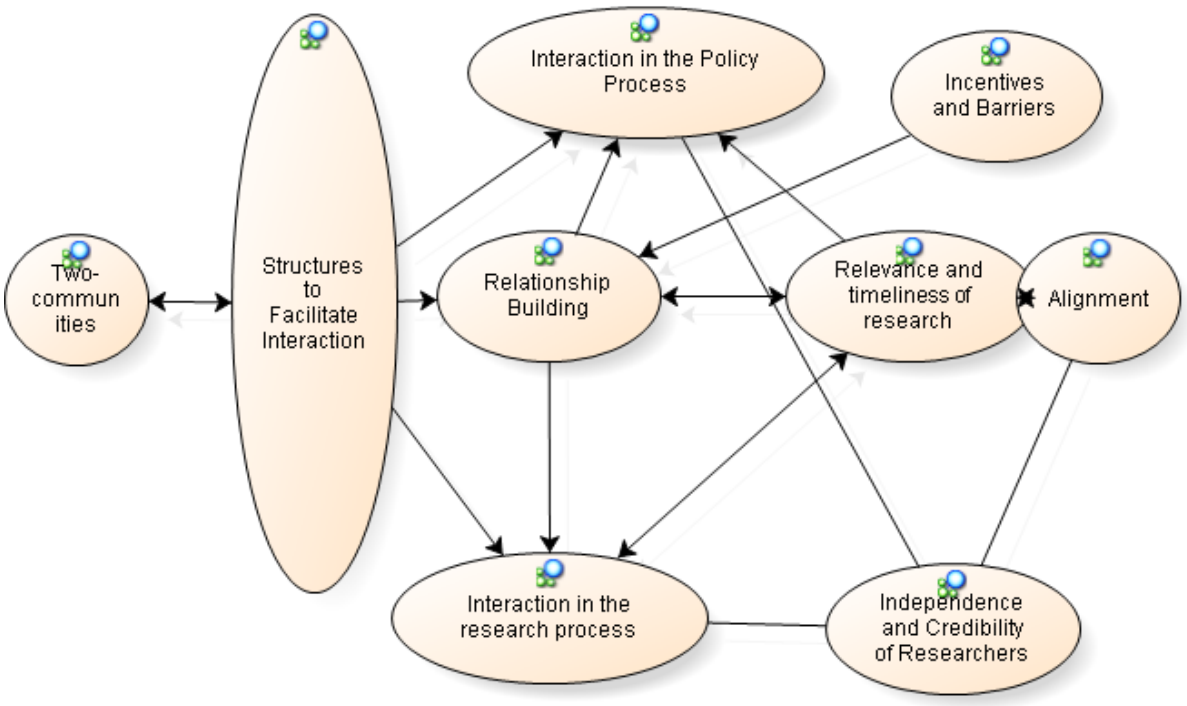
Relevance and timeliness

"Relevance and timeliness" captures codes related to the general relevance of research to policy priorities and the timeliness of research to same. In addition to free nodes directly relating to relevance and timeliness, there are two main sub-categories: (1) "Relevance to priorities of government" which includes relevance of research to current and future priorities, ongoing trends and issues, and relevance to interventions (including programs, policies, strategies, and other intervention approaches), and; (2) "Timeliness" of research relative to decision-making needs of research users.

Alignment

"Alignment" relates to the extent to which the research and policy agendas are shared, including shared objectives, shared priorities, and shared relevance.

Theoretical Relationships between Categories



Appendix J: Saturation analysis of initial codes by interviewee type

Node Name (n=121 nodes)	Researcher (n=8)	Research User (n=10)	Sum (n=18)
Funding from policy incl Contracting or Commissioning research	8	10	18
Relevance of research	8	10	18
Research relevant to priorities of government	8	9	17
Personalities	8	9	17
Timeliness of research	8	9	17
Face-to-face conferences or meetings	6	10	16
Interaction in the research process	8	8	16
Independence of researchers	7	8	15
Interaction ongoing or sustained	8	7	15
Outputs of research - publishing	8	7	15
Time to invest in interaction	7	7	14
Ideas exchange and dialogue	7	7	14
Initiating interactions	6	8	14
Intervention - impact	5	9	14
Role of research - Investigator-driven research	7	7	14
Previous working relationships - demonstrated capabilities	7	7	14
Relationship History	7	7	14
Research Agenda	5	9	14
Role (value) of research to action	5	9	14
Role of research - strategy development and evaluation	7	7	14
Tension between findings and politics	6	8	14
Role of researchers - expertise	7	7	14
Mutual benefit – Meet dual purposes	6	8	14
Ability to communicate -Reporting of research - information needs of research users	5	8	13

Node Name (n=121 nodes)	Researcher (n=8)	Research User (n=10)	Sum (n=18)
Advice - policymakers providing input to increase relevance	3	10	13
Convening function – committees	8	5	13
Funding research - directing research or having input	5	8	13
Health Canada as a convenor	6	7	13
Importance of comparative research	5	8	13
Intervention - implementation issues	6	7	13
Knowledge synthesis	5	8	13
Mutual learning through interaction	5	8	13
Ongoing knowledge of trends and issues	5	8	13
Benefits - increase understanding	6	6	12
Building a relationship	7	5	12
Importance of local data – Relevance	4	8	12
Nature of Policy - multiple inputs beyond research	6	6	12
Research - policy issue as starting point	8	4	12
Role of evaluation	4	8	12
Role of research - justification or confirmation or support	3	9	12
Understand needs	6	6	12
Researchers - want to make a difference	8	4	12
Alignment – Shared priorities	5	6	11
Barriers - staff turnover within government	7	4	11
Currency of research	4	7	11
Funding - tied to needs	7	4	11
Intervention - cost effectiveness or economics	4	7	11
Nature of policy - the political	6	5	11
Research approaches that will meet a specific need	7	4	11
Research or Evaluation Capacity or Expertise – Internal	2	9	11

Node Name (n=121 nodes)	Researcher (n=8)	Research User (n=10)	Sum (n=18)
Role of research - anticipation of policy issues	6	5	11
Role of research – planning	5	6	11
Credibility and accuracy	5	6	11
Role of research - stimulate thinking	5	6	11
Candid exchange of realities and opportunities	5	5	10
Timing of Government Planning	6	4	10
Interest of researchers	6	4	10
Lack of understanding about 'needs' and 'worlds'	1	9	10
Nature of policy - pressure cooker atmosphere	4	6	10
Organizational mandate	7	3	10
Research Takes Time	5	5	10
Responsiveness of researchers	6	4	10
Role of researchers - generate share evidence	6	4	10
Workable or practicality of research	4	6	10
Advice about action	6	3	9
Articulation of policy needs and expectations	4	5	9
CTCRI – funding	5	4	9
Exposure to other sector - boundary spanning	5	4	9
Locating researchers	3	6	9
Networks	4	5	9
Research centres as connecting points	3	6	9
Researchers presenting research	2	7	9
Role of researchers - context and interpretation of evidence	6	3	9
Trust	6	3	9
Researcher - knowledge of government	5	3	9
Advocacy - NGO 'agenda'	5	3	8
Alignment - Shared objective	4	4	8

Node Name (n=121 nodes)	Researcher (n=8)	Research User (n=10)	Sum (n=18)
Feedback loops and mutual influence (2)	5	3	8
Funding structures rewarding collaboration	6	2	8
Interaction - early in research process	6	2	8
Interaction - work through issues	3	5	8
Interaction in the research process - research planning with end users	8	0	8
Language	2	6	8
Outputs of research - non traditional products	8	0	8
Role of research - issue framing	5	3	8
Role of research - agenda setting	4	4	8
Role of research - facilitating use of research	5	3	8
Academic rewards - Tenure and Promotion	5	2	7
Availability of researchers	2	5	7
Conduct of research - consulting regarding implementation	5	2	7
CTCRI - convening function	4	3	7
Face-to-face interaction- tobacco conferences	2	5	7
Nature of policy - competing priorities	4	3	7
Parameters - Confidentiality of evidence	3	4	7
Quality of research - peer review	3	4	7
Respect for each other	5	2	7
Tobacco control as a government priority	4	3	7
Barriers- grants	5	1	6
Face-to-face interaction- training	4	2	6
Independence of researchers - funding influences and COI	4	2	6
Interaction through supporting applications	2	4	6
Nature of policy - moving target	5	1	6
Parameters - re publishing	2	4	6

Node Name (n=121 nodes)	Researcher (n=8)	Research User (n=10)	Sum (n=18)
Role (value) of research - innovation	1	5	6
Role of research - policy options	2	4	6
Tobacco control capacity - stimulates research or evaluation	4	2	6
Academic rewards - institutional support	4	1	5
Building a relationship - insider knowledge	5	0	5
Funding - Research areas where funding is easier to obtain	0	5	5
Future of tobacco control	1	4	5
Independence of researchers - academic freedom	3	2	5
Interaction opportunities - ICE	2	3	5
Interaction- TCLC	2	3	5
Face-to-face interaction- annual symposium	3	1	4
Ideas new	0	4	4
Interaction - helping researchers think differently	3	1	4
Interaction- tobacco coalitions or alliances	2	2	4
Mutual responsibility for the relationship	1	3	4
Parameters - re data ownership	1	3	4
Interaction - infrastructure - Rapid response	2	1	3
Interaction- research advisory committee	2	1	3