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Understanding Views of Evidence in Public Health Practice and Decision Making in Ontario

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ABSTRACT

Background: Perceptions of evidence by public health managers, practitioners and policy makers is one of the key determinants of evidence uptake. Therefore, understanding views of evidence in both practice and policy decision making is important to bridge the evidence-practice and policy gap in public health. **Objectives & Methods:** Two studies are presented in this thesis. The first is a systematic review synthesizing studies exploring the use of research evidence in public health decision making between 2010-2016. The second study is a qualitative descriptive study examining understandings about evidence in Ontario public health units by comparing perspectives from managers and frontline staff across six geographically-diverse units. **Main Findings:** Drawing from both studies, "evidence" is broadly defined in the public health setting. The organization is an important target for interventions or infrastructure to support the use of evidence. However, managers and staff have different perceptions of evidence use. Training on how to use evidence continues to be an important enabler. **Conclusion:** Findings from these studies provide insight into how use of evidence can be promoted within both public health policy and practice context.

Keywords:

CO-AUTHORSHIP STATEMENT

Sara Masood (SM) completed the research presented in this thesis under the guidance of Drs. Anita Kothari (AK) and Sandra Regan (SR). SM received advice from both AK and SR during all stages of this research, including study conception and design, data collection, analysis and interpretation, and writing of the chapters. In addition, AK and SR contributed to the critical revision of the chapters for intellectual content, quality, and clarity.

ACKNOWLEDGMENTS

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CHAPTER ONE

"Public health is the art and science of preventing disease, prolonging life, and promoting health through the organized efforts of society" (WHO, 1998).

Introduction

Many researchers have emphasized the importance of integrating evidence in public health practice and policy in recent years (e.g., Brownson, Chriqui, & Stamatakis, 2009; Campbell et al., 2009; Grimshaw, Eccles, Lavis, Hill, & Squires, 2012; Orton, Lloyd-Williams, Taylor-Robinson, O'Flaherty, & Capewell, 2011; Satterfield et al., 2009). As such, the Ministry of Health and Long-Term Care (MOHLTC) in Ontario developed a policy – the Ontario Public Health Standards (OPHS) – within which there is strong direction for the use of evidence-based programming to inform public health practice and to ensure that health units deliver effective services (MOHLTC, 2016). In order to assess the implementation of the OPHS and to inform the current public health renewal initiatives in Ontario, there is an urgent need to understand factors influencing the process of evidence uptake within public health units. Perceptions of evidence held by different health care managers, practitioners, and decision makers are reported to be one of the key factors influencing the process of evidence uptake (Kyratsis, Ahmad, Hatzaras, Iwami, & Holmes, 2014). Because different professional groups tend to come from a diverse range of educational backgrounds, belong to a variety of different value systems, and perform a specific set of professional roles, their perceptions about evidence are likely to be distinct (Langley & Denis, 2011). However, empirical evidence on how different health care managers, practitioners, and decision makers make sense of evidence is sparse. The research presented in this thesis attempts to understand views of evidence held by frontline staff and their managers in Ontario public health settings in order to understand how use of evidence can be promoted.

Background and Significance

Defining Public Health

Several definitions of 'public health' exist. The most often quoted definition is the one put forward by Sir Donald Acheson in 1988 (quoted above) (Thurston, 2014), which was later adopted by the World Health Organization (WHO) in 1998. Many definitions that emerged since then can be considered a variation of Acheson's definition. The term 'public health' is composed of two key words – <u>public</u> and <u>health</u>. As such, a broad understanding of the term 'public health' can be achieved by examining how various existing definitions describe these words. Generally speaking, both words are open to multiple interpretations. According to Verweij and Dawson (2007), a closer look at the definitions of 'public health' implicates that the word <u>public</u> has at least two dominant meanings: it is used to refer to a 'population' (i.e., communities or a group of people) and to describe (indicate) a 'collective action'. This focus of public health on population and collective action differentiates public health from medicine which instead focuses on an individual patient (Kemm, 2006). Likewise, <u>health</u> is an ambiguous concept – it means different things to different people and it involves a range of factors or determinants. The meaning of the word <u>health</u> is largely shaped by the beliefs, perceptions, experiences, and expectations of those involved. However, predominantly, the word <u>health</u> is used to suggest overall well-being, which consists of various sets of dimensions (Frenk, 1993; Thurston, 2014). For example, the definition of health introduced by the WHO in 1946 captures several key dimensions of health: "Health is a state of complete *physical*, *mental*, and *social wellbeing* and *not merely the absence of disease or infirmity*" (emphasis added) (WHO, 2006). Health is recognized as an important component of development at the individual level (e.g., physical, social, and mental capabilities), the societal level (e.g., internal functioning and stability), and the national level (e.g., economic growth and

prosperity) (WHO, 2006). Health, therefore, can be seen as "a means for personal and collective advancement" and as "an indicator of the success achieved by a society and its institutions of governments in promoting well-being" (Frenk, 1993, p. 469). In a nutshell, public health is about interventions or programs that improve the overall well-being of the population and this is achieved through collective actions organized by society or public bodies. Altogether, the prime focus of public health is on preventing disease, prolonging life and promoting health.

Public Health Policy and Practice

Public health is a multifaceted concept and a multidisciplinary field. It includes activities addressing chronic diseases, food safety, emergencies, infectious disease outbreaks and health promotion to name a few (Public Health Agency of Canada, 2016). Two major domains of public health are policy and practice, both of which are very complex and context-dependent. Public health policy defines public health priorities, provides mandates, and formalizes practices. "[Public] health policy is assumed to embrace courses of action (or inaction) that affect the set of institutions, organizations, services, and funding arrangements of the health system. It includes policies made by the public sector (government) as well as policies made by the private sector" (Buse, Mays, & Walt, 2012, p. 6-7). Depending on the context and problem at hand, policies can take the form of rules, regulations, laws, guidelines, judicial decrees, and/or directions (Brownson et al., 2009), and can involve a variety of stakeholders including the public, patients, health managers, and health professionals (Lavis et al., 2012), not to mention other sectors like primary care or the community sector. Public health practice, on the other hand, involves putting these public health policies into action by doing "the daily work of public health on the front lines of federal, state [province], and local health departments" (Stover & Bassett, 2003, p. 1799). The daily work carried out by public health professionals (managers and practitioners) is

difficult to define or summarize because it comprises numerous activities and programs that vary based on the policy being enacted, the target population, the setting, the sector(s) involved, as well as economic, political, and social factors (Stover & Bassett, 2003). Given that public health policy and practice are highly complex, context-dependent and involve a population, suggestions have been made to include a wide range of influences and to consider various sources of evidence when developing and implementing policies, programs and interventions (Klein, 2003). The following description of public health clearly illustrates its multiple facets <u>and</u> the importance of considering current evidence base when determining potential actions:

> Public health is the process of mobilizing and engaging local, state, national, and international resources to assure the conditions in which people can be healthy. …The actions that should be taken are determined by the nature and magnitude of the problems affecting the health of the community. What can be done will be determined by scientific knowledge and the resources available. What is done will be determined by the social and political situation existing at the particular time and place. (Detels & Breslow, 2002).

Defining Evidence

This thesis is about public health policy, practice and evidence. Debates about what constitutes evidence for the field of public health, or health in general, are abundant. Generally, there are two main types of evidence: explicit knowledge and implicit (or tacit) knowledge (Bhattacharyya, Reeves, & Zwarenstein, 2009). Explicit knowledge comes from "articulated theories and empirical observations" made using systematic processes and scientific methods (Bhattacharyya et al., 2009, p. 493). This includes findings obtained from randomized controlled trials, prospective cohort studies, observational studies, systematic reviews and other research designs (Bhattacharyya et al., 2009). This type of evidence is effective at controlling for

systematic errors (or bias) and can be easily articulated, written or communicated to other people

(Greenhalgh & Wieringa, 2011). Implicit (or tacit) knowledge, on the contrary, comes from the

"judgement of individuals with extensive experience in an area" (Bhattacharyya et al., 2009, p.

493) and as such is built and shaped by the experiences and values of individuals within a given

setting. This type of evidence is difficult to formalize and communicate with other people, but is

seen as closely "linked to action in context" (Greenhalgh & Wieringa, 2011, p. 503). Additional

terms used for knowledge derived from research efforts and for knowledge derived from training

or experiences of individuals are 'formal knowledge' and 'informal knowledge' respectively

(e.g., see Kamper-Jõrgensen, 2000). Within the two main types of evidence mentioned above are

several sub-types, indicating the diversity and complexity of the concept of evidence (Glasgow

& Emmons, 2007; Kothari, Boyko, & Campbell-Davison, 2015). Researchers have reported that

using both quantitative data and qualitative information (e.g., Brownson et al., 2009) as well as

integrating both explicit (formal) and implicit (informal) knowledge is key for evidence-based

public health (e.g., Kamper-Jõrgensen, 2000).

Uses of Evidence

Along with the concept of evidence, the concept of the 'use of evidence' is also

extensively discussed in the literature. Drawing from Weiss (1979), many scholars in the

knowledge utilization field have made a distinction between instrumental, conceptual, and

symbolic use of evidence (Beacham, Kalucy, & McIntyre, 2005; Hanney, Gonzalez-Block,

Buxton, & Kogan, 2003; Innvær, Vist, Trommald, & Oxman, 2002; Reardon, Lavis, & Gibson,

2006). Instrumental use (also known as 'problem-solving' or 'structural' use) is the direct,

tangible use of evidence to bring about changes in behaviour such as policy, programs, and

clinical practice (Innvær et al., 2002; Reardon et al., 2006; Weiss, 1979). Conceptual use

(otherwise known as 'enlightenment") refers to the indirect use of evidence to bring about changes in knowledge, understanding or attitudes of end users (Innvær et al., 2002; Reardon et al., 2006; Weiss, 1979). Symbolic use (also known as the 'political' or 'strategic' use) refers to tactical use of research evidence to validate, legitimize and sustain pre-determined actions (Innvær et al., 2002; Reardon et al., 2006; Weiss, 1979). The extent to which evidence is used instrumentally, conceptually, or symbolically is often related to the: type of evidence; level of individual decision maker; the type of question being answered; and the specific issue under focus (Innvær et al., 2002).

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Problem Statement

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Evidence-Policy and Practice Gap

Billions of dollars are invested annually across the globe – in both the public and private sectors – to advance biomedical, clinical, and health services research as well as to continuously improve health-related programs, policies and services (Grimshaw et al., 2012). This investment is made by several groups including, but not limited to, funding agencies, governmental organizations, non-governmental organizations (e.g., charities and professional groups), educational institutions, private sector bodies, local communities and international organizations. Despite this huge investment, it is consistently reported that not all research findings are translated into practice and policy as recommended (Grimshaw et al., 2012), and that transfer of evidence from research studies into practice and policy is indeed a "slow and haphazard process" (Graham, Tetroe, & the KT Theories Research Group, 2007, p. 937). Health care systems often face difficulty in introducing effective interventions, programs, and services in a timely manner and hence often fall short in ensuring that the best care is provided to all those who are in need (Grimshaw et al., 2012). Similarly, health care practitioners often face difficulty providing the

level of care recommended by current scientific evidence, sometimes leading to cases where either the care provided is not needed or is potentially harmful (Grol & Grimshaw, 2003). This lack of transfer of evidence into policy and practice has been described in literature using many terms depending on the context such as: "theory-practice gap" (Van de Ven & Johnson, 2006, p. 805); "knowledge transfer gap" (Graham et al., 2007, p. 937); "research-policy gap" (Brownson et al., 2009, p. 1576); "know-do gap" (Booth, 2011, p. 331); and finally, the term used in this thesis: the "evidence-practice and policy gap" (Grimshaw et al., 2012, p. 2).

Bridging the Evidence-Policy and Practice Gap

Bridging the gap between evidence and policy and between evidence and practice within the public health context is particularly important because: 1) addressing the population's health is more complex than providing individual patient care; and 2) less research exists on effective population interventions than interventions targeted at improving individual patient outcomes (Brownson, Kreuter, Arrington, & True, 2006). To bridge this gap, there is growing support to utilize the emerging field of Knowledge Translation (KT). The Canadian Institutes of Health Research (CIHR) defines KT as ''a dynamic and iterative process that includes the synthesis, dissemination, exchange, and ethically sound application of knowledge to improve the health of Canadians, provide more effective health services and products and strengthen the healthcare system'' (CIHR, 2012, p. 1). In order to strategically select, tailor and implement KT strategies that are effective in facilitating the use of evidence and meet the specific needs of public health professionals, it is imperative to first understand how managers and practitioners view evidence in a given setting. The research presented in this thesis attempts to understand views of evidence in Ontario public health settings in order to understand how use of evidence can be promoted.

Research Objectives

The two primary research objectives guiding this thesis are as follows:

   I.   To systematically examine studies exploring the use of research evidence in public health decision making.

   II.   To understand views of evidence in Ontario public health units by identifying similarities and differences in the views of evidence held by managers and frontline staff.

This thesis is composed of two independent manuscripts or integrated articles. The first article (presented in **CHAPTER TWO**) addresses objective I using a systematic review design. The second article (presented in **CHAPTER THREE**) addresses objective II using a qualitative description design with content analysis as a method of analysis. The final chapter (**CHAPTER FOUR**) brings together the key findings of the two integrated articles to draw main conclusions and discuss key implications.

Relevance to Health Promotion

"Health promotion is the process of enabling people to increase control over, and to improve, their health" (Ottawa Charter for Health Promotion, 1986, p. 1). The concept of health promotion is drawn upon, and embedded within, all public health systems across the globe. As such, understanding how public health professionals (managers and frontline staff) view evidence not only helps with reducing the evidence-policy-practice gap and improving the performance of the public health system, but also has implications for better health promotion. Through understanding views of evidence among public health professionals, we can begin to understand how to make public health professionals adept at appropriately drawing on evidence in their daily work and how to support the use of evidence-based or evidence-informed standards and tools within both policy and practice. Consequently, this will support the introduction and sustainability of evidence-based health promotion strategies by public health professionals.

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CHAPTER TWO

**The Use of Research Evidence in Public Health Decision Making Processes:
A Systematic Review**

Introduction

One type of evidence that has been strongly promoted in recent years for use in health-related decision making is robust research findings (Campbell et al., 2009; Grimshaw, Eccles, Lavis, Hill, & Squires, 2012). Billions of dollars are spent annually across the globe – in both the public and private sectors – to advance biomedical, clinical, and health services research as well as to continuously improve health-related programs, policies and services (Grimshaw et al., 2012). Despite this huge investment, it is consistently reported that not all research findings are translated into practice and policy as recommended (Grimshaw et al., 2012). For example, in the context of individual patient care, it has been found that it takes approximately 17 years for research findings to be published and disseminated (e.g., in the form of papers, reviews, clinical guidelines), and then to translate and integrate these research findings into practice and policies that are enacted (Brownson, Kreuter, Arrington, & True, 2006).

Over the last few decades, there has been a growing emphasis on the importance of bridging the research-policy-practice gap by better understanding or characterizing research evidence (Dawes et al., 2005; Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). Research evidence is considered explicit knowledge that is obtained from "articulated theories and empirical observations" generated using systematic processes and scientific methods (Bhattacharyya, Reeves, & Zwarenstein, 2009, p. 493). Examples of scientific methods used to obtain research evidence include randomized controlled trials, observational studies, systematic reviews, prospective cohort studies and other research designs (Bhattacharyya et al., 2009). This

specific type of evidence is regarded by some as superior for controlling for systematic errors (or

bias), and can also be easily articulated, written, or communicated to other people (Greenhalgh &

Wieringa, 2011).

The concept of the "use of research evidence" has also been discussed in the literature.

Many scholars in the knowledge translation (KT) field have made a distinction between

instrumental, conceptual, and symbolic use of research evidence (Beacham, Kalucy, & McIntyre,

2005; Hanney, Gonzalez-Block, Buxton, & Kogan, 2003; Innvær, Vist, Trommald, & Oxman,

2002; Reardon, Lavis, & Gibson, 2006; Weiss, 1979). Instrumental use (also known as 'problem-

solving' or 'structural' use) refers to the direct, tangible use of research evidence to bring about

changes in behaviour such as policy, programs, and clinical practice (Innvær et al., 2002;

Reardon et al., 2006; Weiss, 1979). Conceptual use (also known as 'enlightenment') refers to

indirect use of research evidence to bring about changes in knowledge, understanding or attitudes

of end users (Innvær et al., 2002; Reardon et al., 2006; Weiss, 1979). Symbolic use (also known

as the 'political' or 'strategic' use) refers to tactical use of research evidence to validate,

legitimize and sustain pre-determined actions (Innvær et al., 2002; Reardon et al., 2006; Weiss,

1979).

Understanding research evidence and its use in making health care decisions is especially

important in the context of public health problems and solutions, which are complex. Public

health decision making by policy makers, practitioners, and managers influences the general

health of populations rather than a few individuals (Kemm, 2006). It involves making decisions

about public health programs and policy planning, development, and implementation (Kemm,

2006). For example, in terms of policy, "[Public] health policy is assumed to embrace courses of

action (or inaction) that affect the set of institutions, organizations, services, and funding

arrangements of the health system. It includes policies made by the public sector (government) as well as policies made by the private sector" (Buse, Mays, & Walt, 2012, p. 6-7). Depending on the context and problem at hand, policies can take the form of rules, regulations, laws, guidelines, judicial decrees, and/or directions (Brownson, Chriqui, & Stamatakis, 2009), and can involve a variety of stakeholders including the public, patients, health managers, and health professionals (Lavis et al., 2012), not to mention other sectors like primary care or the community sector. As such, it has been argued that public health policy and decision making is context-dependent and vastly complex. In turn, local programs represent the enactment of policies. Accordingly, suggestions have been made to include a wide range of influences and to consider various sources of evidence, including research evidence, in the process of making public health decisions (Klein, 2003).

Given that addressing the population's health is much more complex than individual patient care and that less research exists on effective population interventions than interventions targeted at improving individual patient outcomes (Ovretveit, 2007), a large research-policy-practice gap exists for the uptake of research evidence in public health decision making (Brownson et al., 2006). This gap greatly necessitates the need to synthesize what is known about how research evidence is used by public health decision makers in their practice.

One of the studies that addressed this need was a systematic review exploring the use of research evidence in public health decision making processes (Orton, Lloyd-Williams, Taylor-Robinson, O'Flaherty, & Capewell, 2011). Orton et al. (2011) synthesized data from 18 empirical studies (15 qualitative and 3 quantitative studies) of mixed methodological quality and presented their results as a narrative review. These studies were conducted in countries with universal health care coverage and included a total of 1,309 participants involved in public health

decision making and/or research. Five key findings were reported: (i) There was little empirical evidence on the extent to which research evidence was used in decision making; (ii) Public health decision makers tend to use various types of research evidence (e.g., primary research studies, systematic reviews, program evaluations, local and provincial best practices); (iii) The process of using research evidence in decision making varied depending on the setting and the types of decision makers involved; (iv) Public health decision making was governed by many factors aside from research evidence (e.g., financial constraints and public opinion); and finally (v) Several barriers (e.g., views about evidence and lack of relationships between researchers and decision-makers) and facilitators (e.g., producing targeted research and ensuring capacity building) influenced the use of research evidence in public health decision making. This review was helpful in identifying areas that needed to be addressed urgently by decision makers and researchers to support effective implementation of research informed public health policy. Another systematic review related to public health decision making, and involving synthesis of 56 studies, focused on identifying and describing various political factors that influence evidence use (Liverani, Hawkins, & Parkhurst, 2013).

The aim of this systematic review was to update Orton et al.'s (2011) work by searching, identifying, and examining new evidence published on this topic since then. The need for this update emerged from the surge in publications in KT after 2010. For example, a quick search on PubMed in 2010 using *knowledge translation* and *public health* as keywords resulted in 1,816 human-related articles, whereas a 2013 search resulted in 4,607 articles and a 2016 search done in April resulted in 8,457 articles. It was, therefore, urgent to update this systematic review by synthesizing the new evidence to help maintain its value, validity and relevance for public health decision making. Other reasons to keep this systematic review up to date stemmed from the

understanding that: knowledge is continually evolving as new research studies are being

conducted (Moher & Tsertsvadze, 2006); governments are making huge investments to promote

the use of systematic reviews in informing health-care policy decisions (Atkins, Fink, & Slutsky,

2005); and evidence syntheses are considered by many research funders as an important

mechanism for knowledge exchange between researchers and decision-makers (Tetroe et al.,

2008).

Objective and Research Questions

The primary objective of this review was to systematically examine studies exploring the

use of research evidence in public health decision making in countries with universal health care

coverage. This primary objective was accomplished by addressing five key research questions:

1. "What is the extent to which research evidence is used?" (Orton et al., 2011, p. 2)

2. "What types of research evidence are used?" (Orton et al., 2011, p. 2)

3. "What is the process of using research evidence?" (Orton et al., 2011, p. 2)

4. "What factors, other than research evidence, influence the decision making process?"
   (Orton et al., 2011, p. 2)

5. "What are the barriers to and facilitators of the use of research evidence?" (Orton et al.,
   2011, p. 2)

We did not include countries with both universal health care coverage and countries with

private insurance (or just private insurance) because their health care systems are structured,

managed, and regulated differently and hence experience different issues and challenges (Tuohy,

Flood, & Stabile, 2004).

Methods

Reporting Guideline

The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) Statement – consisting of a checklist and a flow diagram – was used throughout the conduct of this study to ensure transparency and complete reporting of findings (Moher, Liberati, Tetzlaff, Altman, & the PRISMA Group, 2009).

Eligibility Criteria

The eligibility criteria included five requirements for inclusion: (1) studies must focus on public health policy decision making (i.e., decisions that influence the general health of entire populations rather than few individuals); (2) studies must address at a minimum one of the five research questions; (3) studies must be limited to countries with universal health care coverage (i.e., Canada, Australia, New Zealand, and countries within Europe[1]); (4) studies must provide empirical data, but can be of any methodological study design – qualitative studies, quantitative studies, or mixed-method studies; and last (5) studies must be available in the English language. Articles that represented commentaries, editorials, interviews, letters, and books were excluded. Articles testing KT interventions were also excluded. Articles that focused exclusively on public health program and practice were not of interest. Systematic reviews were used for background information, but were not included in data synthesis.

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[1] Austria, Belarus, Croatia, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Moldova, Netherlands, Norway, Portugal, Romania, Russia, Serbia, Sweden, Switzerland, Ukraine, and United Kingdom.

Information Sources

Five different information sources were used to identify relevant studies and to ensure that the search was comprehensive: (1) 14 electronic databases[2]; (2) websites of key organizations including: National Health Service Knowledge, the Cochrane Collaboration, the Campbell Collaboration, the Centre for Reviews and Dissemination, the National Institute for Health and Clinical Excellence, and other public health related Government websites; (3) hand-searching reference lists of all included studies (i.e., reverse citation search); (4) tracing articles that have cited the included studies (i.e. forward citation search); and (5) searching for literature using internet search engines such as Google and Google Scholar.

Search Strategy

A health research librarian was consulted to ensure an efficient search strategy and to determine how to accurately adapt that search strategy for different databases. A combination of MeSH terms and keyword (free-text) terms were used for database searching (see **Appendix A** for MEDLINE search strategy). The previous review (Orton et al., 2011) carried out literature searches to locate relevant studies published between 1980 and March 2010. This present review conducted searches for studies published between 2010 and January 2016. All retrieved studies were imported to and managed in Mendeley database (a reference manager program) to assist in the screening process (Mendeley, 2010).

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[2] MEDLINE, PubMed, SCOPUS, PsychInfo, CINAHL, The Social Science Citation Index, The Science Citation Index, The Arts and Humanities Citation Index, Applied Social Sciences Index and Abstracts (ASSIA), Cochrane Database of Systematic Reviews (CDSR), Database of Reviews of Effects (DARE), DoPHER, the Campbell Library, and the Cochrane Register of Controlled trials (CENTRAL).

Study Selection and Screening

Two reviewers (SM and a trained research assistant) independently reviewed titles and abstracts of all retrieved studies using the eligibility criteria to remove duplicates and to identify which studies needed to be reviewed in full text to confirm eligibility. The two reviewers then screened full-text articles for relevant studies using a pre-designed eligibility assessment form that was piloted with three initial studies (see **Appendix B**). Any disagreements at this phase of the review process were resolved through discussion between the two reviewers.

Data Extraction and Management

All relevant information from the included studies was extracted in Microsoft Excel using the pre-designed data extraction form (see **Appendix C**). The data were extracted by the primary review author (SM) and the extraction results were reviewed by the remaining review authors (AK and SR) to reduce risk of bias and ensure accurate reporting of the included studies. The extracted data included a combination of general information relating to the identification of the study as well as specific information relating to the research objectives, settings, participants, methodologies and findings reported in each study.

Assessment of Methodological Quality

The methodological quality of all included studies was assessed. The appraisal checklists provided by the Critical Appraisal Skills Programme (CASP) were used to assess and report the methodological quality of included qualitative and quantitative studies (CASP, 2014), whereas the Mixed Methods Appraisal Tool (MMAT) was used to assess and report the methodological quality of included mixed-methods studies (Pluye et al., 2011). All studies deemed eligible for inclusion after full-text screening were included in data synthesis despite their methodological quality, as long as they addressed one of the five review questions.

Data Synthesis

Data were synthesized and reported separately for each review question in the form of a narrative review. Narrative review is a critical analysis approach that allows systematic review of both qualitative and quantitative evidence together to deduce findings and interpretations (Mays, Pope, & Popay, 2005). This approach allows presentation of study findings and interpretations in their original format without transforming the data into a common summary measure and without generating entirely new theories (Mays et al., 2005). Salient patterns or themes arising from data extracted were identified, discussed by the research team, and reported for each review question. Study findings are presented in tables similar to the ones provided in Orton et al. (2011) to allow for comparisons.

<div align="center">

Results

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The nature of included studies

A total of 4086 articles were identified from the searches. Of these 4086 articles, 4049 were excluded after removing duplicates (n=103) and after conducting preliminary screening of titles and abstracts of all retrieved articles (n=3946)[3]. The remaining 37 articles were reviewed in full-text to assess their eligibility, resulting in the removal of 21 articles that did not meet the inclusion criteria (see **Table 1** for reasons for exclusion of these articles) and the retention of 16 articles that did meet inclusion criteria. **Figure 1** provides a detailed flow diagram depicting the number of articles included and excluded at different stages of the review process.

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[3] Key reasons for exclusion at this stage of screening:

Commentary; editorial; interview; letter; book; review; unrelated to topic; not an empirical study; does not relate to public health; study not from a country with universal health care coverage.

Table 1: Main Characteristics of Excluded Studies.

Reasons for exclusion	Studies
Article is not a study	Shlonsky & Mildon, 2014; Upshur, 2012; Ward & Mowat, 2012; Wilson et al., 2012; Woolf et al., 2015.
Study does not relate to public health	Evans et al., 2013; Perrier et al., 2011; Tricco et al., 2016.
Study does not relate to public health policy decision making (e.g., focused on program level)	Jacobs et al., 2010; Kothari et al., 2011; Kothari et al., 2012; Latham et al., 2013; Meagher-Stewart et al., 2012; McCormack et al., 2013; Yousefi-Nooraie et al., 2012; Yousefi-Nooraie et al., 2014.
Study is not from a country with universal health care coverage	Tabak et al., 2015.
Study objective does not specifically address the review objectives (either too broad or irrelevant)	Armstrong et al., 2012; Stoneham & Dodds, 2014.
Study is about KT intervention	LaRocca et al., 2012; Lavis et al., 2014.
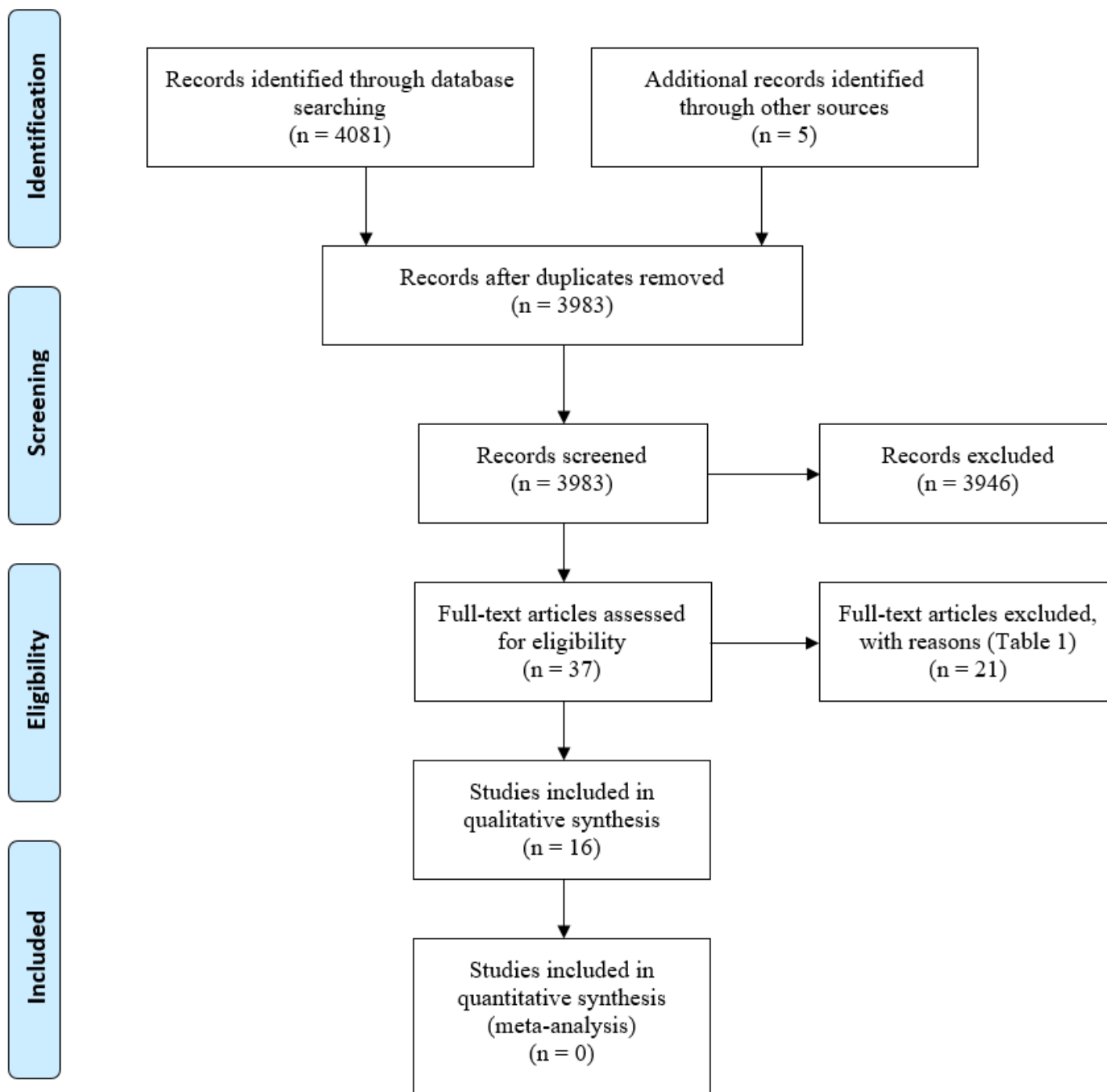
Figure 1: PRISMA Flow Diagram.

The characteristics of included studies are shown in **Appendix D**. Of the 16 included articles, 10 were qualitative studies, 4 were quantitative studies, and the remaining 2 were mixed method studies in terms of their study design. The ten qualitative studies included five studies whose source of data were interviews (Ellen et al., 2013; Ellen et al., 2014; Francis et al., 2015; Milat et al., 2014; Zardo, Collie, & Livingstone, 2014); three case studies using a combination of interview and review of secondary material (Laws et al., 2013; Rosella et al., 2013; Yost et al., 2014); one study using a combination of literature scan and interview (Huckel Schneider, Campbell, Milat, Haynes, & Quinn, 2014); and one focus group study (Lillefjell, Knudtsen, Wist, & Ihlebæk, 2013). Two of these qualitative studies reported on the same data (i.e., Ellen et al., 2013 and Ellen et al., 2014), but answered different questions. Hence, both studies were included. The four quantitative studies included one study involving content analysis of documents (Zardo & Collie, 2014a); and the remaining three studies employed a quantitative survey design (Larsen, Gulis, & Pedersen, 2012; Zardo & Collie, 2014b; Zardo & Collie, 2015). Two of these quantitative studies also reported on the same data for their analysis (i.e., Zardo & Collie, 2014b and Zardo & Collie, 2015), but answered different questions. Hence, both studies were included. The two mixed methods studies included one study using cross-sectional survey design and interviews (Armstrong et al., 2014), and one study of longitudinal cross-sectional design employing survey, interviews, and focus groups (Wathen, Sibbald, Jack, & MacMillan, 2011).

The included studies involved approximately 864 participants in total, not including the number of participants represented in one study (i.e., Wathen et al., 2011) in which both sample size and participants varied at different data collection time points. Study participants included individuals from various public, private and third sector organizations responsible for decision

making at local, regional, national and international level in a range of sectors relevant to public health. This included policy makers, public health officials, health care managers, practitioners, physicians, community providers, scientific advisors, academic researchers and a range of other stakeholders. Most studies were conducted in Australia (n=7) (Armstrong et al., 2014; Huckel Schneider et al., 2014; Laws et al., 2013; Zardo et al., 2014; Zardo & Collie, 2014a; Zardo & Collie, 2014b; Zardo & Collie, 2015); followed by Canada (n=5) (Ellen et al., 2013; Ellen et al., 2014; Rosella et al., 2013; Wathen et al., 2011; Yost et al., 2014); Europe (n=2) (Larsen et al., 2012; Lillefjell et al., 2013); and the United Kingdom (UK) (n=1) (Francis et al., 2015). The remaining one study was international in scope involving a mix of Australian and international public health experts (Milat et al., 2014).

The methodological quality of included studies was mixed. *Qualitative studies:* The ten included qualitative studies addressed most, but not all, of the methodological criteria listed in the critical appraisal tool (**Table 2**). Only a few studies (n=4) adequately justified their choice of study design or method (Ellen et al., 2013; Ellen et al., 2014; Laws et al., 2013; Lillefjell et al., 2013), and no studies adequately considered the relationship between researcher and participants. One study lacked sufficient details about the methods to properly assess methodological quality (Francis et al., 2015). *Quantitative studies:* The four included quantitative studies also addressed most, but not all, of the methodological criteria for quantitative studies (**Table 3**). Only one of the four studies provided enough information to determine that confounding factors were taken into account in the design and analysis (Larsen et al., 2012). *Mixed method studies:* Of the two mixed method studies, one met all methodological criteria for mixed method studies (Armstrong et al., 2014), whereas the other study (Wathen et al., 2011) lacked sufficient information for an

assessment to be made about whether the sampling strategy was relevant; measurements were

appropriate; or the response rate was acceptable (**Table 4**).

Table 2: Methodological Quality of Included Qualitative Studies.

	Ellen 2013	Ellen 2014	Francis 2015	Huckel Schneider 2014	Laws 2013	Lillefjell 2013	Milat 2014	Rosella 2013	Yost 2014	Zardo et al. 2014
Is there a clear statement of the research aims?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Is the study design appropriate?	Y	Y	U	U	Y	Y	U	U	U	U
Is the recruitment strategy appropriate?	Y	Y	U	Y	Y	Y	Y	Y	Y	Y
Were the data collected in a way that addresses the research issue?	Y	Y	U	Y	Y	Y	Y	Y	Y	Y
Has the relationship between researcher and participants been adequately considered?	N	N	U	N	U	U	N	N	N	N
Was the data analysis sufficiently rigorous?	Y	Y	U	N	Y	Y	Y	Y	Y	Y
Is there a clear statement of the findings?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Legend: Y = Yes, N = No, U = Unclear

Table 3: Methodological Quality of Included Quantitative Studies.

	Larsen 2012	Zardo 2014a	Zardo 2014b	Zardo 2015
Is the study question precise?	Y	Y	Y	Y
Is the study design appropriate?	Y	Y	Y	Y
Is participant (or document) selection appropriate?	U	Y	Y	Y
Is the exposure or intervention measured accurately?	Y	U	Y	Y
Are confounding factors taken account of in design and analysis?	Y	U	U	U
Are outcomes measured accurately?	Y	Y	Y	Y
Is length of follow-up adequate?	N/A	N/A	N/A	N/A

Legend: Y = Yes, N = No, U = Unclear, N/A = not applicable

Table 4: Methodological Quality of Included Mixed Method Studies.

	Armstrong 2014	Wathen 2011
Are there clear qualitative and quantitative research questions/ objectives, or a clear mixed methods question/objective?	Y	Y
Do the collected data allow addressing the research question/objective?	Y	Y
Qualitative component:		
Are the sources of qualitative data (archives, documents, informants, observations) relevant to address the research question/objective?	Y	Y
Is the process for analyzing qualitative data relevant to address the research question/objective?	Y	Y
Is appropriate consideration given to how findings relate to the context, e.g., the setting, in which the data were collected??	Y	Y
Is appropriate consideration given to how findings relate to researchers' influence, e.g., through their interactions with participants?	Y	Y
Quantitative component:		
Is the sampling strategy relevant to address the quantitative research question (quantitative aspect of the mixed methods question)?	Y	U
Is the sample representative of the population understudy?	Y	Y
Are measurements appropriate (clear origin, or validity known, or standard instrument)?	Y	U
Is there an acceptable response rate (60% or above)?	Y	U
Mixed methods component:		
Is the mixed methods research design relevant to address the qualitative and quantitative research questions (or objectives), or the qualitative and quantitative aspects of the mixed methods question (or objective)?	Y	Y
Is the integration of qualitative and quantitative data (or results*) relevant to address the research question/objective?	Y	Y
Is appropriate consideration given to the limitations associated with this integration, e.g., the divergence of qualitative and quantitative data (or results*) in a triangulation design?	N	Y

Legend: Y = Yes, N = No, U = Unclear

The extent to which research evidence is used by public health decision makers

Only a few studies (n=4) quantified the extent to which research evidence is used in public health decision making processes. A quantitative survey study published in 2012 (Larsen et al., 2012) found that in terms of the level of evidence use in policy-making, 'to a great extent' was chosen by 44% of the participants for priority setting, by 48% of the participants for planning, and by 42% of the participants for implementation. Another study (Zardo & Collie, 2015) also surveyed respondents to assess their use of research evidence to inform public health policy and program decision making. This study reported that research evidence was used less often (more monthly/quarterly *than* daily/weekly) than internal information such as internal data and reports. Research evidence was also found to be less commonly used than other forms of evidence (e.g., community views) in a study with participants from 45 local governments (Armstrong et al., 2014). Similarly, one study involving quantitative content analysis of 128 policy documents also reported academic research evidence to be the type of information least commonly referenced, with just 50 references in over 30 policies (Zardo & Collie, 2014a).

Types of research evidence used by public health decision makers

Nine studies (including: five qualitative, two quantitative, and two mixed methods) reported the types of research evidence used by public health decision makers (Armstrong et al., 2014; Ellen et al., 2013; Ellen et al., 2014; Francis et al., 2015; Larsen et al., 2012; Laws et al., 2013; Milat et al., 2014; Wathen et al., 2011; Zardo & Collie, 2015). The main findings are documented in **Table 5**; the most common were primary research studies (including both qualitative and quantitative research) and systematic reviews.

Table 5: Types of Research Evidence Used by Public Health Decision Makers.

Primary research studies – qualitative and quantitative (Ellen et al., 2013; Ellen et al., 2014; Zardo & Collie, 2015)
Systematic reviews (Francis et al., 2015; Milat et al., 2014; Zardo & Collie, 2015)
Literature reviews (Larsen et al., 2012)
Internal program evaluation reports (Larsen et al., 2012)
Intervention research (Milat et al., 2014; Zardo & Collie, 2015)
Household studies utilizing census or population health monitoring surveys (Armstrong et al., 2014; Laws et al., 2013)
Epidemiological data (Milat et al., 2014)
Controlled trials (Milat et al., 2014; Zardo & Collie, 2015)
Local quasi-experimental pilot studies (Milat et al., 2014)
Research program reports (Wathen et al., 2011; Zardo & Collie, 2015)

The process of using research evidence

Several included studies revealed some information about the process through which research evidence was used in decision making. Two studies provided evidence on the *purpose of using research evidence* in the decision making process. A quantitative survey study involving 98 Danish health managers from several municipalities found that evidence was used for priority setting, planning and implementation (Larsen et al., 2012). However, this study did not clearly report the extent to which this evidence included research findings. Similarly, a qualitative study exploring the use of findings from an Australian series of population monitoring surveys, called SPANS, revealed that survey findings were used for agenda setting, identifying areas and target groups for interventions, informing new policies, and supporting existing policies and programs across various sectors (Laws et al., 2013). This study identified the sources of research evidence as: journals, key research reports, conference presentations, presentations to stakeholder groups, and media releases (Laws et al., 2013).

Two studies explored the *extent of conceptual, instrumental and symbolic use of research evidence* in public health decision making. A Canadian study that consulted stakeholders from various groups receiving research evidence about violence against women found that conceptual

or symbolic use was identified more often than instrumental and that research findings were often used to support contradictory positions (Wathen et al., 2011). In an Australian study concerning workplace and transport injury prevention and rehabilitation compensation, research evidence was mainly used conceptually (50.3%), then instrumentally (30.3%) followed by symbolically (19.3%) (Zardo & Collie, 2015). Both studies revealed that the ways in which research evidence was used changed across time, was dependent on the context, and was influenced by the types of decisions being made and the stage of decision making (Wathen et al., 2011; Zardo & Collie, 2015).

A study of three Ontario public health departments (Yost et al., 2014) outlined a detailed process of using research evidence and reported on the tools that facilitated implementation of this process in these departments. The process involved identifying and clarifying the question (DEFINE); searching for the best available research evidence (SEARCH); critically appraising the quality of research evidence (APPRAISE); using the research evidence found to identify key messages that can be put into action (SYNTHESIZE); ensuring that the select messages are relevant and suitable for the local context (ADAPT); determining how to effectively implement research evidence in the local context (IMPLEMENT); and assessing whether implementation efforts were effective to inform future practice or not (EVALUATE) (Yost et al., 2014, p. 1-4)

An international study conducted by Milat et al. (2014) explored the role that key players play in the process of evidence-informed decision making. This study focused on the decisions to scale up population health interventions and reported that these decisions were generally made through iterative processes. Policy makers and/or practitioners lead these public health decisions, but these decisions were subject to an approval process by political leaders and funding agencies (i.e., external factors). Moreover, the roles played by policy makers, practitioners and/or service

managers, and researchers in the decision making process were found to be relatively different but complementary. Therefore, this study alluded to the importance of collaborative mechanisms.

Factors, other than research, influencing public health decision making processes

Eight studies identified that factors other than research influenced public health decision making processes. Interviews and focus groups with Australia, UK, and Norway policy makers, public health leaders and researchers involved in public health planning, policy and/or programs revealed that a combination of evidence sources (including research evidence) was used to form an evidence base to inform their decisions (Armstrong et al., 2014; Francis et al., 2015; Lillefjell et al., 2013; Milat et al., 2014). Moreover, one Australian study distinguished internal evidence (i.e., "organizationally derived evidence") from external evidence (i.e., "peer-reviewed research or policy frameworks from other contexts"), and reported that internal evidence was found more *influential* than external evidence whereas more external evidence was found *useful* than internal evidence in informing public health decisions within local governments (Armstrong et al., 2014, p. 8). A similar finding was reported in another Australian study that reviewed total of 128 injury rehabilitation compensation policy documents developed by the Transport Accident Commission (Zardo & Collie, 2014a). This study found that the information types most frequently referenced, and hence more influential, for policy development were internal legislation (i.e., regulations or laws reported within the Transport Accident Act as opposed to other regulations) and internal policy (i.e., policies from the Transport Accident Commission as opposed to policies from other government agencies and professional organizations) (Zardo & Collie, 2014a).

A Canadian study examining the 2009 H1N1 pandemic decision making process within Canada revealed that the same evidentiary sources were interpreted and used differently depending on: existing ideological perspectives (i.e., evidence-based, policy-based, pragmatist);

competing interests of many stakeholders; prior beliefs of epidemiological patterns; credibility, consensus and consistency of information and information purveyors; and institutional factors involving both formal and informal structure (Rosella et al., 2013). Other factors that influenced public health decision making processes for public health managers and policy makers in Australia (Zardo et al., 2014; Zardo & Collie, 2015) and Norway (Lillefjell et al., 2013) included: experiences and expertise of practitioners; ministerial and governmental input; stakeholder feedback and action; legal feedback and action; client feedback and competence; media coverage, and online information.

Barriers and facilitators in the use of research evidence

The majority of included studies (n=12) explored barriers and facilitators to the use of research evidence in public health decision making. The range of barriers and facilitators identified during data collection and synthesis are described thematically: individual, organizational, research itself, social, economic, and political environment.

Several studies identified individual barriers and facilitators, i.e., factors related to the attitudes and beliefs of individuals involved in public health decision making and/or in public health delivery of care (e.g., policy makers, managers, community members, and practitioners). These included: attitudes towards change (Ellen et al., 2014); time constraints (Ellen et al., 2014; Larsen et al., 2012); leadership characteristics (Huckel Schneider et al. 2014); ideological perspectives (Rosella et al., 2013); the intention to use research within the next 12 months (Zardo & Collie, 2014b); and competence (i.e., skills and expertise) in identifying and using a combination of evidence including research (Armstrong et al., 2014; Larsen et al., 2012; Lillefjell et al., 2013; Zardo &Collie, 2014b), in establishing multi-sector interdisciplinary

collaborations (Lillefjell et al., 2013), in translating evidence into practice (Armstrong et al., 2014; Lillefjell et al., 2013), and in increasing knowledge about local political decision making processes (Lillefjell et al., 2013).

Other studies reported a range of <u>organizational</u> barriers and facilitators, i.e., factors related to key characteristics of an organization and its management. These included: local organizational culture/structure (e.g., availability of opportunities for professional development and capacity building) (Armstrong et al., 2014; Laws et al., 2013; Milat et al., 2014; Rosella et al., 2013); roles within the organization that facilitate active use of research (Ellen et al., 2013); technical infrastructure to increase access to research (Armstrong et al., 2014; Ellen et al., 2013; Ellen et al., 2014; Huckel Schneider et al., 2014); training programs to promote and improve capacity building within the staff (Ellen et al., 2013; Huckel Schneider et al., 2014); organizational tools to effectively analyze, generate and evaluate any relevant research (Huckel Schneider et al., 2014); guidelines for use of research (Larsen et al., 2012); internal prompts for use of research (Zardo & Collie, 2014b); and lastly the type of organization and/or agency involved (Zardo & Collie, 2014b).

There was a degree of consensus across studies that <u>aspects related to research itself</u> can sometimes serve as barriers and facilitators. Research barriers and facilitators identified from the studies included: type of research evidence being considered (Wathen et al., 2011); nature of the knowledge gap (Wathen et al., 2011); need to further refine/develop methodologies and methods used for conducting reviews (Francis et al., 2015); need for reviews to consider diverse contexts, interventions, and effectiveness (Francis et al., 2015); dissemination strategies used to promote research use (Francis et al., 2015; Laws et al., 2013); perceived credibility of findings (Laws et al. 2013); timeliness of research (Laws et al., 2013); the extent to which research aligns or

contradicts with professional experiences and values (Wathen et al., 2011); and the actual relevance of research to day-to-day decision making (Francis et al., 2015; Zardo & Collie 2014b).

Five of the included studies addressed <u>social</u> barriers and facilitators (Ellen et al., 2013; Ellen et al., 2014; Francis et al., 2015; Huckel Schneider et al., 2014; Wathen et al., 2011). These five studies reported that establishing both formal and informal relationships with researchers, knowledge brokers, opinion leaders and other relevant stakeholders outside the organization was perceived as important by decision-makers in promoting the use of research evidence.

A few <u>economic</u> barriers and facilitators were also identified as important in limiting the use of research evidence public health policy. This included: availability of funding (money) and resources (such as staff) (Ellen et al., 2014; Francis et al., 2015; Laws et al., 2013); as well as the willingness of decision-makers to invest money and resources to create a KT culture (Ellen et al., 2014).

Two studies revealed aspects of the <u>political environment</u> or influence (i.e., political barriers and facilitators) to be key in affecting the uptake of research evidence in public health decision making. This included organizational policies and guidelines encouraging the use of research evidence (Huckel Schneider et al., 2014) and political system stability or instability (Laws et al., 2013).

Discussion

Results from the 16 studies included in this systematic review are consistent with those reported by Orton et al. (2011), based on 18 earlier studies. There continues to be a lack of extensive evidence that quantifies the extent of research evidence use by public health decision

makers. However, there is moderately extensive evidence to report that a range of research evidence is accessed and used in informing public health decisions. The process of research evidence use in public health decision making varies over time, is influenced by the types of decisions being made and the stage of decision making, is context-dependent, and involves several key players such as policy makers, researchers, practitioners, funding agencies, and community groups. Aside from research evidence, several external and internal factors also influence public health decision making processes. The barriers and facilitators to research evidence use are well-documented and are related to aspects of: the individuals involved in decision making; the organization/agency within which decisions are made; the research being considered for uptake; the social networks and relationships with relevant stakeholders; the economic climate; and the political nature of a given public health issue. Those interested in gaining a comprehensive understanding of the empirical evidence published on the use of research evidence in public health decision making should refer to findings reported in both Orton et al. (2011) and this review.

Some of the recent empirical studies from public health program and practice context have also explored different aspects of evidence or knowledge. For example, Kothari et al. (2012) used a narrative approach involving interviews and focus groups with public health staff responsible for program planning to show that tacit knowledge is used by public health practitioners in different ways as well as at different stages of the planning process. For instance, tacit knowledge can be drawn upon when brainstorming potential ideas or directions for a program, when developing or training a planning team, and/or when deciding on specific program details (Kothari et al., 2012). Another study by Yousefi-Nooraei, Dobbins, and Alexandra (2014) used a network modelling approach to elucidate how information is sought out

in a public health department to make evidence-informed decisions in practice. This study found that public health managers and professional consultants recognized their significant evidence source (for both tacit and explicit knowledge) to be a set of individuals they considered as 'experts' in the organization (Yousefi-Nooraei et al., 2014). These tended to be managers who were recognized as 'experts' based on their level of authority, friendship ties, and expertise in evidence-based practice, as perceived by the information seeker (Yousefi-Nooraei et al., 2014). The findings from these empirical studies, together with findings from this systematic review, suggest that public health decision-making is complex and often utilizes a range of evidence types and individuals in the process. Given the diversity of evidence forms available to public health decision makers, above and beyond research evidence, it is often a challenge for decision makers to select and to translate all relevant evidence into policy and practice.

This review has implications for addressing the existing research-policy gap. Knowledge translation has been strongly recommended as a potential bridge or linkage between research and policymaking processes (Lavis, 2006). Traditional KT strategies have been either "researcher-push" or "policymaker-pull" (Lavis, 2006, p. 40) because the focus has been mainly on increasing research dissemination. Researcher-push strategies are the ones in which researchers (producers) explicitly plan, develop and implement strategies to bring research evidence about health issues to the attention of policy makers (users) (Lavis, 2006; Reardon et al., 2006). Policymaker-pull strategies are the ones in which policy makers (users) explicitly plan, develop and implement strategies that assist them in identifying relevant research evidence from many sources (producers) they recognize as credible (Lavis, 2006; Reardon et al., 2006). Unfortunately, both these traditional KT strategies have only led to a limited increase in the use of research by policy makers (Thomson, 2013). A review of KT literature by Mitton, Adair,

McKenzie, Patten, and Waye Perry (2007) stresses the importance of interactions that allow two-way communication between researchers and policymakers as promising KT strategies. The results of the systematic review presented here – specifically the evidence on the types of research evidence used, the process of using research evidence, and the barriers and facilitators to research use – can be directly used to restructure or refine these traditional KT strategies or build new ones in order to increase their impact, relevance, and timeliness.

Recent theories argue that the gap between theory [research] and practice [policy] is more of a knowledge production problem than of knowledge dissemination (e.g., Van de Ven & Johnson, 2006). Hence, some attention has been diverted from traditional KT strategies to designing and implementing KT strategies that facilitate interactions between health care researchers and research users (Boyko, Lavis, Abelson, Dobbins, & Carter, 2012; Kothari & Wathen, 2013). More specifically, increased efforts are being made to introduce KT strategies that help these two distinct communities to co-produce research knowledge to support evidence-informed policymaking (Boyko et al. 2012; Kothari & Wathen, 2013). This new and emerging knowledge transfer model is often referred to as "exchange" (Lavis, 2006, p. 40; Reardon et al., 2012, p. i), and involves both building and nurturing mutual relationships between researchers and users. This approach can promote the use of research evidence by overcoming some of the barriers identified in this study and ensuring that research findings are useful.

Knowledge brokering is nowadays becoming a popular knowledge translation and exchange (KTE) strategy (Dobbins et al., 2009). Knowledge brokering can be defined as "all the activity [carried out by an intermediary] that links decision makers with researchers, facilitating their interaction so that they are able to better understand each other's goals and professional cultures, influence each other's work, forge new partnerships, and promote the use of research-

based evidence in decision-making" (Lomas, 2007, p. 131). This intermediary is known as a "knowledge broker" and can be an individual, a group, an organization, and/or an entire country (Dobbins et al., 2009). Although knowledge brokering is in initial stage in terms of recognizing and evaluating its potential as a KT mechanism (van Kammen, de Savigny, & Sewankambo, 2006), it is not an entirely new concept (Lomas, 2007). The strengths of knowledge brokering are manifold: (i) it provides an opportunity for all five forms of co-production, identified by Martin (2010) as those allowing users to participate in the research process as either informants, recipients, endorsers, commissioners, or co-researchers; (ii) it can easily be adapted to different contexts (Dobbins et al., 2009); and (iii) it produces a new form of knowledge known as the "brokered knowledge" (Meyer, 2010). Knowledge brokering could be one way to establish either formal or informal relationships between decision makers and researchers, as such relationships were identified as a key social facilitator of research evidence use in this review.

Having a good understanding of how research evidence is used by decision makers is essential in both designing and studying the emerging "exchange" KT strategies in health research. Therefore, the findings reported in this systematic review can be used to determine how to engage both public health professionals (policymakers and practitioners) and researchers in exploring processes of learning, negotiation and capacity building, so that the two communities can function effectively and efficiently both as separate units and as a combined unit. This will eventually help bridge the frequently discussed gap between research and policy.

<center>**Limitations**</center>

There are four key limitations of this study. First, this systematic review only included studies published in the English language. This may have possibly introduced language-related bias and the risk of missing noteworthy studies published in non-English languages. Second, we

did not include contacting experts in public health policy as a component of our search strategy. Therefore, we may have missed a relevant study, thereby influencing the comprehensiveness of this review to some extent. Third, no attempt was made to contact authors of included studies to inquire about any unreported findings, potentially introducing selective reporting bias. Fourth, all studies deemed eligible for inclusion after full-text screening were included in the data synthesis despite their mixed methodological quality. Although studies of lower quality should have been excluded, we included these studies because they still presented useful findings pertaining to the use of research evidence in public health decision making processes and thus made a significant contribution to the evidence base.

Conclusion

This review systematically synthesized evidence from countries with universal health care coverage on five different topics pertaining to the use of research evidence in public health decision making processes. The findings from this review demonstrate the complexity of public health decision making and suggest the need to address the several barriers, facilitators and other challenges identified from the literature.

Future research should include more studies accurately quantifying the extent to which different research evidence types are used in public health decision making. Such information will help identify the types of research evidence that tend to receive most attention, under what conditions and for which public health decision makers, and where most of our KT efforts should be diverted to.

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CHAPTER THREE

Comparing Views of Evidence in Ontario Public Health Units:
A Qualitative Descriptive Study

Introduction

Ontario's Public Health System: A Call for Renewal

Many health gains have been linked to public health initiatives implemented in Ontario. For example, there has been an increase of approximately 30 years in the lifespan of Ontarians as compared to the early 1900s; the percentage of 12-19 year olds who smoke has decreased from 14% in 2003 to 9% in 2009/2010; the percentage of pregnant women consuming alcohol has decreased from 10% in 2005 to 5% in 2007/2008; and the number of traffic-related deaths has also dropped significantly (Government of Ontario, 2013). Despite these health gains, many health challenges still exist that need immediate attention. These include: chronic and life-limiting conditions, injuries, physical inactivity, unintentional falls, childhood and adult obesity, unhealthy alcohol consumption, and high stress (Manuel et al., 2012; Government of Ontario, 2013). Moreover, infectious disease outbreaks, such as the Severe Acute Respiratory Syndrome (SARS) in 2003, have identified further areas that require improved public health measures (Naylor et al., 2003). Given the preventable nature of some of these illnesses, diseases and/or injuries, there is still a need for the development and implementation of effective public health programs and services. This will not only contribute to further individual level gains (such as increased life expectancy and decreased prevalence of chronic conditions), but also key system level gains (such as decreased healthcare costs and fewer hospitalizations). Consequently, a call for public health renewal in Ontario has been made to both meet the specific needs of Ontarians

as well as to improve the functioning of Ontario's public health system in general (Naylor et al., 2003; Canadian Institute of Health Research [CIHR], 2003; Capacity Review Committee, 2006).

Ontario Public Health Standards

Public health is defined formally in Ontario as "the organized efforts of society to prevent illness, disease, and injury through a sustained combination of approaches, including one-on-one health services, health promotion, health protection and healthy public policies" (Government of Ontario, 2013, p. 6). Ontario has thirty-six independent or autonomous public health units (Ministry of Health and Long-Term Care [MOHLTC], 2014). Each public health unit has a board of health that is overseen by the medical officer of health who is accountable for program planning and delivery at the local level (MOHLTC, 2014). Funding for public health is provided by the provincial government as well as the municipal governments (MOHLTC, 2014). The activities of public health are governed by the legislation issued by the Ministry of Health and Long-Term Care (MOHLTC, 2014).

The development of the Ontario Public Health Standards (OPHS) and the incorporated Protocols are widely recognized as an important milestone in public health renewal. The OPHS and Protocols were established by the Ministry of Health and Long-Term Care in 2008 to outline the legislated minimum requirements for each board of health and to provide them guidance for "the assessment, planning, delivery, management, and evaluation of a variety of public health programs and services that address multiple health needs" (MOHLTC, 2016, p. 3). The 2008 OPHS and Protocols replaced the 1997 Mandatory Health Programs and Services as of January 1 2009. The OPHS 2008 were revised slightly in May 2016 (see MOHLTC, 2016).

Figure 1 provides a visual representation of the Ontario Public Health Standards (MOHLTC, 2016, p. 11). The OPHS consists of three foundational components: Principles,

Foundational Standard, and Program Standards. The Principles were developed to guide public

health activity as well as "to balance local public health needs with the need for common

outcomes across the public health system" (Public Health Services Hamilton, 2008, p. 4). The

four Principles of OPHS include: Need, Impact, Capacity, and Partnership and Collaboration

(MOHLTC, 2016, p. 10). The Foundational Standard describes four key activities and specific

requirements concerning these activities that must be carried out by boards of health when

organizing public health services and programs in the province, including Population Health

Assessment, Surveillance, Research and Knowledge Exchange, and Program Evaluation

(MOHLTC, 2016, p. 10; Public Health Services Hamilton, 2008). Finally, Program Standards are

provided for five specific core program areas including Chronic Disease and Injuries, Family

Health, Infectious Diseases, Environmental Health, and Emergency Preparedness (MOHLTC,

2016, p. 11). Each of the five Program Standards has specific goals, societal outcomes, board of

health outcomes, and requirements (MOHLTC, 2016, p. 13).

One of the key elements of the OPHS, unlike previous guidelines, is the strong focus on

the use of available evidence and best practices in developing programs and on the use of

evidence-based tools to inform public health practice (MOHLTC, 2016). Thus, the OPHS have

the potential to inform public health professionals' use and integration of both explicit

knowledge (i.e., knowledge that comes from the "articulated theories and empirical studies") and

implicit knowledge (i.e., knowledge that comes from the "judgment of individuals with extensive

experience in an area") (Bhattacharyya, Reeves, & Zwarenstein, 2009, p. 493). As such, several

general resources and guidance documents have been produced to support and facilitate the

implementation of the OPHS and the incorporated protocols (see MOHLTC, 2015).
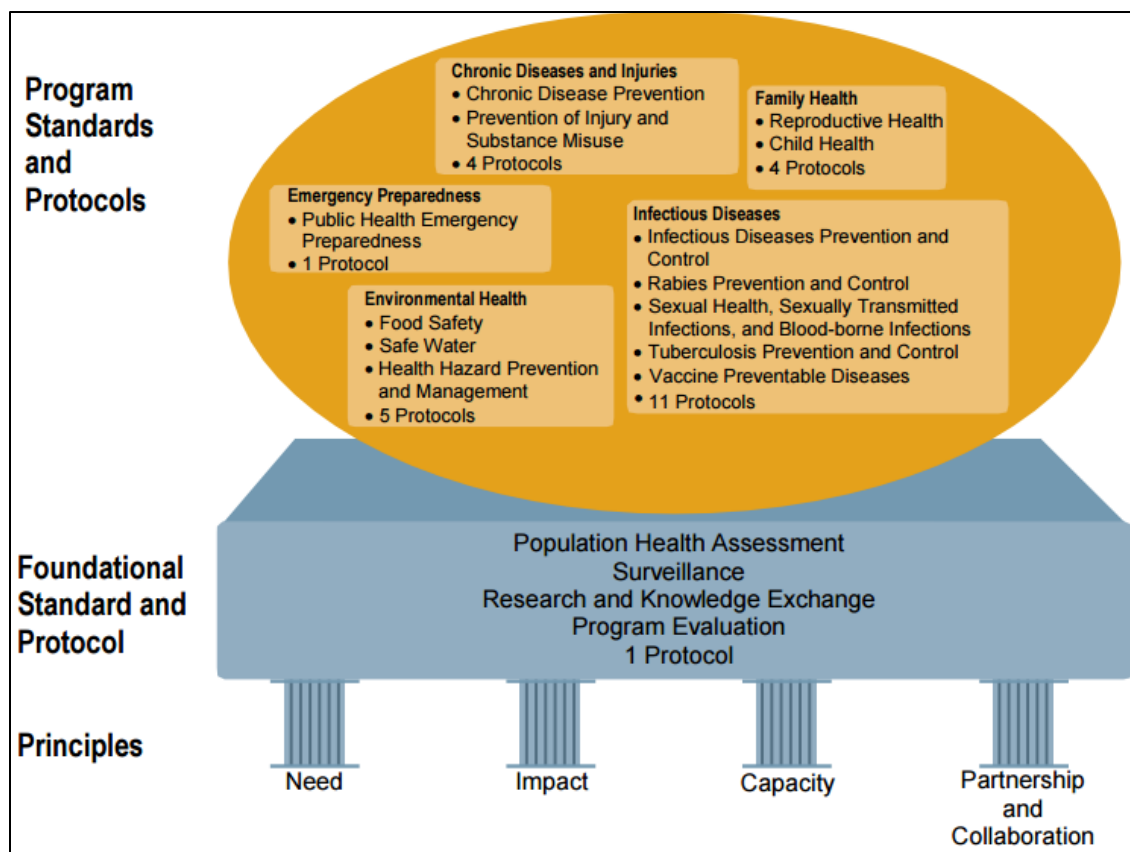
Figure 2: Ontario Public Health Standards (OPHS) Framework.

Adapted from *Ontario Public Health Standards 2008. Revised May 2016,* by Ministry of Health and Long-Term Care (MOHLTC), 2016, p. 11. Retrieved from:
http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/ophs_2008.pdf

The Way Forward

In order to assess the implementation of the OPHS and to inform the current public health renewal initiatives in Ontario, there is a great need to understand factors influencing the process of evidence uptake within public health units. Previous studies have explored different aspects of evidence and its use in public health, with key topic areas being types of evidence used in public health practice, barriers and facilitators affecting the use of evidence, and a range of effective strategies to promote evidence use.

Most studies about evidence use have focused on research evidence, but scholars have highlighted that there are two main types of evidence: explicit knowledge and implicit knowledge (Bhattacharyya et al., 2009; Greenhalgh & Wieringa, 2011). Within the two main types of evidence are several sub-types, indicating the diversity and complexity of the concept of evidence (Glasgow & Emmons, 2007; Kothari, Boyko, & Campbell-Davison, 2015). A number of studies have shown that an integration of tacit and explicit knowledge is often carried out within public health context (Higgins et al., 2011; Kothari et al., 2012; Meagher-Stewart et al., 2012; Yousefi-Nooraei, Dobbins, & Alexandra, 2014), suggesting that studies focused on understanding the utilization of evidence need to employ a broad definition of evidence that moves beyond just research findings.

Studies focused on the determinants of evidence use discuss six types of barriers and facilitators. This includes factors related to aspects of: (i) the individuals involved in decision making (Armstrong et al., 2014; Ellen et al., 2014; Grol & Grimshaw, 2003; Huckel Schneider, Campbell, Milat, Haynes, & Quinn, 2014; LaRocca, Yost, Dobbins, Ciliska, & Butt, 2012; Orton, Lloyd-Williams, Taylor-Robinson, O'Flaherty, & Capewell, 2011; Rosella et al., 2013; Zardo & Collie, 2014); (ii) the organization/agency within which decisions are made (Armstrong et al., 2014; Bhattacharyya et al., 2009; Ellen et al., 2013; LaRocca et al., 2012; Laws et al., 2013; Milat et al., 2014; Rosella et al., 2013).; (iii) the research being considered for uptake (Francis et al., 2015; Glasgow & Emmons, 2007; Langley & Denis, 2011; Laws et al., 2013; Wathen, Sibbald, Jack, & Macmillan, 2011.; Zardo & Collie 2014); (iv) the social networks and relationships with relevant stakeholders (Armstrong et al., 2014; Ellen et al., 2013; Ellen et al., 2014; Francis et al., 2015; Huckel Schneider et al., 2014; Wathen et al., 2011); (v) the economic climate (Bhattacharyya et al., 2009; Ellen et al., 2014; Francis et al., 2015; LaRocca et al., 2012;

Laws et al., 2013;); and (vi) the political environment related to a given public health issue (Armstrong et al., 2014; Grol & Grimshaw, 2003; Huckel Schneider et al., 2014; Laws et al., 2013). Thus, evidence use is a multilevel, complex process that includes some determinants that are amenable to change (e.g., attitudes, skills, infrastructure) and other determinants that are unlikely to change (e.g., larger political system, time constraints).

Recent systematic reviews in this area point towards three KT strategies that can help promote evidence use in public health (LaRocca et al., 2012; Perrier, Mrklas, Lavis, & Straus, 2011; Mitton, Adair, McKenzie, Patten, & Waye Perry, 2007). This includes (i) knowledge brokering (Dobbins et al., 2009; LaRocca et al., 2012; Mitton et al., 2007; Perrier et al., 2011; van Kammen, de Savigny, & Sewankambo, 2006); (ii) partnerships and networks (Kothari, Bickord, Edwards, Dobbins, & Meyer, 2011; LaRocca et al., 2012; Mitton et al., 2007); and (iii) evidence syntheses (Lavis, Posada, Haines, & Osei, 2004; Mitton et al., 2007; Perrier et al., 2011; Thomson, 2013). Each of these three strategies fosters interactions between distinct groups involved in making decisions regarding public health programs and services, which can subsequently help to bridge evidence-practice-policy gap in different ways.

One important aspect of evidence that is not as widely studied is to understand how public health managers and frontline staff differ in their views of evidence and related barriers and facilitators, and how these differences in views of evidence might (or might not) support the implementation efforts in the health units. Perceptions of evidence held by different health care managers, practitioners, and decision makers is reported to be one of the key factors influencing the process of evidence uptake (Kyratsis, Ahmad, Hatzaras, Iwami, & Holmes, 2014). Because different professional groups come from a diverse range of educational backgrounds, belong to a variety of different value systems, and perform a set of specific professional roles, their

perceptions about evidence are likely to be distinct (Langley & Denis, 2011). However, empirical evidence on how different health care managers, practitioners, and decision makers make sense of evidence is sparse, especially in the context of Ontario's public health system and since the implementation of the OPHS. Therefore, this research study sought to address this important gap in knowledge about evidence and public health.

Objective and Research Question

The primary objective guiding this study was to understand views of evidence in Ontario public health units. This objective was accomplished by exploring the research question: What are the similarities and differences in the views of evidence held by public health managers and frontline staff in Ontario?

Methodology

Study Design

This study used a qualitative description design, as described by Sandelowski (2000), and qualitative content analysis as a method of analysis. Qualitative descriptive design allows one to capture an in-depth description or summary of a phenomenon of interest about which we know little, and is especially useful when there is a need for straightforward answers to questions that are relevant to practice or policy (Sandelowski, 2000). It is typically based on naturalistic inquiry (Sandelowski, 2000) which supports the belief that the phenomenon of interest must be studied in its natural state where possible (Lincoln & Guba, 1985). The interpretations in a qualitative descriptive study are "data-near", meaning the interpretations are achieved by staying close to explicit statements that are presented in the data and by avoiding inferring extensively (Sandelowski, 2010, p. 79). Therefore, qualitative descriptive design is both theoretical as well as

interpretive, though not to the same level as other qualitative research designs such as grounded theory or phenomenology (Sandelowski, 2000; Sandelowski, 2010).

Qualitative content analysis method (see 'Data Management and Analysis' section for details) was specifically used to conduct a secondary analysis of focus group data. Secondary analysis involves applying a new research question to a pre-existing data sample that was collected for another study or purpose (Heaton, 2008). Unlike reanalysis that is done to validate findings of earlier studies reporting on the same data (Hammersley, 1997), secondary analysis allows one to generate new knowledge about a phenomenon by exploring a different research question. Also, secondary analysis provides an opportunity to focus on the data analysis phase since sampling and data collection have been carried already (Szabo & Strang, 1997).

The RATS reporting guideline for qualitative studies was followed to guide accurate and complete reporting of all key aspects of this research study, and to support a rigorous research process (see: http://old.biomedcentral.com/authors/rats) (Clark, 2003; Dixon-Woods, Shaw, Agarwal, & Smith, 2004; Eccles, Foy, Sales, Wensing, & Mittman, 2012).

Data Source

The pre-existing qualitative data analyzed in this study were collected during Phase I (2010) of the Renewal of Public Health Systems (RePHS) research project (RePHS, 2010; see http://www.uvic.ca/research/groups/cphfri/projects/currentprojects/rephs/index.php). The prime aim of the multi-phase RePHS research project was to understand the implementation and the impact of the BC Core Public Health Functions framework and the Ontario Public Health Standards using complex adaptive systems theory (RePHS, 2010). This aim was achieved through a case study design employing different data collection strategies, with cases being two core public health programs (i.e., Chronic Disease Prevention/Healthy Living (CDP) and

Sexually Transmitted Infection Prevention (STIP)) (RePHS, 2010). The research questions of the

primary RePHS study included: (1) "What are the processes of the public health standards and

core functions of implementation for two core public health programs in BC and Ontario, and

how do contextual variations within and between each province affect the implementation?"; and

(2) "What are the impacts and outcomes of the two core programs and how does variation in

context and process of implementation affect these?" (RePHS, 2010).

Sampling

Purposeful sampling techniques are typically employed in qualitative descriptive studies

(Sandelowski, 2000). This study specifically used maximum variation sampling, which involves

purposefully selecting or sampling information-rich cases that are related to the phenomenon of

interest to capture a range of variation (Patton, 1990). This particular sampling strategy was

appropriate since the objective of this study was to understand different views of evidence in

Ontario public health units. Given that procedures of STIP are mostly directed (i.e., guided by

medical guidelines), we selected our sample to discussions of CDP where there is greater leeway

to plan and implement programs. Hence, all focus group data from Phase I of RePHS study to

the CDP program area (limited to physical activity, healthy eating, and tobacco control programs

in the original RePHS study) were used. Specifically, this included 12 focus group transcripts

consisting of 6 focus groups with managers (n= 24) and 6 focus groups with frontline staff (n=

40) involved in CDP programs at six rural and urban public health units across Ontario.

Including data from various public health units across Ontario and from both managers and

frontline staff allowed variations due to differences in geographic location and contextual factors

as well as for diverse perspectives to be expressed. The 64 focus group participants were from

diverse disciplines (see **Table 6**). These participants had varying levels of experience with regards to their level of position and length of time spent in their respective public health units.

Table 6: Background of Study Participants (n=64)

Discipline/Title	Number of Participants (n)
Public health nurse	21
Health promoter	13
Public health dietician	8
Public health nutritionist	7
Public health nutritionist/dietician	3
Community/chronic health nurse	2
Health promotion consultant	2
Health promotion officer	2
Youth engagement coordinator	1
Public health inspector	1
Gerontologist	1
Project officer	1
Project specialist	1
Policy and planning specialist	1

Data Collection

Focus groups are a useful data collection technique for qualitative descriptive studies as they can help reveal detailed information about the "*who*, *what*, and *when* of events or experiences" [emphasis in original] (Sandalowski, 2000, p. 338). Focus groups in the primary RePHS study were conducted by the study co-investigators and were generally 60-90 minutes in length. During the focus group discussions, participants were asked to share their views about several topics relating to the introduction of the 2008 OPHS including questions about: participant background, changes in activities since the introduction of the OPHS; evidence; planning; leadership; implementation; evaluation; and partnerships. All questions were open-ended. Focus groups were audio recorded and recordings were then transcribed verbatim by a professional transcriptionist. For the purpose of this study, however, only responses specific to

the evidence and evidence use questions were reviewed and analysed. (see **Appendix E** and **Appendix F** for a detailed list of questions).

Data Management and Analysis

Qualitative content analysis is an appropriate method of analysis in qualitative descriptive studies (Sandelowski, 2000). Content analysis has been used in research since the 18th century (Rosengren, 1981), but its use as an analytic method has evolved over time ever since (Hsieh & Shannon, 2005). The purpose of content analysis is "to provide knowledge and understanding of the phenomenon under study" (Downe-Wamboldt, 1992, p. 314) and to examine the multiple meanings embedded within the text by reducing the phenomenon into key defined categories and themes (Hardwood & Garry, 2003). Content analysis is suitable for analyzing "open-ended" data (e.g., interviews, diaries, focus groups; Elo & Kyngäs, 2008) and a variety of objects of study (e.g., either a person, a program, or an organization; Graneheim & Lundman, 2004). Hsieh and Shannon (2005) define qualitative content analysis as "a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (p. 1278). In other words, it focuses on describing as well as making inferences about the characteristics of language within a text by exploring both the content and the context (Hsieh & Shannon, 2005).

For this particular study, the qualitative content analysis method used was the one articulated by Graneheim and Lundman (2004), and described by Hsieh and Shannon (2005) as a conventional approach. Consistent with qualitative content analysis, data management and analysis involved a multi-step process (Graneheim & Lundman, 2004; Hsieh & Shannon, 2005). Selecting the unit of analysis and a meaning unit are two key decisions made prior to content analysis (Graneheim & Lundman, 2004). The unit of analysis in this study was a focus group

transcript. All focus group transcripts were imported into NVivo 10, a qualitative data analysis software. A meaning unit, defined as "the constellation of words or statements that relate to the same central meaning" (Graneheim & Lundman, 2004, p. 106), was sentences (or sometimes phrases) related to the evidence and evidence use questions.

The first step of the data analysis was familiarization, which involved reading through all transcripts multiple times to become immersed in the data. In this way the characteristics of the participants, the content of the transcripts, and the context was understood (Hseih & Shannon, 2005).

The second step of the data analysis was creating codes (Graneheim & Lundman, 2004; Hsieh & Shannon, 2005) using the method of open-coding (Elo & Kyngäs, 2008). Open-coding involved reading through the transcripts word by word and then labelling (highlighting) chunks of data "that appear to capture key thoughts or concepts" (Hsieh & Shannon, 2005, p. 1279). A priori focus group questions were used to organize how coding began, but codes under that were inductively derived from the data (i.e., predetermined codes were not used). Re-coding of all transcripts was done when new codes emerged from the data or when there was a need to combine the existing codes (Elo & Kyngäs, 2008).

The third step of the analysis was to organize the related and linked codes into smaller, manageable content categories (Graneheim & Lundman, 2004; Hsieh & Shannon, 2005). This particular step involved step by step formulation of inductive categories by which the data could be examined and referenced (Mayring, 2000; Morgan, 1993). All categories were derived from the data itself (i.e., from the issues raised by participants and the words or concepts that recurred in the data) to ensure that participants' views were adequately captured and that the categories were specifically catered to the data being analyzed (Morgan, 1993; Pope, Ziebland, & Mays,

2000). The process of creating categories was associated with manifest content analysis which focuses on analyzing appearance of "visible, obvious components" in the textual material (Graneheim & Lundman, 2004, p. 106-107). As such, category development helped reveal *what* overarching patterns exist given the different contexts that underlie the data. This research study used the term 'subthemes' to refer to categories.

The final step of the data analysis process was "to link the underlying meanings together in categories" by creating themes (Graneheim & Lundman, 2004, p. 107). A theme is defined as "a recurring regularity developed within categories or cutting across categories" (Polit & Hungler, 1999). The process of creating themes was related to latent content analysis which focuses on analyzing the relationships existing in the textual material and the underlying meanings of the content (Graneheim & Lundman, 2004; Hsieh & Shannon, 2005). As such, theme development helped reveal *how* and *why* certain patterns exist given the different contexts that underlie the data (Graneheim & Lundman, 2004). Both manifest and latent content analyses were conducted to gather both the abstract level of understanding as well as an in-depth level of understanding of the transcripts.

Declaration of Self

Though this study did not involve collecting new data or having personal interactions with study participants, it did involve immersion in an in-depth analysis of existing data through coding and interpretation. The researcher who primarily coded and interpreted the data (SM) had no previous professional experience of working in public health, but did hold graduate research assistantships related to public health topics that may have influenced data interpretation. Hence, several measures were taken to ensure trustworthiness, and thus to support a rigorous research process.

Criteria to Ensure Trustworthiness

Trustworthiness is the extent to which research findings can be regarded as truthful or worthy of being trusted (Graneheim & Lundman, 2004). To ensure trustworthiness of qualitative content analysis, this study used the criteria described by Graneheim and Lundman (2004). This included carefully assessing the research process for credibility, dependability, and transferability (Graneheim & Lundman, 2004).

Credibility refers to the degree to which the data used are suitable to address the objective of the research study and the degree to which research findings reflect what was expressed in the data (Graneheim & Lundman, 2004). Credibility involves assuring that "no relevant data have been inadvertently or systematically excluded or irrelevant data included" during data selection, coding, and analysis of the codes (Graneheim & Lundman, 2004, p. 110). To ensure credibility, purposeful sampling was used to select all relevant CDP focus group transcripts from Phase I of the primary RePHS study. Moreover, the codes, categories, and themes generated from the analysis of data were reviewed by and discussed with the advisory committee (AK and SR), both of whom are part of the primary RePHS research team and have experience in both public health research and qualitative research methods. Furthermore, credibility of findings was demonstrated by including example quotations when presenting each theme, as suggested by Graneheim and Lundman (2004).

Dependability refers to the degree to which the researcher's decisions were consistent during data collection and analysis (Graneheim & Lundman, 2004). The risk of inconsistency in data collection was not applicable since this study involved the use of secondary data. However, to ensure dependability during the data analysis process, rigorous reflexivity and self-awareness were employed throughout the research work by keeping detailed personal notes documenting

how decisions were reached and by being conscious of prior knowledge (Tracy, 2010). These notes were reviewed regularly. In addition, all key aspects of this research study were accurately and completely reported to enable external researchers to replicate this study process.

Transferability refers to the degree to which research findings can be applied to other situations and contexts (Graneheim & Lundman, 2004). To facilitate transferability, a rich description of research findings, culture, and context was provided by: 1) accurately presenting all views expressed in the same order and language as conveyed by study participants (termed 'descriptive validity'; Maxwell, 1992); and 2) accurately presenting all and only those meanings that are attributed to views by study participants (termed 'interpretive validity'; Maxwell, 1992).

Ethical Considerations

McMaster Research Ethics Board provided ethics approval for the primary RePHS study (**Appendix G**). An additional ethics approval from Western's Research Ethics Board was not required due to the nature of this research study. The approved ethics documents were carefully read and understood prior to the commencement of this study to ensure that data management, analysis and reporting were all in accordance with what has been approved. Access to data was obtained through informal data sharing (Heaton, 2008). A written research proposal (**Appendix H**) was submitted to the RePHS Steering Committee in July 2015 for permission to access and use the RePHS Phase I data. Upon approval, a confidentiality agreement was signed with the RePHS team (**Appendix I**). All data obtained were stored on a password protected computer at Western University throughout the study. Any information that could identify the participants or the public health units involved was kept strictly confidential when reporting the study findings in any form. The data will be destroyed in accordance with institution policy.

Results

Five major categories emerged from the analysis: 1) meanings of evidence, 2) evidence in practice, 3) process for applying evidence, 4) facilitators of evidence use, and lastly 5) barriers to implementing evidence. In the following sections, the comparisons of managers and frontline staff views are presented for each of the five categories. Illustrative quotes are used throughout to demonstrate findings in participants' own words.

Meanings of Evidence

Table 7 provides a summary of the responses received from public health managers and frontline staff when asked what the term evidence means to them. The responses demonstrate the diversity in the meanings of evidence.

Table 7: Summary of the Different Meanings of Evidence that Emerged from the Data.

	Managers	**Frontline Staff**
Similar Views	"something with impact" (Participant MA1)	"has some measurable impact" (Participant FD6)
	"numbers driven, it's very prescriptive" (Participant MA2)	"is a quantitative thing. You do this with somebody and this will happen" (Participant FE2)
	"how do you know it works" (Participant MD1)	"proof that something is effective or isn't effective, or this is the way to go or not to go" (Participant FC3)
	"research that has been done on a specific strategy, activity, approach" (Participant MB1)	"stuff backed up by strong research literature" (Participant FC4) "something you can trust, something that's kind of research-based" (Participant FA7) "evaluated, proven, researched. Theory-based" (Participant FB2)
	"a combination of the academic literature, grey literature, and the community" (Participant MC6)	"best currently available information or knowledge and demonstrates what works" (Participant FA4)

	"not re-inventing the wheel" (Participant MA1)	"a reason for action to make a move or to get the ball rolling" (Participant FA7)
Different Views	"something tangible" (Participant MA2)	"justification for what you're doing" (Participant FB6)
		"that-makes-sense" (Participant FA2)
		"[sometimes] almost a barrier" (Participant FC3)

Note: Similarities are highlighted in blue.

The major theme emerging from manager and frontline staff responses to the question "what constitutes evidence for you" was that there are multiple forms of evidence, and that all of these forms must be considered and integrated when making decisions regarding CDP program development and implementation. As one manager described it:

I think certainly the message that we communicate quite strongly is that there are multiple forms of evidence, and that we need to assess and evaluate all of them and think about the role that each one of them plays in our decision-making. So that is literature, quantitative/qualitative literature. It is anecdotal from staff, what they see in the field, it is community partners and key informants, what they perceive as, as need or best practice, and political context. Community context. So all of those things together, I think, really need to be considered and integrated into those decisions. (Participant ME1).

Similarly, a frontline staff spoke to this theme quite clearly with an example:

It would look like feedback from your teachers, from your students, the parents, what they tell us, or what the teachings are hearing the students say about certain issues. Or what they are observing in the classroom, because we can't be there all the time. I think there has to be a good marriage between the anecdotal and the hard evidence. (Participant FE3).

While this theme was prominent, an additional insight that emerged from the focus groups with managers and frontline staff was that the perception of what constitutes evidence in public health practice has only recently started to shift from being more exclusive (to research findings) to being more inclusive (to other forms of evidence). Managers attributed this shift in perception partly to the OPHS due to its greater emphasis on evidence use, its support to increase resource allocation towards identifying and gathering relevant evidence, and its expectations of health units to contribute to the evidence base and share with other health units. Frontline staff pointed out that there has been a shift in the understanding of research evidence by pubic health professionals, including both frontline staff and their managers. They indicate that previously, research was considered something more quantitative-focused with an emphasis on capturing breadth through population representation, but recently the value of qualitative work and its ability to grasp the depth of a given phenomenon has also been realized.

Evidence in Practice

Table 8 outlines the major forms of evidence that managers and frontline staff use to inform or guide their practice with respect to the CDP activities. The forms of evidence emerging from the data can be categorized into four main thematic areas: 1) local, 2) expert, 3) research, and 4) experiential evidence[4]. These evidence forms involved different sources of explicit and tacit knowledge. Generally, the forms of evidence considered by public health managers and

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[4] Local evidence was defined as knowledge of local sources shaped by an individual's local context and related factors; Expert evidence was defined as knowledge obtained from formal education and/or training in a given area of practice; Research evidence was defined as knowledge that comes from empirical observations made using scientific methods; Experiential evidence was defined as knowledge gained from learning experiences in a particular field of practice (Kothari et al., 2015).

frontline staff to inform or guide their practice is context specific and "really depends on the topic area" (Participant MC3).

Public health managers and frontline staff indicated that they gather as much relevant evidence as possible given their capacity, time, and funding. However, what evidence actually gets used in practice is greatly influenced by many factors. The main factors are political pressure as well as public demands for the use of evidence. As explained by one manager:

I'd like us to think that we can influence the politicians with our evidence but rather I think it's kind of the other way – they tell us. And we seem to have a fairly quiet voice around that…so in terms of how we do our planning it is you know the palatability from sort of the public, the politicians, takes much greater weight in the overall scheme of things than real hard evidence in terms of what we should be doing. (Participant MF6).

Likewise, a frontline staff explains this situation in a similar manner:

We may say, oh the evidence is saying this, the research is saying this, the community assessment is saying this, but a councillor may have a particular interest area and say no, but you are doing helmets at skateboarding parks, for example. And then that's how our path may be chosen and that's the reality of a political city. (Participant FB2).

Other factors influencing what evidence is used in practice according to some managers include: individual bias (e.g., staff strategically using only evidence that supports their opinions or actions); and whether the issue to be addressed is cross-cutting (e.g., the number of factors and sectors associated with the issue). According to frontline staff, on the other hand, other factors influencing what evidence is used in practice included the support (or lack of support) of city councillors and community organizations.

Table 8: Evidence Identified by Managers and Frontline Staff as Guiding their Practice.

	Themes	Subthemes		Example Quotes
		Managers	**Frontline Staff**	
Similar Views	Local	Community consultations and assessments	Community consultation and assessments	"So when we're program planning, we have to make sure that any program is going to be accepted and actually it's something that the community wants because otherwise you might as well be talking to the wall. So we do look at what is the important pieces that are coming from the community." (Participant MC5) "I'd say for us it's the needs of the community ... We hear from them what we … we have a pulse on what is going on at the current time and you know either provide resources to help or look at programming and what our capacity is to fulfil that need, so." (Participant FC3)
		Epidemiological data / Health status reports	Epidemiological data / Health status reports	"We look at our epidemiology pieces with our you know health-specific data with our Epi Department and most, I think, most programs are going through the process of actually putting together health status data reports where we're looking at indicators that we want to track." (Participant MC3) "We look at a lot of socio-demographic. We look at behaviour, risk-behaviour rates, disease rates locally. That's one source of evidence that we use quite strongly to measure what we're doing." (Participant FF4)
	Expert	Best practice guidelines	Best practice guidelines	"I know right now the Canadian Centre of Substance Abuse has just published this whole best practices guidelines for substance so that's, of course, what our health promoter is looking at now." (Participant MA1)

				"In my field, physical activity, we always go back to our Physical Activity guidelines. And those are sort of our staple tool, as I'm sure with nutrition." (Participant FB2)
	Research	Peer-reviewed published literature	Peer-reviewed published literature	"I suppose literature, published literature, would, would have a higher degree of credibility." (Participant MB2) "The research is ahead of their ability to do that, and so we are looking to the research to actually tell us what is new and what is needing to be addressed." (Participant FB6)
		Grey literature	Grey literature	"Well, certainly, certainly literature, but you know, grey literature as well." (Participant MB2) "So I would say research and sometimes that's grey literature too – things that are some of the leading people in the field what their research, their current papers and so on what they're publishing or not yet published but information that they bring to conference or whatever – that informs our practice." (Participant FC6)
		Guidance documents that are research-based (OPHS Standards and other policy documents)	Guidance documents that are research-based (OPHS Standards and other policy documents)	"There are Regional Standards, there are … there's a Regional 10-year Plan that we also have to make sure that any of our programs can work with it, as well as Public Health's own 10-year strategic plan. So we sort of have this list of things… "(Participant MC5) "The OPHS is certainly the guiding document, protocols, and the guidance document supports that. It is certainly an indication of gaps that are not addressed." (Participant FD7)
	Experiential	Lessons from other health units	Lessons from other health units	"The other thing I put down was working with other health units and you know, the linkages that can happen with that. …what's been done at other places that has shown to be effective and evidence based, and how do you make it your own." (Participant MD1)

				"Well I try to keep in touch with a lot of the Health Units as well as to what they're currently working on… See where they get their information; if they have done an evaluation what are the results of it, to see if it's something that worthwhile pursuing and then go from there." (Participant FD3)
		Observing/talking to fellow practitioners	Observing/talking to fellow practitioners	"And then I think all of us as practitioners it is really important because we are on the ground and we are working with our, with partners, with our different populations. So, I think that matters a lot." (Participant MB2) "And, of course, talking to peers and talking to people in the community that's also what informs our service delivery as well." (Participant FF5)
		One's own experiences / current practice	One's own experiences / current practice	"I would think our current practice helps to inform our practice because we are trying to take a really close look at that." (Participant MD1) "Probably one thing we're not good at doing …is looking at our practice evidence. Like we talk about it, we learn from our practice." (Participant FF4
Different Views	Local	NGO websites that are credible		"Websites. NGO websites that are credible. That certainly helps inform practice." (Participant MB2).
	Expert	Reports produced by experts on various topics that impact or inform practice.		"I think experts, certainly within the tobacco world, within the Smoke-Free Ontario strategy groups, like the Ontario Tobacco Research Unit who produce reports on various topics that impact - very much informs practice." (Participant MB2).
			Best practice evidence from US	"…we look at different kind of best practices that have happened, more so in the U.S. and we look at other places; it's just they seem to be ahead of us and they have more funding than us I guess." (Participant FA5)
	Research	Internal literature reviews		"So, each health promoter or dietician in their program…they're the ones who normally would do the research to find the evidence. They would be the ones who are in charge of funding the local need

			and looking at the evidence and doing, you know, reviews." (Participant MA1)
	Organizational framework based on research		"I think that that framework was … a lot of work went into that. We had consultants. There was a lot of research documents that were looked at to arrive at that. So I think we all believe that it's grounded in some pretty solid stuff." (Participant MF6)
Experiential		Past practice (e.g., those of previous coordinators)	"But I think still ultimately it is past practice and trying to make it fit, at sort of the end of the day for what I'm working in anyhow. And as for the other stuff, still, I think a lot of it is coming from [my coordinator]. She's the one doing a lot of the work for evidence-based." (Participant FD2)

Note: Similarities are highlighted in blue
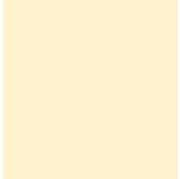
Process for Applying Evidence

Various processes for applying evidence in program development were described by both managers and frontline staff (**Table 9**). Differences were found between managers and frontline staff in terms of what processes they use to apply evidence, and also within managers and within frontline staff depending on their particular focus with respect to CDP. Moreover, while OPHS and protocols were not seen as the absolute guiding documents, both managers and frontline staff did recognize that the OPHS provides a foundation for initiating the collection of evidence for program development, that it has created a structure that guides the application of evidence, and that it is something with which all public health work must be aligned. One participant explains the importance of the OPHS:

> Probably the one thing that the OPHS has done, is it has made it more - not acceptable, but as a manager, you always – I have been a manager for four years, and you always say, guys, we should evaluate this, we should do this, and then the first thing you get from your staff is ah, I don't want to do it. You know, and I think that, okay, so the reality is, I know we knew we had to do it, but we didn't like doing it. And so we only did it when we had to, or we had or somebody else did it for us. So now, at least with this new process, it has influenced how we plan… (Participant ME3).

Table 9: Existing Processes for Applying Evidence in CDP Program Development.

	Themes		Example Quotes
	Managers	**Frontline Staff**	
Similar Views	Towards Evidence Informed Practice (TEIP) *General training for interpreting Standards, and determining how to apply it in practice to ensure all programs are evidence-based*	Towards Evidence Informed Practice (TEIP) *General training for interpreting Standards, and determining how to apply it in practice to ensure all programs are evidence-based*	"We also provided our teams with a training called TEIP, which is Towards Evidence-Informed Practice through OPHA. So all of the health promotion, disease prevention branch had participants at this training. So that they are able to apply the TEIP training now in our program review to ensure that we are meeting the Standards." (Participant MB1) "Well, I think right now, just with our – in preparation for the Board of Health, we have been asked to do program assessment using the TEIP tool." (Participant FB4)
	Program Planning and Evaluation *Includes logic models and various tools via internet to guide the uptake of evidence in practice.*	Program Planning and Evaluation *Includes logic models and various tools via internet to guide the uptake of evidence in practice.*	"Well we have the program planning and evaluation process… And it provides us with some templates in order to move forward on various programs, so you know including logic models and various tools that could be used and they are online or Internet so they're readily available to us." (Participant MC3) "There's a lot of support…to make use of online supports or whether it's having like these PPE reps on each team so that when you're doing your program planning you have someone that's been trained, I guess, to guide you with that process." (Participant FC2)

Different Views	Individual-driven *Each individual assesses their own and does their own programming*		"Right now the process has been each individual kind of assesses their own and does their own programming." (Participant MA1)
	Ministry-driven *Very prescriptive: just follow the steps or recommendations suggested*		"…it's very prescriptive, so there is no decision making done in terms of what are we going to do. It's like, well, if you've got so many high risk premises and they better be done three times a year, they better be done three times a year." (Participant MA2)
	Health Information Dissemination (HIDD) *Established by the MOH, involves a lengthy tool and a review committee to ensure that best practice evidence is used in establishing any program or project*		"… we did have something called the Health Information Dissemination – HIDD – process, which our MOH had established to ensure that we were using best practice evidence in establishing any program or project. So it was a very lengthy tool that we would have to research and demonstrate that we had done our legwork before establishing a program." (Participant MB1)
	Operational planning process *Branch manager carries out a broad scan of political scene, economy, municipal demands, the board of health, and the team to provide a vision of how things will be done. Team effort.*		"Well from perspective, at the start of every operational planning period, we normally, and we will again this year, get training from our branch manager and sort of setting the tone in terms of, you know, how – what the process looks like, what, what we need to be thinking about, so I feel like that's sort of …" (Participant MB2)
	Formal Process via library services *Teaches how to do properly formulate a PICO question and then research it comprehensively*		"There's also a more formal process for … that's through our library services in which we would do a more formal you know PICO question and research it very thoroughly using our library services." (Participant MC3)
	Dedicated planners and health promoters		"And most teams have dedicated planners, or health promoters who have taken the lead to kind of help put some of that data together. With input from all the teams as

These individuals take the lead in putting together evidence, critically appraising it and then assisting with how to apply this evidence		well, but they also meet and share among themselves." (Participant ME2)
	Comprehensive framework

Working with community organizations to build a relationship, understand their needs, find the relevant evidence, present to them, and work together in applying the evidence. | "So the one-offs…to do a display or presentation that they're [the community is] used to we're not doing because we want to do more comprehensive. So instead we work with that community organization, build a relationship, and work on you know goals to achieve together." (Participant FC2) |
| | Practice-Evidence Based (PPE)

Outlines the process of project development, provides different tools and suggests how to integrate evidence in practice. | "… we have…Practice-Evidence Based…So, this has been developed with – you can source the information based on populations, based on process within your project development, or evaluation of needs and blah, blah, blah. So it's talking about tools, it's talking about evidence in practice, so the use of different strategies and so on. So it's addressing many different components that we are often going to for helping us supplement with evidence what we're doing. (Participant FB3) |
| | Evidence-Informed Decision Making (EIDM)

Process for finding, sharing and using what works in public health. Includes a set of tools that guides the process. | "I think there's … I keep saying all these like acronyms PPE and EIDM – Program Planning and Evaluation, Evidence-Informed Decision Making just for your notes." (Participant FC2) |
| | Program Charters

Allows you to track progress and to ensure that key benefits or goals sought for the program are being met. | "Project charters. Like there's a lot of tools so we put the evidence into these tools to help our programming. And so we've become very … at least we thought of going that process. But it does slow you down a lot, like it does, to just go and do what you need to do." (Participant FC2) |

Note: Similarities are highlighted in blue.

Facilitators of Evidence Use

      Table 10 describes the types of facilitators within different themes identified by public health managers and frontline staff as supporting their use of evidence in practice. While both managers and frontline staff identified facilitators related to <u>individual</u>, <u>organizational</u>, <u>research itself</u>, <u>social</u>, and <u>economic factors</u>, only managers discussed how <u>political factors</u> (i.e., having supportive policies) can encourage and promote an increased use of evidence in their practice.

Table 10: Emergent Themes and Subthemes Regarding Facilitators of Evidence Use.

	Themes	**Subthemes**		**Example Quotes**
		Managers	**Frontline Staff**	
Similar Views	Individual Factors	Being part of networks, coalitions and working groups	Being part of networks, coalitions and working groups	"Yes, there's lots. I think there's lots of forums to share the resources, or things that people are working on. So, for example, at the injury prevention managers meetings there's an alliance there now. (Participant MD1) "I'm on one UV network, I'm on a Listserv, and then there's tobacco, there's the media networks as I'm guessing most people, there's a heart health one and… So they really help you keep abreast of any new research or any other new resources and that helps guide us." (Participant FA5)
		Sharing evidence via email listservs	Sharing evidence via email listservs	"There's a lot of papers coming across through email listservs right now around Ontario wanting to change our highways and make it more accessible for bikes." (Participant MA1) "I think there's a lot of like interprofessional collaboration…you know networking with other colleagues or different you know forums or ListServes to kind of share you know information or kind of best practices and stuff like that and you know current literature." (Participant FC7)
	Organizational Factors	In-house epidemiologist or a designated person who compiles all evidence	In-house epidemiologist or a designated person who compiles all evidence	"We look at our epidemiology pieces with our you know health-specific data with our Epi Department and most, I think, most programs are going through the process of actually putting together health status data reports where we're looking at indicators that we want to track." (Participant MC3)

				"We also have an epidemiologist that does ongoing reports so we have a Chronic Disease Prevention report. So the information that comes out of that we use to move forward might create a priority in our health unit, for example, or have evidence to support whatever we are doing in the community." (Participant FA6)
	Research Itself	Websites providing evidence syntheses	Websites providing evidence syntheses	"Websites. NGO websites that are credible." (Participant MB2) "Dieticians of Canada has practiced evidence-based nutrition, a PEN database it's called, P-E-N, so I refer to that often like for nutrition content…" (Participant FF5)
	Social Factors	Linkages with other health units	Linkages with other health units	"The other thing I put down was working with other health units and you know, the linkages that can happen with that." (Participant MD1) "When we look generally at something broader there's a very good network in Ontario for nutritionists that is called OSNPPH the Ontario Society of Nutrition Personnel and Public Health, and we often share the projects or success stories, things that we get transferred from one health unit to another." (Participant FD7)
	Economic Factors	Money invested in resource centres	Money invested in resource centres	"…but I also use a lot of resources from Health Canada, also the Nutrition Resource Centre, a provincial organization." (Participant FF5)
Different Views	Individual Factors		One-on-one expertise / mentoring capacity	"I think we have been fortunate in our nutrition group specifically because we have had a supervisor that's very keen on assessment and evaluation… And I think that's served us very well…" (Participant FB6)
	Organizational Factors	Access to external library service		"So I actually relied on that library to help me with big literature review to guide the evidence." (Participant MA1)

			Fact sheets as part of operational plans	"Well, in the past, and I'm not even sure if it still happens, but for our operational plans on the face sheet we have to explain why we were doing this, like what evidence, what we were basing these activities or programs on." (Participant FA5)
			Practice groups within the health unit	"And then the other one is Nutrition Practice Groups, so at that one you talk about best practices and also bring, for example, a research study or something or some kind of recent announcement on guidelines or something like that and talk about it together." (Participant FC1)
			Expanded in-house library services	"But certainly the library I think has kind of exploded in what they can offer and what they have access to and what we pay for to have access to." (Participant FC6)
			Online courses, modules, and webinars supported through management	"They're very frequently used. I think we all participate in the fireside chats, and the [online] webinars, and that's been something that's been really helpful." (Participant FB2)
			Training sessions and workshops	"I had wanted to get there too, but the qualitative and the quantitative, and I think slowly you are being trained more on both so some of us have started to go to the McMaster training…So I think our perception as it is now in 5 years from now will be very different as it filters." (Participant FC2)
	Research Itself	Availability of provincial evidence		"And so definitely that, the direction is very much supporting, you know, regionally-focused planning, regionally-focused implemented campaigns, and province, sort of mixing into that to make it - to get you the best bang for your buck, essentially." (Participant MB2)
			In-house research units/divisions	We used to have research units…And I would call (indiscernible) and would say, okay we are teaching about eating disorders in school classrooms, is it effective." (Participant FD7)

		Access to clearing house best practices databases	"One thing too, there is an enormous amount of clearing house best practice guideline sources." (Participant FB2)
		Availability of past practice evidence (through coordinators)	"But I think still ultimately it is past practice and trying to make it fit, at sort of the end of the day for what I'm working in anyhow. And as for the other stuff, still, I think a lot of it is coming from [my coordinator]. She's the one doing a lot of the work for evidence-based." (Participant FD2)
	Social Factors	Conferences	"The other thing too, is often a lot of the interesting new innovations and things are – they're given at conferences." (Participant FB2)
		Linkages with medical schools or other institutions that can do research for you	"If you posed to them a research question "poof" they'll come out with a review and say, okay, "we think those six articles will help you with your information" and they do the research for you. So they provide us training maybe once a year and if you don't do it enough then they'll do the first or the second one for you to help you." (Participant FD7)
		Partnerships within the community	"…with all the partnerships within the community, it gives us the opportunity to reach out to the community partners and kind of collaborate to work together to make some use of that evidence." (Participant FA7)
	Political Factors	Supportive policies	"And Smoke Free Ontario Act was like the greatest thing to happen because that's where you really saw some of the change. So I think it's a big help to have it. And same with the school food policies. The fact that that was provincial, I think that would have been a really tough sell for individual schools to just kind of accept that on their own." (Participant MA1)

Note: Similarities are highlighted in blue.

Barriers to Implementing Evidence

      Table 11 describes the types of barriers within different themes as experienced by public health managers <u>and</u> frontline staff when implementing evidence in their practice. While both managers and frontline staff experienced barriers related to <u>individual</u>, <u>organizational</u>, <u>research itself</u>, <u>economic</u> and <u>political factors</u>, only frontline staff discussed how <u>social factors</u> influence their implementation efforts.

Table 11: Emergent Themes and Subthemes Regarding Barriers to Implementing Evidence.

	Themes	Subthemes		Example Quotes
		Managers	**Frontline Staff**	
Similar Views	Individual Factors	Language-related barriers	Language-related barriers	"Another barrier there that has been identified is that we don't, we don't have the francophone capacity to...extrapolate francophone data" (Participant MB1) "at first if you want to be a breast feeding buddy you have to be bilingual because all the training will be provided in English and yet you will be providing the service in French because we don't have internal capacity to train in French." (Participant FD7)
		Time constraints	Time constraints	"I think, again, it is a bit of the time limitation thing. You value the evidence that you have time and ability to collect often, more than others." (Participant ME1) "I know where to go for information, I know for nutrition how to get it. But it's the time to do it and the time to do that search and to compile that information and put it together. With everything I have to do its very time consuming and that's one big barrier for me." (Participant FD1)
		Lack of leadership	Lack of leadership	"Well I would say the willingness of our senior management to be out in front of an issue as opposed to coming in behind where it's …" (Participant MF5) "So I don't know if it's a lack of leadership or a lack of confidence on their part to just say, no we're going to do what we're obligated to do

			which are these evidence-based practices and saying no to the old stuff." (Participant FD4)
	Attitudes towards change	Attitudes towards change	"Well, some more like staff sort of issues would be possibly implementing new things. Like everyone is sort of afraid of change to some degree." (Participant MA1) "I think certain team members are more … embrace the change and the direction and others are resistant and those people who are resistant provide a barrier to the team moving forward." (Participant FC6)
	Competence in identifying evidence and doing evidence-based programs	Competence in identifying evidence and doing evidence-based programs	"You know, where should we go next, kind of stuff, has been very valuable. So in terms of barrier, I don't think that we have enough staff to be able to [interpret and analyze evidence]." (Participant MB1) "So that's definitely a challenge for people that have never … don't know where to look, don't know what to do with it, and then present it and say this is what we're going to use." (Participant FC3)
Economic Factors	Availability of staffing	Availability of staffing	"So I think that that, for us, that that was our biggest barrier is, is money. And capacity." (Participant MB1) "So that's definitely – just because there's evidence there doesn't mean that you necessarily have the capacity to follow through with all that evidence." (Participant FA7)
	Availability of funding	Availability of funding	"Where we had the Youth Action alliances, we had the evidence that has had impact, the message from the Ministry is, "that's too expensive, we can't continue funding it." But we know that it changes behaviours." (Participant MB1) "…because you may have all the evidence in the world to say you should do something but if you

				don't have the money to be able to move on that properly then that can be a barrier." (Participant FC1)
		Short accountability timeframe	Short accountability timeframe	"Well in this complex environment it takes you a year and a half, 2 years, to develop that partnership, let alone start seeing any kinds of … So it is really challenging. And you run the risk of showing no impact and lack of effectiveness because the timeframes are so short." (Participant MF1) "And with for-profit companies they measure their success by the quarter and, you know, in a quarter year if you don't have profit coming in, then we need to get rid of something – and so workplace health seems to take a back seat in a lot of for-profit companies." (Participant FA1)
	Political Factors	Conflict with municipal mandates and reliance on city councillors' support	Conflict with municipal mandates and reliance on city councillors' support	"The focus of our accountability I think will be more so given our you know municipal mandates and you know councillors will be looking at the immediate to short term kind of focus, and with an emphasis on those customer services that we're talking about." (Participant MF1) "…people in the subdivisions would make deputations to council and have petitions and get everybody on board to say no sidewalk, no sidewalk and council is like, okay no sidewalk." (Participant FA2)
Different Views	Organizational Factors	Governance structure		"And maybe some of that has to do with our particular structure…And other Boards of Health may have a little bit more freedom to be risk takers because they're not quite so tied to the municipal governance structure." (Participant MF5)
		Need to prioritize		"And I think the other barrier to implementing evidence, and you have probably alluded to this a bit, is the need to prioritize...you know, what we put into our plans, okay these are the services

			we will continue, these are the services that we're stopping." (Participant MD1)
	Proportion of staff dedicated towards evidence-collecting versus delivery of service: balance		"Well, it's always…the struggle between servicing the population and you know, what proportion of your staff is dedicated to that evidence-collecting piece versus the delivery of service that's required. So what is that balance." (Participant MB2)
		Structure of the health unit	"So now I have to train; sometimes it's a pop health nurse, sometimes its family health nurses, because it is zero to six, well really - healthy eating happens zero to six and beyond. So there are silos to be broken there." (Participant FD7)
		Failures not shared as successes are	"if something is a failure it just gets put aside; it's the unmentionable, rather than that is evidence. That is available and we should be learning." (Participant FB2)
		Lack of proper training on identifying a priority population	"I think a big barrier for me, is what is a priority population…and our health unit, as far as I am concerned, hasn't offered any sort of, how are we going to do that. You are kind of left to figure it out." (Participant FE2)
		Organizational direction towards behaviour-change instead of awareness-raising	"We've gathered the information; it seems to have been effective. But it was effective [in] awareness-raising in the target population. It wasn't effective in creating behaviour change. And so it wasn't comprehensive...so its been pulled." (Participant FC6)
Research Itself	Need for more provincial evidence		"We're just wondering why, each individual health unit, why are we all struggling and spinning our wheels trying to do the same thing; that's a lot of time and resource, when the province could just say, okay you know what, let's just do something provincially…and get it taken care." (Participant MA1)
	Accessibility and availability		"I think accessibility and availability. I think evidence needs to be in, you know, nice neat packages. Like even the guidance documents are so big that you really have to comb through

				them and look to see if there's certain ideas." (Participant MD1)
			Finding and maintaining current statistics and evidence	"In any event, with the smoke-free movies campaign where there are well researched, peer-reviewed journal articles that are published on it, something like that, the movies that they're referencing are already a few years old so they don't really resonate with the youth as much when you're using that research." (Participant FA5)
			Information overload: too much evidence to grasp	"One thing too, there is an enormous amount of clearing house best practice guideline sources. It's almost overwhelming, to the point where you go to this website and there's 2000 best practices for a project and it's almost information overload." (Participant FB2)
	Social Factors		People do not recognize the benefits of chronic disease prevention	"I think one of the biggest barriers is that people in general in Public Health and outside they don't recognize the benefit of Chronic Disease Prevention…because it's not acute care. It's not a person's going to get better. You're going to save their life. They just don't see the long-term benefit at all." (Participant FF5)
			Barrier for a partnership in the area due to: • Cultural constraints • Loss of credibility as service providers Power dynamics: public health seen as funders, not as partners	"…we were going to do an event [around tobacco prevention outside of the school and we needed permission from the principals, but there was backlash from the parents and the community that were in the tobacco farming business or industry..." (Participant FA5)
	Economic Factors		Duplication of services with other sectors and within the health sector with CHCs.	But we have just realized lately that even within our city, there are other groups sometimes that are doing things similar. Like, I'm thinking Parks and Rec with you guys, that's a direct …duplication, slash, slash. (Participant FB3)

	Political Factors		Evidence not consistently valued at all levels in the municipality	"[Evidence is] valued in health but not elsewhere, so if you're working in an environment where you're working closely and you are trying to be collaborative and integrate, it's difficult when you have very difficult core values." (Participant FB2)

Note: Similarities are highlighted in blue.

In summary, public health frontline staff and their managers agreed that there are diverse types of evidence. Both similarities and differences were found in terms of what evidence types managers and frontline staff use as well as the processes they utilize for applying the evidence to inform or guide their practice with respect to the CDP activities. Moreover, there were also areas of consistency and inconsistency between managers and frontline staff with respect to facilitators identified as promoting evidence use as well as barriers to implementing evidence.

Discussion

The importance of implementing evidence-based programs to improve the general health of populations is increasingly recognized. Despite this recognition, several studies have reported that not all potentially useful and evidence-supported programs are implemented in practice (Grimshaw, Eccles, Lavis, Hill, & Squires, 2012; Grol & Grimshaw, 2003; Kyratsis et al., 2014). An important undertaking to reduce this gap is by studying perceptions of evidence held by different health care practitioners and decision makers (Kyratsis et al., 2014). Therefore, this qualitative descriptive study examined understandings about evidence in Ontario public health units by comparing perspectives from managers and frontline staff across six geographically-diverse units. The analysis revealed similarities and differences with respect to: 1) meanings of evidence; 2) types of evidence guiding practice; 3) process for applying evidence; 4) facilitators of evidence use; and 5) barriers to implementing evidence. The overall finding that there are differences in how public health frontline staff and their managers view, practice and apply evidence support the claim that individuals from different educational backgrounds and/or disciplines, belonging to different value systems, and performing a different set of professional roles tend to perceive evidence differently (Langley & Denis, 2011).

In terms of the meanings of evidence, the findings of this study suggest that both public health managers and frontline staff have a similar understanding of evidence: that multiple forms of evidence exist. This understanding of evidence is consistent with what literature has reported about what constitutes evidence and the different types of evidence that exist (e.g., Bhattacharyya et al., 2009), including in the public health context (Kamper-Jõrgensen, 2000; Kothari et al., 2015). Another aspect of meaning of evidence that emerged from participant responses was that different participants used a range of different words to describe an evidence type, for example words such as "impact", "proof", "evaluated", "what works" and "justification", suggesting that policies guiding practice might do well to include a clear, broad definition of "evidence".

In terms of the types of evidence guiding practice, both frontline staff and their managers mentioned that they use various sources of evidence and evidence types to inform or guide their practice. Moreover, participants described that their choice of evidence is context-dependent as well as program-dependent. This aligns with a number of studies have shown that an integration of knowledge is often carried out within public health context and that this integration can vary depending on the stage of program planning (Higgins et al., 2011; Kothari et al., 2012; Meagher-Stewart et al., 2012; Yousefi-Nooraei et al., 2014). In terms of the differences between managers and frontline staff, the types of evidence used by frontline staff were based on practice evidence (e.g., practice evidence from U.S., past practice of coordinators), whereas managers focused more on research-based documents.

Fortunately, both managers and frontline staff noted that there are different ways that (practice, research) evidence comes together and there are some processes already in place to support evidence integration and use. However, more differences than similarities were found in

terms of the types of processes used. One of the key difference that existed was that only frontline staff talked about using a comprehensive framework process to applying evidence in practice, which involved building ongoing connections with community organizations. Managers, on the other hand, pointed to external resources such as library services that could assist with the use of evidence. The difference in processes may be because these two groups have different professional roles and responsibilities in public health (Langley & Denis, 2011). For example, frontline staff spend more time in the actual context delivering the program and services to the target population in conjunction with other groups carrying out public health work.

In terms of factors influencing evidence use, a set of different barriers and facilitators of evidence use was discussed by managers and frontline staff. Nevertheless, in terms of common views, the findings suggest that strategies such as networks, listservs, websites and connecting with other health units are acceptable ways to promote the use of evidence. But frontline staff identified more facilitators than managers, suggesting that there are more opportunities to promote the use of evidence by this group. Frontline staff also suggested that capacity building through training and communities of practice are viable ways to support evidence use. In terms of barriers, both groups identified competencies, attitudes and leadership as challenges. Perhaps relatedly, staff also identified a number of organizational barriers that could in fact be amenable to change. This understanding of differences in barriers and facilitators could allow individuals involved in KT to strategically select, tailor and implement KT strategies that meet the specific needs of both public health managers and frontline staff.

The findings need to be considered in light of study limitations. In terms of carrying out a secondary analysis of qualitative data, there was a dependence on using focus group questions

designed by the RePHS team for their purpose to answer the research question investigated in this study. Although both the primary RePHS study and this study were about the same phenomenon, RePHS study had a slightly different research focus and involved various topics in addition to evidence in their discussions. Therefore, the data used may not necessarily be of best depth and pertinent detail for this particular secondary analysis (Hinds, Vogel, & Clarke-Steffen, 1997). However, this limitation was addressed by focusing analysis on responses from evidence-specific questions. This ensured that data which specifically represented views of participants about evidence were analyzed.

Another limitation is the reliance on original researchers for the quality of data collected. This is a challenge for all secondary analysis studies, including this one, as researchers have no opportunity to interact with participants or to make observations, and had no control over managing the quality of data gathered. This lack of first-hand experience limits the level of tacit knowledge a researcher has about participants whose perspectives are expressed and about the setting and culture informing these perspectives (Hammersley, 1997). Therefore, understandings of the context and thus interpretations were made on the basis of information found within the transcripts. To address this limitation, iterative discussions were held with members of the advisory committee, AK and SR, both of whom are part of the primary RePHS research team and both provided guidance throughout the conduct of this research study.

Two additional limitations must also be considered. First, findings were based on data collected over five years ago. Despite this, the study still provides an in-depth description of various views of evidence in public health units. Moreover, study findings can be compared to analyses of recent data to identify if there are any changes in views. Additionally, findings from this study are limited to CDP programs.

Nevertheless, the findings from this study can be useful for many reasons. First, having a deeper level understanding of the views of evidence held by managers and frontline staff could help inform how to utilize generalized (e.g., dissemination) and also more specific (e.g., knowledge brokers) knowledge translation (KT) strategies to encourage and facilitate an increased use of evidence. Second, the findings of this study also has important implications for developing new or revising existing guidelines and instruments for barrier and facilitator assessment studies (e.g., BARRIERS scale; Kajermo et al., 2010). Tools that take into account differing views of evidence can better assist frontline staff and their managers in conducting their self-directed assessments and in making public health decisions that are both effective and efficient.

In conclusion, this study provides a detailed description of how public health managers and frontline staff view and use evidence in their practice. The findings of this study could be helpful in developing strategies to improve the implementation of the OPHS and to promote an increased use of evidence-informed interventions and large-scale projects that are effective across public health units in Ontario. Future research could undertake an analysis that provides insight on different ways in which evidence is actioned in practice, which was not the focus in this study.

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CHAPTER FOUR

Summary of Key Findings

This thesis presented two studies. The first was a systematic review that examined primary studies exploring the use of research evidence in public health decision making published between 2010 and January 2016; this work extended Orton, Lloyd-Williams, Taylor-Robinson, O'Flaherty, and Capewell's (2011) review that covered studies published between 1980 and March 2010. The current systematic review, described in Chapter Two, incorporated 16 studies to provide insight into five topics pertaining to public health decision making: 1) the extent to which research evidence is used; 2) types of research evidence used; 3) process of using research evidence; 4) factors other than research influencing decisions; and 5) barriers to and facilitators of evidence use. Findings aligned with previous literature to show that various types of research evidence are being accessed in public health policymaking. Further, challenges and enablers exist at multiple levels of the system, suggesting that the use of research evidence is a complex, interdependent process.

The second study was a qualitative descriptive study that examined understandings about evidence in Ontario public health units by comparing perspectives from managers and frontline staff across six geographically-diverse units. The analysis revealed similarities and differences with respect to: 1) meanings of evidence; 2) types of evidence guiding practice; 3) process for applying evidence; 4) facilitators of evidence use; and 5) barriers to implementing evidence. Findings demonstrated that although both managers and frontline staff understand that multiple forms of evidence exist and that these forms must be integrated when making decisions regarding CDP program development and implementation in public health units, frontline staff highlighted the role of practice-based evidence. Both groups named tools and processes that were

available to assist their decision-making. Frontline staff also indicated that capacity building, through webinars or connections with other health units, were important for supporting evidence use. Both groups noted that leadership could present a challenge to evidence-based programs if it is not supportive of the evidence-based solution for public health problems. On the other hand, strong leadership can help bring about change at all levels (especially at the organizational level). It is important to note that the understanding of leadership differs between frontline staff and managers in Ontario public health units. For frontline staff, leadership means managers, and for managers, leadership means senior staff.

In the following sections, key implications for policy, practice, and research are discussed in light of the findings obtained from the two studies.

Implications for Policy

Public health policy defines public health priorities, provides mandates, and formalizes practices. Public health policies are developed at multiple levels: federal, provincial, regional and local. Given the findings of this research, policy makers responsible for developing public health policies at the provincial level can contribute to promoting further use of evidence in public health practice in three possible ways. First, although managers and frontline staff understood the concept of evidence in the same way, it would be useful for provincial policy makers to be clear about what they mean by evidence. This will ensure that there are no gaps between what is communicated by policy makers through broad strategic direction or guidelines presented in provincial policy and what actually gets operationalized by managers and frontline staff in their daily work at the regional and local level. Second, frontline staff and their managers agreed that diverse types of evidence are useful to inform their practice. Along the same lines, the systematic review demonstrated that a variety of research evidence types are important. An implication of

this finding is that policy makers need to acknowledge and incorporate various forms of evidence in making provincial policy decisions. Third, both managers and frontline staff identified various supports at the organizational level (e.g., access to library services, in-house epidemiologist) for promoting evidence use in practice. Such services are often not possible without proper funding and supportive policies. The systematic review also pointed to the need for supports and infrastructure, which in turn contributes to a culture of evidence use. Therefore, policy makers responsible for developing provincial policy can play an important role in sustaining the existing supports in public health units as well as in providing additional supports

Implications for Practice

Public health practice involves public health professionals (managers and practitioners) doing "the daily work of public health on the front lines of federal, state [province], and local health departments" (Stover & Bassett, 2003, p. 1799). Three major practice implications can be drawn from this research. The major finding of this research is that frontline staff and their managers have different perspectives related to some aspects of evidence and evidence use. Some managers and frontline staff shared that they come together to engage in mutual discussions about evidence in a context- or program-specific way. These groups found such discussions to be very effective in allowing them to identify a similar goal around evidence and to look at the varieties of evidence that inform public health services. However, other managers and frontline staff identified lack of such mutual discussions in their groups as a problem. In order to better understand each others' views about evidence and needs to support evidence use, it would be useful for all managers and frontline staff to engage in mutual discussions about their understanding of evidence and how their use of evidence in practice is influenced by various factors. Organizing and using deliberative dialogues is one way to involve managers and

frontline staff as key action agents in policy making and to gain better knowledge of both their perspectives and the contexts in which their actions are operationalized (Lavis, Boyko, Oxman, Lewin, & Fretheim, 2009).

Another finding that emerged from this research was that there are different ways that evidence comes together, that there are different sources of evidence, and there are some processes already in place to support evidence use. Practitioners should incorporate and apply those tools in practice that are not exclusively focused on research evidence but instead focused on integrating various sources of evidence. Moreover, while both managers and frontline identified websites providing evidence syntheses as one of the facilitators, they identified the lack of competency in identifying relevant evidence and doing evidence-based programs as one of the barriers. One way these two groups can resolve this issue is by getting involved in more online courses, modules, and webinars that are available through management (identified as another facilitator by frontline staff) as well as looking out for courses that build research skills provided free of cost at other institutions (e.g., universities). Given that both managers and frontline staff experience time constraints, it is very important to create an organizational culture where competency in identifying relevant evidence is valued, where organizational resources are available to support involvement in courses, and where leadership (which consists of managers for frontline staff and senior staff for managers) is supportive of the evidence-based solution.

Implications for Research

There are three key implications for research that can be derived from the findings presented in this thesis. The finding that managers and frontline staff identified a set of different barriers and facilitators of evidence use suggests that perhaps KT strategies also need to be different. Therefore, future research could concentrate on finding more tailored KT activities for

the two groups, and for public health policymaking as identified in the systematic review. Given that funding for research is often limited, researchers using findings from studies presented in this thesis should perhaps start with focusing on the themes that have a lot more to offer in terms of opportunities for improvement. According to the findings, this involves dedicating resources towards addressing organizational barriers and facilitators first and then research-related factors. It is also important to note that different types of barriers and facilitators are often inter-related, and hence addressing one may address another to some extent. In addition to this, the finding that an integration of different evidence types is often carried out by both managers and frontline staff suggests that research studies focused on understanding the utilization of evidence need to employ a broad definition of evidence that moves beyond just research findings. Moreover, one of the key findings obtained from the systematic review conducted is that processes of evidence uptake depend on what type of decisions are to be made and what context is involved. Future research could concentrate on this topic further by studying the different types of processes that exist in-depth and by identifying what forms of evidence are used for what type of decisions.

Conclusion

Bridging the gaps among evidence, policy, and practice in public health requires taking on a holistic approach. Policymakers, managers, practitioners, and researchers are all key players in the process of evidence-informed decision making, not to mention other key stakeholders like public and members of community sector. The roles each play in the decision making process tend to be different but complementary. The ways in which evidence is used in practice and policy changes across time, is dependent on the context, is shaped by evidence available to address the problem, and is influenced by the types of decisions being made as well as the stage of decision making. To better integrate various sources of evidence in public health decision

making, policymakers, practitioners, and researchers should work together to understand each other's perspectives, to recognize each other's roles and processes, and to support each other's needs. The views of managers and frontline staff on evidence offer insights into how evidence is understood and incorporated in practice, and the influence of policy. Understanding how views of evidence differ is important to better support implementation efforts in the health units.

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APPENDICES

Appendices for Chapter Two

Appendix A: MEDLINE Search Strategy.

Resource Selected: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily and Ovid MEDLINE(R) 1946 to Present

	Searches
1	Public Health/
2	Community Health Services/
3	Community Health Planning/
4	Regional Health Planning/
5	"Delivery of Health Care"
6	public health.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
7	population health.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
8	community health.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
9	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8
10	evidence$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
11	9 and 10
12	Health Policy/
13	Decision Making/
14	Policy Making/
15	Health Planning/
16	policy$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
17	plan$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
18	decision$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
19	12 or 13 or 14 or 15 or 16 or 17 or 18
20	11 and 19
21	limit 20 to (english language and humans and yr="2010 -Current")

Upper case letters = MeSH terms;
Lower case letters = Free-text terms

Appendix B: Eligibility Assessment Form for Full-Text Papers.

ELIGIBILITY ASSESSMENT FORM

Full Citation	

- **Does the study focus on public health decision making**?
  NOTE: Public health decision making involves decisions that influence the general health of entire populations.

     ____YES   ____NO   ____UNCERTAIN

  ### IF NO OR UNCERTAIN, STOP HERE. IF YES, CONTINUE.

- **Does the study address at least one of the five research questions?**
  NOTE: The five research questions include: (1) What is the extent to which research evidence is used in public health decision making?; (2) What types of research evidence are used by public health decision makers?; (3) What is the process of using research evidence?; (4) What factors, other than research evidence, influence the decision making process?; and (5) What are the barriers to and facilitators of the use of research evidence?

     ____YES   ____NO   ____UNCERTAIN

  ### IF NO OR UNCERTAIN, STOP HERE. IF YES, CONTINUE.

- **Is the study based in settings with universal health care coverage?**
  NOTE: Settings with universal health care coverage include Canada, Australia, New Zealand and certain countries within Europe (e.g. UK)

     ____YES   ____NO   ____UNCERTAIN

  ### IF NO OR UNCERTAIN, STOP HERE. IF YES, CONTINUE.

- **Does the study provide empirical data (i.e. is the study design qualitative, quantitative, or mixed methods)?**

     ____YES   ____NO   ____UNCERTAIN

INCLUDE IN THE SYSTEMATIC REVIEW:
____YES   ____NO

Appendix C: Data Extraction Form.

DATA EXTRACTION FORM

Author(s)		Publication Year	

Study aim
Describe study aim and research objectives

Methods
Describe study design and setting

Particiapnts	
Describe sample size	Describe participant characteristics

Findings
Describe main findings

Methodological quality (use these criteria if qualitative study)
Mark: Y= Yes; N=No; U=Unclear; or N/A=Not Applicable
Is there a clear statement of the research aims?
Is the study design appropriate?
Is the recruitment strategy appropriate?
Were the data collected in a way that addresses the research issue?
Has relationship between researcher and participants been adequately considered?
Was the data analysis sufficiently rigorous?
Is there a clear statement of the findings?

Methodological quality (use these criteria if quantitative study)
Mark: Y= Yes; N=No; U=Unclear; or N/A=Not Applicable
Is the study question precise?
Is the study design appropriate?
Is participant (or document) selection appropriate?
Is the exposure or intervention measured accurately?
Are confounding factors taken account of in design and analysis?
Are outcomes measured accurately?
Is length of follow-up adequate?

Methodological quality (use these criteria if mixed methods study)
Mark: Y= Yes; N=No; U=Unclear; or N/A=Not Applicable
Are there clear qualitative and quantitative research questions/ objectives, or a clear mixed methods question/objective?
Do the collected data allow addressing the research question/objective?
Qualitative component:
Are the sources of qualitative data (archives, documents, informants, observations) relevant to address the research question/objective?
Is the process for analyzing qualitative data relevant to address the research question/objective?
Is appropriate consideration given to how findings relate to the context, e.g., the setting, in which the data were collected??
Is appropriate consideration given to how findings relate to researchers' influence, e.g., through their interactions with participants?
Quantitative component:
Is the sampling strategy relevant to address the quantitative research question (quantitative aspect of the mixed methods question)?
Is the sample representative of the population understudy?
Are measurements appropriate (clear origin, or validity known, or standard instrument)?
Is there an acceptable response rate (60% or above)?
Mixed methods component:
Is the mixed methods research design relevant to address the qualitative and quantitative research questions (or objectives), or the qualitative and quantitative aspects of the mixed methods question (or objective)?
Is the integration of qualitative and quantitative data (or results*) relevant to address the research question/objective?
Is appropriate consideration given to the limitations associated with this integration, e.g., the divergence of qualitative and quantitative data (or results*) in a triangulation design?

Appendix D: Characteristics of Included Studies / Data Extracted.

Study	Research Objective(s)	Setting	Participants	Methods	Main Findings
Armstrong 2014	To identify the types of evidence and how each contributes to evidence-informed decision making process that takes place within local governments (LGs).	Victoria (Australia): multi-sector / diverse areas relevant to public health	135 participants from 45 LGs involved in public health planning, policy or programs	Mixed methods: Cross-sectional survey and interviews.	There was a disagreement amongst participants regarding what constitutes 'evidence'. Similarly, levels of access to evidence, confidence in finding and using evidence and LG culture (i.e. opportunities for professional development and building skills) for EIDM varied. Various forms of evidence were included in evidence base to inform public health decision making, with some forms of evidence *used* more often (e.g. community views) than other forms (e.g. research evidence). Internal evidence was found more influential that external, and external evidence was found more useful than internal evidence.

Ellen 2013	To identify current supports available in healthcare organizations that facilitate use of research evidence in decision making.	Ontario and Quebec (Canada): RHAs = regional health authorities, hospitals, PCPs = primary care practices.	57 participants including senior managers, library managers, and knowledge brokers.	Qualitative: Semi-structured telephone interviews.	Supports that promote the uptake of evidence within healthcare organizations included: roles within the organization that facilitate active use of research; building relationships with key stakeholders outside of the organization (e.g., researchers); technical infrastructure to increase access to research evidence; and training programs to improve capacity building within the staff. Evidence in this study included products of academic research and various types of population data.
Ellen 2014	To identify barriers, facilitators and views regarding implementing supports for research use and evidence-informed decision making in health systems.	Ontario and Quebec (Canada): RHAs = regional health authorities, hospitals, PCPs = primary care practices.	57 participants including senior managers, library managers, and knowledge brokers.	Qualitative: Semi-structured telephone interviews.	Key barriers included: limited resources (money and staff), time constraints, and negative attitudes towards change. Key facilitator was interest and willingness of decision-makers to support KT culture by investing in resources. Key views with respect research use in evidence-informed

					decision making were the identified need for better technical and organizational infrastructure, and building relationships with researchers and knowledge brokers that are external to the organization. These relationships could be formal or informal.
Francis 2015	To examine the needs of decisions makers that are linked to promoting use of evidence syntheses in their practice, and to discuss the implication of this for reviews and the steps that can be taken to build capacity.	UK: public health	28 participants from UK including representatives from policy organizations (n=15) and review authors (n=13).	Qualitative:\n\nTelephone interviews.	Policy makers associated high value to systematic reviews among other types of information. Policy makers mentioned that reviews must be relevant to policy and local context, conducted using rigorous methods, communicated in a way that makes its uptake and application easier and available in a timely manner. This can be achieved through collaboration between policy makers and review authors, making review methodologies better, and by considering diverse contexts, interventions and effectiveness when doing reviews.

					Review authors identified complex nature of data and interventions, challenged in gathering literature from various sources, difficulties related to methodological that arise when handling a variety of data types, limited funding and resources as challenges in meeting the needs of decision-makers. Workshops, e-learning, mentoring and knowledge sharing opportunities can be utilized to improve capacity.
Huckel Schneider 2014	To determine policy makers' perceptions of eight key organizational attributes and capabilities found in the literature as promising for facilitating research use in public health policy and	Australia: range of areas related to health policy (e.g. population health, preventive health, healthcare quality and safety).	9 senior health policy makers holding policy unit management positions or higher, and a minimum of ten years of experience working in public health agencies.	Qualitative: Literature scan; semi-structured telephone interviews.	Eight organizational capabilities identified from the literature as having the potential to support research use in policy decision making included: i) training (staff skills and competence); ii) access to research; iii) policies encouraging the use of research; iv) leadership; v) organizational tools to analyze, vi) generate, and vii) evaluate

	program decision making.				relevant research; and finally viii) strong relationships with researchers. Although participants varied in their discussion of these eight capabilities, they indicated all of them to be relevant, applicable, and practical in real world settings. Training, leadership and relationships were rated as the three most important capabilities.
Larsen 2012	"To investigate how and on which level evidence is used in policy as well as work processes related to local public health work in Denmark." (p. 478)	Denmark (Europe): public health work	98 health managers from Danish municipalities.	Quantitative: Electronically based questionnaire/survey	Health managers understood the concept of evidence differently, with 54% of them agreeing that evidence is results of evaluation reports, literature reviews, monitoring and quality assurance systems derived from qualitative and quantitative studies. In terms of level of evidence use in policy-making, "to a great extent" was chosen by 44% for priority setting, 48% for planning, and 42% for implementation. The actual use of evidence was based on

					health managers' emphasis on evidence use, political desire, and evidence capacity. Barriers involved aspects related to time and competences. Facilitators involved collaboration between municipalities and with research units, and guidelines for use.
Laws 2013	To describe the use of findings from an Australian series of population monitoring surveys (SPANS) in policy and practice, and to identify key factors influencing the use of the survey findings.	New South Wales (Australia): the Schools' Physical Activity and Nutrition Survey (SPANS) series.	12 participants including 3 academic researchers who were chief investigators of the three SPANS surveys (1997, 2004, and 2010), and 9 relevant end-users including policy makers and practitioners from a variety of sectors.	Qualitative: Case study design using semi-structured interviews, and bibliometric and documentary analysis.	Survey findings advanced knowledge (e.g. by means of journal articles, key reports, presentations to stakeholder groups, media releases and conference presentations) and built capacity (e.g. using research projects/ positions, and professional development). Survey findings were used during different stages of the policy process (e.g., agenda setting, identifying which groups should get the intervention) as well as to inform new policies and support existing policies in different sectors. Main barriers and facilitators were: extent to which findings

					are perceived as credible; strategies used to disseminate survey findings; and various contextual factors (e.g. political system instability, poor timing, resource and capacity limitation, organizational culture).
Lillefjell 2013	"To identify local and regional strengths and barriers in the ability to identify, translate, and use relevant evidence of "what works" in public health management." (p. 471)	Norway (Europe): public health management	22 researchers, public health leaders and/or leaders with organizational and policy responsibilities from 2 municipalities, 1 county and a university research centre.	Qualitative: Focus groups	Competence (analysis and process skills/ expertise) emerged as the core theme and included several subthemes: This included competence in: 1) identifying evidence: a combination of evidence sources (research, practitioners' experiences/expertise, users' competence) should be used for taking action since population health data alone is insufficient; 2) forming multi-sector and interdisciplinary collaborations among stakeholders from research, policy, and practice realms;3) translating evidence into practice; 4) increasing knowledge of local political decision making processes. Lack

					of competence in above was identified as potential barriers evidence use.
Milat 2014	To examine how decisions are made to scale up population health interventions, as well as the role research evidence and also policy makers, practitioners and researchers play in this decision making process.	International (mainly Australia, but also from Asia UK, and the US): Population health interventions	21 participants including current and former senior government and non-government policy makers (n=7), senior practitioners/ service managers (n=7), and senior researchers (n=7).	Qualitative: Interviews (or self-administered surveys for international participants).	Iterative processes were used to make decisions regarding scaling up population health interventions. Policy makers and/or practitioners lead these decisions, but these were subject to an approval by political leaders as well as fund holders. Research evidence was only one of the information types used in decision making, mainly due to the scarcity of research on intervention and cost effectiveness. Types of research evidence used were: epidemiological data, intervention research, systematic reviews, controlled trials, local quasi-experimental pilot studies. Policy makers, practitioners/ service managers, and researchers were played different, but complementary roles in the decision making process.

Rosella 2013	To examine how evidence was used during the H1N1 pandemic decision-making process in Canada to make public health decisions.	Canada: 2009 H1N1 pandemic	40 public health officials and scientific advisors; 76 pandemic policies focused on either vaccine priority, adjuvant pregnancy, N95 respirators, and/or school closures.	Qualitative: Case study design using semi-structured interviews and document analysis.	Decision making process and the use of evidence in developing policies was to a great extent shaped by pandemic pre-planning. The interpretation and the use of same evidentiary sources varied depending on existing ideological perspectives (i.e. evidence-based, policy-based, pragmatist); competing interests of many stakeholders; prior beliefs on epidemiological patterns; credibility, consensus and consistency of information and information purveyors; and institutional factors involving both formal and informal structure. There is a need for a more transparent and iterative approach for using evidence in public health decision making within this context.
Wathen 2011	To gather perspectives of those receiving research evidence about VAW	Ontario (Canada): Violence against	Stakeholders from various groups including public health policy, healthcare	Mixed methods:	Types of research evidence included VAW research program reports and results from 11 projects. KTE strategies that provided

	about the: 1) utility of specific knowledge translation and exchange strategies; 2) factors influencing the uptake, sharing and use of research evidence; 3) ways in which research evidence is used.	women research program.	providers, social service providers, and women's advocates. Sample size varied at different data collection time points.	Longitudinal cross-sectional design using surveys, observation and journaling, focus group discussions, forums, workshops, and interviews.	the following opportunities were found most effective: having in-person meetings with researchers, being able to contribute to forming key messages by providing feedback, and making connections with other key stakeholders. The uptake, sharing and use of research was influenced by factors related to knowledge itself, the nature of the knowledge gap, the contexts of different stakeholders, and whether it professional experiences and values align with use of research evidence. The ways in which research evidence was used changed over time, and was greatly influenced by "the types of decisions being made and the stage of decision making". Conceptual or symbolic use was identified more often than instrumental. Research findings were used to support contradictory positions, but were not actively shared with networks.

Yost 2014	To identify and describe tools that three Canadian public health departments use to inform decisions related to policy and practice.	Ontario (Canada): public health departments	37 participants with varied backgrounds including project/team staff and specialists (n=14), managers/support staff (n=16), and senior management employees (n=7)	Qualitative: Case study design with interviews (n=37), journal entries (n=170), and document analysis (n=160).	The process of using research evidence involved: identifying and clarifying the question (DEFINE); searching for the best available research evidence (SEARCH); critically appraising the quality of research evidence (APPRAISE); using the research evidence found to identify key messages that can be put into action (SYNTHESIZE); ensuring that the select messages are relevant and suitable for the local context (ADAPT); determining how to effectively implement research evidence in the local context (IMPLEMENT); and assessing whether implementation efforts were effective to inform future practice or not (EVALUATE). Health departments employed various tools to support these steps and found them valuable (i.e. they

					eased the decision making process, were easily accessible, increased confidence).
Zardo et al. 2014	To examine external factors affecting evidence-informed policy and program decision making in an Australian context.	Victoria (Australia): workplace and transport injury prevention and rehabilitation compensation.	33 participants from two government public health agencies (i.e. Victorian WorkCover Authority and the Transport Accident Commission) including senior managers (n=17), managers (n=9) and non-managers (n=7) from various policy/legislative development teams.	Qualitative: Semi-structured interviews.	Five key themes emerged from the data analyses as key external factors (other than research) affecting public health decision making in terms of policy and program development: "stakeholder feedback and action; ministerial and government input; legal feedback and action; injured persons (i.e. client feedback); and media coverage." (p. 120) These influential groups must be taken into account when developing interventions to promote research use.
Zardo 2014a	To examine policies in order to determine the type of information sources referenced, their purpose, and the extent	Victoria (Australia): transport accident commission (TAC) injury	Not applicable.	Quantitative: content analysis of 128 policy documents	Types of information most commonly referenced were Internal Policy, Clinical/ Medical Evidence, Internal Legislation and Other Evidence. Type of information least commonly referenced was the Academic

	of reference to academic research evidence.	rehabilitation compensation policies			Research Evidence, with just 50 references in 30 policies mostly related to treatment. Main purpose of references generally was to support decision making regarding claims. The information types most often referenced for policy development purpose were Internal Legislation and Internal Policy.
Zardo 2014b	To identify factors predicting how research evidence is used in decision making related to public health program and policy in an Australian context.	Victoria (Australia): workplace and transport injury prevention and rehabilitation compensation.	372 senior managers, managers and non-managers from two government public health agencies (WorkSafe Victoria and the Transport Accident Commission) mainly involved in either projects/programs, policy/ legal, operational tasks or administration/assistance.	Quantitative: Multiple logistic regression analyses on survey data.	Five key factors related to individual and organizational levels that significantly predicted the use of research in this context were: "i) relevance of research to day-to-day decision making; ii) skills for research use; iii) internal prompts for use of research; iv) intention to use research within the next 12 months; and v) the agency for which the individual worked." (p. 1)

Zardo 2015	To measure types, extent and purpose of research use compared to other types of information to inform public health policy / program decision making; and to examine any differences that exist in information use across various individual level factors.	Victoria (Australia): workplace and transport injury prevention and rehabilitation compensation.	372 senior managers, managers and non-managers from two government public health agencies (WorkSafe Victoria and the Transport Accident Commission) mainly involved in either projects/programs, policy/ legal, operational tasks or administration/assistance.	Quantitative: Online survey.	There were differences in terms of how information was used both across and within the two government public health agencies. Various information types were used by participants: internal data & reports; policy, legislation & legal information; medical & clinical evidence; experience, expertise, & advice; academic research evidence, and information online. "Academic research evidence included peer reviewed journal articles, reports of academic/scientific research, conference abstracts and papers." (p. 3) Research evidence was used less often (more monthly and quarterly use than daily or weekly), and internal data and reports were used most often (with a general tendency to use internal information more frequently). Those in policy and program

| | | | | | roles were most likely to use research evidence, and those in operational roles were least likely. Research evidence was mainly used for conceptual purposes (50.3%), and then instrumental use (30.3%) followed by symbolic use (19.3%). |

Appendices for Chapter Three

Appendix E: RePHS Phase I Focus Group Questions for ON Managers – Evidence.

1. In general, what informs or guides your practice?
   (E.g., literature, observing/talking to peers/experts)
   a. What has the most influence in guiding your practice?
2. What does the word evidence mean to you?
   a. What constitutes evidence for you?
3. What evidence or information was used to inform the development of the CDP/STIP program activities as they relate to the OPHS?
4. What is the process for applying evidence in program development?
   a. How are the OPHS, protocols, and guidance documents used?
   b. At what level(s) are decisions made in terms of what evidence is used?
   (E.g., who decides what evidence is used?)
5. What influences how and what evidence is used?
6. Do you have an opinion on their use?
7. Has there been an effort to create/develop provincial evidence as a result of public health renewal?
8. Are there barriers to implementing evidence?

Appendix F: RePHS Phase I Focus Group Questions for ON Frontline Staff – Evidence.

1. In general, what informs or guides your practice?
   (E.g., literature, observing/talking to peers/experts)
2. What does the word evidence mean to you?
   a. What constitutes evidence for you?
3. What evidence/strategies do you use to guide/inform your practice as they/it relate(s) to the OPHS?
4. What kinds of mechanisms are in place for you to foster the use of evidence if any?
5. How do you think evidence is used in relation to the CDP/STIP activities?
6. Do you encounter barriers regarding implementing evidence in your practice?

Appendix G: McMaster Research Ethics Board Approval for Primary RePHS Study.

RESEARCH ETHICS BOARD

McMaster University

Hamilton Health Sciences

Fax: 905-577-8378

March 31, 2010

PROJECT NUMBER: 10-086

PROJECT TITLE: Public Health Services Renewal in British Columbia and Ontario

PRINCIPAL INVESTIGATOR: Dr. Ruta Valaitis

This will acknowledge receipt of your letter dated March 23, 2010 which enclosed the revised Participant Information and Consent Forms for the above-named study. These issues were raised by the Research Ethics Board at their meeting held on February 16, 2010. Based on this additional information, we wish to advise your study has been given **final** approval from the full REB. The submission, study protocol version 1 dated January 26, 2010 including the Participant Information and Consent Form/For Social Network Analysis, version 2 dated March 9, 2010 was found to be acceptable on both ethical and scientific grounds. **Please note** attached you will find the Consent Form with the REB approval affixed; all consent forms and recruitment materials used in this study must be copies of the attached materials.

We are pleased to issue final approval for the above-named study for a period of 12 months from the date of the REB meeting on February 16, 2010. Continuation beyond that date will require further review and renewal of REB approval. Any changes or amendments to the protocol or information sheet must be approved by the Research Ethics Board.

The Hamilton Health Sciences/McMaster Health Sciences Research Ethics Board operates in compliance with and is constituted in accordance with the requirements of: The Tri-Council Policy Statement on Ethical Conduct of Research Involving Humans; The International Conference on Harmonization of Good Clinical Practices; Part C Division 5 of the Food and Drug Regulations of Health Canada; and the provisions of the Ontario Personal Health Information Protection Act 2004 and its applicable Regulations.

PLEASE QUOTE THE ABOVE-REFERENCE PROJECT NUMBER ON ALL FUTURE CORRESTPONDENCE

Sincerely,

Jack Holland, MD, FRCP, FRCP (C)
Chair, Research Ethics Board

Appendix H: RePHS Student Project Involvement Proposal.

Sara Masood (MSc Candidate)
Health and Rehabilitation Sciences Graduate Program, Western University

Background:

"The primary focus of public health is the health and well-being of the whole population through the promotion and protection of health and the prevention of illness" (Ministry of Health and Long-Term Care [MOHLTC], 2008, pg. 4). To meet this goal, billions of dollars are invested each year in both the public and private sectors across the globe to advance biomedical, clinical, and health services research as well as to improve health-related programs and services (Grimshaw et al., 2012). Despite this, several studies have reported that not all potentially useful and evidence-supported programmes/interventions are implemented in practice (Grol & Grimshaw, 2003; Grimshaw et al., 2012). To address this crucial problem, there is growing support to utilize the emerging field of Knowledge Translation (KT). As such, the Ministry of Health and Long-Term Care in Ontario has developed a policy, the Ontario Public Health Standards (OPHS), within which there is strong direction for the use of evidence-based programming to inform public health practice and to ensure that health units deliver effective services (MOHLTC, 2008).

In order to assess the implementation of the OPHS and to inform the current public health renewal initiatives in Ontario, there is a need to understand factors mediating the process of evidence uptake within public health units. One of the key factors mediating the process of evidence uptake is reported to be perceptions of evidence held by different health care practitioners and decision makers (Kyratsis et al., 2014). Because different professional groups tend to come from a diverse range of educational backgrounds, belong to a variety of different value systems, and perform a specific set of professional roles, their perceptions about evidence are likely to be distinct (Langley & Denis, 2011). However, empirical evidence on how different healthcare practitioners and/or decision makers make sense of evidence is sparse. Therefore, the aim of this research study will be to qualitatively understand how frontline public health staff and their managers in Ontario view evidence, and how the differences in their views might impede and/or facilitate the use of evidence in public health practice and decision-making, and thereby influence the implementation of OPHS. This understanding will help in developing strategies to reduce the evidence-practice gap and to improve the performance of public health system.

Research Questions:

The primary objectives guiding this research project will be as follows:
  I.   To compare, and as such identify the similarities or differences in, the views of evidence between public health managers and public health frontline staff in Ontario.
  II. To discuss possible implications of my research findings for practice, policy, and research.

Methodology:

This research project will use a **qualitative content analysis design**. Content analysis design has been used in research since the 18th century and has been evolving ever since (Hsieh & Shannon, 2005). The purpose of content analysis is "to provide knowledge and understanding of the phenomenon under study" (Downe-Wamboldt, 1992, p. 314) by reducing the phenomenon into key defined categories or themes (Hardwood & Garry, 2003). It is based on an interpretivist paradigm and a naturalistic approach which supports the belief that a phenomenon must be studied in its natural setting, with the assumption that reality is socially constructed and can take on multiple forms based on subjective perception (Guba & Lincoln, 1994; Hsieh & Shannon, 2005). Content analysis design is suitable for the analysis of a variety of "open-ended" data (e.g., interviews, diaries, focus groups; Elo & Kyngas, 2008) and a variety of units of analysis (e.g., a person, a program, an organization; Graneheim & Lundman, 2004).

Researchers have used content analysis as both a quantitative research method and qualitative research method (Hsieh & Shannon, 2005). Hsieh & Shannon (2005) define qualitative content analysis as "a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (p. 1278). In other words, it focuses on describing as well as making inferences about the characteristics of language within a text by exploring both the content and the context (Hsieh & Shannon, 2005). Unlike quantitative content analysis, qualitative content analysis does not require a testable hypothesis and hence is based on a hermeneutic approach (White & Marsh, 2006). Its fundamental flexibility, as a methodology, is clear from the various analytic approaches that are available to matchup the various "theoretical and substantive interests of the researchers and the problem being studied" (Hseih & Shannon, 2005, p. 1277).

This study will conduct **secondary qualitative content analysis** which involves applying a new research question to a pre-existing qualitative data sample (Heaton, 2008). More specifically, it will use a summative or inductive content analysis approach which involves using a variety of techniques to gain a deeper level understanding of the data (Elo and Kyngas, 2008). These techniques include: familiarization (Hsieh & Shannon, 2005), quantification (Hsieh & Shannon, 2005), open-coding (Elo and Kyngas, 2008), codebook development (Morgan 1993), code counting (Morgan 1993), mapping using manifest content analysis (Graneheim and Lundman, 2004), and interpretation using latent content analysis (Graneheim and Lundman, 2004). This methodological aim aligns well with the aim I have for my research in that I want to engage in answering questions about *how* and *why* certain patterns exist given the different contexts that underlie the data, and hence gather both the abstract level of understanding and in-depth level of understanding of different views of evidence in public health practice and decision-making.

Request for Access to Data:

In order to complete this research project, I will need access to the raw data transcripts from Phase I of the Ontario RePHS focus groups and interviews. I will specifically be working

with the questions pertaining to 'evidence' and related to the Chronic Disease Prevention/ Healthy Living program area.

Expected Timeframe:

This secondary analysis will **begin in September 2015** and will **end in July 2016** to coincide with my graduation from the Masters of Health and Rehabilitation Sciences program and Western University. **Stage 1** will focus on data review (Sep 2015 to Oct 2015). This stage will involve becoming immersed in the data by familiarization (i.e., reading through all transcripts multiple times) and by quantification (i.e., exploring the contextual use of recurrent words, concepts, and themes using frequency queries). **Stage 2** will focus on data management and data analysis (Nov 2015 to Feb 2016). This will be accomplished through open-coding, codebook development, code counting, mapping, and interpretation. **Stage 3** will involve writing a research paper under the guidance of my committee (Mar 2016 to May 2016). **Stage 4** will involve presenting my research through oral defense and public lecture (Jun 2016 to Jul 2016).

Supervisors/RePHS Team Members:

Dr. Anita Kothari (supervisor) and **Dr. Sandra Regan** (advisor) will be overseeing this research project. Both are current faculty members at Western University and are also RePHS team members.

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Appendix I: Signed Confidentiality Agreement with RePHS.

McMaster University

Faculty of Health Sciences
School of Nursing

PLEDGE OF CONFIDENTIALITY

In order to ensure that all members of the research team involved in **Public Health Services Renewal in British Columbia and Ontario (RePHS)** fulfill their obligations to the Study Participants, anyone with access to confidential information of third parties must make this Pledge of Confidentiality.

1. I recognize and acknowledge that in the course of my involvement in the research study **Public Health Services Renewal in British Columbia and Ontario (RePHS)**; I may gain access to certain "Confidential Information" (as defined below). I shall not use any Confidential Information at any time except for purposes of performing my duties with respect to the Research Study. I shall not disclose any Confidential Information in any manner, at any time, to any individual or entity that is not bound to confidentiality provisions with McMaster University, School of Nursing and/or any Research Partners similar to the ones imposed by this Agreement. I shall continue to observe strict confidentiality of this information when I cease to be involved with the Research Study.

2. "Confidential Information" means information you gain access to in the course of your participation in the Research Study, that is, private information pertaining to an individual or organization or information that is of a confidential or secret nature and that may be related to the Research Study including, without limitation, the protocol, methods, processes, procedures, strategies developments, results, and outcomes.

3. I acknowledge that I have had sufficient time to review this Agreement and fully understand its contents and its effect on me.

RESEARCH TEAM MEMBER   WITNESS

Sara Masood   *Tahira Shameem Chughtai*
Printed name of Team Member   Printed name of Witness

Signature of Team Member   Signature of Witness

Masters Student
Role on Research Team

August 1, 2015   *1-August-2015*
Date   Date

School of Nursing

CURRICULUM VITAE

Name: **SARA MASOOD**

Post-secondary   **York University**
Education and   Toronto, Ontario, Canada
Degrees: 2009-2014, BSc. Hons. (Biology and Humanities)

                       Western University
                       London, Ontario, Canada
                       2014-2016, MSc. (Health and Rehabilitation Sciences)

Honours and   **Western Graduate Research Scholarship (WGRS)**
Awards: 2014-2016

                       FHS Graduate Conference Travel Award
                       Faculty of Health Sciences (FHS)
                       2016

                       HRS Graduate Conference Travel Award
                       Health & Rehabilitation Sciences (HRS) Graduate Program
                       2016

                       PSAC 610 Community Involvement Scholarship
                       Public Service Alliance of Canada (PSAC) Local 610
                       2016

Related Work   **Graduate Teaching Assistant**
Experience: Course: HS3400 – Health Policy
                       Supervisor: Dr. Sandra Regan
                       Western University
                       Fall 2014

                       Graduate Teaching Assistant
                       Course: PT9600 – Introduction to Quantitative Research Methods
                       Supervisor: Dr. Dianne Bryant
                       Western University
                       Fall 2015

                       Graduate Research Assistant
                       Knowledge Translation Lab in Health
                       Supervisor: Dr. Anita Kothari
                       Western University
                       2015-2016

Community Involvement Internal:	**Committee Member** Health & Rehabilitation Sciences Graduate Research Conference Western University 2014-2015 **VP Academic / Chair of HRS Graduate Research Conference** Health & Rehabilitation Sciences (HRS) Graduate Student Society Western University 2015-2016 **Departmental Steward: Health & Rehabilitation Sciences** PSAC Local 610 Western University 2015-2016
Certificates:	**Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans Course on Research Ethics (TCPS 2: CORE)** Oct 2014 **Teaching Assistant Training Program (TATP)** Western University Jan 2015 **The Western Certificate in University Teaching and Learning** Western University Jan 2015-In progress
Memberships:	**Member of Golden Key International Honour Society** 2010-Present *Membership into the Society is by invitation only and applies to the top 15% of university students based on academic achievement*

Publications:

Masood, S., Kothari, A., & Regan, S. (2016). Comparing views of evidence in Ontario public health units: a qualitative study. *Western Journal of Graduate Research.* Abstract submitted for publication.

Peter, N., Kothari, A., & **Masood, S.** (2016). Identifying and understanding the contributions of research: an umbrella review. Manuscript submitted for publication.

Foisey, L., Kothari, A., Regan, S., Zecevic, A., & **Masood, S.** (2016). Public health and third sector partnerships for chronic disease prevention: a scoping review. Manuscript in preparation.

Presentations:

Masood, S., Kothari, A., & Regan, S. (2016, March). *Comparing different views of evidence in Ontario public health units: a qualitative study.* Poster presentation at the Faculty of Health Sciences (FHS) Research Day, Western University, London, ON.

Masood, S., Kothari, A., & Regan, S. (2016, March). *Comparing different views of evidence in Ontario public health units: a qualitative study.* Oral presentation at the 14th Annual Crossroads Interdisciplinary Health Research Conference, Dalhousie University, Halifax, NS.

Masood, S., Kothari, A., & Regan, S. (2016, March). *Comparing different views of evidence in Ontario public health units: a qualitative study.* Poster presentation at the Western Research Forum (WRF), Western University, London, ON.

Masood, S., Kothari, A., & Regan, S. (2016, February). *Comparing different views of evidence in Ontario public health units: a qualitative study.* Oral presentation at the 9th Annual Health & Rehabilitation Sciences (HRS) Graduate Research Conference, Western University, London, ON.

Teaching Conferences and Workshops Attended:

Winter Conference on Teaching for Graduate Students - January 24, 2015

Future Professors Workshop Series - March 24, 2015; July 6, 2015; March 7, 2016

Teaching Mentor Program – January 25, 2016 - March 22, 2016

Other Professional Activities:

Guest Speaker at the Youth Leadership Development Program: ICNA Relief Canada, Mississauga ON, August 22, 2015.

Judge at the 2016 SciNapse Undergraduate Science Case Competition (USCC): Western University, London ON, March 19, 2016.

Guest Speaker at the Youth Leadership Development Program: ICNA Relief Canada, Mississauga ON, August 6, 2016.