HOW CONTEXT INFLUENCES KNOWLEDGE USE IN PUBLIC HEALTH UNITS

by

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AUTHOR'S DECLARATION

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

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

Abstract

Objective: The effectiveness and efficiency of health promotion programs and policies relies on evidence to inform and guide these practices in an age of increased cost-efficiency and accountability. To achieve impact and continuous improvement requires the application of evidence to inform and guide population and public health decisions. To facilitate the broader use of knowledge derived from research and evaluation, we must identify the factors that facilitate or impede the use of such evidence among pubic health professionals. At the individual level, we have developed considerable understanding of these factors; however, at the organisational level this understanding lags. The purpose of this study was to examine how the organisational context of Ontario health units influences evidence-informed public health practice.

Methods: The study employed a multiple case study design. Data sources included interviews, internal health unit documents and correspondence from three health units (reflecting high, moderate and low use of evidence) participating in the SHAPES-Ontario Knowledge Exchange Extension Project. Qualitative analyses using constant comparative methods intended to maximize trustworthiness identified macro-, meso- and micro-environmental level factors related to the use of local tobacco and physical activity data in public health program planning and evaluation. Individual and cross-case analyses determined the extent of each factor's influence, how the factors inter-related and identified similarities and differences between sites.

Results: Several internal contextual factors were directly and indirectly influential on knowledge use. The most directly influential factors were commitment/receptiveness to use evidence, and the leadership and internal co-ordinated action given to facilitate uptake and use. The degree of each of these factors directly influenced the level of knowledge use. Other internal contextual factors were also influential on utilisation however, through a less direct route. This included organisational mandates/priorities as well as previous experiences with knowledge use which were influential on the other contextual factors, as a result indirectly influencing knowledge use. Overall, it appears the more extensive the contextual factor the more extensive the influence, directly or indirectly, on knowledge use.

Additionally, several external factors influential on the internal context and knowledge use within health units were identified, including external relationships, external processes and procedures, external mandates and priorities as well as external resources. The need to adapt to these external contextual factors was necessary in order for health units to have a strong working relationship with external parties (i.e., schools and school boards). As a result of this relationship, health units conformed and adapted to external contexts such as the processes/procedures, priorities and resources of schools. In turn, this adaptation process influenced the type of information utilised by health units as well as how the information was used and to what degree. At this point, the inter-relation between external contextual factors as well as direct connections to internal contextual factors was not entirely clear and requires further examination.

Conclusions/Implications: Studying these cases has illuminated the processes and structures that contribute or impede evidence-informed practice. The findings and interpretations of this study help to identify organisational supports that facilitate the use of population health intervention research, in turn, contributing to more effective and efficient health programs and policies aimed at improving population health.

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1. Introduction

Health promotion today faces several modern day challenges including the growing prevalence of chronic diseases, such as heart disease, stroke, diabetes and cancer (World Health Report, 2003; Canadian Tobacco Control Research Initiative, 2005). The rise in chronic disease is seen throughout the world's developed countries and is no different in our own backyard. Chronic diseases not only bring about illness and potentially death, but exponential health care costs and poor quality of life. Due to the magnitude of chronic diseases in Canada, there is a need for health promotion programs and interventions that are designed to address individual and population based behaviours and contexts that contribute to chronic disease. However, the effectiveness and efficiency of health promotion programs and interventions relies on research evidence to inform and guide these practices (Lomas, 2000). The implementation and evaluation of research evidence provides program accountability as well as a framework for "best practices" interventions.

Best practices are "those actions-policies, research, programs and services-that will have the greatest impact on reducing the current and future burden of disease" (Moyer et al., 2001, as cited in Canadian Tobacco Control Research Initiative, 2005, p 7). Best practices are typically identified through systematic reviews that recognize multiple, well-designed studies of a program or intervention. In addition to this, best practices also consist of programs and interventions that are believed to be successful in their given context as identified by the program implementer. This method of identifying best practices is typically not based on the same evaluation as systematic reviews and recognizes programs that have taken contextual influences into consideration (Canadian Tobacco Control Research Initiative, 2005). Recently, the use of best practices has been emphasized to inform and guide the processes to planning health interventions but unfortunately, this does not ensure the actual use and implementation of knowledge derived from best practices. Moreover, best practices are typically adapted to different contexts, making the transfer from research to practice complex (Green, 2001).

To facilitate broader use of best practices and evidence (research and practice-based) we must identify the factors that facilitate or impede knowledge utilisation among health practitioners. Steps have been taken to understanding factors at the individual level; however, we lack comprehension of organisational level factors influencing knowledge use. As a result of the need to better understand knowledge exchange to further facilitate the use of research evidence, the purpose of this study is to gain a better understanding and appreciation of the factors influencing knowledge use at an organisational level.

2. Literature Review

A review of knowledge exchange theory and literature focusing on contextual influences and research utilisation was conducted in an attempt to identify gaps in the literature and assist with a reflective analysis. Eight databases including business, health, sociology, psychology and education research were explored for the concepts of knowledge use, context, evidence-informed practice and public health within English literature between the years 1999 to 2006. A breakdown of databases and respective search terms are available in Appendix A. The following summary provides a description of what the literature revealed with regards to the need for further research evidence in public health planning and the contextual influences on evidence-informed public health practice.

2.1. Evidence-Informed Practice-Breakthroughs & Obstacles

In recent years there has been a push for evidence-informed public health practice. This momentum is partially a result of evidence-based medicine which involves "the delivery of optimal individual patient care through the integration of current best evidence on pathophysiological knowledge, cost effectiveness, and patient preferences" (Brownson et al., 1999, p 87). It is also the result of increased volume and access to systematic reviews and the need to evaluate the effectiveness of health promotion programs (Green, 2000). Yet the purpose and role of evidence-based medicine has been derived from a clinical setting which focuses on individual level health and may be inappropriate to apply to a public health setting focusing on the health of a population. Though evidence-based medicine is important to providing effective and efficient individual health care, evidence-informed public health is also essential. Public health employs a population health approach and addresses a broader range of factors that go beyond the individual level such as the environment and social structure. However, modest attention has been paid to the large contrast in the accessibility, type and use of research evidence in medicine in comparison to the accessibility, type and use of research evidence in public health practice. Firstly, evidence-based medical practice has access to a greater volume of relevant research in comparison to the literature available to public health practice. The

use of systematic reviews has provided the medical field with a plethora of synthesized research (e.g., Cochrane Reviews) that is more readily accessible and straightforward with regards to interpretation and implementation of research evidence (Green, 2000). Secondly, research used to inform evidence-based medicine is largely conducted in a manner conducive to a clinical setting that is not always generalisable to a public health setting. For instance, most medical research consists of randomized control trials that constrain or remove contextual influences while public health practice requires evidence that has taken context into consideration, such as quasi-experimental designs (Brownson et al., 1999). Thirdly, the use of systematic reviews and clinical research, while being very effective for the medical field, is incongruous with public health planning that requires a more ecological approach (Green, 2000).

The need for more relevant, synthesized health promotion research is a barrier to increasing the uptake and application of research evidence in public health practice. In an attempt to fill this void there has been an increase in the development and distribution of best practices. Best practices are those effective programs and/or interventions that have been identified via the systematic review process providing an increase in available relevant research (Canadian Tobacco Control Research Initiative, 2005). Many best practice reviews examine the quality of research studies with an emphasis on internal validity at the expense of external validity. As a result, best practices may not be as effective when implemented in various real life settings containing influential contextual factors not originally considered (Canadian Tobacco Control Research Initiative, 2005). In an attempt to compensate for this issue, better or promising practices have been identified. "Better practices are the full range of activities and processes, carried out vigilantly, that are associated with developing or identifying, implementing, evaluating and improving interventions aimed at positively impacting health…while recognizing the contributions of current practice and experience, valuing context-specific decision-making" (Canadian Tobacco Control Research Initiative, 2005, p 8). The concept and purpose behind best/better practices seeks to facilitate evidence-based practice, "an informed, explicit, and judicious use of evidence that has been derived from any of a variety of science and

social science research and evaluation methods (Rychetnik et al., p. 538)." However, best/better practices is not enough given that simple identification and dissemination does not guarantee the use of research evidence in public health planning and evaluation (Green, 2001). Furthermore, consideration must be given to *how* research evidence is being used in the decision-making process.

2.2. Knowledge Use

There are several different ways *how* knowledge is used with varying degrees of application. Literature focusing on the different forms of how knowledge is used, originated by Weiss (1979), has evolved with three distinct categories emerging, including instrumental use, conceptual use, and symbolic use (Weiss, 1979; Beyer & Trice, 1997; Lavis et al., 2003). *Instrumental use* involves the direct application or research evidence in specific ways, such as developing a policy as a product of a research finding(s) (Beyer & Trice, 1997). Typically, instrumental knowledge use results in a "behavioural change" that creates distinct changes to policies or programs (Kramer et al., 2005a, p. 9). Instrumental knowledge use can be further broken down into *effort to use*--making an effort to use knowledge, *procedural use*—creating procedures that facilitate the use of knowledge and *structural use*—implementation and adaptation of knowledge to the relevant context (Manske, 2001). The second type of knowledge use is *conceptual use,* which is the more general application of knowledge to provide basic enlightenment while creating a change in users' awareness and bringing attention to new ideas (Beyer & Trice, 1997; Kramer et al., 2005a). Accretion of conceptual knowledge (learning) eventually leads to instrumental knowledge use, though it is difficult to attribute a particular piece of instrumental knowledge use to a particular "bit" of learning. The third type of knowledge use, symbolic knowledge use (also known as "political use") is the utilisation of research evidence to "justify a position or action that has already been taken for other reasons" (Lavis et al., 2003, p. 228).

Overall, the literature has outlined several different forms of how knowledge is used (conceptual, instrumental, symbolic). However, it is important to recognize that measurement of

knowledge use has traditionally focused on instrumental use, more specifically, the use of knowledge in decision making by practitioners and decision-makers (Landry et al., 2001).

2.3. Organisational Knowledge Use

In order to ensure the actual application of instrumental, conceptual and symbolic knowledge use to encourage evidence-informed public health practice, there is a need to understand how specifically organisations use research evidence and the factors within that facilitate and/or impede the use of evidence.

To build on this notion of organisational knowledge utilisation, Choo (2001) explains information use by organisations, including how they make sense of new information, how they create new knowledge and how they use knowledge to make decisions. The latter use of information, i.e. knowledge for decision-making, has implications for how and why an organisation, such as public health, will use research evidence in their planning and evaluation processes (Choo, 2001). Access to relevant and credible evidence may assist public health practitioners and policy makers with making well-informed decisions. However, the issue requiring action may influence if and how public health will use research evidence in the decision making process. Issues that require an immediate decision/action, such as a communicable disease outbreak, will not provide practitioners with the appropriate amount of time required to search all available evidence (Keifer et al., 2005). Likewise, some decisions are influenced by "politics" and the process becomes one of negotiation and meeting individual interests, reinforcing the concept of symbolic/political knowledge use (Choo, 2001, p 199). These factors, such as time and politics, and their influence in the process of decision making, reveal the significant role context plays in the facilitation and impediment of knowledge exchange and utilisation within an organisation like public health.

2.4. Examining the Role of Context in Knowledge Use

In an attempt to further understand the role of context with regards to knowledge exchange and utilisation, the exploration of peer reviewed published literature found limited research examining

organisational contextual influences on knowledge use and even less focusing on contextual factors within the public health setting. Furthermore, the scan produced a very small volume of research investigating what makes up "context". McCormack et al. (2002) recognized this gap and emphasized the need for further investigation of the concept of "context". As such, McCormack et al. conducted a concept analysis of the term finding themes of leadership, culture and evaluation as constituents of context. Yet a more detailed description is needed to further our comprehension of the role of differing contexts and provide a better understanding of the relationship between concepts like culture and leadership that make up the contextual setting (McCormack et al., 2002).

The lack of definition for the concept of context may contribute to the limited literature focusing on organisational contextual factors. The literature that is currently available focuses on individual approaches to knowledge exchange while little attention has been paid to organisational level contexts (Rycroft-Malone et al., 2004; Meijers et al., 2006; Kitson et al., 1998). Focusing on individual level factors produces limited changes in knowledge exchange practices unless organisational level factors are understood and adapted to individual approaches (Rogers, 1995).

The limited organisational level literature that is available is typically conducted within the business or health care sector. While health care research may be more comparable to population health versus the business sector, health care research is still limited because of the focus on clinical practices which is only one component of overall public health practice. Within in these settings (business sector and/or health care sector) a variety of contextual factors have been found to either impede or facilitate research utilisation and knowledge exchange. Gerrish and Clayton (2004) examined factors influencing the application of research to practice among nurses and identified time restrictions and limited resources as major obstacles to research utilisation. In addition to this, a systematic review of contextual factors and research utilisation among nurses was conducted by Meijers et al. (2006). An initial literature review identified several contextual factors and provided an outline for the systematic review inclusion criteria including; time, access to research and resources, leadership, authority, culture, structure, support, incentives, skills/education, size of the hospitals,

professionalism, internal and external communication, and presence of an innovation champion (Meijers et al., 2006). The Meijer et al. review resulted in a low yield of articles (10 in total) focusing on contextual influences and evidence-based practice in nursing. Consequently, this indicates that even within the clinical setting there is limited literature focusing on organisational context and its role in research utilisation and knowledge exchange. The outcome of the Meijer et al. systematic review produced several influential factors on research utilisation among nurses including, the nurse's role, access to resources, organisational climate, support for evidence-based practice, time and education/training.

On account of the Meijer et al. review examining contextual influences within a clinical setting (nursing), additional literature was reviewed in an attempt to examine contextual influences within a public health setting. Perhaps one of the most relevant public health articles was by Adily et al. (2005). Adily et al. investigated contextual influences on research use within Australia's Division of Population Health consisting of both clinical and public health practitioners. Adily et al. identified infrastructure and organisational factors impeding the use of research evidence. Influential infrastructure factors impeding research use included the following; job description/role, limited or content specific research, lack of dissemination of evidence, lack of guidelines for evidence-based practice, lack of evaluating evidence-based practice, overwhelming volume of information, time restrictions, as well as political and financial issues. Organisational factors impeding research use included; perceived skill requirement for evidence-based practice, lack of training, limited access to research sources such as databases, lack of communication between research producers and research users, little support by team members and the organisation, lack of resources, and little management of local relevant evidence. Adily et al. also asked practitioners to identify methods to overcome impeding factors. Changes to infrastructure to encourage the use of research evidence included the following; making evidence-based practice a priority as well as part of the daily routine, using evidence-based practice to determine organisational priorities and improve the synthesis of research evidence available in population health. Recommendations to improve organisational factors

included; clear expectations regarding the level of expertise required of staff to conduct evidence-based practice, creating specific roles that support the use of research evidence, creation of a shared information/data system, better management of local data, more local data, improved communication between researchers and practitioners to create more relevant evidence, management support, and training for evidence-based practice. Adily et al. were able to identify several barriers, as well as facilitators, of research utilisation, however, it is important to note that they did not expand on the degree of influence these factors may have and how the factors inter-relate. Most literature to date emphasizes how important the role of context is but does little to examine the relationship between individual factors and contextual factors as well as the degree to which context influences knowledge exchange (Rycroft-Malone et al., 2004).

In addition to the Adily et al. results, Hemmelgarn et al. (2006) disclosed the implications of organisational culture on intervention research in mental health services by recognizing that the social context within an organisation can determine what decisions are made and what programs or interventions are chosen and ultimately determining the overall success of the organisation. Hemmelgarn et al. have also suggested effective interventions have resulted from "fitting" innovations (i.e., evidence) to organisation contexts (i.e., culture). Other authors also argue this point and advocate for evidence to fit within the organisation's contextual, political and financial agendas in order to be used and exchanged (Rycroft-Malone et al., 2004; Canadian Tobacco Control Research Initiative, 2005). Regardless of how context is studied, be it context should conform to evidence or evidence should conform to context, it is apparent there is a link between context and knowledge exchange that needs to be further examined.

Additional literature has described the link between context and knowledge exchange within a framework or system. This link has been depicted in several frameworks (Beyer & Trice, 1982; Huberman, 1987; Kitson et al., 1998; Manske, 2001; Dobbins et al., 2002) from across sectors, such as education, business, health care and health promotion, which have been developed to demonstrate how knowledge is facilitated, impeded, supported or influenced. Early work by Huberman (1994)

emphasized the importance of the research user's setting/context and its influence on the actual use or disregard of evidence. Huberman's work also indicated the importance of "sustained interactivity" between research producers and users (Huberman, 1994, p. 17). This interaction between producers and users is a reciprocal relationship that allows for the production of more relevant research, in turn, facilitating further uptake and implementation of knowledge derived from research evidence. Huberman's early work contributed to the foundations of more recent frameworks, such as Manske et al. Ultimately, many of these models outline contextual factors influential in diffusion of knowledge but with limited indication of the degree of influence or inter-relation between factors and how they fit within the overall "system" of knowledge exchange.

The concept of knowledge exchange as a system is not a recent idea and has been discussed at great length by Havelock (1986). Havelock has suggested the connections and/or flow of information within the knowledge exchange system is often depicted by pre-established context, such as principles, beliefs, and cultures. Contextual factors need to be examined not only individually but how they inter-relate as a means of gaining a more in-depth understanding of how knowledge exchange is facilitated or impeded with a "system". Furthermore, understanding the inter-relation between contextual factors will help to comprehend how the system as a "whole" works. The current literature focuses on the individual components/pieces with a lack of clarity regarding the sum of the system which is often greater than the parts.

2.5. A Gap in the Literature

Overall, the review of literature identified a need for further research focusing on organisational context and what specifically this encompasses. Such research will provide a better understanding of the concept of context that will draw boundaries and a clear definition. Furthermore, the literature has not measured the degree to which contextual factors influence knowledge exchange or how these factors inter-relate and affect the overall system of knowledge exchange. This will help to identify the core contextual influences most helpful or obstructive to the use of research-derived and practice-

derived knowledge. By and large, there is limited research focusing on the contextual factors influencing knowledge exchange and utilisation. There is even less literature focusing on contextual factors within the public health setting. By identifying factors that impede or facilitate knowledge use we can begin to paint a picture of an ideal environment and/or system that supports individual level knowledge exchange and utilisation and in turn increase capacity for evidence-informed practice. Providing the supports that will allow for knowledge exchange and evidence-informed practice will ultimately produce more effective and efficient public health programming and evaluation.

3. Rationale & Research Questions

A review of the literature identified a gap in our understanding of organisational factors influencing knowledge use contributing to evidence-informed practice in a public health setting. Furthermore, there is limited insight regarding what constitutes context or how contextual factors inter-relate to one another. In an attempt to increase our depth of understanding of contextual factors and their link to the different types of knowledge use, the current study gathered data to build on existing knowledge of organisational influences while complementing the SHAPES-Ontario Knowledge Exchange Extension Study which aims to build health unit capacity for evidence-informed practice using the SHAPES-Ontario data (localized data on youth smoking and physical activity). This study attempted to identify and measure organisational contextual influences on knowledge use and investigated the following research question(s):

> ***In Ontario public health, how do organisational contextual factors influence knowledge use? More explicitly, what factors influence knowledge use in public health? What is the extent of each factor's influence and how do the various factors inter-relate?***

In addition to seeking a more in-depth understanding of the contextual influences on knowledge use within public health units, the study aimed to fill a gap in the literature, more specifically literature conducted within a public health setting. The study also provided an opportunity to examine how contextual factors inter-relate while building upon an existing knowledge utilisation framework (Manske, 2001) (Appendix B). Ultimately, this provides better insight into the workings of knowledge exchange as a system consisting of interdependent parts and not individual entities. By examining this puzzle from a Social Ecological perspective (Stokols, 1992 & 1996) we gain insight into this system and the overall processes contributing to knowledge use while acquiring a better understanding of the interplay between context and knowledge utilisation within Ontario health units. Eventually, this may assist organisations and researchers to identify ways to encourage

and support knowledge utilisation and exchange processes for evidence-informed practice and create more effective and efficient public health programs and policies.

4. Methods

4.1. Study Design

The current study was based in the theoretical perspective of interpretivism which suggests the existence of multiple realities that are co-constructed (Patton, 2002). Interpretivism is based in the epistemology of Constructionism which deems meaning is constructed through individuals' interaction with the realities of their world, and therefore, each individual will create different meaning. (Patton, 2002). Using an Interpretivist viewpoint, the study methodology incorporated and examined the multiple perspectives and realities that contribute to an organisation's atmosphere or context. This qualitative assessment of individual cases and across cases of the differing realities creating unique contexts specific to each organisation provided a comprehensive depiction and understanding of the various contextual factors contributing or impeding evidence-informed practice in public health.

4.2. Background Details

The sample and data for the current study were from a pre-existing project entitled the SHAPES[1]-Ontario Knowledge Exchange Extension (KE Extension). The KE Extension is an expansion of the SHAPES-Ontario project which collected smoking and physical activity data within 81 secondary schools clustered in eight Ontario health unit districts. Seven of the health units chosen for participation in SHAPES-Ontario were leads for the Tobacco Control Area Networks (TCAN). The eighth health unit was selected because of their earlier experience with SHAPES and because of their overall leadership in tobacco control.

Out of the eight SHAPES-Ontario health units, six agreed to participate in the KE Extension. The remaining two health units opted not to participate because of their inadequate volume of

[1] The SHAPES acronym represents School Health Action Planning & Evaluation System, a local modular data collection system. Additional details are available online at http://www.shapes.uwaterloo.ca/.

SHAPES data/results (a consequence of active consent limitations and recruitment issues). This limited the remaining two health units' amount of research evidence (aka "knowledge") for the purpose of exchange and utilisation in the KE Extension project.

In an attempt to build on the SHAPES-Ontario project, the KE Extension provided the six participating health units with access to a Knowledge Broker as a means of increasing health unit capacity to analyse, interpret and use the SHAPES-Ontario data in public health program planning, implementation and evaluation. The "information" or "data" received by health units included feedback reports (see Appendix C for a copy of the SHAPES feedback report) describing the physical activity levels and smoking rates for students surveyed as well as aggregated data across schools within each health unit's respective region. The purpose of providing this information was twofold. Firstly, the feedback reports supplied health units with locally-relevant research evidence and secondly, the feedback reports also contained actions or steps to be taken by schools and health units that may assist with addressing the issues of tobacco use and physical inactivity. Overall, the SHAPES feedback reports provided concrete evidence with actionable messages in a comprehensive, user-friendly format to help identify and address the issue at hand and help inform and guide the decision-making process at the health unit level and school level.[2] The purpose of providing the aggregated data was to allow health units to conduct analyses relevant to their program planning, implementation and evaluation needs.

In order to help facilitate the uptake and use of the knowledge derived from the SHAPES reports/data, the KE Extension employed a Knowledge Broker to act as a link between the research unit (University of Waterloo) and the research users (health units). As the researcher for the current study, I also acted in the role of Knowledge Broker. As the Knowledge Broker, I was responsible for identifying and assisting with health unit needs and increasing capacity for evidence-informed practice by clarifying the information contained within the feedback report and soliciting the use and

[2] Example SHAPES feedback reports are also available online at http://www.shapes.uwaterloo.ca.

application of the information in their decision-making processes. I brought my own experience working in a small Ontario public health unit for 2 years to this role. This provided me some insight and appreciation for the context in which I worked as Knowledge Broker. For a more in-depth description of the KE Extension and my role as Knowledge Broker, please refer to Appendix D.

Additionally, as the Knowledge Broker I was responsible for developing/adapting data collection tools and procedures as well as conducting interviews and collecting additional internal health unit documents and correspondence relevant to the KE Extension. As part of this process, I requested participating health units to identify staff members involved in or familiar with the SHAPES-Ontario project. Following identification of suitable staff, I requested participants to partake in an interview to examine organisational processes for knowledge exchange.[3,4]

4.3. Sample Selection

The sample selected for the current study included three out of the six health units participating in the KE Extension. Sample selection was based on each health unit's score on the Knowledge Utilisation Uptake Scale (Skinner, 2007), available in Appendix F. The Knowledge Utilisation Uptake (KUU) Scale was initially developed to measure the reach and uptake of disseminated best/promising practices in diabetes prevention. As noted by Skinner (2007), the scale is adaptable to other public health interests and accordingly was adjusted to measure reach and uptake of the SHAPES-Ontario data. The KUU Scale contains a combination of stages and categories derived from Knott & Wildavsky's *Seven Standards of Utilisation* and Hall et al.'s *Levels of Use Scale* respectively. The KUU Scale consists of two sections, the first contains questions designed to probe the reach and use of knowledge (i.e. SHAPES-Ontario data), the second section is employed to examine deliberate non-

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[3] All KE Extension project recruitment materials, consent forms and measurement tools have received full ethics clearance as outlined by the University of Waterloo Office of Research Ethics (ORE #12781.) A copy of full ethics clearance is available in Appendix E.

[4] The current thesis study has received full ethics clearance as outlined by the University of Waterloo Office of Research Ethics (ORE #13826.) A copy of full ethics clearance is available in Appendix E.

use of the knowledge. As a result, the scale measures eight levels of knowledge utilisation, ranging from the lowest level, "non-use", to the highest level, "renewal" (Skinner, 2007).

KE Extension participants completed the KUU Scale as part of the interview process. Each participant was provided with a copy of the scale to visually assist with their responses and the interviewer (i.e. Knowledge Broker) recorded participant's responses to items on the scale. Each participant's responses contributed to the score for their health unit. In order for a health unit to have demonstrated scoring on a particular level of knowledge use, for example "orientation", a minimum of 60% of respective health unit staff completing the scale must have scored on "orientation" in their individual responses. The 60% cutoff mark was used for determining each of the eight levels of knowledge use for each health unit. Ultimately, the three health units demonstrating highest, moderate and lowest levels of knowledge use as per the KUU Scale were selected for the sample. By selecting three health units with varying degrees of utilisation, the variability among the sample was maximized and provided more detailed insight into the contextual factors influencing the various degrees of knowledge utilisation.

It is important to note that the KUU Scale attempts to examine processes and is not intended to capture attitudes or beliefs (Skinner, 2007). An "overall" score is not realistic since adoption of knowledge/innovation is a process and cannot be calculated by an end point or overall score (Hall et al., 1975). Increased knowledge use can be measured as one makes progress through the individual stages to higher levels, e.g., routine, refinement and integration (Skinner, 2007). Since the KUU Scale measures eight levels of knowledge use, scoring on four levels was considered the "middle" point. Health units that scored on four levels were considered at a "moderate" level of knowledge use. Health units scoring on more than four levels of knowledge use were considered at a "high" level of knowledge use, health units scoring on less than four levels were considered at a "low" level of knowledge use. The health unit selected for being at the "highest" level of knowledge use scored on six levels of the KUU Scale. Furthermore, of these six levels, three of them were in the higher stages (e.g., routine, refinement and integration). The health unit selected for "moderate" level of

knowledge use scored on four levels of the KUU Scale. The health unit selected for "low" level of knowledge use scored on two levels of the KUU Scale. The remaining health units not selected scored on three levels of knowledge use each. The following Table 1 provides a summary of the health units and their respective scores on the KUU scale, shaded columns represent selected sample health units.

Table 1: Health Unit KUU Scale Scores

	HIGH KU	**MODERATE KU**	**LOW KU**			
LEVEL OF KU	**HU A**	**HU B**	**HU C**	**HU D**	**HU E**	**HU F**
Non-Use						
Orientation	√	√	√	√	√	√
Preparation						
Mechanical	√	√	√	√	√	√
Routine	√					
Refinement	√					
Integration	√	√			√	
Renewal	√	√	√	√		
Total KU Levels	**6 levels**	**4 levels**	**3 levels**	**3 levels**	**3 levels**	**2 levels**

HU=Health Unit
KU=Knowledge Use

As a result of the selection procedures, the health units chosen for the sample varied in size (number of employees), service area (geographical area serviced) and structure (number and type of divisions/departments). The following Table 2 summarizes the organisational characteristics across the three selected health units.

Table 2: Organisational Characteristics Across Sites

Characteristics	**Site 1 High KU**	**Site 2 Moderate KU**	**Site 3 Low KU**
Organisational Size	~450 employees	~200 employees	<200 employees
Service Area/ No. Residents	~3,000 km^2/ ~1 million residents	~6,500 km^2/ ~200,000 residents	~150,000 km^2/ ~150,000 residents
No. of Divisions	4	5	3
No. of Offices	1	<5	> 5 offices
PHRED Department	Yes	Yes	No

The unique characteristics of each sample health unit as well as potential influences of organisational characteristics on knowledge use will be described in greater detail in the cross case comparison section.

4.3.1. Knowledge Utilisation Uptake Scale Validity

Currently, the KUU Scale has a strong theoretical basis; however, validity and reliability testing are yet to be conducted. Since the tool was used to determine and select the health units with low, moderate and high levels of knowledge utilisation, it was important to determine if the scale was actually measuring the construct of knowledge use.

Preliminary concurrent validity was conducted to test the degree of association between the KUU Scale items and the qualitative assessment of knowledge use. Qualitative data included interview transcripts originally collected for the Knowledge Exchange Extension. Using QSR NVivo 2.0, transcripts were coded for instances of knowledge use (e.g., preparation, orientation, mechanical etc.) as prescribed by the KUU Scale (see Appendix F). To ensure trustworthiness of the coding, inter-rater reliability was performed. Transcripts samples selected for inter coder rating included three randomly selected transcripts (one per case study). To ensure consistency in code definitions, a coding index was developed (available in Appendix G). The coding index included the eight levels of knowledge use measured by the KUU Scale. Since the KUU Scale contains levels from the Hall et al. (1975) framework, definitions for each level of knowledge use were developed from classifications outlined by Hall et al. Using the coding index, the two coders reached agreement of instances of knowledge use approximately 80% of the time. By means of SAS 9.1, the PROC FREQ command was used to determine a percentage of agreement between items on the KUU Scale and instances of knowledge use in the transcripts. Table 2 describes the eight levels of knowledge use and example instances resulting from the transcripts.

Table 3: KUU Scale Levels of Knowledge Use & Qualitative Examples

Knowledge Use Level	Definition	Example
Non-Use	State in which the user has little or no knowledge of the innovation, no involvement with the innovation, and is doing nothing toward becoming involved. (Hall et al., 1975, as cited in Skinner, 2007, p. 61)	*"Well I haven't actually seen the feedback report. I am aware that it would be made available to us."*[Site 3, Participant 3, 16]
Orientation	State in which the user has acquired or is acquiring information about the innovation and/or has explored or is exploring its value orientation and its demands upon user and user system. (Hall et al., 1975, as cited in Skinner, 2007, p. 61)	*"Well when I first read it I thought it was great… it gave a really comprehensive overview of tobacco results…So I was really interested in seeing what happened with the numbers…I've enjoyed working with it and reading it. I see lots of uses for it"* [Site 1, Participant 5, 9]
Preparation	State in which the user is preparing for first use of the innovation. (Hall et al., 1975, as cited in Skinner, 2007, p. 61)	*"We haven't implemented a strategy to use the results. We certainly have had a number of meetings saying here is what we have, here is the information. Our health unit is just within the last couple of weeks in a formative stage…to come up with a unified strategy for our health unit to act upon the data."* [Site 3, Participant 4, 72]
Mechanical	State in which the user focuses most effort on the short-term, day-to-day use of the innovation with little time for reflection. Changes in use are made more to meet user needs than client needs. The user is primarily engaged in a stepwise attempt to master the tasks required to use the innovation, often resulting in disjointed and superficial use. (Hall et al., 1975, as cited in Skinner, 2007, p. 61)	*"I refer people to it and make sure that they're aware of it and using it in their planning, so keeping it sort of fresh in peoples' minds that we do have it."*[Site 2, Participant 1, 61]
Routine	Use of the innovation is stabilized. Few if any changes are being made in ongoing use. Little preparation or thought is being given to improving innovation use or its consequences. (Hall et al., 1975, as cited in Skinner, 2007, p. 61)	*"For us in tobacco you know it's been an ongoing process because we did the school smoking profiles so it was a follow up on that."* [Site 1, Participant 5, 33]

Knowledge Use Level	Definition	Example
Refinement	State in which the user varies the use of the innovation to increase the impact on clients within immediate sphere of influence. Variations are based on knowledge of both short- and long-term consequences for clients. (Hall et al., 1975, as cited in Skinner, 2007, p. 62)	*"…we're putting the SHAPES results on a big poster board and having a mobile presentation that's going to go around to all the high school staff."* [Site 1, Participant 2, 39]
Integration	State in which the user is combining own efforts to use the innovation with related activities of colleagues to achieve a collective impact on clients within their common sphere of influence. (Hall et al., 1975, as cited in Skinner, 2007, p. 62)	*" …the working groups…are looking at incorporating SHAPES in and some other people…they kind of work on physical activity initiatives and they're using the SHAPES stuff too. So it's happening…but not from one…working group."* [Site 2, Participant 4, 107]
Renewal	State in which the user evaluates the quality of use of the innovation, seeks major modifications of or alternatives to present innovation to achieve increased impact on clients, examines new developments in the field and explores new goals for self and the system. (Hall et al., 1975, as cited in Skinner, 2007, p. 62)	*"I've used CFLRI reports and data extensively…but the thing is in the context of my specific child and youth action plan, then I would have to say yes I favoured SHAPES over other sources, partly because we don't have any other local data for children and youth. But, so I guess I'm qualifying that saying as far as just within my child and youth strategy, but ultimately we have a very large strategy which looks at seniors and adults as well. So I've used other data for other strategies."* [Site 1, Participant 2, 235]

4.3.2. Validity Testing Results

The following Table 3 provides a summary of matches and mismatches for the eight levels of knowledge use on the KUU Scale and within the qualitative interviews. The final column is the percentage of agreement for each of the eight levels of knowledge use between the scale and interviews.

Table 4: Test of Concurrent Validity for KUU Scale

Level of KU	Match	Mismatch	Percentage of Agreement
Non-use	15	0	100%
Orientation	15	0	100%
Preparation	15	0	100%
Mechanical	14	1	93%
Routine	14	1	93%
Refinement	14	1	93%
Integration	14	1	93%
Renewal	7	8	47%

Based on the results in the above table, it appears the KUU Scale does measure several levels of knowledge utilisation in a valid way. There was a large percentage of agreement between the KUU Scale and the qualitative assessment on seven of the knowledge use levels including; non-use, orientation, preparation, mechanical, routine, refinement and integration. In particular, the KUU Scale was very effective in measuring the non-use, orientation and preparation stages of knowledge use with 100% agreement for all three levels. There was slightly less agreement (93%) for the levels of mechanical, routine, refinement and integration but can still be considered effectively measured. Conversely, the scale was less able to measure the final stage, renewal, with a low agreement rate of 47%. However, there is a potential explanation for the low level of agreement for the renewal stage. The interviews were not originally designed to measure specific levels of knowledge use as outlined

by the KUU Scale. Rather, the interviews were designed to collect data for an existing project focusing on organisational processes and knowledge exchange within and between health units.

Instances of knowledge use were captured as part of the interview process but were not the sole focus unlike the scale which measures the specific stages of knowledge use. As such, the KUU Scale contains specific items to measure the stage of renewal which was clearly reflected in the participant responses (11 out of 15 participants scored at the level of renewal). The interview transcripts produced few instances of renewal with only 5 out of 15 transcripts indicating a level of renewal. In this particular circumstance, the interviews possibly did not ask the "right questions" to clearly derive instances of renewal and therefore was not coded by the inter coders.

Overall, based on the results of the concurrent validity testing, I am confident the scale was effective in measuring the construct of knowledge use and was suitable for selecting sample health units demonstrating high, moderate and low levels of knowledge use. Additional validation of the KUU Scale, i.e. construct or concurrent criterion-related validity, would assist in solidifying the effectiveness and value of the scale for future use.

4.4. Data Set: Interviews/Internal Documents/Correspondence

The study analysed data collected for the KE Extension including 15 interviews with male and female staff from the three Ontario health units including Managers, Supervisors, Public Health Nurses, Public Health Promoters, Youth Advisors, and Program Planning and Evaluation Officers. The data set only included initial interviews (T1) in order to meet study timelines, therefore not allowing for a longitudinal study. T1 interviews began in August 2006 and were completed by April 2007. Participants were assigned a code number to ensure confidentiality and maintain anonymity of the research participants. All interviews were conducted by the KE Extension Knowledge Broker over the phone and lasted 30 to 60 minutes. The interviews were semi-structured and included broad scoping questions regarding the use of research evidence and factors influencing the use of evidence in public health planning and evaluation. To review the interview guide please see Appendix H. In

addition to the interview questions, participants were guided through the adapted KUU Scale (Appendix F) as previously discussed in section 4.3 Sample Selection. All interviews were recorded digitally and sent for transcription to an external transcription company. In an effort to ensure a credible data set, transcripts were sent via email to the respective interviewees to review for accuracy and appropriate representation of their responses.

In addition to interview transcripts, the data set consisted of internal health unit documents collected via the KE Extension. Internal documents included a variety of papers and electronic files such as health unit organisational charts, meeting minutes, terms of reference, and reports. All consent forms (Appendix I) outlined the need, purpose and requested permission to collect internal health unit documents. The type and volume of documents collected was at the discretion of the participating health units and varied between sites. When necessary (e.g., health unit had not provided an organisational chart etc.) these data were supplemented with web-based information including health unit websites containing organisational charts, programs and service area details. This supplementary information assisted in developing a clearer picture of organisational characteristics and contexts when internal documents were unavailable or limited in details. Furthermore, it assisted in case development so characteristics could be compared across sites.

The final source of data included correspondence between health unit staff and the research team (e.g., Knowledge Broker) as well as internal health unit correspondence between health unit staff. As Knowledge Broker, I was responsible for tracking and collecting correspondence including emails, teleconference notes and phone call notes.

To ensure appropriate storage of the data and maintain confidentiality, all hard copies of transcripts, internal documents and correspondence were stored in a locked filing cabinet in a locked office in Population Health Research Group at the University of Waterloo. All electronic data, such as digital interview recordings, electronic transcripts, internal document files and correspondence (email) were stored on a secure server within a permissions restricted folder. Organisations and

participants were not identified in any reports resulting from the analysis as a means of ensuring confidentiality and protecting participant anonymity.

4.5. Qualitative Analysis

A qualitative analysis was performed using the data collected from the KE Extension and included the development of three single case studies containing thick descriptions of individual health unit case contexts (e.g., size of the health unit, staff demographics). Following the individual health unit case development, cross case analysis (between health units) was conducted to identify similarities and differences between sites. To guide the individual case and cross case analysis, a Social Ecological approach was drawn on as an overarching framework for the interpretation of the data. The Social Ecological approach emphasizes the relationship between physical environment and social environment and the interaction between the two (Stokols, 1992 & 1996). According to the Social Ecological approach, the "environment" is made up of several attributes including both physical characteristics and social characteristics, objective and subjective qualities, as well as differing sizes and proximities relative to an individual or a group. Furthermore, the Social Ecological approach incorporates concepts from Systems Theory to include the notion of co-dependencies between environments (social and physical) and the interplay between people and their environment (Stokols, 1992 & 1996). As stated by Stokols (1992, p. 8), there are "recurrent cycles of mutual influence" between physical and social environments. As a result, the Social Ecological approach emphasizes that changes within one environment and/or system can affect or create changes within other environments/systems (Stokols, 1992 & 1996; Green & Kreuter, 1999). Given that I am interested in how knowledge is used within Ontario Public Health, it was appropriate to use a perspective that incorporated the broader "whole" as well as the individual components and how these inter-relate. The Social Ecological approach provided a framework to guide the analysis and interpretation with a focus on the overall processes within health units and how the social and physical environments interact to both encourage and/or impede knowledge use. Additionally, using the Social Ecological

approach to steer the analysis was harmonious with the Interpretivist perspective applied to the research design. The Social Ecological approach focuses on the multiple levels of influence and the interplay between people and their environment, much like Interpretivisim which is steeped in the theory that meaning comes into existence via people's engagement with the realities of their world (Patton, 2002).

4.5.1. Coding

In order to conduct the qualitative analysis, appropriate coding procedures and criteria to determine what constitutes a "contextual factor" and "knowledge use" was established. Accordingly, the contextual factors identified in the literature review in conjunction with Manske's Knowledge Utilisation Conceptual Framework (2001), were drawn on to assist with identifying and coding contextual factors influencing knowledge use within the data. Based on this, context included but was not limited to the following organisational level factors including:

- commitment or receptiveness to evidence,
- priorities and mandates,
- resources/funding,
- leadership and/or authority,
- structure and/or size,
- politics and/or culture,
- support and/or incentives,
- communications (internal & external),
- access and/or dissemination of evidence, and
- guidelines and/or evaluation of evidence-informed practice.

Additional codes for context / organisational factors were developed and defined throughout the coding and analysis process.

Criteria to identify and code for examples of "knowledge use" included the spectrum of knowledge use definitions as outlined in the literature including:

- instrumental use (structural, procedural & effort to use),
- conceptual use,
- symbolic use, and
- non-use.

To begin the analysis, an initial review of all transcripts, internal documents and correspondence provided an overall picture of the contextual influences within the three sample health units. It should be noted that the interview transcripts made up the majority of the data analysed while I used the internal documents and correspondence to supplement and validate the emergence of themes throughout the analysis. The use of memoing through the entire analysis process provided annotation and clarification of my initial perception of themes unfolding in the data while allowing for the development of develop insights surrounding my findings. Memoing provided me with the ability to reflect on my thoughts and ideas while bracketing my assumptions and opinions about the analysis, findings and entire research process. Furthermore, memoing was useful in connecting key categories while understanding their fit within the broader context (Charmaz, 2000, as cited in Denzin & Lincoln).

Following the initial review of the data, QSR NVivo 2.0 assisted with the organisation and management of coding, including open coding, axial coding and selective coding. The use of open coding is consistent with qualitative research methodology, and as such, allowed a breakdown of the data and identification of simple, broad categories (Strauss & Corbin, 1990). As each transcript underwent open coding, the constant comparative method was used to reveal common patterns that surfaced across the data while ensuring consistency and accuracy in coding across individual cases (Strauss & Corbin, 1990).

Interviews were coded for examples of knowledge use and contextual influences on knowledge use. The examples coded in each participant's transcript provided a picture of the type of knowledge utilisation, e.g., conceptual, instrumental or symbolic. To ensure trustworthiness of the coding, inter-rater reliability was conducted. One transcript per case study was randomly selected for inter coder rating. To ensure consistency between coders, an index with code definitions was utilised (see Data Analysis Coding Index in Appendix J). The coding index included definitions for characteristics of the information, contextual factors (individual, organisational and environmental) as well as interactive processes and types of knowledge use (i.e., conceptual, instrumental and symbolic). The two coders reached agreement of instances of the aforementioned themes approximately 85% of the time.

After recognizing potential broad themes via open coding and establishing inter-rater reliability, axial coding was used to bring the data back together and identify more specific themes regarding organisational contextual influences and their respective descriptions from the initial open codes. Once again, the constant comparative method was used to compare across the data during the axial coding process. The axial coding assisted with identifying main themes as well as relationships between the main themes (i.e. inter-relations between contextual factors). Main themes were identified by their presence in the data (continually repeated/re-emerging). In addition to presence in the data, a main theme was also identified by its associated rich descriptions provided by respondents (i.e., the more prominent the theme, the more description and detail provided by the respondent). Identifying main themes based on prevalence and description allowed for more delineation of the individual themes and the inter-relations between themes.

As the main themes began to emerge, selective coding was used to recognize a core theme and other emergent themes materializing throughout the entire analysis process. The core theme was deciphered and extracted from the other emergent themes based on two elements. Firstly, the core theme for each health unit was identified as the pivotal *internal* factor in relation to knowledge use. In other words, the core theme was the internal contextual factor directly related to each

organisation's level of SHAPES utilisation. Secondly, each site's core theme was directly linked to the other emergent themes (as validated and supported in the findings), either by emergent themes influencing the core theme or the core theme influencing emergent themes. As the core theme and emergent themes developed, they were further subdivided based on their nature of influence, i.e., direct influence or indirect influence on knowledge use. A theme that was identified as directly influential had a direct impact on the level of knowledge use. Indirect themes were those themes that impacted other themes (core or emergent). Therefore, indirectly influential themes influenced knowledge use via impacting other themes that directly influenced utilisation. The breakdown of themes by direct and indirect influence assisted in identifying inter-relations between and across themes. The following section outlines the core and emergent themes and the linkages between themes found during the coding and analysis process.

5. Results

In order to answer the research question, how contextual factors influence knowledge use and how these factors inter-relate, an in-depth analysis of interview transcripts, internal documents and correspondence from the three sample health units was conducted. A description and validation of a core theme and emergent themes per health unit was developed to determine contextual factors influencing knowledge use and how these factors inter-relate within each respective organisation (the definition for each theme is available in Appendix K). The analysis of each health unit as individual cases as well as an analysis and description across cases was included to determine similarities and divergences of contextual factors influencing knowledge use in all three Ontario health units.

5.1. SITE 1: Knowledge Use Description & Organisational Details

Site 1 was the health unit considered to have the "highest" knowledge use[5], scoring on six levels of the KUU Scale as described in section 4.3: Sample Selection. Based on interview transcripts, correspondence and internal documents, Site 1 had used the SHAPES results in numerous ways, such as informing program planning and decision-making and development of resources to disseminate information and bring about awareness of physical inactivity issues. Furthermore, the information had been used with external clients to gain buy-in and support for health related programming within the client's setting and target population. These examples of knowledge use were reflected in the high score Site 1 received on the KUU Scale and indicated a wide range of knowledge use including symbolic, conceptual and instrumental across the organisational structure within relevant teams and/or divisions.

Site 1 is organised into four main divisions responsible for an array of public health services, such as health protection, health promotion, health surveillance and disease control, as well as an associated Public Health Research and Education Department (aka PHRED unit) that is mandated to

[5] The uptake of knowledge is based specifically on the use of SHAPES data/feedback reports versus the uptake of other research evidence in general.

conduct public health research.[6] All four divisions are embedded within a branch of a regional municipality with elected officials serving as the Board of Health. Each division has a director(s), program managers, frontline staff (e.g., public health nurse) and administrative staff. Based on correspondence with a primary contact from Site 1, there is approximately 450 staff working for the public health department. With regards to services offered, Site 1 provides programs and services to approximately one million urban and rural residents within an estimated 3,000 square kilometre service area.

5.2. SITE 1: Analysis Results

Upon analyzing the transcripts, internal documents and correspondence for Site 1, several inter-related themes emerged. The following provides a summary of the core theme and other emergent themes regarding contextual factors specific to Site 1, the influence of these factors on knowledge use and how these factors inter-relate.

5.2.1. Core Theme: *Commitment & Receptiveness*

During the analysis one core theme, commitment and receptiveness resonated throughout the data. Commitment & receptiveness was defined by Manske (2001) as *the extent to which the user's attitudes are favourable to the use of the disseminated information* (Appendix K) and ranged from receptive to unreceptive. Accordingly, the more receptive an individual or organisation is toward the information increases the more likely they will make a commitment to use it. All staff members interviewed from Site 1 continually demonstrated a very positive attitude toward SHAPES and the usefulness of the information provided (e.g., student smoking rates and levels of physical activity). As one participant described "*It's a very good source of information that's useful now to sort of show*

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[6] The PHRED program is a partnership between local boards of health (aka health units), Ontario Universities (with health sciences/medical programs) and the Ministry of Health and Long Term Care. This collective partnership works together to promote health and prevent disease among the Ontario population. One of the core mandates of the PHRED program is to conduct public health research. Additional information about the PHRED program is available online at http://www.phred-redsp.on.ca/aboutPHRED.htm.

the results of our work and all the efforts from all the schools" [Site 1, Participant 1, 45][7]. As a result of the overwhelming receptiveness displayed by all Site 1 participants, it was appropriate to presume the individual positive attitudes contribute to the overall attitude/perception of the organisation and the strong receptiveness and commitment demonstrated by Site 1.

The receptiveness toward SHAPES was often a direct reflection of staff's perception of specific characteristics of the information, such as its relevance and advantage over other sources of information, *"So I think we're going to get the information out quite widely in the community because it's not often that we get local, very topical data on our key populations such as youth and I think a lot of people are going to be interested in it"* [Site 1, Participant 2, 39]. This is congruent with Manske's Knowledge Utilisation Framework (Appendix B) which depicts the characteristics of information (i.e., relevance, timeliness, relative advantage, complexity, trialability and observability) as important qualities in order for knowledge uptake and utilisation. As Rogers (1995) established, the rate an individual adopts a new innovation (e.g., SHAPES) is affected by how the individual perceives the innovation and its attributes, e.g., advantages to using SHAPES. In the case of Site 1, all five participants indicated the knowledge derived from SHAPES had meaning to them and the organisation, specifically relevance to programs and services offered. This resulted in a positive perception and receptiveness towards SHAPES and a commitment to use the information in organisational program planning. Several Site 1 participants expressed their support and use of SHAPES.

> *"It's very good as an information tool to present to the school, teachers, principals and the parents. It's a very informative tool."* [Site 1, Participant 1, 13]
>
> *"…for the staff…[SHAPES] gives a sense of where they're starting from and hopefully what…their goals might be to, to have some impact"* [Site 1, Participant 2, 35].
>
> *"It's been great. I've enjoyed working with it and reading it. I see lots of uses for it. The staff here is certainly interested in it…Physical activity was certainly interested in it because it's a new initiative for them so it was a real baseline and given some concrete ideas as to where they should go."* [Site 1, Participant 5, 9 & 33]

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[7] Quotation references include the site number, participant number and transcription paragraph.

"My impressions of the Feedback Report are very favourable. I think that it's an excellent tool for staff to work with results in the field and it has been incorporated into our tobacco control interventions, as an, an ongoing component… So it's, it's very positive. We, we find that it provides a replicate platform for discussions around planning activity in individual schools and across the city." [Site 1, Participant 3, 10]

The receptive attitude toward SHAPES was in part a result of how staff perceived the information to benefit them when compared to other sources of data. Site 1 participants viewed the SHAPES evidence as advantageous over other sources of information (i.e., relative advantage), "*Well as a comparison, I've worked a lot with the other surveys over the years and I think the SHAPES survey is a, a marvelous resource for us to work with in public health"* [Site 1, Participant 2, 11]. It appears the relative advantage of the SHAPES evidence over other sources of information was attributed to the local nature of the data. Site 1 participants expressed their appreciation for local data specific to their service area and acknowledged the rarity in obtaining this level of information with often no comparable data available.

"Yes I do understand that it's, it's actually a rarity for us to get such quality literal data and so it's, it's generated some excitement here obviously." [Site 1, Participant 2, 255]

"To me it was in the working environments a valuable report… because I was involved with the physical activity in previous years in the programs and we had a very hard time to get info for physical activity. So this was really wonderful to have." [Site 1, Participant 4, 14]

Interestingly, participants expressed how the evidence/knowledge was in line with the organisation's efforts to engage and work with external organisations, "*I also think it's going to be a very useful tool… to use with our, with our clients"* [Site 1, Participant 2, 11]. Site 1 participants indicated that the information was very relevant and useful in relation to their work with key external parties such as schools.

"I think this is very good because it shows to the school, to the teachers that not all the students will start smoking in grade nine. Now you get to the problem, the picking up of the habit as they go along. And this was very credible in that sense and I personally actually was able to give out this kind of information to the staff at the school…so in that way I felt that it was very good, credible data to have. In general I think it's a very informative tool to present… so it's really good." [Site 1, Participant 1, 13 & 29]

"…it's [SHAPES] certainly giving us a good starting point to begin proceeding with our schools and our students…" [Site 1, Participant 2, 35]

Accordingly, how well the information "fit" with the organisation's interests was associated with the positive perception of SHAPES evidence and commitment to apply the information to organisational practice. The weight Site 1 placed on mandates and priorities was influential on the relevancy of information and whether it was perceived as applicable or not. The fact the information was useful to the needs of Site 1 (i.e., relevant) and complemented organisational mandates and/or priorities was very important to the staff and potentially contributed to the high degree of SHAPES utilisation. This clearly demonstrated the relation between the core theme of commitment and receptiveness and the first emergent theme, organisational mandates and priorities.

5.2.2. Emergent Theme 1: *Organisational Mandates & Priorities*

Organisational mandates and priorities were defined as *explicit and implicit mandates and priorities established within the setting and the associated weight attributed to different sources of information* (Cousins & Leithwood, 1993, as cited in Manske, 2001) (Appendix K). As with all Ontario Health Units, Site 1 had explicit service mandates outlined by the Mandatory Health Programs and Service Guidelines (MHPSG).[8] The MHPSG described the required public health programs and services necessary to improve the health of the population, such as immunization, communicable disease control, health promotion and prevention (Ontario Ministry of Health and Long Term Care, 1997). As outlined by the MHPSG, health units were required to service and provide programs in diverse settings including local school boards and their respective schools on a variety of health issues, "The board of health shall work with all schools and school boards to implement health promotion programming. Topics that must be included are: tobacco-free living, healthy eating, healthy weights and regular physical activity" (Mandatory Health Programs and Service Guidelines, 1997, p. 16).

The data from Site 1 continually conveyed the organisation's mandate as very influential on program design (e.g., tobacco, physical activity programs) and implementation settings (e.g., schools)

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[8] The Mandatory Health Programs and Service Guidelines are available online at http://www.alphaweb.org/mhpsg.asp. Updated guidelines are to be posted soon.

and potentially influenced what type of information is relevant and useful to the organisation. This is consistent with previous literature (Manske, 2001) that has identified organisational mandates and priorities as a contextual factor relevant to knowledge use. A mandate to work with and engage school boards and schools, specifically on tobacco use and physical activity, was influential on Site 1's perception of the relevance/usefulness of the knowledge derived from SHAPES. This relationship between receptiveness/commitment and mandates/priorities was a result of how the SHAPES information informed public health programs focusing on tobacco use prevention or physical activity and how the information assisted the organisation's efforts to work with schools/school boards. This was reflected in one participant's statement of how SHAPES engaged Site 1 and schools to work together on relevant health issues,

> *"The fact that this is a tool that is extremely valuable for Community Development and Community Mobilization approaches because it, it engages School Personnel and Public Health Personnel together around each of the problem(s) and around the different elements that are involved in having an impact in that school"* [Site 1, Participant 3, 90].

Participants from Site 1 felt the SHAPES evidence assisted their work with schools by bringing conceptual awareness to their clients (i.e., schools) regarding issues of tobacco use and low levels of physical activity among student populations. Furthermore, SHAPES evidence helped to "sell" health unit tobacco prevention programs while engaging schools to take action.

> *"I've always met with the school staff but the survey was a great tool to use actually to sort of show where the rates, the tobacco smoking rates of the students were at and what we could do. It was a very good tool to start discussion or to really push the anti-smoking campaign for instance. I got actually a lot of teachers on board because of that information I was presenting. It was evidence…this tool is a very informative tool to the rationale, why we need an anti-tobacco campaign in the school, actually with every school. I've used it as well with the parents at a parents' meeting. It was, I would say, very appropriate…especially with this school I have to say that the SHAPES results, the database was very helpful to get people on board and to get them working with me."* [Site 1, Participant 1, 65 & 69 & 162]

As previously discussed, the organisation's positive commitment/receptiveness toward SHAPES and the knowledge derived from it was associated with the characteristics of the information. However, the organisational mandates/priorities were influential on the staff's perception of the information, such as its relevance to their interests and advantages to using

SHAPES over other sources of data. The more the information was in line with organisational mandates the more relevant it became to their needs and sequentially the greater the commitment and receptiveness toward the use of the information.

> *"… it's [SHAPES] definitely where we want to go as far as monitoring youth behaviours and attitudes that have an impact on chronic disease prevention. And so to the fact that it's got tobacco capacity, physical activity capacity… it draws everyone in…our particular Health Department…Where the focus right now is on, working with school age youth and where the focus is definitely trying to be prevention and comprehensive school health programming… I just had a meeting with the [title of employees] earlier this week, the second meeting at which we discussed if there's something we're going to continue with to what extent do we hang our hat on this system as our Evaluation Monitoring Tool. And it's to a very great extent, they definitely see it as the most credible and useful source and that's the appeal that it has around the Feedback Reports because local data…."* [Site 1, Participant 3, 42 & 44]

This demonstrated the association between the core theme of organisational commitment & receptiveness and emergent theme of organisational mandates and priorities.

The influence of mandates/priorities on organisational perception of information and the influence of the information on organisational commitment/receptiveness validated Manske's work which illustrated a link between information and context within the overall utilisation framework (Appendix B).

The SHAPES evidence and its complement to the mandates and priorities of Site 1 had resulted in a positive receptiveness and strong commitment to applying the information, reflected in the "high" knowledge use score Site 1 received on the KUU Scale. However, further analysis revealed that the high degree of knowledge use was not limited solely to the application of SHAPES but in fact, Site 1 already had previous experience utilising knowledge. This "history of prior knowledge use" was another important contextual factor associated with knowledge utilisation, as described in the next section.

5.2.3. Emergent Theme 2: *History of Prior Knowledge Use*

Analysis of Site 1 data revealed a rich history of prior knowledge use which was defined as *evidence of prior history of information use* by Cousins and Leithwood (1993, as cited in Manske, 2001) (Appendix K). Site 1 demonstrated experience in collecting and applying knowledge derived from

credible research, such as data from Statistics Canada, Canadian International Development Agency, and the Canadian Fitness and Lifestyle Research Institute. Additionally, Site 1 participated in the Rapid Risk Factor Surveillance System (RRFSS)[9] which collects local data on a variety of health issues.

> *"…epidemiology here tracks…information for our community health survey, the Canadian Community Health Survey,…OSDUS [Ontario Student Drug Use Survey], information from RFFSS for us provincially, locally um it's… any kind of data sources."* [Site 1, Participant 3, 204]

> *"No I don't take any information and certainly, you know, the latest article in time is interesting but it's certainly not something I would use professionally. So I, I would definitely qualify my answer saying I, I, I would say 99% of the time like, I can't even think of an exception, but I always have to allow for it, I would say I always reference extremely reputable sources and sites and, and of course with the, you know, generally, government reports, reports from credible agencies and obviously research that, you know, and even research I don't take, I don't take all research as, as credible, credible, but, but the amount of research is what I would consider appropriate, appropriate to use and a good basis for my actions."* [Site 1, Participant 2, 131]

Site 1 exhibited not only access to, but also support for the application of a range of scientific knowledge which had contributed to an environment that demonstrated an existing commitment and/or receptiveness toward knowledge use. As one management level staff stated, there was organisational encouragement for the use of explicit (scientific) evidence, "*…we've been for the past two years demonstrating the CFLRI [Canadian Fitness Lifestyle Research Institute] stuff and it's, how comprehensive it is and, and urging people to, to, within their own topic area to, to use this kind of material to develop their programs"* [Site 1, Participant 2, 327].

It is important to note, Site 1 did not rely solely on scientific evidence, but learned from field experiences and feedback from community members and applied this knowledge to organisational practice. Personal experiences included references to "training, work and personal experience of the participant or other member(s)", in this case health unit staff (Cousins & Leithwood, 1993, as cited in

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[9] Rapid Risk Factor Surveillance System (RRFSS) is a telephone based survey that samples adults (18 years of age and older) for a variety of health-related behaviours. Additional information is available online at http://www.rrfss.on.ca/.

Manske 2001). One participant explained the need to rely on experiential knowledge (personal experiences) to complement scientific evidence or when scientific evidence was not available to develop programs,

> *"You know I think pretty much personal experience and encounters of staff as well in the program. You know sometimes there is no real evidence but there the needs are expressed vocally and then people would attend to that too, so pretty much experience with a combination of kind of evidence, especially when they want to implement a certain program or project. We rely pretty much on evidence, you know environmental scans and then what can we do to add"* [Site 1, Participant 4, 137].

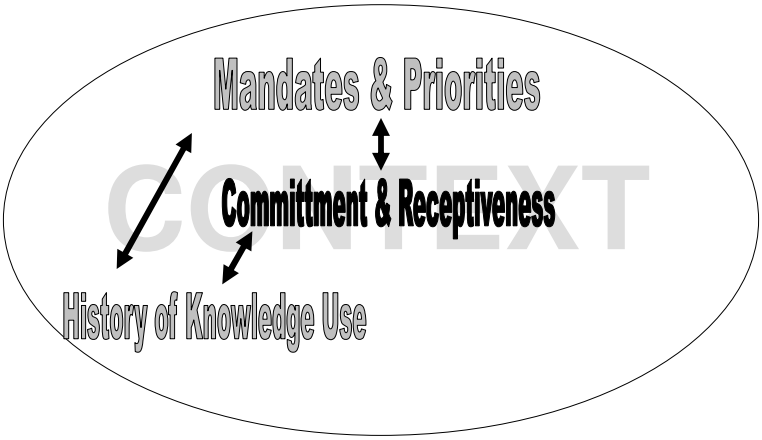
The application of scientific literature as well as evidence of community need and experiential knowledge, clearly displayed an extensive history of knowledge use within Site 1. This point was further validated with the following comment.

> *"We'll take everything from the high level, what I call high level or traditional sources: Stats Can and the Canadian Community Health surveys and CIDA… We'll take those, those more rigorous survey sets of data but we'll also take RFFSS which is local also a survey dataset. We'll also take just informal knowledge, other people who've worked in programs so a lot of decisions in programs are made based on practice experience and we'll take stuff from grey literature, we'll take stuff from other PHRED units, we'll take stuff from Systematic Lit Reviews, certainly around media intervention for tobacco, there've been a lot o… lit reviews stuff in the States so they took some stuff from that. But they also will run on their gut, response to community needs and also to needs assessment data, we'll just take it from anywhere."* [Site 1, Participant 3, 216]

The organisation's experience and "comfort" with utilizing knowledge demonstrated a positive commitment/receptiveness toward applying information to program planning and decision-making. Furthermore, the previous use of knowledge to inform program priorities and interests demonstrated a link between the organisational mandates/priorities and a history of knowledge use. The following Figure 1 demonstrates the inter-relation between the core theme and emergent themes discussed to this point. The core theme of commitment and receptiveness to use SHAPES had been placed centrally in the overall sphere of context, with the core theme being influenced by how the information corresponded with organisational mandates/priorities (i.e., the information was in line with organisational interests increasing receptiveness and commitment). Moreover, a history of prior knowledge use aided in facilitating the organisation's positive commitment and receptiveness to applying information. Described by a Site 1 participant, their experiences and history of using

SHAPES had increased staff comfort with continued use of SHAPES to inform mandated services including tobacco programming, *"For us in tobacco you know it's been an ongoing process because we did the school smoking profiles [SHAPES' predecessor] so it was a follow up on that…I think it's being used more in [name of tobacco program] now than the school smoking profiles were… People are more comfortable with it [SHAPES]"* [Site 1, Participant 5, 33], as well as guiding physical activity programming, "*I think it's definitely giving direction for physical activity. Their program is being based around it, so that's really exciting"* [Site 1, Participant 5, 41]. This also demonstrated an association between the two emergent themes since previous knowledge utilisation had occurred in an effort to address organisational mandates and program priorities, such as tobacco and physical activity programming.

Figure 1: Site 1 Linkages Between Commitment/Receptiveness & Mandates/Priorities & History of Knowledge Use



In the case of Site 1, historical instances of knowledge use were not limited solely to program planning and decision-making. Site 1 demonstrated instances of applying knowledge as a means of "learning" from staff experiences in an effort to inform and develop future practice and processes that are more efficient and effective. One participant described how the organisation is trying to improve their practice to develop more comprehensive planning. As part of this process, they had attempted to apply lessons learnt from their experience in tobacco program planning to future physical activity program planning.

> *"How physical activity has functioned up until now in physical activity, interventions have been very scattered throughout the Health Department. And even though that touched on schools, there were lots of different people working with the school population lots of different, smaller, physical activity initiatives as well they move it to like tobacco was made more homogeneous in it's approach to schools and following a peer-led, youth-led, professional supported approach using what they refer to as the [name of program]to the Tobacco Control Program the Tobacco Use Smoke Free Program um Model. Um they're, they're having youth facilitators tied to different schools and they're trying to work in a more comprehensive way and it's called the [name of physical activity program], so it's analogous to the [name of tobacco program]."* [Site 1, Participant 3, 71]

Accordingly, applying the accumulated knowledge from the experiences of the tobacco program had eased the application of SHAPES knowledge within the physical activity program,

> "*Well yeah initially when I was assigned to, to do the physical activity strategy and learnt about SHAPES through the tobacco initiative, I did sit down with a supervisor of the tobacco program and found out what their feeling of SHAPES was and how they'd used it and in fact, we're fortunate because [name of tobacco program] has kind of… crossed a number of bridges for us already. So we, we are in fact having an easier time moving into this whole process with the schools"* [Site 1, Participant 2, 195].

These instances of "learning" from previous experiences demonstrated the commitment/receptiveness Site 1 had to effectively utilise SHAPES evidence while also revealing elements of organisational learning within Site 1 processes.

Organisational learning, as defined by McGill et al. (1992, as cited in Malhotra, 1996) is the "ability of an organisation to gain insight and understanding from experience through experimentation, observation, analysis, and a willingness to examine both successes and failures." The organisational learning ability of Site 1 was further revealed via processes developed to solicit feedback on staff experiences disseminating SHAPES results at the school level. All Public Health Nurses presenting SHAPES results to school staff were requested to evaluate their presentation experience via an evaluation form. The collection and application of such information displayed an effort to learn from staff experiences which is similar to organisational learning mechanisms, for instance postproject reviews or project postmortems (Lipshitz et al., 2002). In addition, the use of program evaluations, formative and summative, has often been used as a means of organisational learning in the health care sector (Scriven, 1991, as cited in Lipshitz et al., 2002) which was also apparent in Site 1. In view of that, attempts to use knowledge gained from program evaluation to inform program planning and decision-making processes within Site 1 were under way,

> *"But we're also trying to get everyone who's ever done an evaluation to put on to us, trying to get a central place on our "F drive" where we have copies of all evaluations that have been done on all sorts of different programs that people can see as they're, as they're happening so we're trying to get more centralized around those resources"* [Site 1, Participant 3, 204].

The combination of previous knowledge use and elements of a learning organisation demonstrated the rich history of knowledge utilisation within Site 1. In turn, this had contributed to the organisation's commitment/receptiveness to conduct evidence-informed practice and validated the inter-relation between the core theme of commitment and receptiveness and the emergent theme of history of prior knowledge use demonstrated in Figure 1. The rich history of prior knowledge use, in conjunction with additional contextual factors had contributed to an overall supportive knowledge use environment within Site 1. As one participant had explained, the use of SHAPES evidence was spawned from a pre-existing supportive environment with strong leadership for knowledge utilisation that resulted from internal co-ordinated action among multiple programs and the organisation as a whole,

> **"***Although I think you know the momentum for these meetings have come from the managers: a momentum for, you know, bringing everybody together, it comes from a desire to make our work around SHAPES more co-ordinated and consistent and then that spills over into a desire to make all work in schools more co-ordinated and consistent and it just comes at the really good time"* [Site 1, Participant 3, 152].

This notion of a supportive knowledge utilisation environment appeared to result not only from previous knowledge use but two other key elements 1) supportive leadership and 2) internal co-ordinated action. These two elements helped the organisation to facilitate knowledge exchange and utilisation processes and procedures that were nurtured, supported and carried through. A detailed description of these two key elements can be found in the subsequent sections.

5.2.4. Emergent Theme 3: *Leadership*

The emergent theme of leadership was defined as *evidence that there is initiative concerning knowledge use* and ranged from extensive to minimal (Manske, 2001) (Appendix K). In the case of Site 1, there was more extensive leadership with several instances of guidance/initiative in the use of SHAPES evidence and other knowledge in general. For example, Site 1 staff was encouraged to utilise knowledge in their practice,

> "*Yes, and we've been trying to get people to think data. To think data sources and where they can get sources with good data to build their programs on and so that operational*

> *planning is more reflective and so that operational plans…that the planning process incorporates where they're going to get their data, what they're going to continue to measure and move everyone a little bit closer to evaluation plans for each program. It means certain highlights of each program. And so that's something that some programs do very well but very inconsistent and never well enough and so this is the first time that management has ever asked anyone from our shop to be involved before operational planning to assist the group to try to see how they can use evidence in their planning process"* [Site 1, Participant 3, 164].

The encouragement for evidence-informed practice had largely come from the organisation's research department, more specifically PHRED staff, "*but pushing [evidence/data] folks are the people from our PHRED unit"* [Site 1, Participant 3, 200]. The leadership given to knowledge utilisation was not limited to the PHRED unit; other individual staff members also displayed initiative to encourage staff to utilise available evidence. In particular, one supervisor explained her process of ensuring staff had access and understanding of available evidence,

> *"I started off the interview by giving an example of the, the student drug use survey, which in the past I've used with my previous team, the injury prevention and substance abuse teams, and we used that every two years as a very key area to explore any trends and issues for the population that we were targeting, which was again the high school students. So I just found out what I would normally do with a local survey and that is make sure that, that the staff all receive the information and that they understand it and then they explore how they could use it. It's just a process that I do"* [Site 1, Participant 2, 55].

It appears in the case of Site 1, the leadership given to evidence-informed practice had begun to set an implicit expectation to provide evidence in organisational decision making processes and justification for actions pursed, *"I think these people are at the stage that when they need to approach someone to do something they need to provide evidence. That's very, very appropriate"* [Site 1, Participant 4, 113]. This implicit expectation had contributed to an environment supportive (or expectant) of knowledge use. In turn, this support was directly reflected in organisational commitment and use of SHAPES results and evidence in general. Site 1 leadership had facilitated and encouraged application of information to organisational practices that will maintain a history of knowledge use to inform programs and policies necessary to meet organisational mandates/priorities.

Upon further examination of the leadership theme, individual staff members also demonstrated initiative specific to the utilisation of SHAPES evidence. One staff member in

particular took a leadership role in the uptake and use of SHAPES within the organisation. This individual expressed the importance of her role as a champion for SHAPES, "*…it has a lot to do with having somebody who has that positive you know, there is quite a reliance on my presence with SHAPES…and for many people, my name is synonymous with this tool"* [Site 1, Participant 3, 148]. Ultimately, this staff member assumed responsibility for increasing the access to and ability of staff to utilise SHAPES results but could not guarantee actual use, "*I'm enabling staff to be able to use the results but I'm not ensuring that they do"* [Site 1, Participant 3, 456]. Additionally, other staff members indicated their role in encouraging the use of SHAPES evidence in order to meet organisational priorities such as physical activity programming, *"Because there are so many priorities that we just kind of remind them of physical activity and we see how they plan, what they want to do and then just to remind them okay, but remembering the reports [SHAPES feedback reports], this is the stats, what are we going to do"* [Site 1, Participant 4, 101].

Clearly, Site 1 demonstrated strong leadership with respect to knowledge dissemination and utilisation and more specifically, the utilisation of SHAPES. Participants indicated strong leadership for evidence-informed practice within their organisation, especially from the PHRED unit. However, participants also indicated that other staff in an ideal position to take a leadership role (e.g., management) didn't have the time or ability to always do so.

> *"The key people, the PHRED , it's the PHRED units it's the Program Planning and Evaluation Officers and Managers. But the problem is managers don't have time. Managers are very well disposed to make use of data they really want but they don't have the time to make it happen. So, and in our Epidemiology Department you would think that they would be pushing but they're not linked with programs closely enough"* [Site 1, Participant 3, 196].

The data examined was limited with respect to the role of resources influencing leadership and a more in-depth understanding could not be developed. However, this had indicated some inconsistency in the organisation's expectations of staff to uptake and utilise knowledge as well as other factors, such as time, influencing management's ability to encourage the application of evidence.

Overall, Site 1 had demonstrated a high degree of leadership that encouraged evidence-informed practice and more specifically supported the application of SHAPES data in organisational

planning. The display of leadership was positively associated with knowledge uptake and utilisation, congruent with previous literature indicating "the presence of an innovation or research champion consistently exerts a positive influence on the adoption of innovations and the utilisation of research" (Schon, 1963; Chakrabarti, 1974; Howell & Higgins, 1990; Markham, Green & Basu, 1991, as cited in Estabrooks, 2003, p 56). The leadership Site 1 had given to SHAPES directly reflected the organisation's commitment and receptiveness toward the use of SHAPES information and evidence in general. Furthermore, the more intensive leadership given to the utilisation of the information had contributed to an environment supportive of knowledge use necessary to meet organisational mandates and priorities. However, it is important to note, leadership along with a history of prior knowledge use, were not the only contextual factors creating a supportive knowledge use environment within Site 1. Consideration was given to the organisation's internal co-ordinated actions and processes contributing to knowledge utilisation.

5.2.5. Emergent Theme 4: *Internal Co-ordinated Action*

During the analysis, Site 1 revealed a predisposition to conduct well-planned and calculated internal co-ordinated action with and between appropriate programs and respective staff (e.g., tobacco, physical activity, school health, program planning and evaluation) to ensure appropriate uptake and use of the SHAPES results. Internal co-ordinated action was defined as *explicit organisational processes and procedures developed and carried out as a means of facilitating action on a particular issue* (Appendix K). This internal co-ordinated action on behalf of Site 1 demonstrated a high level of commitment and receptiveness and was directly reflected in the organisation's actions to establish multilevel working groups across programs to facilitate the application of SHAPES evidence.

> *"It [working group] is cross directorate, it's management and you know I sit on that as a staff liaison person. Like I haven't had a lot of opportunity to do that particular kind of thing but I wouldn't want to say that it didn't happen in other areas because I know it does happen but I'm not sure about the specifics, about exactly how it happens with other areas. I think it's certainly worked well. It makes it easier for the staff to understand where everybody's coming from, so we're sorting it out at a different level, but I think it's working well."* [Site 1, Participant 5, 73]

The internal co-ordinated action (i.e., working groups) had allowed for cross program discussion, consistency of use and increased the ability of Site 1 to engage and service schools while achieving organisational mandates and priorities. Notably, participants describe the processes of co-ordinating efforts via working group(s) as a typical organisational procedure.

> *"…this is really a working group with SHAPES only to get it started. So it was established because of SHAPES but it is the normal kind of working procedure."* [Site 1, Participant 4, 82]

> *"I think we came together rather informally just to – I can't even remember what we discussed at the first initial meetings – but it was more of the organisation trend to smooth things out, what we could do better and then we just realized there was benefit in keeping that working group going. So we're still meeting probably every, I would say about every three weeks that we're meeting, three weeks to four weeks now still, so I think that we will continue to do that."* [Site 1, Participant 5, 93]

This type of internal co-ordinated action preceded SHAPES and illustrated that the organisation's normal procedures had contributed to an environment supportive of knowledge use (i.e., SHAPES). These processes were partially a direct result of the commitment of the organisation to use SHAPES as well as a direct link to the leadership that encouraged knowledge use and exchange within Site 1. The establishment of working groups had revealed the natural development of a Community of Practice (CoP) within the organisation with a shared purpose to fully utilise SHAPES evidence. The CoP consisted of health unit staff who had shared expertise and interests and work together for the purpose of interacting while creating knowledge, resources and developing processes to use the SHAPES evidence to inform and guide decisions and program planning, "*Mostly the physical activity staff people within the program but then as I said they will come back in our little working group, okay this is what we see, this is what we would like to share, that kind of consistency then going on."* [Site 1, Participant 4, 361].

As outlined by Wenger (1998), there are three essential elements of a successful CoP including mutual engagement, joint enterprise and shared repertoire. The first dimension, *mutual engagement*, is the basis of a Community of Practice. CoP members develop and share a common understanding that is produced through member engagement and interaction, while each member

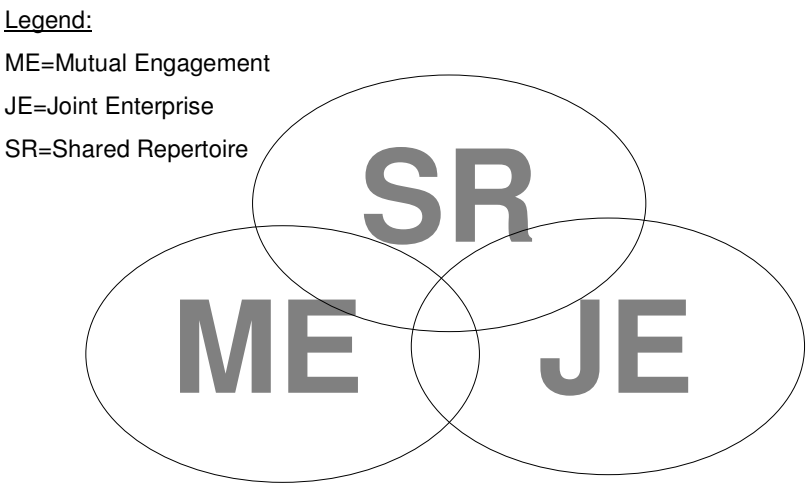
maintains their own unique characteristics. It is important that each member maintain their distinctiveness so collectively members can continue to engage each other and facilitate knowledge exchange (Wenger, 1998).

The second dimension of a CoP is *joint enterprise*, which consists of negotiated meanings among the community members. Communities of Practice are influenced by contextual factors and exist under restricted situations such as limited resources. In order for a CoP to reach a universal goal, members must negotiate meanings and processes in order to function under existing circumstances (Wenger, 1998).

The final dimension, *shared repertoire*, involves the sharing of stories, experiences, resources and tools as a means of informing the community. Shared repertoire is the common manner in which members carry out tasks and interpret events. Furthermore, shared languages and styles (i.e., dress) within the community help to develop an identity of belonging to that particular CoP. The dimension of shared repertoire provides the characteristics and history of the CoP. Over time, CoP develop a "repertoire" of resources (e.g., tools, protocols, manuals) to provide a means of continuous engagement between members so they may strive for their common purpose/goal (Wenger, 1998).

Ultimately, all three dimensions, mutual engagement, joint enterprise and shared repertoire, work together in order for a CoP to function and evolve. Figure 2 provides a visual depiction of the three dimensions as they overlap and influence one another.

Figure 2: The Three Dimension's of Wenger's Community of Practice (1993)



Manske's Knowledge Utilisation Framework (2001) includes Wenger's CoP elements as part of the "interactive processes" necessary for knowledge exchange and utilisation to occur. Interactive processes are the "type, quality and amount of communication between the group and the outside world. These interactive communications are critical for assimilating new information and developing appropriate actions/strategies and build broader understanding of context" (Lambraki, 2004). The working group(s) from Site 1 displayed and conducted interactive processes essential to knowledge use and exchange. The regular meetings, "…*we do have almost at this time a weekly meeting which will soon taper off to once every two weeks"* [Site 1, Participant 4, 85], allowed for continuous mutual engagement among community members as well as opportunities to negotiate their shared purpose and goals (i.e., joint enterprise). *"Yeah depending on what it is. I think that the SHAPES working group gives us an opportunity to discuss things as a group and make decisions that relate well for all programs"* [Site 1, Participant 5, 137]. The mutual engagement had facilitated discussion that allowed the group to jointly develop programs and services to meet external partner needs as well as serve internal organisational purposes, "…*the meetings are kind of informal. We*

discuss the results and what do we present, you know that kind of brainstorming, what is important according to their needs and to and from and on personal, individual levels too." [Site 1, Participant 4, 89]. This had created a sense of shared purpose or negotiated enterprise among community members, *"No, I think everybody has a willingness to work together. I think everybody sees the value of the SHAPES survey and is looking you know to make that a good fit for all programs, for the tobacco and the physical activity teams*" [Site 1, Participant 5, 81]. As a result, the CoP developed a shared repertoire/language among its members which was apparent in their collective name for the group (i.e., "SHAPES working group") as well as the development of a terms of reference to outline specific roles, responsibilities and goals of the community. Additionally, the group/community had developed resources (e.g., poster and pamphlet, PowerPoint presentations) to facilitate their work with schools and school boards as part of the organisational mandate *"It was really to establish the poster kind of information, the pamphlets which they want to take back to schools when it starts today."* [Site 1, Participant 4, 85].

The establishment of specific roles and responsibilities within the group had created a natural evolution of individuals responsible for disseminating or encouraging the use of the SHAPES evidence. This is harmonious with Manske's Knowledge Utilisation Framework, in which *involvement with change* is defined as "the direct participation in dissemination or initiating a push for change" (Cousins & Leithwood, 1993, as cited in Manske 2001). Particular staff members within the working group(s) had assisted in ensuring staff had access to SHAPES results while encouraging the use and appropriate interpretation and application of the knowledge.

> *"But I was the person involved in organizing staff to using both [Tobacco & Physical Activity], in sections of the Feedback Report initially."* [Site 1, Participant 3, 14]
>
> *"Within physical activity yes I ensure that those people do have a copy…making sure that people, the results with regard to interpretation that they reach consensus. This is what it really means to us...and make sure that staff do use that. The whole process is developed in the sense that there is no other way they need to use it."* [Site 1, Participant 4, 273 & 345]

In order for those involved with change to initiate the use of SHAPES results they must be engaged with the group members (not to be confused with the previously described mutual engagement).

Engagement is the "active involvement in the implementation or dissemination of follow-up activities." (Cousins & Leithwood, 1993, as cited in Manske 2001). One participant involved with change described their engagement with other members of the group essential to creating a resource for schools, "*Yeah, they will tell you more but certainly they've distributed the various reports and my involvement was really also with the working group from the physical activity team to create a poster that would be in schools"* [Site 1, Participant 4, 73].

The working group(s) had allowed for staff engagement in follow-up activities that facilitated the dissemination and use of the results externally at the school level while also creating a form of ongoing contact both internally and externally to the organisation. Ongoing contact is the "interaction with the initiators of change (either internal or external to the organisation), especially local ones that increased accessibility, knowledge of local context and personal stake in change effort" (Cousins & Leithwood, 1993, as cited in Manske, 2001). One participant explained her role and how her direct involvement with engagement activities allowed her to work with health unit staff directly linked to schools (i.e., initiators of change).

> *"Well personally right now I'm working on the presentation so I'm trying to develop presentations for…staff to take out to the schools to present the tobacco results piece. So I've been working on guidelines for staff as to how to do that and putting a package together, working with the slides that Waterloo has provided us to choose which ones we wanted, which ones we felt were more meaningful, were involved in staff training, and then the staff will go out to the schools and hopefully present the results to all the schools in the city…as well the presentations will go to the board as well so I'll need to do that at some point as well."* [Site 1, Participant 5, 53]

Her role as a "liaison" with other group members was direct involvement with developing resources to assist with the dissemination of SHAPES at the school level. Her role allowed for ongoing contact with youth facilitators that acted as "initiators of change" knowledgeable of their own context within the school setting.

> *"We've done a lot of work with the youth facilitators over the past few years and they do a lot of the work with the high school youth and I think that's been a really innovative program. So yeah, we've definitely learned a lot through that process. With regards to SHAPES, I'll be liaising with the coordinator from that group and hopefully we'll involve the youth facilitators in the presentations to school staff about this SHAPES data as well because they will eventually be one of the key links in working with the students so they can get this*

information back to the students as well, of course as long as the principal is okay with that." [Site 1, Participant 5, 121]

Through the working group and the interactive processes, Site 1 had been able to develop procedures to engage external partners, i.e., schools, in the use of knowledge derived from SHAPES. Establishment of such processes and procedures demonstrated how Site 1 had shifted from more mechanical use of data into a more routine use and refinement to increase impact on external clients (Skinner, 2007). Once again, many of these procedures were in place to collectively determine the most appropriate use of the information that addresses the priorities and mandates of both the health unit as well as the respective schools/school boards. When working with external partners, protocol had been put in place to help ensure access and application of the evidence.

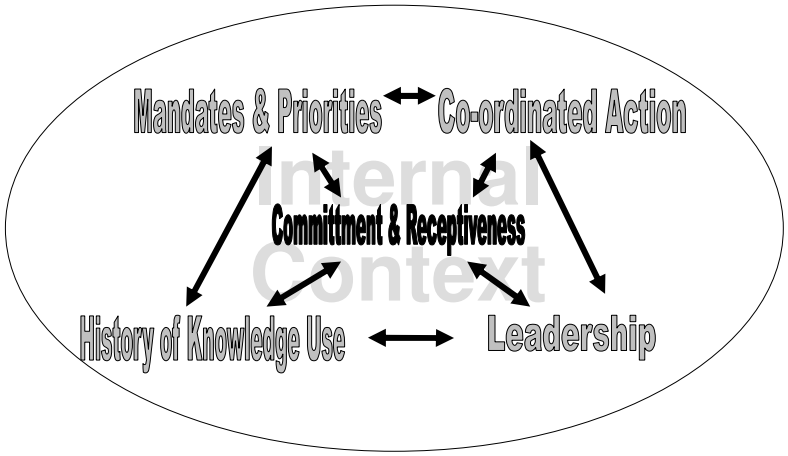
> *"…this SHAPES data to this point has been included in the tobacco intervention is that, it's one of the components that is signed off on by each principal so the [name of tobacco program] representative meets with the principal at the beginning of every school year … they run through the required components and they sign off on an action plan. So the components of the intervention are cessation, work, advocacy work,…. a multiple intervention covering all the different strategies and they have an agreement that legally binds um the school and the Health Department to work together on this particular action plan they sign off and there they go for the year. One of the key pieces is that if they participate in the SHAPES survey that will provide them with Feedback Reports from the school and they did reciprocate and that we plan to re-sample about every three years their school so that they can see…so they sit down, they sign off on this action plan and then whether it be part of that meeting or a later one, then they review together the Feedback results when they come to them. So each school is different but as each wave of schools that come on to the [name of tobacco program]we survey them… They come on us the program in September, we survey them in as soon after as we can get at ourselves in the field, usually that's like November or early December that they surveyed of the first year that they start to participate and then our plan has me to come back and re-survey them. We've managed to do that now because the SHAPES Ontario funding…"* [Site 1, Participant 3, 83]

Such processes and procedures allowed for Site 1 to share the SHAPES results while bringing conceptual awareness to schools regarding the health of their respective student population. The application of SHAPES knowledge also assisted in decision making processes and program planning (i.e., instrumental knowledge use) for example,

> *"The Feedback Reports provide them with a picture of where they're at now in their school, it will change the focus of their intervention if they sit down with the Principal or if they sit down with the Planning Committee in each school and they see that they have a real problem with female students in smoking then the targeting of activities has tended to be more female"* [Site 1, Participant 3, 84].

Having an established working group with the necessary interactive processes, designated roles and procedures for disseminating and applying the SHAPES results, along with supportive and encouraging leadership contributed to an overall supportive knowledge use environment within Site 1. The internal co-ordinated action, i.e., working group(s), pointed to the organisation's commitment and receptiveness to knowledge utilisation. It also demonstrated the interactive processes that facilitated the use of the evidence and corroborates both Wenger's and Manske's work. Ultimately, the natural development of a CoP within Site 1 increased the uptake and utilisation of SHAPE results which was directly reflected in the organisations score of "high" knowledge use on the KUU Scale. The working group (i.e., CoP) and interactive processes provided a means of meeting organisational mandates and priorities to work with external partners with a focus on tobacco and physical activity programming. The inter-relation between all of the contextual factors is illustrated in Figure 3.

Figure 3: Site 1 Internal Core & Emergent Theme Linkages



It is evident the co-ordinated efforts allowing for interactive processes (i.e., CoP) within Site 1 had helped to facilitate knowledge use and exchange between the organisation and their respective

clients, schools/school boards. Further analysis of the interactive processes had indicated that the exchange between Site 1 and outside organisations, such as schools, can expose the health unit to external factors unique to school/school board contexts. These external factors cannot be ignored since they have the potential to greatly influence internal organisational context within Site 1 and ultimately impede or facilitated knowledge use.

5.2.6. Emergent Theme 5: *External Contextual Factors*

In concert with the Social Ecological concept that changes within one environment can create changes within other environments (Stokols, 1992 & 1996; Green & Kreuter, 1999), the analysis included a review of external contextual factors and their relation to internal contextual factors influencing knowledge use. External contextual factors were defined as *factors/characteristics of the environment external to the organisation under study, i.e., health unit.* External contextual factors may be specific to external organisations or factors to external environment in general. To fully understand the link between external and internal factors, an examination of the relationship between Site 1 and the schools/school boards was conducted. From this analysis several external factors influential on internal health unit context emerged.

5.2.6. A: *External Relationships*

As previously discussed, Site 1 had a mandate to work with local schools/school boards on numerous health related topics. As a result of this mandate, an external relationship between the health unit and schools/school boards had evolved. External relationships were defined as *a state involving mutual dealings between people or organisations external to the organisation under study, i.e., health unit* (Appendix K). The relationship between Site 1 and local schools/school boards appeared to be a dynamic association with varying degrees of trust that had evolved over time. The history of this relationship had shown a shift from a more informal to formal affiliation changing the nature of the relationship, described in the following statement.

> *"Previously we had more informal relationship with Directors of Education, directly through our Medical Officer of Health [MOH] and that was [the MOH's] work style with informal linkages and [the MOH] would do a lot behind the scenes to pave the way for communication and for the initiatives. Now in the last year, there's a move and its a very concerted effort to streamline communication one person talking to each Board, one contact person on both sides and that communication for the most part at the Board level goes through these people. So this has just started and it does seem to be working well."* [Site 1, Participant 3, 234]

This shift in formality was also the result of earlier changes within the health unit's structure,

> *"I wanted to tell you that the Health Department has recently undergone amalgamation. We were split apart, school Health's Program with separate, separated from adult Health, from Healthy Eating Programs and off by itself was Recreation and then two years ago got put back together again. So our Health Department is still struggling with that, with are re-oriented structures and the relationship with the School Boards and there are four of them, those relationships have been constantly changing in the last three years, because the people have been constantly been changing the linkages on both sides they've been constantly changing.."* [Site 1, Participant 3, 232]

Furthermore, the role of the health unit within the school environment had changed and altered the relationship,

> *"…it's quite challenging and, and I'm going to think, ever since, I think in the late 90's when we worked through public health nurses from the schools as, as a school-based health nurse, I don't think that relationship has ever really recovered. And you can see I'm speaking quite frankly. And as a result, gradually as the school staff has sort of changed, we, there is less of an expectation for the old guard that remains that, you know, public health we will go back to the old ways and have a nurse available. But basically the, working with the, the schools is, is challenging."* [Site 1, Participant 2, 71]

These changes had created a dynamic relationship between the two parties and may have hindered previous communications and knowledge exchange processes as well as hindered commitment or receptiveness on behalf of the school boards/schools. However, more recently this relationship was changing and had become more positive. Health unit staff attributed specific successful programs and services provided by the health unit as key contributors to the rebuilding of this relationship, allowing for increased communication and developing connections among the school environment.

> *"One thing the [name of tobacco program] has done has sort of revitalized the role of the nurse…the [name of tobacco program], which was very targeted and specific and had very clear deliverables resulted in public health getting some redeeming recognition at schools and I think we've also increased our credibility… So the result is that things are improving…certainly the response regarding January when we started going into the schools with our second wave of physical activity information and the [name of physical activity*

program], has been very positive…. I do think things are improving here and that I have an expectation that the staff will be offered at least I would look for 30 minutes, hopefully 15 minutes at a staff meeting...sometimes you have to establish credibility with the principal before he'll let you loose on, on, on his precious time at staff meetings." [Site 1, Participant 2, 71]

"I mean especially with [name of tobacco program] we have lots of links with teachers now so it may not just be through the principal, it may be through our [name of tobacco program] group, teachers that have been involved with [name of tobacco program] as well as we've done a lot of work with the curriculum so it might be a phys ed. teacher, a history teacher, a drama teacher, those kinds of things where we've developed those connections." [Site 1, Participant 5, 145]

As a result, it appeared the nature of a relationship (positive or negative) could either hinder or facilitate knowledge exchange between the health unit and external parties. The nature of the relationship had implications for organisational processes and knowledge utilisation. For example, a negative or strained relationship may have required Site 1 to provide more evidence to sell their programs to schools/school boards. Conversely, a more positive relationship may have revealed more receptive external partners willing to work with Site 1 to address health issues such as youth physical inactivity and tobacco use. Ultimately, the nature of the relationship Site 1 has with schools can be very influential on internal health unit context.

Further analysis of the relationship between Site 1 and the local schools/school boards had exposed the health unit often conformed to external processes and protocols established by external parties. Conforming to external processes and procedures seemed to be a necessary step for Site 1 to facilitate and maintain a positive relationship with schools/school boards. A more detailed description of the role and influence of "external processes and procedures" are outlined in the subsequent section.

5.2.6. B: *External Processes & Procedures*

The relationship between Site 1 and local school boards/schools historically had been dynamic and challenging. Participants had indicated the relationship with boards and schools had evolved over time and become a more positive union. In order to maintain the forward momentum, Site 1 had often conformed to the needs of schools/school boards, in particular following external protocols and

procedures, such as board approval requirements and communication processes. External processes and procedures were defined as *specific processes and procedures, e.g., policies and protocols, developed and implemented by parties/organisations external to the organisation under study, i.e., health unit* (Appendix K). As a result, processes and procedures external to Site 1 could impose requirements and specific actions on behalf of the health unit in order to communicate and work with external partners. As one participant expressed, conforming to these processes was a rationalised necessity,

> *"So, you know, that's, that's the reality because they are just inundated, actually it's sometimes for public health I think cause there's at least 12 different areas within our department that make approaches to them, from everything from immunization through to, you know, bicycle helmets etc. So, you know, that's a reality that they've, they, that's the process that they require and it's, it's fairly understandable"* [Site 1, Participant 2, 143].

Much like the evolution of the relationship, school/school board protocols and procedures had evolved into more formal requirements that allowed for more efficient communication between both parties while providing an opportunity for knowledge exchange and utilisation to occur, in this particular instance, the application of SHAPES evidence.

> *"Now the other piece that's happening is, it used to be you worked with each Board, each four School Boards people separate and you link with the Superintendents and most of that was informal and now they formalized it and they got one Superintendent from each School Board has been designated to meet with the Health Department Upper Management and Middle Management four times a year at regular meetings where we, where's there's an opportunity to discuss key initiatives. So that is just starting in September and one of the items on the agenda will be the SHAPES result"* [Site 1, Participant 3, 236].

Additional external procedures and protocols included Site 1 seeking approval at the individual school level. This process ranged from informal to formal and varied by client.

> *"It depends on what you do. There are things you do have to go through – again, depending on schools. Some of my schools were more or less informal I could do whatever I could do, for other schools it was more formal. So it really depends on the information from the vice principal, accept the rules basically… there are schools where you are flexible of doing whatever you want to do and there are others that are much more strict about the time, the date to be there"* [Site 1, Participant 1, 97].

Site 1 conformed to these informal and formal external processes in an effort to leverage school/school board engagement while gaining commitment and support to conduct mandated public

health programs and initiatives at the school level. School engagement and support could be seen at various levels ranging from approval to implement programs to the actual allocation of a school staff member to assist in implementation. *"So as I said, we would be presenting it to the principal as well there was a letter of agreement saying that he was supporting it and then most of the time we were going off to connect with the same teacher that he was assigning"* [Site 1, Participant 1, 122]. Following the required processes allowed the health unit to continue a relationship with the school boards/schools and gain their support to ease implementation processes.

> *"Also, at the beginning actually, assign a teacher. I find when you do actually have a teacher assigned things are really going much more smoothly and you can actually do all the components that you wanted to do. So the principal would support and then we would be going to meet with the assigned teacher to go over the plan and he or she would be deciding exactly what they would be doing"* [Site 1, Participant 1, 122].

Furthermore, obtaining board/school support (i.e., approval) there was often a need to utilise evidence and "sell" school programs. As previously discussed under the core theme of commitment/receptiveness, Site 1 had an affinity toward SHAPES because it provided evidence of the issue at hand and enabled them to sell public health programs when seeking approval at the board and school level. Ultimately, the external processes and procedures increased the need for evidence-informed action within Site 1. Moreover, conforming to the needs and requirements of external parties helped to facilitate trust between the two parties and further strengthened the relationship.

5.2.6. C: *External Resources*

Another element of maintaining a strong relationship appeared to include consideration for the parameters external parties must work within due to limited resources. These limited external resources were specific to organisations/parties external to the organisation under study (i.e., Site 1) and included *references to money, staff or time that may impact knowledge use* (Manske, 2001) (Appendix K). Being aware of limited resources and capacity on behalf of the school boards/schools demonstrated the health unit's respect for limitations placed on schools and school boards. Site

participants made statements recognizing the restrictions placed on schools that can impede their ability to commit to health promotion programs.

> *"There has to be the capacity I think for these things. There is so much at the schools; there is so much the schools are doing. It depends on the size of the school too. You know if you've got a rural school or something with a small staff group and they're still expected to handle all the same sports initiatives and you know drama groups, music groups and all those extra curricular kind of things, it's more difficult for them I think to find staff that might be available to take on some of these other different things. If you've got a key teacher, if you've got somebody who is really interested then there's no problem. So it's finding the right fit with people too."*[Site 1, Participant 5, 157]

> *"… it's such that we don't get much time assigned to us at staff meetings and, and it's possible in some places that we won't be given time at a staff meeting until well into the, the fall term. So we are going to use the SHAPES materials, as I said, there's a poster. Also we're developing a, a small informational pamphlet that we can leave in the staff room and also provide to our parent advisory groups. Two of those are going to be making a presentation in, in each high school"* [Site 1, Participant 2, 39]

The limited resources available to school boards/schools influenced how the health unit was able to disseminate and apply knowledge to develop effective programs that fit to external partner's working environment as well as their unique needs. Consequently, the health unit had to adapt and work within the external contextual factor of limited resources (e.g., time and capacity) in order to disseminate and use knowledge, resulting in Site 1 adapting to another means of dissemination, including the development of a poster and pamphlet outlining the SHAPES results.

The fact that school boards/schools have such limited resources required the health unit to use evidence to engage these external partners and make it worth their while. Similar to utilising evidence as part of the process to seeking approval, Site 1 utilised knowledge to assist with justifying the allocation of rare resources.

> *"We offer schools money to compensate them for teacher time now, not all schools but schools that come on to the teacher outreach program, we also provide the schools with a thousand dollars each to do the activity so that their [name of tobacco program] teams have something to work with to do displays, assemblies, bringing in speakers, drama, presentations and to mount the contest and get their entries into media contest, that kind of thing"* [Site 1, Participant 3, 84].

This strategic use of knowledge was validated via a review of internal documents including minutes from a joint meeting between Site 1 and school principals. The minutes indicated the

dissemination/sharing of SHAPES results with principals to bring attention to program progress as well as conceptual awareness of the issues relative to tobacco use and physical activity among youth. Symbolic use of the SHAPES results helped to justify and support the continuation of health unit programs within school settings and demonstrated an attempt to gain ongoing engagement from schools.

In addition to limited resources, external mandates and priorities determined what external partners deemed as important to support and resource, in turn demonstrating their level of commitment.

5.2.6. D: *External Mandates & Priorities*

Engagement of schools/school boards appeared to not only be dependent on conforming to external processes and limited resources but was also influenced by external mandates and priorities. As previously discussed, internal mandates and priorities were positively or negatively influential on an organisation's commitment/receptiveness toward information by influencing perceptions of the characteristics of the information and determining if that information was relevant and useful. This was the same for external organisations with their own mandates/priorities that differed from the mandates/priorities of Site 1. External mandates and priorities were specific to organisations/parties external to the organisation under study (i.e., Site 1) and were defined as *explicit and implicit priorities established within the setting and the associated weight attributed to different sorts of information* (Cousins & Leithwood, 1993, as cited in Manske, 2001) (Appendix K).

External mandates and priorities could be influential on whether schools/school boards were interested in the information, programs and services Site 1 had to offer.

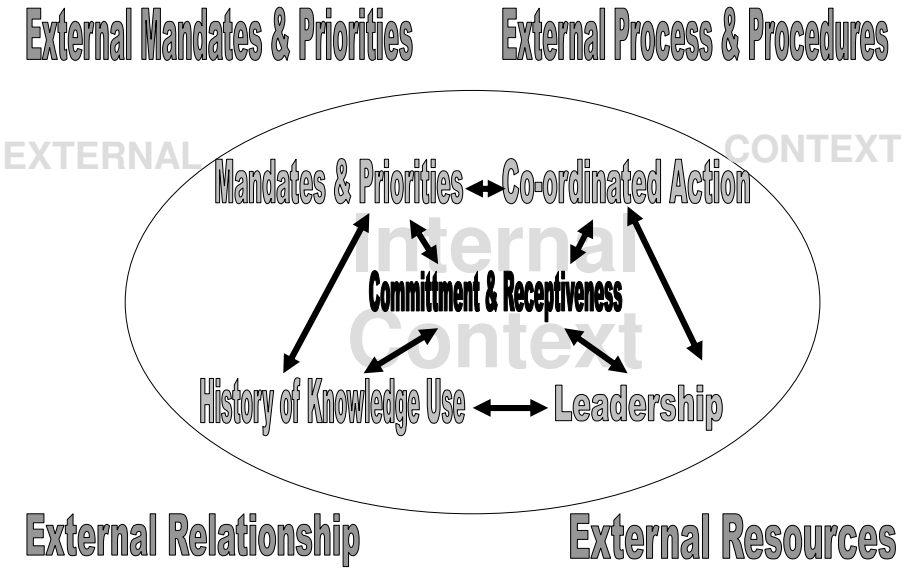
> *"I think it really just depends on where the school is and you know where the school is at that moment in time and where their priorities are. Schools have so many different priorities, different groups of students, different issues, many different issues right now to deal with. You know smoking; tobacco use may not be a priority for them right now so then we need to look at groups within that school where they're more interested in getting that message out"* [Site 1, Participant 5, 153].

In the case of schools/school boards, their mandates/priorities focused on education, not health issues, and as such influenced their willingness to accept knowledge and demonstrate support for the programs offered by the health unit. One participant summed this up nicely by explaining how the limited resources, in conjunction with external mandates/priorities, influenced school/board commitment and engagement with health promotion programs.

> *"You know coupled with workload, education you know the time to do stuff like physical activity or arrange a program or an activity where students are involved and you know in a highly academic kind of environment physical activity takes second place. There is just not enough time I think with the responsibilities on teachers, what they need to do."* [Site 1, Participant 4, 205]

Ultimately, the mandates and priorities of external partners influenced their perception of the usefulness of the information brought forward by Site 1. This had implications for how Site 1 chose to disseminate the information at the school/board level. Consideration of not only external mandates/priorities, as well as their external process/procedures and limited resources was crucial for Site 1. The desire and mandate to work within the school environment required Site 1 to conform its internal processes to accommodate external contextual factors (e.g., resource, mandates etc.) while requiring the health unit to use evidence to gain support and bring awareness to the importance of health within schools/school boards. The influence of external contextual factors on internal contextual factors is depicted in Figure 4 below.

Figure 4: Site 1 Internal & External Contextual Factors



5.3. SITE 1: Summary

In summary, there were several internal and external contextual factors influential on knowledge use specific to Site 1. The core contextual factor of commitment and receptiveness was associated with other emerging themes of leadership, internal co-ordinated action, organisational mandates and priorities and a previous history of knowledge use. Additionally, the data also demonstrated an influence from external contextual factors on the internal context and knowledge use within Site 1. The following sections will highlight the findings from the remaining two case studies. How the internal and external contextual factors specific to Site 1 compare and diverge from the other health units will also be discussed in the cross case comparison section.

5.4. SITE 2: Knowledge Use Description & Organisational Details

Site 2 consisted of the health unit considered to have "moderate" knowledge utilisation scoring on four levels of the KUU Scale including, orientation, mechanical, integration and renewal. A review of Site 2 data revealed several examples of SHAPES knowledge use including assistance in program planning and development and awareness of tobacco and physical activity issues among youth, as well as buy-in from school boards/schools and justification for health promotion programs at the school level. These examples of knowledge use are congruent with the score Site 2 received on the KUU Scale. However, the low score on routine use and refinement may have been the result of several different factors including dissemination methods and actions taken to facilitate utilisation. The following detailed analysis will help to identify these factors and provide a better picture of knowledge utilisation across the Site 2 organisation.

Site 2 has approximately 200 employees spread between one main office and three satellite offices. The organisation is composed of five main divisions with an associated PHRED unit conducting local public health research and training.[10] Each of the five divisions includes a director(s), program managers, frontline staff and administrative staff. Site 2 provides programs and services to approximately 200, 000 residents within three neighbouring counties covering an estimated 6,500 kilometres. Each county consists of several municipalities with the board of health comprised of elected officials representative of the municipalities within the three service areas.

5.5. SITE 2: Analysis Results

Site 2 transcripts, internal documents and correspondence were analysed for core and other emerging themes. The following is a summary of the themes, how they relate to one another and their overall influence on knowledge use with respect to Site 2.

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[10] The PHRED program is a partnership between local boards of health (aka health units), Ontario Universities (with health sciences/medical programs) and the Ministry of Long Term Care. This collective partnership works together to promote health and prevent disease among the Ontario population. One of the core mandates of the PHRED program is to conduct public health research. For more information on the PHRED program visit http://www.phred-redsp.on.ca/aboutPHRED.htm

5.5.1. Core Theme: *Leadership*

As the analysis of Site 2 was carried out, the core theme of leadership materialized (definition of leadership available in Appendix K). The data collected from Site 2 continually illustrated varying degrees of initiative to use SHAPES evidence and knowledge in general. Members of management expressed their role in prompting staff's awareness of SHAPES and its potential use in program planning and decision-making processes.

> *"I refer people to it and make sure that they' re aware of it and using it in their planning, so keeping it sort of fresh in peoples' minds…my job is to make sure people use it. I don't really use it on a daily basis myself but then it's included in our planning and evaluation and that sort of thing."* [Site 2, Participant 1, 61 & 533]

> *"I wouldn't say that I ensure staff is using the results, I just ensure that staff is aware of it."* [Site 2, Participant 2, 392]

Less specific to SHAPES, management had also demonstrated leadership by providing a supportive environment for staff to conduct evidence-informed practice, including training for staff to increase their skills in knowledge utilisation, *"I think here they're very supportive of using data… I don't know if it's formally written down but I know we've had lots of workshops on it [evidence-based practice] and management is very supportive of that and looking for it"* [Site 2, Participant 4,146 & 154]. Moreover, management had a protocol that required the inclusion of available evidence to justify taking action. One management level staff described their preference to include evidence as part of staff processes, *"I like it for really coming up with a new program idea to have that written up in a proposal sort of format, even a short one. We want to know why and what the rationale is, what the evidence was if any to support it"* [Site 2, Participant 1, 177]. This inclusion of evidence as a required element of the planning processes demonstrated the leadership given to initiate knowledge utilisation.

In addition to management initiating the use of evidence, individual staff demonstrated strong leadership in the dissemination and uptake of the SHAPES results. Fellow coworkers commented on the actions taken by an individual "champion" of SHAPES. *"She's really good at you know just bringing information to – reminding us about the SHAPES information and encouraging people to*

use it" [Site 2, Participant 4, 107]. This particular SHAPES champion demonstrated personal characteristics conducive to knowledge utilisation and exchange. Her personal habits and processes included a history of utilising evidence.

> "*Well I usually look at research evidence, the numbers, some of the findings. I look at the literature, like what the literature is saying, some of the review articles… I tend to be the type that likes to look at that kind of stuff probably more so than most but if people want to know where something is I can usually help them too."* [Site 2, Participant 3, 328/348]

Her leadership style included a tendency to share evidence with co-workers, "*What I do is when I get it [evidence] I put it out to my team….I share it because that way everybody gets it"* [Site 2, Participant 3,332], while encouraging fellow staff to use evidence, in particular the SHAPES results, "*Probably interpreting the results. I think getting other staff to look at the results, even the capacity reports, the environmental reports, like reading the data that they have, to help them think about it"* [Site 2, Participant 3, 720].

The leadership from both management and the SHAPES champion appeared to be an important contextual factor in the uptake and application of knowledge. In the case of Site 2, the leadership given to SHAPES was the pivotal factor (i.e. core theme) in the dissemination and use of the knowledge within the organisation. The internal use of the information within Site 2 included application of SHAPES evidence to pre-existing operational processes in an effort to complement current program planning and decision-making. A detailed description of internal application of SHAPES results is summarized below in the emergent theme of internal co-ordinated action.

5.5.2. Emergent Theme 1: *Internal Co-ordinated Action*

The theme of internal co-ordinated action (Appendix K) was a theme seen throughout the data from Site 2. For example, in Site 1 the development of a specific SHAPES working group to facilitate uptake and use of SHAPES evidence was deemed as internal co-ordinated action. Site 2 also employed working groups as a typical organisational operation for facilitating action on the issue at hand. Several Site 2 participants validated this point.

> *"Yeah, we have working groups, that's how we work. We have like a large team and then a small group will take a project and start a sidebar and come up with a plan and bring it back to the group."* [Site 2, Participant 1, 105]

> *"…we all work together but we tend to have specific areas that we focus more in. So like I do more physical activity and there would be two or three of us doing that, so we can work as a small group and pull in larger numbers as we need them… So if we developed a program… two or three of us would work on that and then any of the public health nurses within their own schools are welcome to either get in and do specific things around that or help with whatever we need help with."* [Site 2, Participant 4,110]

These previous statements demonstrated how Site 2 placed emphasis on collaborative work in the form of teams. In turn, these teams break into smaller working groups to help facilitate action on a particular issue or task. As part of the internal co-ordinated action process, working groups maintained ongoing communication with the larger team as a means of maintaining collaboration and knowledge exchange. As one participant explained, "*…we have team meetings, we have plans and responsibilities with different people. We have families of schools and a nurse attached to families of schools. So then we have kind of different working groups within the health unit but then we all come back to the team to kind of say okay heads up, this is what's happening"* [Site 2, Participant 3, 248].

The application of co-ordinated processes within Site 2 allowed for the interactive processes necessary for knowledge utilisation and exchange as outlined by Manske's framework (2001). For example, one participant described the collaborative negotiation (i.e., joint enterprise) of annual program plans to work within restricted resources.

> *"You know once a year we have our operational plan so we sit down and develop that and look at what we want to do over the year and who is doing what. Then our manager, our director, will write that up so hopefully it's a snapshot over the year of who is doing what around the mandatory programs. Then throughout the year if something new were to come up and we have time available to do it then we could you know run that by the team, run that by our manager and see how that fits in, if we've got enough staff, enough time, enough resources in order to work on something new."* [Site 2, Participant 4,122]

Furthermore, these processes also brought about a sense of shared accountability and responsibility among team members.

> "*I would say that just the way that we set ourselves up in our team anyways with having a lot of the staff work on things together and then they all take a lead in certain projects, plus there's a lead for their own schools so they feel responsible so it's not just somebody else's*

issue, it's theirs. I think they're very accountable because of that." [Site 2, Participant 1, 189]

Even though Site 2 demonstrated internal co-ordinated actions as a practice used in the past, there was no co-ordinated action specific to the use of SHAPES and/or knowledge utilisation. As one participant explicitly explained,

> *"In terms of a separate working group that has broken off and looking at specifically SHAPES and how it can be used, I would have to say no…Like the working groups say around [name of tobacco program] that are looking at incorporating SHAPES in and some other people that you probably will speak to regarding physical activity, they kind of work on physical activity initiatives and they're using the SHAPES stuff to. So it's happening but not from one SHAPES working group"* [Site 2, Participant 4,107].

However, Site 2 had incorporated SHAPES into existing working groups to help inform their current work,

> "*…we are starting a new component to our smoking cessation program in the high schools this year… So one of the girls on our working group, she actually fleshed out some key points in the SHAPES report and the one thing was regarding the statistic about students being unaware of the smoking on school property rules and the consequences"* [Site 2, Participant 4, 91].

The application of SHAPES across existing programs and working groups had facilitated the incorporation of knowledge which was congruent with Site 2's score of "integration" on the KUU Scale. In this particular case, Site 2 had demonstrated "combining their own efforts to use the innovations with related activities of colleagues to achieve collective impact on clients" (Hall et al., 1975, as cited in Skinner, 2007, p. 62). However, applying SHAPES evidence to existing working groups and not the development of a specific SHAPES working group may help to explain why Site 2 had not exhibited "routine" use of knowledge on the KUU Scale. The employment of a specific SHAPES working group within Site 1 allowed for the development of routine procedures for utilising the evidence as well as refinement and integration of the knowledge to increase impact on clients. Whereas Site 2 had not indicated any routine use of the SHAPES knowledge among the working groups utilising the evidence but rather jumped from mechanical use directly to integration of knowledge as depicted on the KUU Scale.

In general, Site 2's internal co-ordination included the use of SHAPES to complement existing work groups but was not specific to SHAPES utilisation. Furthermore, dissemination included one central report shared by all relevant staff, as referenced by participants.

> *"Well our agency has, I don't have my own personal copy, but yes the agency does and I know where it is."* [Site 2, Participant 1, 417]
>
> *"Well we have a copy [SHAPES report] in a binder that's accessible for everybody to use."* [Site 2, Participant 2, 272]

Though a shared/central copy of the SHAPES report(s) was a cost efficient means of dissemination, it appeared to have posed problems for uptake and utilisation. In particular, the non-immediate access appeared to be a barrier in remembering to refer to or utilise the SHAPES results versus immediate access (i.e., each staff member having their own individual copy). The SHAPES champion influential in the dissemination of SHAPES expressed her concern with staff remembering to access the information. *"Maybe that's partly why trying to show the report, trying to sort of say this is where the data is, this is where it's in. I've reported all that but you know then people come back and say where again is that you know. If people were remembering..."* [Site 2, Participant 3, 304]

Overall, Site 2 had demonstrated some degree of co-ordinated action to use the SHAPES results. Site 2 adapted the use of SHAPES to existing co-ordinated action, mostly as a result of leadership and encouragement from a SHAPES champion and to a lesser degree management, revealing a link between the core theme of leadership and the emergent theme of internal co-ordinated action. In the case of Site 2, much of the leadership had been given to the dissemination and awareness of the SHAPES knowledge with less emphasis on staff utilisation. This was evident in a statement by a manager previously quoted indicating their role was to increase awareness, not specifically increase use. "*I wouldn't say that I ensure staff is using the results, I just ensure that staff is aware of it"* [Site 2, Participant 2, 392]. Internal co-ordinated action within Site 1 included dissemination and utilisation of the SHAPES feedback reports to all relevant working group members. Within Site 2, leadership was given to awareness and dissemination with staff accessing a

central SHAPES feedback report. Once again, the fact that Site 2 had not taken internal co-ordinated action specific to SHAPES or provided individual immediate accesses to the data may have been one of the reasons why the organisation had not demonstrated "routine knowledge use" on the KUU Scale. Not having a work group specific to utilising SHAPES did not allow for staff to engage and establish routine procedures and processes for applying SHAPES evidence.

Ultimately, the leadership within Site 2 contributed to the increased awareness and dissemination of the SHAPES results among staff. Though specific actions to use results were not defined by the organisation, there was still a direct link between these two themes.

5.5.3. Emergent Theme 2: *History of Prior Knowledge Use*

As the themes of leadership and internal co-ordinated action emerged from the data, another theme, history of prior knowledge use, also surfaced. Through out the analysis, Site 2 demonstrated a strong history of prior knowledge use (Appendix K) with Site 2 participants referring to a variety of scientific literature sources. As one participant clearly described, the organisation relied on scientific evidence when it is available and relevant to their needs.

> *"Well systematic review for sure, they're really good. I like those… But there are only so many of those [systematic reviews] and they don't address all the topics. Journal articles certainly, we have files of those with annotated bibliographies to go with them all organized. Basically any research based product that you get that's scientific based. In our field you don't have everything you need and that way you can't prove everything with the human population so we just have to go with the best we can and one thing that we do use a lot if they're available is intervention studies, so research based intervention studies."* [Site 2, Participant 1, 237 & 245]

Conversely, the organisation's history of prior knowledge use was not restricted solely to scientific evidence, *"Everything we do – I shouldn't say everything – evidence based practice is really important here but it doesn't stop people from progressing with something that still hasn't been proven. It doesn't stop people from using it."* [Site 2, Participant 4,150]. Several Site 2 participants expressed the need to rely on experiential knowledge via personal experiences as well as the experiences of other health units in order to fill a void when relevant scientific literature was not available.

> *"I mean to be quite honest often it's somebody, you look and see a need and say boy this would either work or not work and what does somebody think and then we would kind of build on that. I mean we do use best practice so certainly, like [name of tobacco program]if somebody finds an idea has worked pretty well for a different area or it has come up in best practice, so they would bring that forward and see how that works. But sometimes it's a brand new idea that has no evaluation or anything behind it just to see how it goes. If it works then you start looking at how can we evaluate it from there."*[Site 2, Participant 4,138]

> *"We look at what other health units have done and what's been successful after things have been evaluated. That's a really big tool that one of the people has done."* [Site 2, Participant 2, 132]

The organisation's use of both scientific and experiential knowledge was a reflection of organisational leadership that encouraged evidence-informed practice, previously identified when discussing the leadership given to evidence use within Site 2. This was reiterated by another manger expressing staff were "required" to use evidence, "*Yes, they require evidence and it has to be, you know you have to sort of fork up the evidence before it even goes any further"* [Site 2, Participant 2, 128].

To complement the history of prior knowledge use within Site 2, participants referred to organisational resources that had assisted in accessing information as well as interpretation and application of the evidence. Such resources included access to a librarian that was fundamental to knowledge dissemination within the organisation,

> *"Oh yeah, the other thing is we have a great librarian and a great library. She sends out e-bulletins, say for instance a general health promotion comes out, she sends the index out to everybody electronically and then if you want something you just email it back to her and then she'll give you an electronic copy or if we don't have access to that she'll get it printed out. There's lots of journal articles floating around and she will just keep an eye out for this"* [Site 2, Participant 2, 140].

Another resource was the PHRED department staff that provided assistance with interpretation of evidence,

> "…w*e have our PHRED group here so if we're concerned about information we can send it to them and say you know, do we know these people and how does this look because not all of it has a strong research background… So they're a good resource to use and they'll come back and say whether it's been in reviews and say all the appropriate stuff"* [Site 2, Participant 4,194 & 190].

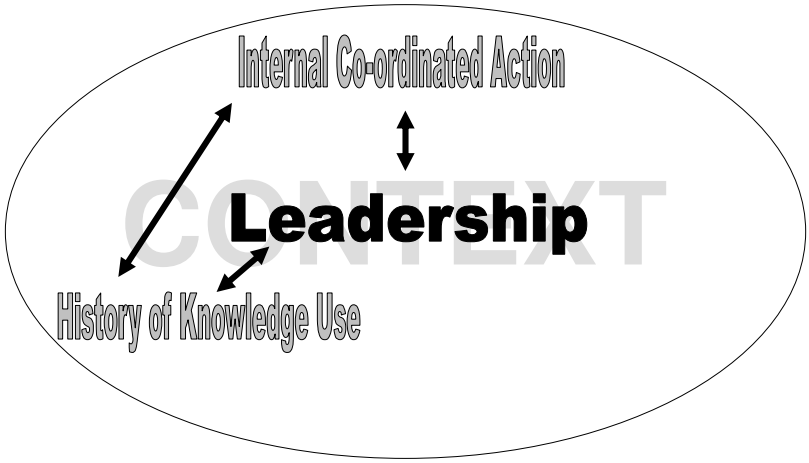
It appears these resources aided in knowledge utilisation among Site 2 staff. Interestingly, Site 2 participants did acknowledge the PHRED department was supportive in the process of applying evidence but they did not make reference to the PHRED department taking initiative to promote evidence-informed practice and knowledge utilisation. Any reference to leadership was solely related to management level staff or the individual SHAPES champion.

The leadership Site 2 had given to evidence-informed practice was demonstrated in the organisation's previous experience with knowledge use that was something they have "always done", "Y*eah I would say absolutely we've always done that [evidence-informed planning] because I usually at some of those things talk about the evidence and some of the admin people, they are some excellent minds and they'll talk about the evidence"* [Site 2, Participant 3, 792]. Participant descriptions of prior knowledge use included the application of information gained from other health units to inform co-ordinated actions. This clearly outlined a link between history of previous knowledge use and internal co-ordinated actions. An excellent example of this was provided by one participant describing the school health team's previous use of knowledge to complement their efforts.

> *"We had a workshop last spring and [name of another health unit] was doing a presentation that was all around working with schools and working with youth. So they were telling us about this great program that they do… We thought that was a great idea so our members from the school health team got together and brainstormed how they could use those ideas and tweak them for our region. That would all be put in writing, and then we would bring that to the director in the school health meeting and sort of tweak how we think the program would go, and then it would all be written up into a protocol, and then it's sent to the school board to see if we had permission to do it and in what schools, and then the protocol then goes into the service manual and then people start working together to actually implement it."* [Site 2, Participant 2, 100]

Overall, Site 2 demonstrated a history of knowledge use that was not only linked to the core theme of leadership but also linked to the organisation's internal co-ordinated actions. As a result of the organisation's leadership, Site 2 had applied evidence to their internal co-ordinated actions which was also reflected in a history of previous knowledge use to inform their practice. On the whole, this provided a clearer picture of the relationship between the contextual factors of leadership, internal co-ordinated action and history of knowledge use within Site 2 (see Figure 5 below).

Figure 5: Site 2 Linkages Between Leadership, Internal Co-ordinated Action & History of Knowledge Use



To this point, it appeared three contextual factors have been influential on the uptake and use of evidence within Site 2 (i.e., leadership, internal co-ordinated actions and previous knowledge use). However, the leadership given specifically to the dissemination of SHAPES evidence and its application to internal co-ordinated actions were rooted in the organisation's commitment and receptiveness to using the knowledge. To better understand this association, the following section illustrates and validates the link between the aforementioned themes and the emergent theme of commitment and receptiveness.

5.5.4. Emergent Theme 3: *Commitment & Receptiveness*

Commitment and receptiveness (Appendix K) was identified as a key contextual factor influencing knowledge utilisation within Site 2. Site 2 demonstrated a commitment and positive receptiveness toward SHAPES and the knowledge it produced. *"Oh everybody here is quite thrilled with it and we actually use it. So that's good. You know you do get a lot of reports from various things but this is something we've been involved in for some time and we value it"* [Site 2, Participant 2, 20]. Site 2

participants illustrated a very positive attitude toward SHAPES, mostly due to the relevance and relative advantage of SHAPES evidence.

> *"It's relevant to us because it is local data, we will use it and have used it with our school board and the school board has it and we have it because they allowed us to. So it's great, it's really helped in program planning and emphasizing things and training of staff and that kind of thing."* [Site 2, Participant 1, 45]

> *"I would say the same, you know it's useful in terms of in particular the PHN to the schools participated in this survey to have that specific information, so I would say on whole the team finds it useful information to have."* [Site 2, Participant 4, 27]

> *"It gives me the local data that I need which is what people are looking for because for so long we've been using cross material, you know across the United States whatever, and now we've got local data to use. The other thing I like all your background information as well, it just gives me up-to-date, concise, like I would turn to it and use it. I find it brings a lot of stuff together that we've been using bits and pieces over the years."* [Site 2, Participant 4,66]

Even more evident was the importance Site 2 placed on the usefulness of the information to work with local schools and school boards.

> *"Well they [schools] already have the results themselves but they may be on a shelf somewhere so if we're sort of bringing them forward and showing them what's sort of going on in their schools, what the issues are, then it's valuable because they participated in the survey, they have the results and now we're just sort of bringing them to their attention again. The fact that they're credible and their own students, that's really important."* [Site 2, Participant 1, 289]

Moreover, participants indicated that the SHAPES feedback reports provided a picture (i.e., observability of the information) of tobacco and physical inactivity issues at the school level.

> "*I like it. I like the fact that the feedback report that we have for the health unit, it gives us sort of a snapshot of the area in general and also from the School Board we have a sense of it and then the feedback reports also we have access to the different schools so it gives us information on what's happening in each of our schools."* [Site 2, Participant 3, 16]

Though Site 2 demonstrated a positive receptiveness toward SHAPES, the level of commitment to use the results was to a lesser degree. Site 2 had committed leadership to encourage the use of SHAPES but had not established dedicated co-ordinated action to use SHAPES. This lesser degree of commitment resulted in a more mechanical use of the data within Site 2 (versus the routine use of SHAPES), as indicated by the KUU Scale (i.e. no achievement of the level "routine use").

Overall, Site 2 had exemplified a positive receptiveness toward SHAPES results due to its advantages over other sources of data (i.e., local data) as well as its relevance to Site 2 priorities (i.e., work with schools). The leadership given to SHAPES resulted in a commitment/receptiveness to use the information to inform current internal co-ordinated action that was also informed by existing experiences and knowledge use. Furthermore, a history of previous knowledge use demonstrated the organisation's receptiveness and commitment to use evidence in general. As a result, there was a relationship between all four themes.

The positive commitment and receptiveness demonstrated by Site 2 was in part influenced by the organisation's mandates and priorities. Similar to the earlier analysis of Site 1 which indicated a relationship between commitment/receptiveness and organisational mandates and priorities, this association was also evident during the analysis of Site 2 data. Accordingly, the organisational mandates and priorities of Site 2 were influential on the organisation's perceptions of the characteristics of the information, meanwhile these perceptions influenced the organisation's receptiveness and commitment to utilise the information. In the end, revealing a connection between commitment and receptiveness and organisational mandates and priorities.

5.5.5. Emergent Theme 4: *Organisational Mandates & Priorities*

The organisational mandates and priorities (Appendix K) of Site 2 were outlined in the Mandatory Health Programs and Service Guidelines and required health units to work with schools/school boards in the area of physical activity, tobacco use prevention, healthy eating and healthy weights (Mandatory Health Programs and Service Guidelines, 1997). Site 2 participants indicated the importance of SHAPES evidence "fitting" with their mandate to work with and engage schools and school boards,

> "*Yeah, it's all about giving them the information sort of say this is your data, this is your information and this is how – you know information and data mean nothing but if we can do something that is our next step is for you working together then that's what it's about. And our job is working with the schools right? So having that is helpful in directing us or just even selling it to be honest"* [Site 2, Participant 3, 480].

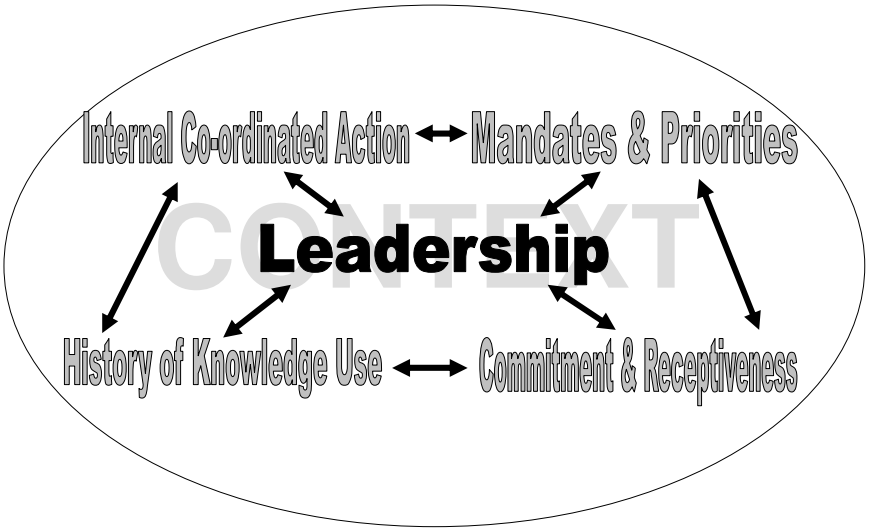
The importance of meeting mandates/priorities was influential on how the organisation perceived the usefulness of the data. This included the consideration of how the information allowed Site 2 to engage schools/school boards while allowing them to continue to promote and sell their services.

> *"Okay, so from our perspective in terms of planning programs or validation of programs, so for myself I would say again with like the smoking cessation program, it validates why we need to be offering smoking cessation program…So I find it validates why we're offering those programs to schools."* [Site 2, Participant 4, 23]

The symbolic use of the SHAPES evidence justified services offered while also bringing conceptual awareness to the schools regarding potential health issues among their student population, *"They are seeing their rates and their seeing firsthand kids with cigarettes. That combined with what they're seeing in schools and its further backup, its evidence for us to show to them"* [Site 2, Participant 2, 208].

As a result, the SHAPES evidence and its complement to organisational mandates and priorities resulted in a positive commitment and receptiveness towards the information. The positive affinity towards SHAPES was seen in the leadership given to the dissemination and encouragement of SHAPES evidence, resulting in an application to internal co-ordinated action to help facilitate its application. The organisation's comfort with knowledge utilisation via previous knowledge use experience contributed to a norm of using knowledge, which was also the result of leadership encouraging and/or requiring evidence to inform program planning and decision making. The specific leadership given to the dissemination and access of SHAPES evidence was echoed in Site 2's achievement of "orientation" on the KUU Scale as participants indicated an understanding of the value of the information and an awareness of its relevance to their work and priorities. This resulted in a positive attitude toward SHAPES and inevitably revealed the inter-connections and influences each internal contextual factor had on the other as illustrated in Figure 6.

Figure 6: Site 2 Internal Core & Emergent Theme Linkages



Due to the organisational mandate to work with external organisations such as schools/school boards, Site 2 was exposed to external contextual factors. Working with schools/school boards required Site 2 to work within the contexts specific to these external parties. Therefore, it was important to understand the influence of these external contextual factors on internal contextual factors specific to Site 2.

5.5.6. Emergent Theme 5: *External Contextual Factors*

As previously indicated, Site 2 had to contend with external factors (Appendix K). External contextual factors were influential on the organisational conduct within Site 2 while potentially impeding or facilitating the organisation's ability to utilise evidence. Site 2's perception of SHAPES evidence was influenced by the compatibility of the information with the organisation's goal to work with and engage schools. As a result of this mandate, the organisation adapted to external factors, specifically factors within the school/school board setting. These external contextual factors appeared

to be influential on Site 2 processes and procedures in order to establish a positive working relationship with schools/school boards.

5.5.6. A: *External Relationships*

The contextual factor, external relationship (Appendix K) was evident in the case of Site 2. Through out the analysis, there was evidence of a very strong trusting relationship between Site 2 and one of the local school boards. *"Sure, well we have a very close relationship with one of our boards. They're right across the street and we know all the superintendents well plus the curriculum people extremely well"* [Site 2, Participant 1, 309]. The strength of this relationship was reflected in the development of less formal processes revealing trust, *"…we keep in close contact and have a really good working relationship with the school boards so every time we run a new program or want to offer something new we check with the school board. We have a great, we're informal enough that we can email them over"* [Site 2, Participant 2, 72], as well as the ease of communication between both organisations, *"…and I have a very informal thing back and forth to the board now. It's like Hi [name of director]… I got this today, this seems to be, and then I give a little spiel on it."* [Site 2, Participant 3, 260]. However, it was important to note, the relationship Site 2 had with other school boards varied, revealing a less positive working relationship. Yet, a Site 2 participant indicated this relationship was improving over time.

> *"The other board [name of school board] goes beyond our district boundaries and they're huge and they're understaffed. In the last year the relationship has been much better. There as well we now have a contact that we send things through but you just don't get that quick of a response or update. Before we would get no response, now we get a response but it might take a little longer."* [Site 2, Participant 1, 333]

The differing relationships Site 2 had with the school boards may have been due to several diverse factors. Firstly, the reference to differing service areas between Site 2 and the one board, as well as limited resources on behalf of the school board seemed to place tension on their respective relationship. This lack of connection with the one board had implications for knowledge exchange and utilisation by limiting Site 2's ability to work with the board's respective schools. Conversely,

the positive working relationship with the other board may have been, in part, the result of close geographical proximity to the health unit as well as a common service area between both organisations. Furthermore, evidence of a long history of working together and familiarity between both organisation's staff had also contributed to a positive working relationship, *"A lot of them have been principals in the system and worked with our staff and they know them really well"* [Site 2, Participant 1, 313].

In order to facilitate and/or maintain a relationship with external organisations, Site 2 had developed a staff "liaison" specifically responsible for building a rapport with schools/school boards,

> "*She has built a relationship with them, met with them, how you want staff. She's outlined our philosophy. I've been with her at that meeting about how we're trying to help them and very cognizant that they're overworked and that kind of thing. You keep that fresh sort of, that's our goal and our philosophy, not to make more work for them but to lighten their load of things they have to do anyway"* [Site 2, Participant 1, 337].

This enabled school based nurses to implement programs at the individual school level,

> *"Yeah, the process to how it's set up is we're always trying from year-to-year streamline our process but again, [liaison's name] is the main contact for both of the school boards in our area… So if there's something like a new event…it then goes to her board contacts and sort of asks for some of their time and explains the program and sees if we can get go ahead from the board level. Then we can go ahead and send the letters out to the principals and work more on I guess the front line level, the PHN to her school assignment. But there is sort of a streamlined process and pretty much everything gets filtered through [liaison's name]who is the school board liaison and she filters it to her contacts at the board and then gives direction from there based on what the board contacts say"* [Site 2, Participant 4, 249].

In the role of liaison, there were opportunities to exchange information with boards and use evidence to sell health unit programs. As one participant explained, the SHAPES results were used by the liaison to gain commitment and approval from the school board.

> *"We have one person, that would be [liaison's name], is our liaison and we have a really good working relationship with them [board] and we use this as evidence for what we want to do. So like I know the letters that [liaison's name] sends over, she often will quote numbers off the report saying that this is what we need and why we need it."* [Site 2, Participant 2, 72]

Furthermore, via a liaison, there was a venue for developing efficient processes for communication between the health unit and the school boards/schools, described by the liaison herself, *"So we've*

formed that little strategic way of doing business. When he [new superintendent] came on board this fall we met and had a good talk about process and what would work and some things that had been done before and what would he like so it seems to be going well" [Site 2, Participant 3, 276]. By utilising a liaison, Site 2 had been able to build a solid working relationship with a local school board and its respective schools. This had allowed for open communication and increased likelihood of knowledge exchange and utilisation at the board level. The liaison demonstrated use of evidence to engage school boards and initiate board conceptual knowledge of health issues/concerns among the student population. Furthermore, the role of liaison had provided an opportunity for knowledge utilisation, in particular the dissemination and uptake of SHAPES results at the school board level.

As the liaison previously indicated, she had used the results in many ways with the school boards, including instrumental use of the results to gain buy-in and approval from the school board to move forward and address the issue of tobacco use by implementing tobacco related programming,

> *"You've got the board sitting at the table and so what I've done with both the assistant director and the superintendent of high schools, I've sat down with them with this information, with the SHAPES, and also in talking about a new program we were looking at for smoking, smokers in the high schools, …I actually used some of the data directly from the feedback report, some of the information to talk about our rates compared to other rates and some of the issues that were identified to sell the program. I think what's happening is they want to – because they see the results, they feel that we need to be doing something"* [Site 2, Participant 3, 92].

Additionally, Site 2 had facilitated co-ordinated action between both the health unit and the school board via a "strategic planning committee" to address the health issues identified in the SHAPES data,

> *"…so this is our opportunity to work together in partnership to address it...You know it may even help with the thinking and provide some of the background data or anything that they need to sell, to support what needs to be done...because we all work together we have a whole strategic group here working you know hand-in-hand. It's a group of brains coming together"* [Site 2, Participant 3, 96].

As a result, this committee consisted of key stakeholders from both Site 2 as well as the school board. Through this committee the liaison had engaged the key stakeholders from the school board/schools

and encouraged them to refer to and utilise the SHAPES results as well as share this information with the entire group in an effort to identify concerns and how to addresses them,

> *"I mean they have a strategic planning program now at the board level and I've met with them and talked with them about the reports. I've encouraged each of the schools to look at their environment so the reports that they received back directly from their schools and then they've brought back some of that information that they were willing to share with the whole group about you know where were the successes, where were the barriers of issues that could be identified. So there was a huge brainstorming session that took place and information compiled related to that"* [Site 2, Participant 3, 52].

Ultimately, the liaison's instrumental use of the SHAPES results had provoked discussion at the school board level to address issues of tobacco use and physical inactivity among the youth in their respective schools. The development of a committee with representatives from Site 2 as well as the school board also demonstrated the strong relationship between these two organisations.

At the individual school level, the strength of the relationship was in a large part due to the school based health unit nurses. Site 2 had nurses associated with individual schools and provided an opportunity for knowledge exchange and utilisation with school staff. In particular, the use of knowledge to bring awareness (conceptual use) to issues as well as make programming decisions and move health initiatives forward (instrumental use). One Site 2 participant expressed how the nurse connections helped to facilitate knowledge exchange and utilisation. "*I think it's useful to have – I guess the thing is having the nurses attached to the schools is valuable because the informal process in selling a program or talking about data or even getting research in the school happens at the one on one at the school level too"* [Site 2, Participant 3, 532]. Furthermore, the nurses' direct contact with schools helped to make connections at the school level building a relationship between Site 2 and individual schools, while also providing a link back to relevant health unit teams which created a strong link between schools and the health unit as a whole. *"Of course we have a nurse in each school so the nurse in the school is part of the team and I think that's very valuable. You realize that it's not just one or two people, there's a whole team and then the many bodies integrating and networking, connecting makes the difference"* [Site 2, Participant 3, 236].

Overall, it appeared the stronger the relationship the more readily the external parties were willing to uptake and utilise knowledge. The external relationship factor and the nature of this association were very influential on the work of Site 2. Not only had Site 2 developed a specific liaison role to help facilitate a strong, positive relationship, but also had implications for the degree of uptake at the school board and school level. Furthermore, a strong relationship allowed for communication and knowledge exchange between parties and assisted Site 2 in gaining support and buy-in from schools to implement health promotion programming while meeting the health unit's organisational mandate. However, this relationship, as previously stated, exposed Site 2 to other external contextual factors with implications for knowledge utilisation and health unit practice. These other contextual factors included external processes and procedures, as well as external mandates and priorities. The following consecutive sections will further describe these external contextual factors.

5.5.6. B: *External Processes & Procedures*

As previously stated, the relationship between Site 2 and schools/school boards left the health unit exposed to external contextual factors, such as external processes and procedures (Appendix J). Site 2 needed to adapt to the processes and procedures (e.g., board approval) outlined by schools/school boards in order to gain their support and commitment. However, in the case of Site 2, the liaison played a pivotal role in this process, "*Well any new program that we have has to go through our coordinator who is [name of liaison] because she has to present it to the board and then it's either yes you can take it in or no you can't, like it either goes or stops"* [Site 2, Participant 4,306].

The adaptation of Site 2 to external processes and procedures required the organisation to streamline their work and accommodate client needs and processes. The use of a liaison helped to facilitate communication while being aware of not overwhelming clients and follow their external approval processes, all in an effort to maintain a positive working relationship with school boards/schools. Several Site 2 participants recognized the need for such a process and acknowledge how it had improved knowledge exchange between both parties.

> *"Here what we have run into in the past is that a lot of our other teams are quite eager to get things into the schools so we have a family health team to deal with from zero to six, they also do a lot of our teen programming, anyway it's just the structure of our health unit and then our adult team does a lot of our workplace stuff. We have to be really careful that it's all funneled through [liaison's name]… otherwise you get things coming in from a lot of different areas and the school board gets tired if things are hitting it. It needs to be coordinated."* [Site 2, Participant 4,342]

> *"Yeah, I know it is because it's easier from their perspective too right, that the have one person [liaison] you know on both side."* [Site 2, Participant 4, 257]

> *"I think what helps is trying to have open and clear communication. What we've found in trying to do better through [liaison] is linking with her and starting at the board level and then her board contacts, how the system is set up where then he sends a communication to the principal. So trying to keep that communication loop constantly moving. So I think that's helped, open communication and streamlining communication."* [Site 2, Participant 4, 305]

Additional Site 2 processes adapted to conform to external partner processes included a shift in planning procedures in an attempt to co-ordinate with school planning schedules,

> "*We used to always have it [planning day] in December because of the year, you know plan for the year, but we as a group we decided we should be doing it in the summer to sort of go by the school calendar….So we switched it up and did it in August to look at the whole school year and looking at the different things going on and what we're doing."* [Site 2, Participant 3, 400]

This demonstrated Site 2's acknowledgement of the need to take external processes/procedures into consideration when undergoing planning and decision making, otherwise they may not have been able to work with schools/school boards. As one participant explained, it was necessary that Site 2 conduct their planning, mandates and school priorities in concert with one another. "*Well we have an operational plan, and we look at our mandatory plans and we also look at sort of marry those with the school curriculum"* [Site 2, Participant 3, 376]. In the end, this revealed a link between external contextual factors (e.g., external processes/procedures) and influences on internal contextual factors (e.g., internal processes/procedures), all in an effort to maintain a working relationship.

5.5.6. C: *External Mandates & Priorities*

To help maintain a positive relationship with the schools/school boards, Site 2 was not only cognizant of external processes and procedures, but also external mandates and priorities (Appendix K). As one Site 2 participant explained, external mandates and priorities were influential on how a health unit

disseminated information and implemented programming, *"You know timing is everything and what they view as being important. You know what's a priority and what is of importance to them is a factor. Just because we think something is quite urgent or relevant does not necessarily mean that's within theirs"* [Site 2, Participant 3, 364].

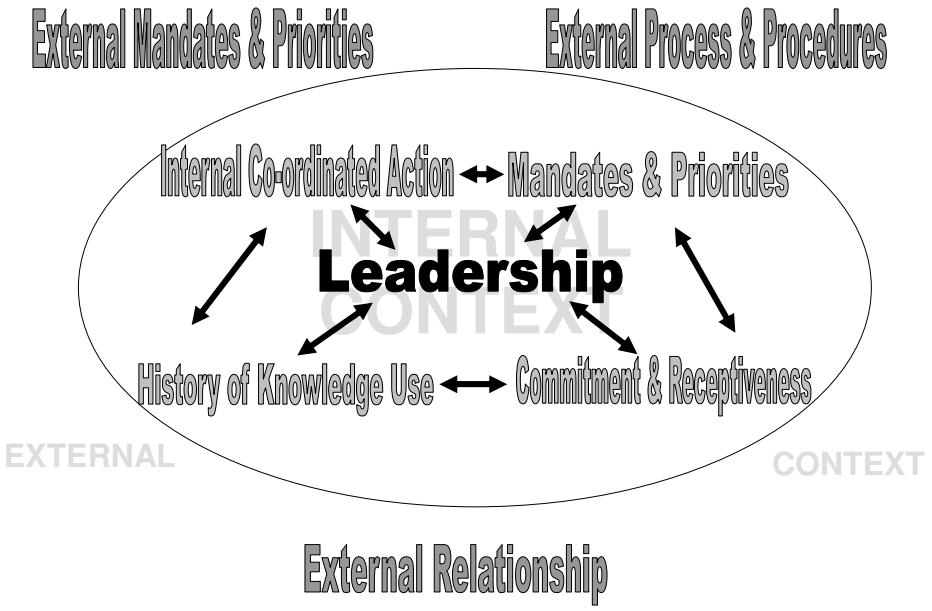
External mandates and priorities were specific to organisations/parties external to the organisation under study (i.e., Site 2). As a result, the external mandates and priorities of schools/school boards acted as an obstacle to engaging schools since they had educational priorities taking precedence over health related issues, "*I think their agendas are so full and I'm sure you've heard this all the time when it comes to physical activity. You know literacy is so important, math is so important, so it's been an ongoing push to bring physical activity as something that really needs to fit in there"* [Site 2, Participant 4,382]. Consequently, Site 2 explained the need to adapt their processes and programming to marry school interests with the health unit's interests, *"Yes and it has to fit into their curriculum and it has to have a need. Some places you run into this all the time that it doesn't jump out at you, the curriculum and you just can't get it in"* [Site 2, Participant 3, 544]. Accordingly, Site 2 used evidence in conjunction with external priorities and needs (e.g., school curriculum) as part of their practice to gain access to schools as well as facilitate the development of trust within the working relationship.

> "*So I would go to the board and say you know we're thinking about doing such and such and you know this is the evidence for doing such and such and this is how it fits with the curriculum. Well for our [name of program]you know this is an idea that seems to be based on research, …this is what we'd like to do, this is the ins and outs of it, this is how it's logical..."* [Site 2, Participant 3, 496]

Ultimately, the external mandates and priorities of schools/school boards along with other external contextual factors were influential on the internal contextual of Site 2. The mandates of Site 2 to work with school boards/schools exposed the organisation to these external contextual factors. As a result, Site 2 adapted its internal processes to build a relationship with schools and school boards while also adapting to their external processes/procedures and mandates/priorities. The need to conform to these external factors had implications for the knowledge disseminated and applied

between Site 2 and its external partners. The process/procedures as well as mandates and priorities of schools/school boards required the health unit to use evidence that would meet the needs of the schools/school boards in order to gain their support and commitment to work with the health unit on health related issues. The external contextual factors influencing internal contextual factors have been depicted in Figure 7 below.

Figure 7: Site 2 Internal & External Contextual Factors



5.6. SITE 2: Summary

The analysis of Site 2 revealed several internal and external contextual factors influential on knowledge use .The core contextual factor of leadership was associated with other emerging themes including commitment and receptiveness, internal co-ordinated action, organisational mandates and priorities and a previous history of knowledge use. In addition to the numerous internal contextual factors, there were also several external contextual factors influential on the internal context and knowledge use specific to Site 2. To continue building on our understanding of the contextual factors

identified thus far, the following section outlines the factors influential on knowledge use in the final case study, Site 3.

5.7. SITE 3: Knowledge Use Description & Organisational Details

The third and final case study, Site 3, is the health unit considered to have the "lowest" level of knowledge use (specific to the use of SHAPES data) on the KUU Scale. Site 3 achieved two levels of knowledge use according to the KUU Scale, including orientation and mechanical. Congruent with their score, Site 3 interviews revealed little use of the SHAPES results with instances limited to staff familiarizing themselves to the data and preliminary discussion on potential future plans for utilising the SHAPES results.

Site 3 is organised into three divisions that provide various health services including health promotion, prevention and protection. Similar to Sites 1 and 2, each division contains director(s), managers, frontline and administrative staff. However, unlike Site 1 and 2, Site 3 does not have the local resources (i.e., local university with medical/health sciences program) to partake in PHRED program[11] and therefore does not have an associated PHRED program. Site 3 offers services to an estimated 150, 000 residents within approximately 100,000 square kilometres. Site 3 employees less than 200 staff within one main office and several satellite offices. The board of health consists of selected representatives and provincial appointees from several municipalities within the overall service area.

5.8. SITE 3: Analysis Results

Equivalent to the analysis of Sites 1 and 2, interview transcripts, internal documents and correspondence from Site 3 were examined. A core theme, additional emergent themes and how they

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[11] The PHRED program is a partnership between local boards of health (aka health units), Ontario Universities (with health sciences/medical programs) and the Ministry of Long Term Care. This collective partnership works together to promote health and prevent disease among the Ontario population. One of the core mandates of the PHRED program is to conduct public health research. For more information on the PHRED program visit http://www.phred-redsp.on.ca/aboutPHRED.htm

inter-relate were identified and authenticated in an effort to understand the contextual factors within a health unit with "low" knowledge utilisation (i.e., specifically little or no SHAPES utilisation). The following section provides a summary of this analysis.

5.8.1. Core Theme: *Commitment & Receptiveness*

The analysis of Site 3 revealed a core theme of commitment and receptiveness, with Site 3 participants continually demonstrating a less receptive attitude toward SHAPES. (Please refer to Appendix K for the definition of commitment/receptiveness). This partial commitment/receptiveness on the behalf of Site 3 participants was directly reflected in the organisation's uptake and utilisation of SHAPES results on the KUU Scale. Site 3 interviews revealed a more mixed response, and consequently, lower commitment and receptiveness towards the usefulness of SHAPES. Participants indicated the organisation was divided on the relevance of SHAPES evidence. The divide in receptiveness was due in part to the results being more representative of surrounding remote communities,

> *"I would have to say a little bit mixed. The front line staff is very pleased with it especially in our small outlying communities because they have data that is actually very, very local. Our epidemiologist has had some questions… in terms of the data…but the front line staff is really, really appreciating having something that is very concrete that they can take and show to people and it is immediately very understandable"* [Site 3, Participant 1, 13].

As a result, SHAPES appeared to be more relevant and advantageous to the staff at satellite offices within the remote communities versus staff within the main office,

> *"I find it very useful in the fact that there are other surveys that have been done out there…the numbers themselves aren't specific to my smaller community. So this makes it much more accurate so I know who my target audience is and how to focus in, even like age specific, like the grade nine and ten as opposed to the grade twelve."* [Site 3, Participant 5, 60]

This divide in receptiveness was clearly explained by one satellite office participant, *"Because they [main office staff] are based in [name of city], they don't feel that it is a big impact overall for them, whereas because I'm in a smaller community and our high school, we only have the two and that one represents the majority of our youth here, I feel it's very accurate"* [Site 3, Participant 5, 36].

In addition to the mixed response on the relevance of SHAPES, there was some indication that staff did not find the evidence to be "timely" and fit within their current planning cycle, *"We're on a planning cycle that sort of we were finished by the time we got the SHAPES results"* [Site 3, Participant 1, 53]. Also, participants from Site 3 made very little reference to the relative advantage of SHAPES, however there was some affinity toward SHAPES, more specifically, the communication quality of the feedback reports, *"It was easy to comprehend the way it was laid out. I like the graphs and there are certain statistics that were pulled out, you know, the trends in physical activity and tobacco, there was, the issue laid out quite nicely and also liked the school can make the difference section"* [Site 3, Participant 2, 17], as well as observability of the results, *"I think it is a very worthwhile report giving us a snapshot of what's happening with our high school population in the area of physical activity and tobacco"* [Site 3, Participant 2, 9].

Overall, Site 3 demonstrated a mixed receptiveness toward the SHAPES evidence as a result of the organisation's perception of the information. Participants indicated limited relevance and advantage of the information depending on where they were located (main office versus outlying communities). Furthermore, there was some concern regarding the timing of the results not coinciding with organisational planning cycles. Positive receptiveness toward SHAPES included the communication quality of the information as well as the observability of the results.

As previously discussed, Manske's Knowledge Utilisation Framework (2003) indicates the characteristics of the information as an important ingredient for knowledge utilisation. Site 3's perception of SHAPES as being partially relevant and advantageous (more so for the satellite offices) contributed to the mixed receptiveness, mirrored in the organisation's low score on the KUU Scale. Moreover, the mixed receptiveness may have restricted the organisation's commitment to use the evidence. However, it is important to note that the timing of the evidence appeared to be influential on the *current* use of the data (i.e., time of data collection) and may not have been an enduring factor. Site 3 participants indicated the SHAPES results did not fit with their present processes based on when they received the information (didn't fit with their planning cycle). Yet, several participants

who did express some value in the information (e.g., observability and communication quality) indicated potential future use of the evidence.

> *"It certainly provides a snapshot of information for the youth that we have, in this case in a couple of our high schools around the district, so a valuable and useful tool that we hope to implement and use over the next little while… Everybody is looking towards what can we do with this information, what does it mean for us."* [Site 3, Participant 4, 16 & 20]

> "*…as we're coming to a time where we have to think about our operational planning for '08, I can foresee that SHAPES will be on an operational plan for sure for next year"* [Site 3, Participant 2, 156].

Therefore, future examination may reveal a higher degree of SHAPES utilisation should Site 3 find the information applicable or more timely with upcoming planning cycles.

Essentially, the receptiveness and commitment to use evidence is a result of the organisation's perception of the information. In turn, the degree (positive or negative) of receptiveness/commitment can be very influential on the organisation's knowledge uptake and utilisation. In the case of Site 3, the mixed receptiveness resulted in limited commitment to use the information, consequentially minimal uptake and utilisation of the SHAPES results ensued. An organisation's level of receptiveness/commitment is also reflected in the degree of leadership given to knowledge utilisation (see previous case studies). As a result, leadership is an important contextual factor in knowledge use, previously identified by other authors including, Meijers et al. (2006), Estabrooks (2003) and Manske (2001). Further examination of Site 3 leadership, its influence on knowledge use and its association with the core theme of commitment/receptiveness has been outlined in the in the following section.

5.8.2. Emergent Theme: *Leadership*

Evidence of leadership within Site 3 to encourage and initiate the use of SHAPES results was limited. Site 3 leadership (Appendix K), in regards to use of SHAPES, appeared to be at the minimal end of the spectrum. There was some reference to discussing SHAPES, initiated by Site 3 management, but no reference to full dissemination or initiation for utilisation by staff, *"We, myself and another*

manager here at our health unit, have shared this information within our division as well as with other managers in other divisions, both prior to the survey going out and of course now that the feedback report is back" [Site 3, Participant 4, 20].

At the time data (interviews, internal documents and correspondence) were collected, there was no indication of a champion for SHAPES utilisation within Site 3. One manager explained their limited personal use of the data and that frontline staff were considered as responsible for using the information. *"I don't apply them [SHAPES data] that much myself other than perhaps if I'm speaking to someone from a school board, at that level, because I'm not involved in program delivery. In just sort of working with staff who are you know just sort of thinking about plans to implement that data"* [Site 3, Participant 1, 41]. Conversely, frontline staff made reference to waiting for some guidance/leadership, perhaps from management level, regarding how to use the evidence. *"I'm waiting for like I said that official, can we you know, how do we use this information… I try not to think too much on it because until I know what we can use"* [Site 3, Participant 5,464 & 516]. This implied a disconnect between frontline staff and management regarding who was accountable/responsible for leading the utilisation of SHAPES with no one taking initiative. Recent literature does indicate that research uptake will vary across different decision-making levels (e.g., management level versus frontline staff). However, regardless of the level of decision-making, it is expected that uptake will occur at all levels in some fashion to best inform actions (Dobbins et al., 2007). The disconnect between Site 3's organisational levels to use the information and the limited leadership given to SHAPES, along with the minimal receptiveness/commitment, was reflected in the organisation's low score on the KUU Scale. Also, when looking beyond the specific utilisation of SHAPES, there was minimal reference to leadership for evidence-informed practice overall.

By and large, there appeared to be a link between the core theme of commitment/receptiveness and leadership. The mixed commitment/receptiveness toward the SHAPES information may have contributed to the lack of leadership for utilising the knowledge. Additionally, the lack of leadership given to the importance of SHAPES and evidence in general may

have contributed to the less enthusiastic receptiveness or commitment towards the information. This inter-relation was a reciprocal relationship with the two themes influential on one another. The mixed receptiveness and the minimal direction on the issue (i.e., minimal leadership) demonstrated the organisation's limited commitment to use the information. The partial receptiveness/commitment and minimal leadership within Site 3 was mirrored in the organisation's limited application of SHAPES evidence to internal co-ordinated actions. To better understand the role of internal co-ordinated action and its link to previous themes of leadership and commitment/receptiveness, further analysis was conducted. The following section provides insight into the internal co-ordinated actions of Site 3, its influence on knowledge use while validating an association with the themes of commitment/receptiveness and leadership.

5.8.3. Emergent Theme 2: *Internal Co-ordinated Action*

Internal co-ordinated actions were defined as *explicit organisational processes and procedures developed and carried out as a means of facilitating action on a particular issue* (Appendix K). Similar to previous sites, Site 3 used working groups as a common form of co-ordinated action, *"I think they're [working groups] pretty typical…So having that working group allows us to cross program expertise, both tobacco, physical activity, using the health promotion experts as well as the public health nurse to really get to the meat of it"* [Site 3, Participant 4, 96]. However, where Site 3 differed was the limited reference to the direct application of SHAPES to existing working groups as well as little or no apparent co-ordination of internal action to facilitate the uptake and use of SHAPES. It appeared this type of action to facilitate use had not yet occurred within the organisation (to be discussed further in subsequent paragraphs).

In addition to the lack of internal co-ordinated action to use SHAPES, Site 3 displayed weak interactive processes necessary for knowledge utilisation. The interactive processes, such as mutual engagement, joint enterprise and shared repertoire, that grow out of internal co-ordinated actions (e.g., specific SHAPES working group). There was however, a large emphasis on communication

within Site 3 contributing to some degree of interactive processes overall but not specific to SHAPES. This communication occurred at various levels, including management, *"On an organisational basis we have an incredibly integrated divisional management team that work very, very closely together and do not silo the programming"* [Site 3, Participant 1, 297], as well as at the level of program staff, such as public health nurses, *"We have people from three or four different teams but are working together kind of on one project and it's a lot of informal communication"* [Site 3, Participant 1, 297].

Site 3 having a strong emphasis on communication was due in part to the how the organisation was structured. Due to Site 3's large geographical service area it required several satellite offices to service more remote locations. This resulted in Site 3 needing resources that enable ongoing communication between staff that was more cost efficient than travel expenses associated with face-to-face meetings. Site 3 relied on technology for knowledge exchange and communication across offices. As one participant explained, this was a necessity to overcome geographical barriers, *"We also have meetings with our coworkers as well. On a weekly basis, we have a teleconference with them. The other youth advisors just like to update them and go through everything"* [Site 3, Participant 3, 84]. This also had implications for exchanging knowledge with external partners,

> *"We also have monthly video conferences with all of the clusters in our region. As we are really spread out, it's very hard to get together, so we've got area coalition video conferences which last a couple of hours once a month. So it's a lot of communities so it's pretty elaborate. That's sort of disseminating information as well as updating everyone else"* [Site 3, Participant 3, 100].

These statements demonstrated that communication processes allowed for mutual engagement within the health unit (i.e., quote Site 3, Participant 3, 84) as well as with external parties (i.e., quote Site 3, Participant 3, 100). Furthermore, planning meetings with satellite offices allowed for joint negotiation of programs for implementation that fit within the context of the service setting,

> *"In the main office the programs develop, like individual programs where there would be substance abuse or physical activity, tobacco, healthy eating; we develop mandated programs and then we have planning meetings with the branches to see how and even if they're able to bring those programs into their areas, whether they have the capacity, where there's a fit for their respective communities"* [Site 3, Participant 2, 94].

As a result, overcoming geographical limitations required additional resources of Site 3 (i.e., technology) as well as more time consuming planning processes and man power to ensure incorporation of appropriate staff across all health unit offices,

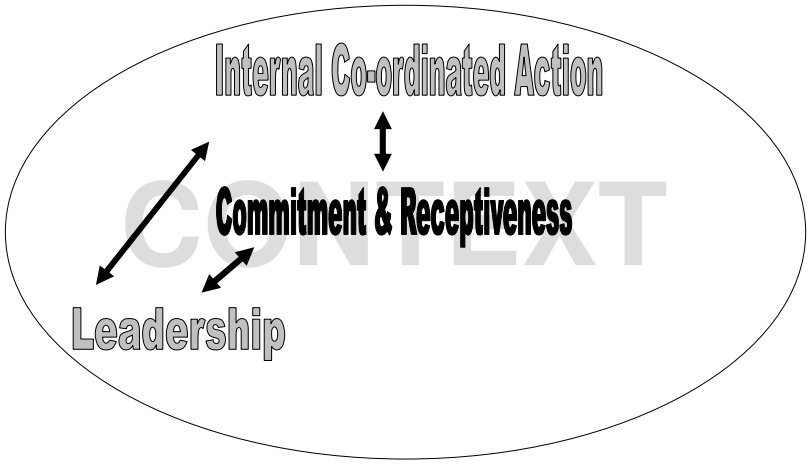
> "*You know, the whole thing of isolation and distance because you have to travel there but although the planning could happen via internet or teleconferences, all those things, but if the activities we choose require more hands on and more action on their parts and they may require more human resource people to assist them that would be challenging"* [Site 3, Participant 2, 106].

The added element of organisational sprawl (i.e., numerous offices) contributed to a more complex system of knowledge exchange among the staff of Site 3. Though the data for Site 3 did provide instances of mutual engagement and joint enterprise (non-specific to SHAPES), it did not reveal any prominent instances of shared repertoire, (i.e., no reference to development of shared resources/tools etc.). Furthermore, the data did not reveal examples of interactive processes specific to SHAPES utilisation. According to Wenger (1998), all three elements (mutual engagement, joint enterprise and shared repertoire) must be present for a Community of Practice to grow, exchange and utilise knowledge. The limited development of interactive processes may have impeded the application of SHAPES evidence to existing internal co-ordinated action (i.e., working groups). Moreover, the complex communication processes within Site 3 required more thought and effort given to the dissemination of SHAPES knowledge across the organisation. Even though Manske's Knowledge Utilisation Framework does not consider interactive processes as a contextual factor, they are still important elements of the overall knowledge utilisation and exchange system within an organisation. The interactive processes grow out of and are influenced by contextual factors including the internal co-ordinated actions conducted by organisations. Therefore, the organisational contextual factors have implications for the degree of interactive processes essential to knowledge utilisation. This was evident in the health unit with high knowledge use (Site 1), with strong internal co-ordinated actions contributing to a community of practice incorporating all interactive processes (i.e., mutual engagement, joint enterprise, shared repertoire etc.). With respect to Site 3, the more limited

interactive processes were a reflection of the organisation not applying SHAPES to internal co-ordinated action.

The lack of internal co-ordinated action to use SHAPES within Site 3 was partially the result of limited leadership to disseminate and encourage knowledge use. Furthermore, the less receptiveness and commitment to use SHAPES was evident in the restricted application of the information to internal co-ordinated action. Overall, Site 3's partial receptiveness limited the organisation's commitment and leadership given to SHAPES utilisation, effectively limiting the application of SHAPES to internal co-ordinated action. The links between all three themes has been depicted in Figure 8 below.

Figure 8: Site 3 Linkages Between Commitment/Receptiveness, Leadership & Internal Co-ordinated Action



It is important to note that Site 3's limited use of SHAPES was a reflection of organisational knowledge use at the time of data collection. The level of knowledge use specific to SHAPES uptake may evolve over time and future examination may reveal a higher score on the KUU Scale through increased receptiveness/commitment, leadership and application of SHAPES to internal co-ordinated

action. This notion was supported by further examination of Site 3 data revealing that participants indicated the organisation was potentially progressing toward the utilisation of internal co-ordinated actions to facilitate SHAPES use. At the time of data collection, Site 3 had not applied SHAPES evidence to internal co-ordinated action but did express how the evidence may help to guide future efforts, *"And I think it does point out new areas and because it's quite specific one of the things we are able to say to ourselves is look for an item or something that really surprised you and maybe go from there"* [Site 3, Participant 1, 61]. As a result, the organisation had begun to take steps to facilitate a strategy resulting in an internal co-ordinated action for using SHAPES,

> "*I'm thinking about the results and our next step is to share the results with internal stakeholders and come up with a plan internally here before we go to the schools or to the community… It would be our epidemiologist, the school nurses, and the tobacco people and my partner… I think the internal stakeholders are trying to see where the fit might be into existing initiatives already"* [Site 3, Participant 2, 82 & 90].

This statement clearly demonstrated that Site 3 was undergoing orientation to the information by trying to determine the best use of SHAPES. There was also an indication the organisation was shifting into a "preparation" phase which was defined as a "state in which the user is preparing for first use of the innovation" (Skinner, 2007). This preparation included an initial meeting of key staff members,

> "*Our health unit is just within the last couple of weeks in a formative stage together, a group of two managers, a couple of health promotion planners, a public health nurse who is in my youth advisor team, to come up with a unified strategy for our health unit to act upon the data. We've had one formative meeting…we've just basically pulled the group together"* [Site 3, Participant 4, 72 & 100].

Furthermore, the organisation had begun the process of determining the appropriate staff to be involved in a SHAPES working group, *"Now we've sort of brainstormed who are the most appropriate people to have on our committee to take the information, apply it to what we want or need to do at our health unit and carry it out"* [Site 3, Participant 4, 88].

The efforts made by Site 3 to orient and prepare themselves to use SHAPES may have partially resulted from what appeared to be a shift in organisational culture with an emphasis on evidence-informed planning. One Site 3 participant indicated the organisation had recently developed

a plan that places prominence on evidence-informed practice. This plan will eventually result in a formal policy requiring staff to utilise available evidence in their program planning and implementation.

> *"We have done an organisational strategic plan over the past number of months and that information is starting now to roll out to staff and one of the goals is to use evidence-based practice and policy and to find best practices out in the community… it's definitely going to be the next three to six to maybe nine months before there are sort of formal policy and practice documents put together for the strategic goals that have been created…that it is a strategic goal of our health unit to ensure the use of evidence-based practice and research information and develop best practices for program implementation. So that is something that we certainly… will be carrying forward in the future. SHAPES fits into that very nicely."* [Site 3, Participant 4, 186 & 198 & 523]

As a result of the prospective internal co-ordinated action for SHAPES as well as the progression of organisational policies supporting evidence-informed practice, future analysis may reveal these actions help to cultivate a leader(s) encouraging knowledge utilisation and potentially improve the organisation's commitment and receptiveness to utilising the SHAPES and other evidence in their program planning and decision making. Nonetheless, during the current study there did not appear to be extensive commitment/receptiveness and leadership to use SHAPES, which was reflected in the lack of co-ordinated action to facilitate uptake and use.

Though Site 3 participants indicated future development of internal co-ordinated action for SHAPES, consideration was given to the delay in these processes which may have been the result of "timing" of the information. Previous analysis revealed participants from Site 3 found the SHAPES results did not coincide with their planning cycle. Site 3 may have delayed processes until the information fits with their planning cycle, preventing full use of the results at the time of data collection and contributing to the low knowledge use score on the KUU Scale. As discussed during the core theme of commitment and receptiveness, the timing of the data may have been better suited to prospective planning cycles. In turn, this may increase the receptiveness toward the information in the future and ultimately increase their level of SHAPES utilisation.

5.8.4. Emergent Theme 3: *History of Prior Knowledge Use*

Similar to previous cases, Site 3 also displayed a history of prior knowledge (Appendix K) as demonstrated in the following participant's statement, *"I go to PARC website and they've got pretty good stuff there. I'll go use our librarian, we'll use the Health Unit people here like our epidemiologist and look at all the most recent reports and I also am part of many ListServ's and I try to keep up with the latest research that way"* [Site 3, Participant 2, 181]. Previous knowledge use was also illustrated through one participant's reference to the use of credible scientific literature.

> *"I can throw a number of different sources up: what other health units have done, what other allied profession healthcare partners may have done… sometimes international data and studies depending on the relevance and timeliness, whether or not it has been peer reviewed, whether the evidence or the data has been scrutinized by other organisations and other ethics boards…What we don't look to do is type in on Google and find out what comes out. We do look at a couple, RNAO always a great place for best practices, that's one more typical area or locations we would look."* [Site 3, Participant 4, 202]

This previous quote highlights some of the more scientific sources of information utilised by Site 3, however it also reveals an emphasis on the experiences of others (e.g., other health units) and tacit knowledge. The application of experiential and tacit knowledge within Site 3 appeared to be very important in the organisation's program development and implementation with external clients, such as schools. In fact, the processes within Site 3 were set up in a way that elicits knowledge from other staff members, specifically those with experience in working with schools.

> *"Once the content and the basic messages are developed, then they will meet usually with the school team to talk about okay, how do we make this actually work in schools. If it's a peer led, the public health nurses will have a look at it and say this will work, this will work, this will work, this one probably would be better if we did it this way… So the public health nurses who work with schools have a good expertise at what actually works, what kind of peer led things work, how they have to work differently with peer leaders."* [Site 3, Participant 1, 225 & 221]

The reliance on experiences of health unit staff was important in informing the direction and implementation of health unit programs and services. This enabled Site 3 to adapt to the external context of schools/school boards. Furthermore, staff indicated scientific evidence did not always fit within the settings of those the organisation services, *"Some of the stuff that comes from certain areas where they have very heavily clinical school services don't translate to Ontario very well because we*

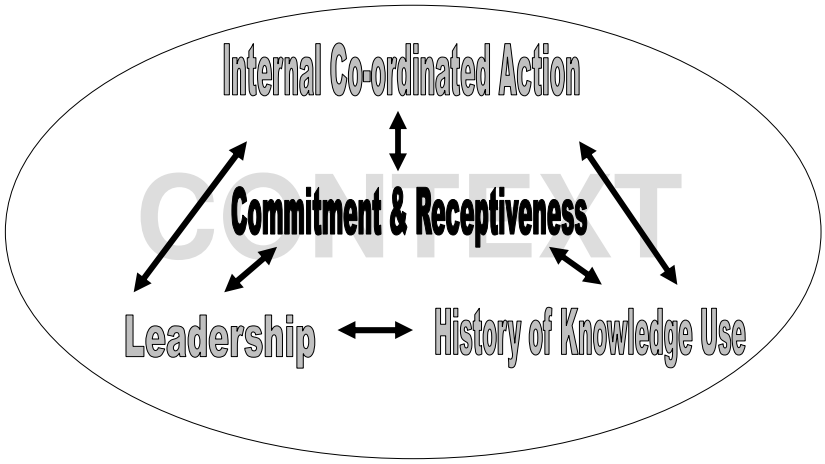
generally don't have that. So they need to have worked in a situation that the school can visualize replicating" [Site 3, Participant 1, 117].

In general, Site 3 used a combination of information to inform their programming, including scientific evidence, experiential and tacit knowledge via staff experiences as well as the experiences of other relevant organisations. The use of available evidence, such as best practices, helped to provide guidance and direction to Site 3 programs and services, *"…but before we go out and try to reinvent the wheel. So we would always in our practice try to see what do we want to do, is there some practice out there that others have done and would you know prove credible and an opportunity, a direction for us to follow."* [Site 3, Participant 4, 182]. However, participants from Site 3 also indicated the application of recommended/best practices required consideration of how well the practices worked within the external environment they were serving, *"…how can we try to not reinvent the wheel so we go through, let's say, what provincial programs are available out there that have been proven to be our recommended practice or our best practice and whether and if we can implement them here"* [Site 3, Participant 2, 244]. The large emphasis on adaptation to the external environment had influenced the use of evidence within the organisation. One participant explained how the need to adapt to school environments impeded the use of best practices, *"And you know, so what we're trying to do is provide things that really support their [schools] curriculum but you can wind up, because you really want something to work in a school environment operationally, you can wind up forgetting what the best practice is"* [Site 3, Participant 1, 289].

Overall, Site 3 placed greater emphasis on experiential and/or tacit knowledge and the adaptation of information to external contexts and as a result, it appeared the external environment was influential on Site 3 and their application of knowledge. Site 3's previous history of knowledge use indicated the importance of the external environment impeding the application of knowledge to internal co-ordinated actions. That is, knowledge may not have been applicable if it was not adaptable to the external context, therefore limiting what the organisation was receptive toward and committed to using. The less receptiveness and commitment toward the information contributed to

limited leadership and initiative to develop internal co-ordinated actions facilitating uptake and use. Furthermore, previous discussion on the lack of leadership for knowledge utilisation may have contributed to limited emphasis on the use of explicit evidence in program planning and decision making which may also have affected the level and uptake of scientific knowledge, such as SHAPES. The link between all four themes is illustrated in Figure 9.

Figure 9: Site 3 Internal Core & Emergent Theme Linkages



In summary, the previous history of knowledge use within Site 3 revealed a pattern of adapting knowledge to the external environment of clients when developing programs and making decisions. This revealed the influence of external contextual factors on internal context. An examination of external contextual factors was necessary to understand influences on internal processes and knowledge utilisation. The subsequent section outlines the external contextual factors influential on the internal context of Site 3.

5.8.5. Emergent Theme 4: *External Contextual Factors*

Site 3's large emphasis on adapting knowledge to external environments indicated an influence of external contextual factors (Appendix K) on the internal context of the organisation. The data from Site 3 revealed several external contextual factors influential on the internal processes of the health unit with implications for the organisation's use of knowledge. The noteworthy external contextual factors relative to Site 3 included external relationships, external mandates and priorities and external processes and procedures.

5.8.5. A: *External Relationships*

Throughout the analysis it became apparent that external relationships (Appendix K) had enabled Site 3 to work with local schools to implement health promotion programming. The external relationship between Site 3 and their local school boards for the most part appeared to be a positive association, *"We have been very, very well received in most of the school boards, and that opens the doors quite wide for implementation with the principals at the school level"* [Site 3, Participant 4, 290]. The external relationship between Site 3 and school boards was an important factor, influential on internal processes within Site 3 and the organisation's ability to utilise knowledge. This relationship also had implications for the organisation's capacity to utilise SHAPES in the future.

> *"Well, I'm thinking that if there is an urgent issue that they feel they need to get help and assistance we're probably the first ones that they call…. it's a good thing that they see us a good resource, a reliable resource. That will help with the SHAPES I think that they see us as a credible source of information"* [Site 3, Participant 2, 340].

In the case of Site 3, there was heavy emphasis on allowing schools to indicate their needs and wants which ultimately determined what programs the health unit provided.

> *"We have a good relationship I think with our schools as much as they want it to be. It's very much a school driven kind of thing. Some schools are very, very involved in our programming. Others are you know a little bit more, you know it's not a priority for us right now, so we let them drive that process"* [Site 3, Participant 1, 197].

This resulted in a more passive process of engaging schools and had implications for the type of information shared and whether it was relevant or not. Consequently, schools needed to indicate an

interest in tobacco or physical activity in order for SHAPES to be shared and utilised, *"…we work with the school on what they want to work on. So if a school were to pick tobacco or physical activity, the SHAPES data would certainly be helpful in supporting that"* [Site 3, Participant 1, 81]. This passive method that relied on schools to drive the process may have been another factor as to why Site 3 had a lower KUU score and did not fully utilised the SHAPES results.

In order to maintain the external relationship, Site 3 conformed to the external processes outlined by school boards and schools. By adapting to the processes and needs of external clients, the health unit was able to establish trust within the working relationship. As one manager explained, the internal processes within Site 3 demonstrated respect for the external needs and processes of school boards,

> *"If it's a new program or something that's very different, we would certainly want to make sure that the boards are aware of it, A) to get their support and permission for us to approach the school, and B) if it is something that they, the board themselves, may have some questions on, we want to make sure that we've actually gone through the proper steps"* [Site 3, Participant 4, 286].

As a result, this had enabled a strong relationship with the school boards which was nicely summarized by a Site 3 participant, *"It is such a routine practice now that the board typically gets back within the day and says yep, it looks wonderful, you guys are great partners, go for it"* [Site 3, Participant 4, 278]. Over time, the routine processes had developed a "typical" method of conducting work between the school board and Site 3. Through this history of working together, the schools were aware of the services offered and what to expect of the health unit with respect to a trusting, open relationship,

> *"…they [boards] know that we produce quality programming and that if there is something that there may be a bit of a red flag about, that we actually usually call them and say you know what do you think about this because it's something that is kind of on the edge of whether they would approve it or not"* [Site 3, Participant 1, 185].

Additionally, maintaining trust within the relationship required acknowledgement of the external context of schools/school boards. Therefore, Site 3 had to be cognizant of the parameters placed on schools/school boards. …*"if the school is really struggling with a particular issue that's really*

impacting their school, to really see that from their point of view. Like if they've got a huge problem in September with busing then this is not the time to talk about renovating the cafeteria" [Site 3, Participant 1, 321]. Consequently, the large emphasis on meeting school board/school needs and contexts could impede Site 3's knowledge uptake and utilisation. As one participant explained, regardless of the evidence it came down to what the school wanted, *"Yeah, because you're often thinking about operationally what works and operationally what works really has to have the support of the school. A lot of what the school would like us to do is not evidence based and in fact the evidence is the contrary"* [Site 3, Participant 1, 273]. The adaptation to school needs/contexts was also evident in earlier discussion concerning Site 3's previous history of knowledge use which revealed a reliance on tacit knowledge that was adaptable to external contexts. Once again, this validates the influence of external characteristics on internal context.

In an effort to maintain a positive association with schools/school boards, Site 3 had developed a specific school team that enriched the relationship at the individual school level. The school health team followed a comprehensive school approach described by one participant as,

> *"…the school community coming in together and identifying an issue and working towards moving that issue forward. So you could say like physical activity or the kids are really are not eating healthy is this an issue? Then you come together and you develop awareness activities curriculum-based initiatives, physical or social kind of environment supports and it involves the whole school, the parents, the kids"* [Site 3, Participant 2, 277].

As part of the comprehensive school approach, the school health team included public health nurses linked to several different schools to provide health programming services while creating a bridge between the health unit and the local school community. Through the nurses' contact with schools, they were able to identify school issues and needs with respect to health concerns among the student population,

> *"Their job is to go into the school and talk to the school about what their health issues actually are and what they perceive those issues to be. So they could be physical activity. They could be drug use. They could be bullying. They could be nutrition, but it's what the school community is identifying. They try to talk to principals. They try to talk to teachers, parents, kids. They try to get some sort of an idea of things that schools would like to work on"* [Site 3, Participant 1, 73].

As part of the process, other health unit staff recognized the value of the nurses' link with schools, *"We work with the school nurses to plan and then co-implement and evaluate the programs. So they have a pulse of the school. You know, they're the ones that build the relationship with the schools and they try to promote the programs from the Health Unit"* [Site 3, Participant 2, 277]. Site 3's use of a school health team had helped to develop a relationship with schools however it is important to recognize that the process was still driven largely by the schools and what they wanted/needed, in turn potentially limiting the evolution of Community of Practice with a shared enterprise/goal among both all stakeholders (health unit and schools). Though such a relationship has implications for knowledge utilisation by the health unit, building and maintaining the relationship was essential to meeting the organisational mandates and priorities of Site 3. As part of the relationship process, Site 3 often attempted to meet external client needs. In order to fully understand these needs, Site 3 was cognizant of the external mandates and priorities of schools and school boards. The role of external mandates and priorities and its influence on internal processes and knowledge use has been outlined in the following section.

5.8.5. B: *External Mandates & Priorities*

In the case of Site 3, the external mandates and priorities (Appendix K) of the local community as well as the schools/school boards was very influential on internal processes and knowledge utilisation. Site 3 placed a large emphasis on the priorities of the local community including local concerns and issues that were deemed more important than addressing the health issues promoted by the health unit, *"So I think it all depends on local economy. It depends on the state of the community itself, what other factors are going on"* [Site 3, Participant 4, 31]. This has been acknowledged by previous literature recognizing the role of community factors impacting organisational decision-making (Lewis & Seibold, 1993; Utterback, 1974, as cited in Dobbins et al., 2002). As a result, community concerns and priorities were very influential on the dissemination and uptake of

information, with implications for the knowledge Site 3 was able to utilise. One participant from Site 3 described the role of public opinion and its influence on knowledge use.

> *"Outside of SHAPES specifically, there may be more or less of a community appetite for specific data or specific information at specific times…The smoke free legislation, having come out basically a year ago this month. A year ago versus now there may be more appetite for surveys and studies and evidence-based information to come out then there would have been prior to legislation and prior to the implementation of the Smoke Free Ontario Act"* [Site 3, Participant 4, 214].

This statement implied the timing of public priorities with health promotion efforts was crucial to the dissemination and uptake of knowledge. As illustrated by Site 3 staff, the timing of public priority may help with future application of the SHAPES data,

> *"Right now there is between the Smoke Free Ontario Act coming into place last year and the new emphasis in the schools on daily physical activity, it is very timely because people have a real interest in the whole area of healthy weight, particularly as it applies to children…I think that it [SHAPES] will give some valuable data because there is a movement on to lobby the province about putting a second mandatory phys ed. credit into the secondary curriculum. So I think it will be useful for that"* [Site 3, Participant 1, 25].

The influence of community priorities was not only influential on the health unit but other organisations as well. The priorities of the local population were influential on the mandates and priorities of schools/school boards within that community. Circumstances within local communities had implications for the numerous issues schools addressed which often took precedence over health promotion programming.

> "*It can also be what is going on in your community at a given time. If there is sort of a significant trauma of some kind or other going on in the community, and that can be things like your major employer that really drives the town shuts down. You know suddenly physical activity and tobacco really takes a bit of a back seat to all the mental health issues and stuff that are going on. So you're working more at trying to really support the students and support the schools in a sort of a mental health kind of way…it really influences what the school's priorities are…"* [Site 3, Participant 1, 333 & 345]

As a result, the priorities of the local community and schools/school boards had implications for the information Site 3 was able to utilise and disseminate. A participant from Site 3 demonstrated how meeting the needs and priorities of external partners limited/impeded the application of evidence, *"…so you have to meet their needs and sometimes that doesn't allow you to work with the information that you've been given…I mean, you can go as far maybe go on media release and just*

build awareness about it" [Site 3, Participant 2, 228]. Furthermore, external priorities influenced the health unit's ability to work with and engage schools, *"Well because if the Health Unit coming and say, hey, look at this. But if that's not their priority, if they're not really interested or maybe they don't have the capacity to implement whatever we say, hey, look at this, we can do this and that and they say, well, we can't do that"* [Site 3, Participant 2, 206]. Ultimately, this required Site 3 to adapt to the external mandates and priorities of schools and school boards, *"They have to be fairly simple because schools right now, a lot of their focus is literacy and numeracy so we have to find things that don't take a huge amount of school time. If they can enhance literacy and numeracy, so much the better"* [Site 3, Participant 1, 117].

In essence, the external mandates and priorities of the local community and the schools/school boards were very influential on the dissemination and uptake of information by external partners and community members. Moreover, external priorities had implications for the type of information Site 3 was able to utilise in their program planning and decision-making processes. Further examination of Site 3 also revealed a similar adaptation to external processes and procedures which has been described in the following section.

5.8.5. C: *External Processes & Procedures*

Reminiscent of the previous case studies, the internal processes of Site 3 were influenced by the formal processes and procedures established by external partners. External processes and procedures were defined as *specific process and procedures, e.g., policies and protocols, developed and implemented by external parties/organisations* (Appendix K). Several Site 3 participants clearly demonstrated conforming to external processes and procedures, such as school board approval, in order to work with and engage local schools.

> *"If we are going to work on a specific program with the schools or offer something to the schools, we go through a process called School Board Approval where we send basically information about the program or project or whatever we're doing to the school board and get their approval to take it out to their schools."* [Site 3, Participant 1, 77]

> *"If there are any new resources or programs that we want to bring to the schools then the new thing that we developed is a Board approval process. So we don't just email or mail things, drop things on the desk of the principals or the teachers. We give a sample to a board contact and they approve yes, go ahead with this, it's been board approved. So we know that it's not going to end up in a (inaudible) that it's not going to sit on a shelf or end up in the garbage."* [Site 3, Participant 2, 282]

> *"Generally, if we're going to be doing an activity or initiative in the school, a month ahead of time approximately we will submit a request to the school board and have them okay it. It will also be discussed with my manager to make sure that it doesn't reflect poorly in any way on the health unit and that everything will be alright from this end."* [Site 3, Participant 3, 48]

At the individual school level, there appeared to be another approval process, typically controlled by individual principals, *"Well, usually it's the principal. They're the gatekeeper. If they believe that health is important, health and learning go hand in hand, you know, that whole personal value is detrimental whether something will happen in the school or not"* [Site 3, Participant 2, 316]. The approval processes at the school level varied in formality. This variation in formality was partially tied to the external context of small local communities, acknowledged by participants, *"…because we're a small community, they know us and it comes down to the principal's decision so a lot of times they'll let us go in and do stuff"* [Site 3, Participant 5, 104]. However, this less formal relationship, acknowledged by other staff, also recognized that board level approval was still the preferred protocol, *"…often the schools can decide on their own depending on the type of project if it's okay but I think that they generally prefer it if they have school board approval first, although we have been able to sneak around that from time to time if it's more of a low key project"* [Site 3, Participant 4, 60].

The need to follow school board and school approval processes had resulted in Site 3 adapting what appeared to be a more "passive" approach that relied on the schools to spearhead or "drive" the process, *"The whole project really has to have commitment from the school and it has to be sort of school driven. They have to feel whatever we're proposing is going to work in their school"* [Site 3, Participant 1, 101]. The more passive approach was reflected in the organisation's internal process for seeking board approval, which was simplistic and did not readily include face-to-face engagement. One participant explained the organisation's internal process to seek approval.

> *"…we actually send them copies of everything we're going to do, like letters or posters or whatever we're going to do and it goes attached to a memo. It has the key contact person from the health unit for that program on the memo. All they basically do is check off the boxes and sign the memo and fax it back to us."* [Site 3, Participant 1, 149]

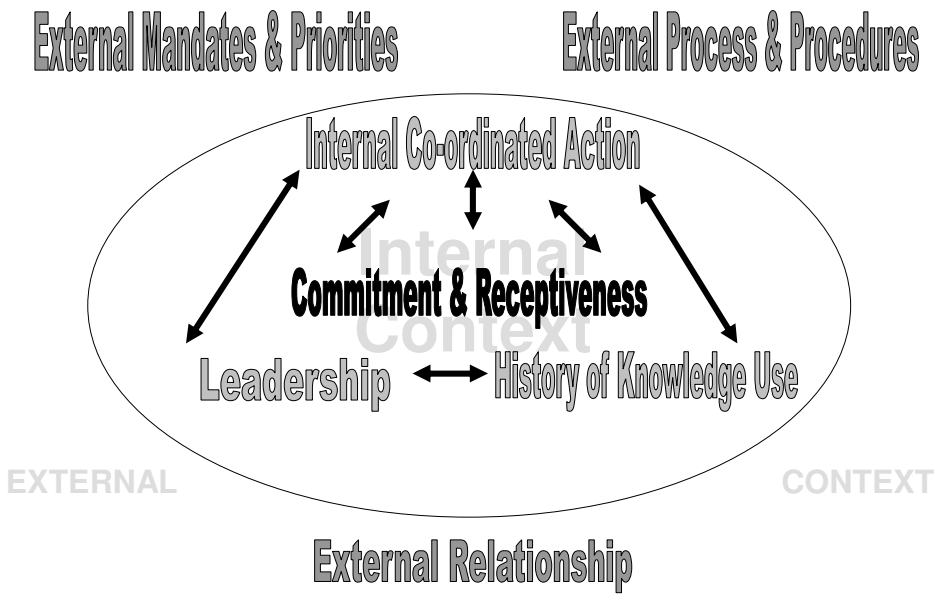
This more passive approach may have provided a means of working within restricted resources. Site 3 data revealed the organisation provides services to over 10 school boards within a vast geographical area. The large number of school boards may have created a need for a more simplistic less resource intensive method of gaining approval/access. However, this form of engagement had implications for knowledge utilisation. The use of a "memo system" did not necessarily provide an opportunity to discuss or outline evidence supporting the need for health unit programs and services, especially when the use of SHAPES/other evidence may have been beneficial in seeking board approval while also bringing conceptual awareness to issues of tobacco use and physical inactivity among youth. This demonstrated Site 3's internal processes were adapted to meet external processes (i.e., approval) but do not lend themselves to knowledge utilisation due to required adaptation to external characteristics such as overcoming large geographical barriers and resource limitations. Ultimately, this may be another contributing factor to the organisation's low score on the KUU Scale

Overall, Site 3 had adapted to external processes and procedures in order to gain school/school board engagement, including the use of a more passive system (e.g., memo) for engaging external stakeholders, such as school boards. Unfortunately, the data for this particular study did not provide details regarding the nature and number of meetings/communications the health unit had with school boards/schools to draw a clearer picture of how passive (or how active) Site 3 was with respect to engaging schools/school boards. What is clear is that Site 3 was using these approval processes as a means of building a relationship and maintaining communication with school boards/schools.

In summary, the external contextual factors had ultimately required Site 3 to conform to external processes and procedures while also taking external mandates and priorities into consideration in an effort to maintain a strong external relationship. It is clear that external contextual

factors played a role in the knowledge utilisation internal to Site 3, however, the degree of influence of these external contextual factors as well as how the external factors inter-relate was not clearly defined. The data collected for this particular study focused on internal contextual factors with some indication of external contextual factors. Therefore, the level of influence and association between contextual factors could not be visibly explained. The following Figure 10 outlines the external contextual factors influential on internal context.

Figure 10: Site 3 Internal & External Contextual Factors



5.9. SITE 3: Summary

There were several internal and external contextual factors influential on knowledge use specific to Site 3. The core contextual factor of commitment and receptiveness was associated with other emerging themes of leadership, internal co-ordinated action, and a previous history of knowledge use. Overall, Site 3 had mixed receptiveness/commitment toward SHAPES as well as limited leadership and internal co-ordinated action, resulting in less uptake of the SHAPES evidence. Additionally, the data also demonstrated an influence from external contextual factors on the internal context and

knowledge use within Site 3. Even though Site 3 had achieved a lower score on the KUU Scale, it is important to acknowledge that Site 3 demonstrated prospective use of the SHAPES data. Additional future data collection may reveal an increased uptake of SHAPES results within Site 3.

The following final results section outlines a comparison of internal and external factors across all three case studies in an effort to highlight similarities and divergences between cases while providing greater insight into how context influences knowledge use in Ontario public health units.

5.10. Cross Case Comparison

From the results described in the previous sections, internal and external contextual factors influential on knowledge use were identified. To further understand how these factors were influential and inter-related a cross case analysis was conducted. By examining the similarities and divergences across health units with varying levels of knowledge use we gain further insight into the degree of influence each factor had on knowledge utilisation while validating inter-relations between factors. Furthermore, comparing across sites helped to delineate the internal and external factors of Ontario health units while indicating the role they played in facilitating and/or impeding knowledge use in public health practice. The following Table 4 provides a summary of the main internal contextual factors influential on SHAPES utilisation by site. The core theme for each site has been indicated in bold font.

Table 5: Summary of Internal Contextual Factors Influential on Knowledge Use across Sites

Site 1: High KU	Site 2: Moderate KU	Site 3: Low KU
+ve commitment & receptiveness	+ve commitment & receptiveness	**Partial commitment & receptiveness**
+ve leadership	**+ve leadership**	-ve leadership
+ve internal co-ordinated action	partial internal co-ordinated action	-ve internal co-ordinated action
+ve organisational mandates & priorities	+ve organisational mandates & priorities	n/a
+ve history of KU (scientific/experiential)	+ve history of KU (scientific/experiential)	+ve history of KU (scientific/experiential)

The table illustrates the varying degrees of each internal factor within the individual sites. For example, a site demonstrating positive/strong commitment and receptiveness toward evidence/SHAPES was indicated with a "+ve". Conversely, a site with mixed commitment and receptiveness toward evidence/ SHAPES was indicated with "partial", no or little commitment/receptiveness was marked with a "-ve".

5.11. Cross Case Comparison of Internal Factors

In order to compare the internal factors illustrated in Table 4, the following subsections compare each factor individually across all three sites. This evaluation assisted in understanding how each factor contributed to individual organisational knowledge use scores while comparing to the other sites examined.

5.11.1. Cross Case Comparison-*Commitment & Receptiveness*

The internal contextual factor of commitment and receptiveness (definition available in Appendix K) was a common theme across all three sites, especially with respect to Sites 1 and 3 identified as the core theme for both organisations. When comparing sites, Sites 1 and 2 continually demonstrated a very positive attitude toward SHAPES and the usefulness of the information provided, "*it's certainly giving us a good starting point to begin the proceeding with our schools and our students and for the staff too give a sense of where they're starting from and hopefully what, what, what their goals might be to, to have some impact* [2A: 35]. Furthermore, Site 1 and 2 participants viewed the SHAPES evidence as advantageous over other sources of information (i.e., relative advantage) due to the local nature of the data. As a result, Sites 1 and 2 had a strong receptiveness toward the information but varied in their level of commitment to use the information through the application of internal co-ordinated actions (i.e., Site 1 employed a specific SHAPES working group versus Site 2 applying SHAPES to existing working groups). With respect to the third case study, Site 3 was less receptive to the SHAPES information which varied from the strong receptiveness and commitment of Sites 1 and 2. In turn, Site 3's partial receptiveness was reflected in the organisation's limited commitment to

utilise the SHAPES results. The partial receptiveness on behalf of Site 3 was a result of many staff indicating the information may be more applicable to satellite office staff in the outlying communities versus staff at the main office, *"this report is a little bit different because most of the research was done in our branch offices so in a way it's good but in another way it is a little more"* [2F: 69]. As a result, receptiveness varied by location; however, superseding "authority" laid within the main office which had limited receptiveness/commitment and therefore may have contributed to the lack of action on behalf of Site 3. There were also limited instances of how SHAPES was relevant and advantageous over other sources of data. Previous studies examining knowledge utilisation have often emphasized the importance of the characteristics of the information, such as timing, relevance, relative advantage, observability of the results and so forth (Rogers, 1995; Lamari et al., 2001; Manske, 2001; Dobbins et al., 2002; Jacobson et al., 2003). As a result, the partial receptiveness due to lack of relevance and advantage of the information may have contributed to the lack of commitment to use the data, contributing to the organisation's lower level knowledge use on the KUU Scale.

Another area of contrast between sites was the relevance of the information to organisational mandates and priorities. Both Sites 1 and 2 expressed how the evidence/knowledge was in line with the organisation's efforts to engage and work with external organisations. They viewed the information as very relevant and useful in relation to their mandate to work with key external parties such as schools and school boards, once again contributing to the higher degree of commitment and receptiveness to use the information by both sites. However, Site 3 did not indicate that the information was in line with organisational mandates and priorities and therefore, may have contributed to the limited relevance of the information which was demonstrated in the lesser degree of receptiveness and commitment.

In general, when comparing the level of commitment and receptiveness across all three sites, it seems the degree of receptiveness and overall commitment to use the information was directly reflected in the organisation's results on the KUU Scale. The health units with high and moderate

knowledge use demonstrated extensive and moderate commitment/receptiveness respectively. Accordingly, the health unit with the lowest knowledge use also had the least commitment and receptiveness to use the information. This indicated the strong role commitment and receptiveness played in knowledge use. Higher degrees of commitment and receptiveness aided in facilitating uptake and utilisation. On the other end of the spectrum, less commitment and receptiveness to use the information impeded or contributed to less knowledge uptake and use.

5.11.2. Cross Case Comparison-*Leadership*

Like commitment and receptiveness, the notion of leadership was another prominent theme across all three sites, especially Site 2 with leadership representing the organisation's core theme. Leadership (Appendix K) ranged from extensive to minimal in accordance with each site's score on the KUU Scale.

Site 1 demonstrated the most extensive leadership across levels and programs with numerous instances demonstrating the organisation's initiative to use SHAPES results and other evidence in general. Site 1's initiative to use research data/SHAPES had contributed to an implicit expectation to provide evidence in organisational decision making processes and justification for actions pursed, suggesting a "culture" of knowledge utilisation. The extensive leadership within Site 1 was also clearly illustrated in their actions taken to facilitate the use of SHAPES via internal co-ordinated action (to be described further in the following subsection). As a result, the strong leadership and organisational culture supportive of knowledge use was seen in the organisation's high achievement on the KUU Scale.

Site 2 also demonstrated strong leadership to utilise SHAPES but the majority of this leadership was facilitated by an individual staff member or SHAPES "champion". The sole SHAPES champion was regarded by their coworkers as very influential and pivotal in the dissemination and uptake of SHAPES within the organisation. However, when compared to Site 1 there was less extensive leadership from across organisational levels and across programs in Site 2, illustrating a

difference in the level or degree of leadership between Sites 1 and 2. The degree of leadership may have been a contributing factor to overall knowledge use, such as the more extensive the leadership (i.e., more than one person) the higher the knowledge use as demonstrated by Site 1, where as more moderate leadership within Site 2 contributed to a more modest knowledge use score.

With respect to Site 3, there was little reference to leadership for evidence-based practice or more specifically initiative to use SHAPES. In fact, the lack of leadership left staff unsure as to how the information was to be utilised, *"I think we're waiting because it's so new and what exactly we can do with it"* [5F: 88]. Site 3 had a more partial commitment/receptiveness toward SHAPES information which may have contributed to a lack of leadership. Additionally, the lack of leadership given to the importance and uptake of SHAPES and evidence in general contributed to a less enthusiastic receptiveness/commitment to use the information. The reciprocal relationship between leadership & commitment and receptiveness was previously discussed in Site 3's findings, demonstrating a strong link between these two themes. Ultimately, the leadership within Sites 1 and 2 was directly reflected in both organisation's commitment and receptiveness toward the use of the information and evidence in general, in turn the strong receptiveness and commitment to use the information had lead to leadership and initiative to use the results. In the case of Site 3, less commitment and receptiveness lent itself to limited leadership, in which little initiative and leadership to use the results decreased the commitment/receptiveness to utilising the information. Based on the comparison of leadership/initiative across sites, it appears the varying degrees of leadership were influential on knowledge use scores, the less leadership, the less uptake and use of knowledge. Furthermore, this notion of leadership as a key contextual factor in knowledge use has been supported by numerous literature in the past (Kitson et al, 1998; Manske, 2001; Estabrooks, 2003; Davies, 2006).

In summary, all three organisations, demonstrated varying degrees of leadership. Site 1, the health unit with the highest knowledge use, illustrated strong leadership from several individuals including management as well as individual champions across programs. One area that Site 1 did

stand out was their leadership given to organisational learning. This element of a learning organisation was only seen in Site 1 data and created an environment conducive to knowledge use potentially contributing to the organisation's high KUU Scale score. Site 2 differed by demonstrating leadership mostly through one particular staff member. This was evident in their application of SHAPES to existing internal co-ordinated action (i.e. working groups) versus Site 1's initiative to devise a group specific to the facilitation of SHAPES.[12] Site 3 demonstrated the least initiative and leadership to use the SHAPES results, directly reflected in their lower knowledge use. Accordingly, the lack of leadership was linked to Site 3's limited receptiveness and commitment to use SHAPES. Overall, the leadership in the health units ranged from extensive to moderate to minimal, much like the level of receptiveness/commitment across sites. Accordingly, each organisation's knowledge use score corresponded to their degree of commitment/receptiveness and leadership.

5.11.3. Cross Case Comparison-*Internal Co-ordinated Action*

The preceding discussion on leadership indicated a direct link to the theme of internal co-ordinated action. The degree of leadership given to SHAPES utilisation was reflected in each site's varying amount of initiative to develop processes and procedures to utilise the information via internal co-ordinated action (Appendix K).

The organisation with the highest knowledge use (Site 1) continually illustrated a predisposition to conduct thoroughly planned internal co-ordinated action with and between appropriate programs and respective staff to ensure uptake and use of the SHAPES results. Site 1's extensive leadership and initiative in the organisation's actions to establish multilevel working groups to facilitate the specific application of SHAPES evidence demonstrated the organisation's high level of commitment and receptiveness to use SHAPES. Through the development of SHAPES working

[12] It is important to note, Site 2 gave a large degree of leadership to the use of SHAPES *outside* of the organisation by working with local school boards and schools versus strong internal leadership. The interview guide and KUU Scale may not have adequately captured the leadership and knowledge use outside of the organisation, therefore contributing to a more modest score on the KUU Scale.

group(s), a community of practice (CoP) with essential interactive processes formed allowing ongoing knowledge exchange, "*our working group with regard to SHAPES and physical activity yes we have exchanged opinions about the information"* [4A: 289], while also establishing and distributing responsibilities to ensure uptake, *"I act as a liaison with program planning so I'm the…rep that would sit on the SHAPES committee"* [6A: 57]. The evolution of a CoP within Site 1 increased the uptake and utilisation of SHAPES results which was echoed in the organisation's score of high knowledge use. The working group (i.e., CoP) and interactive processes provided a means of knowledge utilisation and exchange in order to meet organisational mandates and priorities to work with external partners like schools and school boards.

Site 2 (moderate knowledge use) also applied internal co-ordinated action but not in the same fashion as Site 1. Rather, Site 2 applied SHAPES to existing programs and working groups to inform current program planning and decision making, *"I've used them in a number of ways. I know we've been looking at for example developing one of our programs called [name of tobacco program]"* [3E: 92]. Both Sites 1 and 2 integrated the information across the organisation through internal co-ordinated action, however, Site 1's explicit SHAPES working group(s) allowed for the establishment of routine procedures to utilise SHAPES both internally and externally to the organisation, *"they will get a binder in the end, every staff member involved, with all the information, a copy of the [SHAPES] report. So wherever they go it will be ready and handy to use"* [4A: 357]. The internal co-ordinated action allowed Site 1 to receive a score of "routine knowledge use" and assisted in the organisation's ability to refine the information to external client needs, in turn contributing to their achievement of high knowledge use on the KUU Scale. In contrast, Site 2 had not established methods for utilising SHAPES and therefore had not obtained a level of "routine knowledge use" on the KUU Scale which inhibited any refinement of the information and contributed to a lesser degree of knowledge use than Site 1. The organisation with the lowest knowledge use, Site 3, had not demonstrated any internal co-ordinated action to apply the SHAPES results. This was in accordance with the organisation's partial commitment and receptiveness to the SHAPES information.

Furthermore, the little leadership Site 3 gave to using SHAPES inhibited the development of internal co-ordinated action to apply the SHAPES information.

Overall, the health unit with the highest knowledge use also demonstrated the strongest commitment/receptiveness and leadership that lead to extensive internal co-ordinated action. When compared to the remaining sites, Site 2 and 3 did not have as extensive internal co-ordinated action that lead to a lack of routine use and refinement of the information. Rather, Site 2 had applied the information to existing internal co-ordinated action allowing for integration of the information resulting in a score of "moderate" knowledge use. In comparison, Site 3 had not illustrated any internal co-ordinated action (at the time of data collection) and therefore had not demonstrated any routine use, refinement or integration of the information. Hence, this had limited Site 3 to orientation toward the information and limited mechanical use, contributing to the organisation's low level of knowledge use on the KUU Scale. Ultimately, this demonstrated that the application of knowledge via internal co-ordinated action helped to facilitate knowledge use, where as a lack of internal co-ordinated action impeded knowledge use.

5.11.4. Cross Case Comparison-*Organisational Mandates & Priorities*

Across all three sites, the varying degrees of commitment and receptiveness toward SHAPES and evidence in general, as well as the leadership and initiative for internal co-ordinated action to use SHAPES was directly linked to organisational mandates and priorities (Appendix K). Participants from both Sites 1 and 2 continually expressed how well SHAPES information complemented organisational interests leading to a more positive perception of SHAPES evidence and commitment to apply the information to organisational practice. In contrast, Site 3 made little reference to how SHAPES was relevant or beneficial to their current priorities and mandated efforts.

Overall, it appears organisational mandates/priorities were influential on an organisation's perception of the information, such as its relevance to their work and advantages to using SHAPES over other sources of data. This argument has been supported by Landry and colleagues (2001).

Landry, Amara and Lamari indicate that unless research fits within organisational interests the information will be disregarded. Furthermore, "research results are more likely to be used when they support the interests and the goals of the organisation" (Oh, 1997; as cited in Landry et al., 2001, p 335). Accordingly, the more the information was in line with health unit mandates/priorities the more relevant it became to their needs and sequentially the greater the commitment and receptiveness to use the information as demonstrated in the respective knowledge use scores. On the other hand, Site 3, the health unit with the lowest knowledge use score expressed limited relevance to using SHAPES and that it did not appear to fit with their organisational priorities. This inhibited the organisation's receptiveness and commitment which resulted in limited application of SHAPES.

Interestingly, all three sites were guided by the Ontario Mandatory Health Programs and Service Guidelines however, based on the analysis each organisation placed greater emphasis on differing mandates and priorities. Therefore, each organisation's emphasis on different health programs may have been influential on how the organisation perceived information. Riley et al. (2003), refers to this as a "predisposition" or the organisation's motivation to address a particular issue(s). For example, Site 1 had determined physical activity as a top priority for the organisation, "*physical activity is a program that is fairly new as a hierarchy health issue here at public health"* [2A: 87], which contributed to their perception of SHAPES data (i.e., physical activity data) as complementing organisational priorities and efforts. In contrast, Site 3 may have placed greater emphasis on other services (besides tobacco/physical activity) and as a result did not readily seek extensive tobacco and physical activity data, therefore inhibiting their perception of the relevance and benefit of SHAPES evidence and ultimately limiting their commitment to use the information.

In the end, it seems the emphasis on specific organisational mandates and priorities was influential on organisational commitment/receptiveness toward evidence (i.e., relevancy, relative advantage etc.), leading to leadership/initiative to take internal co-ordinated action for utilizing SHAPES. The more the organisation perceived the information to be congruent with their needs and priorities the more commitment and receptiveness toward utilizing the information. The greater the

organisational commitment and receptiveness toward the information, the greater the initiative taken to co-ordinate internal actions, leading to increased uptake and utilisation of SHAPES.

5.11.5. Cross Case Comparison-*History of Prior Knowledge Use*

The final internal contextual factor across all three sites was a history of prior knowledge use (Appendix K). All three sites demonstrated previous experience utilizing scientific and experiential knowledge in program planning and decision making. Though there was relative consistency across cases with respect to previous experience utilizing knowledge, there were also a few divergences between Sites 1/2 versus Site 3. Sites 1 and 2 displayed a history of prior knowledge use, scientific and experiential, that aided in facilitating organisational commitment and receptiveness for applying information, *"Everything here is evidence based. We don't do anything without it having the highest…background"* [2E: 120]. There was also an indication of an association between previous knowledge use in an effort to address organisational mandates and priorities. However, in the case of Site 3, the organisation placed greater emphasis on tacit/experiential knowledge over scientific knowledge and expressed a greater need to adapt this type of information to external contexts versus Sites 1 and 2, *"So the teams basically look at you know what they're hearing, say from schools, what they're hearing from schools about their needs. What seems to be the rising issues"* [1F: 369]. It appears the external environment was very influential on the evidence-informed practice of Site 3 by increasing the need for knowledge adaptable to the needs of external clients (i.e., schools/school boards). This reliance/preference for experiential knowledge may have limited the information Site 3 was receptive toward and committed to using (i.e., scientific knowledge). Also, previous discussion on the limited leadership for knowledge use within Site 3 may have contributed to the little emphasis on use of scientific evidence in program planning and decision making, resulting in a preference for tacit/experiential knowledge via previous experiences.

The fact that all three health units had a history of previous knowledge use but varied in their application of SHAPES evidence indicates that previous experiences with knowledge utilisation did

not guarantee future application of evidence. Rather, a history of previous knowledge use was one of many internal contextual factors (i.e. commitment/receptiveness, leadership, internal co-ordinated action, mandates and priorities) that impede or facilitate knowledge use. An organisation with experience utilizing evidence may demonstrate a certain level of "comfort" applying knowledge (as demonstrated in Site 1) but unless the information fits with internal mandates and priorities and the organisation has some degree of commitment/receptiveness toward the information as well as leadership and co-ordinated action to use the knowledge the uptake may be less likely. This has implications for researchers to produce evidence that takes all of these internal factors into consideration (to be examined further in the discussion section).

Overall, it is apparent that internal contextual factors and the degree of each factor can influence knowledge use. Factors such as commitment/receptiveness, leadership and internal co-ordinated action played a leading role in health units utilizing knowledge. Other factors, such as organisational mandates and priorities as well as a history of prior knowledge use were also influential but perhaps more indirectly by influencing other contextual factors (e.g., mandates and priorities can influence an organisation's commitment/receptiveness). Though internal contextual factors were influential on organisational knowledge use, there were other factors external to public health that also played a role in knowledge use. In line with the Social Ecological perspective, what happens within one system may have an impact on another system. This was evident through out the analysis as external contextual factors emerged and demonstrated influence on internal context within each organisation examined. As a result, a cross case comparison of external factors has been outlined in the proceeding section.

5.12. Cross Case Comparison of External Contextual Factors

Earlier sections describing the findings from the analysis outlined several external contextual factors influential on the internal processes and knowledge use within all three sites. Several external factors (Appendix K) emerged, including external relationships, external processes & procedures as well as

external mandates and priorities and external resources. The following Table 5 outlines the external contextual factors illustrated in each case analysis. The degree of influence (i.e., +ve, -ve, partial) has not been indicated due to limited data not allowing for a clear picture of the degree of influence for each external factor.

Table 6: Summary of External Contextual Factors Influential on Knowledge Use across Sites

Site 1: High KU	Site 2: Moderate KU	Site 3: Low KU
External Relationships	External Relationships	External Relationships
External Processes & Procedures	External Processes & Procedures	External Processes & Procedures
External Mandates & Priorities	External Mandates & Priorities	External Mandates & Priorities
External Resources	n/a	n/a

Based on the summary in Table 5, it is apparent that most of the external contextual factors were consistent across all three case studies. The following subsections examine and compare the aforementioned external contextual factors and the role they play with respect to internal processes and knowledge use. Similarities and divergences of these external contextual factors across all three cases have been delineated and described.

5.12.1. Cross Case Comparison-*External Relationships*

An examination of external contextual factors revealed a consistent theme of external relationships (Appendix K). It seems the nature of an external relationship, either positive or negative, can facilitate or hinder knowledge exchange and utilisation between the health unit and external parties. Site 1 indicated that a more negative relationship with local school boards required the health unit to provide evidence of why their services were relevant to the school population, i.e., conceptual and procedural knowledge use. In contrast, a more positive relationship resulted in receptiveness toward evidence/information on behalf of schools and school boards potentially increasing knowledge use and exchange, *"In the big picture it's great to have an established process and relationship that the health unit can count on, the boards can count on, the schools can count on. The information flowing*

through that main conduit tends to be communicated more readily, easily, without gaps, people are more aware" [Site 3, Participant, 4, 305].

The strong emphasis all three sites placed on external relationships was partially a result of their organisational mandate requiring them to work with local school boards/schools. Such was the case for Site 2, who continually demonstrated the use of a school "liaison" that was responsible for building a bridge between the numerous health unit services/programs and schools/school boards. This allowed for open communication and increased likelihood of knowledge exchange and utilisation between Site 2 and the school board. Site 2, similar to Site 1, referenced the use of evidence to engage school boards and initiate the board's conceptual knowledge of health issues/concerns among their student population while facilitating external co-ordinated action via the development of a strategic committee consisting of key stakeholders from public health and education. The importance of external relationships was also evident within Site 3 with implications for the organisation's ability to utilise SHAPES. Site 3 placed emphasis on a school driven relationship that allowed schools to indicate their needs and wants which ultimately determined what programs Site 3 could implement. Because of the school driven relationship, schools/school boards local to Site 3 needed to indicate an interest in tobacco or physical activity programming in order for SHAPES to be shared and utilised. This may have been another contributing factor to Site 3's limited use of SHAPES results, especially if their local schools/school boards were not interested in addressing tobacco use and physical inactivity.

In essence, it appears the stronger the relationship the more readily the external parties are willing to uptake and utilise knowledge. Site 2's previous experiences and the development of a specific liaison role to help facilitate a strong and positive relationship had implications for the degree of uptake at the board and school level (i.e., creation of a strategic committee with key internal and external stakeholders). Furthermore, the strength of the external relationship allowed for communication and knowledge exchange between parties and assisted both Sites 1 and 2 to gain support and buy-in from schools to address health issues and implement health promotion

programming at the school level, *it's always what's in it for them and we have to keep that in mind. If they're getting something out of it then they're more likely to want to work with us"* [Site 2, Participant 1, 393]. A more school driven relationship, such as that of Site 3, allowed external parties to depict what information they were willing to receive and utilise, in turn affecting what information health units could uptake and apply to their programs and decision making processes.

Overall, health units placed a large emphasis on the need to establish and maintain external relationships with organisations such as schools and school boards. External relationships were both a facilitator and or obstacle to knowledge exchange and utilisation. Relationships created opportunities for knowledge exchange (e.g., Site 2 liaison and the strategic committee) or conversely, impeded the process by limiting what information the health unit was able to utilise (i.e., what is relevant or irrelevant to external parties in the case of Site 3). In general, a positive relationship with external parties allowed health units to work with and engage schools and school boards while assisting health unit in meeting their organisational mandates and priorities.

This notion of maintaining a positive external relationship manifested in the other external contextual factors such as the health units' need to consider the working processes of external organisations and being cognizant of the differing needs and priorities of schools/school boards. In order for Sites 1, 2 and 3 to maintain these external relationships they had to adapt to external processes and procedures, as well as external mandates and priorities while being aware of the limited resources and parameters placed on external organisations. This indicated a link between external relationships and other external contextual factors, such as external processes/procedures, external mandates/priorities and external resources, discussed in the following sections.

5. 12.2. Cross Case Comparison-*External Processes & Procedures*

Discussions in the previous section outlined the emphasis all three sites placed on external relationships. In order for these external relationships to foster and grow, each site illustrated a need to conform to the external processes and procedures (Appendix K) of schools/school boards. The

processes and procedures external to each site imposed requirements and specific actions on behalf of each health unit in order to communicate and work with external partners. All three sites referenced the need to adapt to external processes and procedures, such as school board approval, in order to gain support and commitment from the board and school level, *" If we're planning to work in the school board, anything new or controversial has to be approved by them"* [Site 2, Participant 1, 165]. The need to conform to external practices had implications for how knowledge was disseminated and shared between health units and external parties. Furthermore, adapting to external processes required knowledge utilisation on behalf of the health units. For example, both Sites 1 and 2 indicated a need to use evidence to gain school board approval (i.e., justification for action), "*in terms of getting approval through the school board and drafting a letter to go to the principals, some of the SHAPES data was pulled out and used…quotes were used in the principal letter to say why we should be trying to implement this program."* [Site 2, Participant 4, 245]. The use of SHAPES evidence by both Sites 1 and 2 brought conceptual awareness of health issues while justifying future or past services and programs offered by the health units, *"I met the principal he knows the results and they've bought into a number of the programs that we haven't been able to push as much in that particular high school"* [Site 2, Participant 3, 472]. Site 2 had taken additional action by developing a specific internal role (i.e., liaison) that provided a connection between organisations and ensured the health unit followed the appropriate processes outlined by the school board. Ultimately, the external processes and procedures increased the need for evidence-informed action within Sites 1 and 2 which was reflected in their scores on the KUU Scale. Moreover, conforming to external processes and procedures allowed both health units to maintain a trusting external relationship with their respective schools/school boards.

Site 3 also clearly demonstrated conforming to external processes and procedures, such as school board approval. However, the external relationship Site 3 had with schools/school boards appeared to be more passive in nature and relied on a school driven process. As a result of this more "laid back" approach, Site 3 used a memo procedure to engage schools (see Section 5.8.5.) that is

more limited with respect to knowledge utilisation and exchange (i.e., schools respond to a health unit memo listing available programs). The more passive approach adopted by Site 3 was in response to developing a less resource intensive method of adapting to external processes since Site 3 had to work with over 10 school boards. However, much like Sites 1 and 2, the adaptation to external processes allowed the organisation to build a relationship and maintain a form of communication and exchange with external partners.

In summary, all three sites indicated the need to conform to external processes and procedures in order to maintain an external relationship with schools and school boards. As a result of conforming to external processes and procedures, all three health units had to adapt their internal processes to meet external requirements such as approval protocols. Adapting to these external processes had required the use of evidence, more so on the behalf of Sites 1 and 2, to promote available health program and services. With respect to Site 3, their adaptation to external processes had lead to the development of an internal process that was useful for knowledge dissemination (i.e., memo listing health unit services); yet we know that simple dissemination does not always guarantee uptake. Furthermore, a more passive approach may not lend itself to face-to-face engagement, ultimately limiting knowledge utilisation by Site 3 and its external partners. However, Site 3's more simplistic dissemination approach renders itself to meeting the needs of external parties that will help to maintain a positive relationship between the health unit and the school board/schools. Furthermore, adoption of a dissemination approach allowed Site 3 to work within restricted resources to provide service to numerous school boards.

Overall, the processes and procedures of external organisations were influential on the internal processes of each health unit with implications for knowledge utilisation. Ultimately, the adaptation to external processes and procedures had allowed all three health units to build and maintain a positive relationship to work with and engage schools and school boards in an effort to meet their internal organisational mandates and priorities.

5.12.3. Cross Case Comparison-*External Mandates & Priorities*

The previous section outlined the adaptation of internal health unit processes to meet external processes and procedures in an effort to build a positive relationship with external organisations. In turn, this allowed Sites 1, 2 and 3 to meet their own organisational mandates to work with schools/school boards. However, the engagement of schools/school boards appeared to not only be dependent on conforming to external processes but was also influenced by external mandates. In fact, the internal mandates/priorities of health units were often in competition with the interests and priorities of external parties, *"I think it's just some of our programs that we've already had in place that we know they meet our mandate for working in the schools and their evidence based to start with. But it's whether or not a school picks up on them"* [Site 2, Participant 3, 472]. Earlier discussion indicated that internal mandates and priorities can be positively or negatively influential on an organisation's commitment/receptiveness toward information by swaying perceptions of the information. This was no different for external organisations with their own mandates and priorities that differed from the mandates/priorities of public health (Appendix K). External mandates and priorities were influential on how external organisations perceive the usefulness of the information brought forward by health units. This had implications for how health units chose to disseminate information at the school and school board level.

Similar to the adaptation to external processes and procedures, Sites 1, 2 and 3 indicated that external mandates and priorities could be an obstacle to engaging schools. School boards/schools had different priorities that focused on education (numeracy and literacy) which take precedence over health promotion. All three sites indicated a need to adapt their internal processes and programming to school needs and priorities while also trying to accomplish their own internal mandates and interests. As a result, all three sites had to relay information/knowledge in a way that schools would perceive the information as relevant to their priorities. In addition to school mandates and priorities, Site 3 also referred to the influence of other external priorities, such as those of the local community. Site 3 placed a large emphasis on the priorities of the community including local issues that were

considered more important than some of the health initiatives offered by the health unit (e.g., tobacco cessation and increasing physical activity). The priorities of the local community and schools/school boards had implications for the information Site 3 was able to utilise and disseminate, which indicated that meeting the needs of external organisations superseded using the information they had been given. As a result, the external mandates and priorities of the local community and the schools/school boards were very influential on the dissemination and uptake of information by external partners and community members with respect to what they deemed as important and useful to uptake and apply. Moreover, external priorities had implications for the type of information all three sites are able to utilise, requiring them to adjust internal processes to be considerate of external mandates and priorities in an effort to maintain a positive working relationship.

In essence, the mandates and priorities of external organisations and the community at large were influential on internal processes and knowledge utilisation. Unfortunately, to what degree external mandates and priorities influence internal context and knowledge use was not adequately captured by the data set examined. However, it is important to acknowledge that external mandates do in fact play a role in public health knowledge utilisation.

5.12.4. Cross Case Comparison-*External Resources*

Another element of maintaining a strong relationship between health units and schools/school boards was the consideration of parameters placed on external parties and recognition of their limited/scarce resources (Appendix K). Being aware of limited resources and capacity demonstrated the health unit's consideration for limitations placed on schools and school boards. Interestingly, Site 1 was the only case study that continually demonstrated being aware of and adapting to the limited external resources of schools/school boards. Site 2 and 3 made minimal reference to adapting internal processes to accommodate for scarce external resource but to a much lesser degree compared to Site 1. This may have be a result of the interview guide not adequately capturing the role of external

factors such as external resources; however, it was a strong theme throughout the analysis of Site 1 and therefore deserves mentioning.

During the analysis of Site 1, the organisation continually illustrated adapting their internal processes and programs to be considerate of the school environment and the resources they do or do not have access to. In order to properly disseminate the SHAPES evidence, it required Site 1 to adapt to other forms of distribution that would fit within school time restrictions, such as the development of posters and pamphlets in place of an oral presentation. Moreover, the limited external resources required Site 1 to utilise evidence to assist in the justification and allocation of scarce resources. By taking the time and effort to adapt to the external resources of others it had enabled Site 1 to engage and work with school while maintaining a positive working relationship.

In summary, it is apparent that external factors, like internal factors, play a role in knowledge utilisation. The emphasis Sites 1, 2 and 3 placed on external relationships was influential on the internal processes and knowledge utilisation of each organisation. Health Units' organisational mandate to work with schools required the establishment of a positive working relationship between both parties. In order to do this, all three sites illustrated the need to adapt to external processes, procedures, mandates and priorities as well as limited external resources. Adapting to these external contextual factors had implications for how knowledge was relevant and useful as well as how it was disseminated and utilised by health units, school boards and schools. Though literature has begun to identify the role of external factors on research use, little of this research focuses on the external factors specific to a health setting (Dobbins et al., 2002). The analysis for this study has only scratched the surface of external contextual factors and their influence on knowledge use in public health. However, it is evident that they are a factor and cannot be disregarded when examining the entire system of knowledge exchange and utilisation.

5.13. Cross Case Comparison of Additional Characteristics

In addition to the cross case comparison of internal and external contextual factors influencing knowledge use, it was important to compare and contrast unique characteristics of each case study. No two health units are identical therefore differences as well as similarities between organisations may play a role in the varying levels of knowledge utilisation between sites. Literature has shown that characteristics of an organisation can influence knowledge use, making it an important factor to examine (Dobbins et al., 2002). Using correspondence, internal documents, the world wide web and transcripts to identify characteristics of each site, the following section compares and contrasts these characteristics and how this may influence overall level of knowledge use, including organisational size, structure, service area and previous experiences with SHAPES.

5.13.1. Cross Case Comparison-*Organisational Size, Service Area & Structure*

Sites 1, 2 and 3 varied in their organisational size, service area and structure. Organisational size included references to the number of staff within an organisation (Dobbins et al., 2002). Organisational service area was the geographical area a health unit was designated to provide services to. Organisational structure included references to how staff were organised and divided within the organisation, such as divisions, departments, as well as the type of divisions and departments. An element of organisational structure was *functional differentiation*, which was the number of different divisions and departments (Dobbins et al., 2002). A summary of organisational characteristics across all three sites can be reviewed in Table 2 (page 18).

With respect to organisational size, the health unit with the highest knowledge use (Site 1) had the largest number of staff but also the largest population to service at approximately 1 million people. The health unit with moderate knowledge use (Site 2) had half the staff of Site 1 but also serviced a significantly smaller population (approximately 200, 000 people). Site 3 was comparable to Site 2 with smaller staff numbers than Site 1 and also a smaller population to service (approximately 150, 000 people). The notion of organisational size influencing knowledge use is

supported by current literature indicating that organisational size can exert a positive influence on the adoption of an innovation (e.g., SHAPES) (Davis & Taylor-Vaisey, 1997, as cited in Dobbins et al., 2002; Estabrooks, 2003). Estabrooks (2003) argues that the larger the organisation the greater occurrence of innovation adoption which is congruent with the pattern of organisational size and level of knowledge use across all three sites. Site 1 being the largest organisation also had the highest knowledge use score or uptake/adoption of SHAPES. Sites 2 and 3 were smaller in size respectively and as such achieved lower levels of knowledge use on the KUU Scale leading to less uptake of SHAPES when compared to Site 1.

When examining the size of service area, it appears the health unit with the largest area to serve also had the lowest score on the KUU Scale. As a result, a pattern emerged, as the size of service area decreased, the knowledge use score increased. Site 3 serviced a significantly larger geographical area (approximately 150,000 kilometers) and had the lowest KUU Scale score, Site 2 (moderate knowledge use) serviced a greater geographical spread (approximately 6,500 kilometers) than Site 3 and also had a higher score on the KUU Scale. Finally, Site 1 had the smallest geographical service area (approximately 3,000 kilometers) and the highest score on the KUU Scale. Though there does appear to be a pattern with respect to size of geographical service area and level of knowledge, there was insufficient data to determine direct causality or validation of influence on knowledge use.

Finally, when comparing and contrasting organisational structure, there were many similarities as well as differences across the three sites. Firstly, all sites had similar divisions with similar staff titles (e.g., manager, director, public health nurse). Granted these divisions and staff titles varied slightly between sites, overall, the organisational structures were relatively comparable. Where there was a difference is the number of offices (main and satellite) which was associated with the size of geographical service area, the larger the service area the greater number of satellite offices (i.e., functional differentiation). Also, it was important to note that Site 3 did indicate having to overcome several barriers associated with servicing a large geographic area. This included issues

around resources (i.e., time and man power) to co-ordinate efforts with staff at external sites (satellite offices). Interestingly, Sites 2 and 3 both have several satellite offices to accommodate for their larger service areas. The reference to geographic barriers, co-ordination of satellite staff and its influence on knowledge use seems to be reflected in the moderate to low level of knowledge use on the KUU Scale for Sites 2 and 3 versus the higher level of knowledge use of Site 1 which has one main office and no satellite offices. These factors point to a potential influence of organisational structure and functional differentiation, including the satellite offices, on knowledge use and exchange.

In addition to the issues around satellite offices, there was also the factor of internal resources such as a PHRED department. Two of the sites examined were PHRED health units, meaning they had an internal PHRED department responsible for public health research and training of public health staff. The two health units with a PHRED department were also the health units with high and moderate knowledge use (Sites 1 and 2). The health unit with the lowest knowledge use, Site 3, did not have a PHRED department, meaning staff had less access to research staff and research resources. This may have contributed to Site 3's lower knowledge use. The notion of research-generating organisations (e.g., PHRED health units) having greater knowledge use has been examined by Dobbins et al., (2007). Dobbins and colleagues noted that research-producing organisations reported having higher use of research. This could be a similar case with health units containing PHRED departments that generate public health research (i.e., Sites 1 and 2) versus non-PHRED health units lacking the capacity to generate and utilise research evidence. Though this association requires further examination it does make logical sense. Not only did Sites 1 and 2 potentially have more access to research resources/staff but also the leadership necessary to encourage evidence-informed practice. In fact, literature has supported the notion that access to research and resources (i.e., studies, libraries, etc.) was an important element in research utilisation among clinical nurses (Estabrooks et al., 2003). Though clinical nurses work in an environment different than public health practitioners, it seems reasonable to suggest the lack of access to research resources impedes knowledge use and

increased access facilitates knowledge use. This was demonstrated by Site 1 illustrating leadership/initiative by PHRED staff encouraging the use of data in program planning and evaluation. Ultimately, these additional research resources and leadership for knowledge utilisation are an important factor to consider when comparing and contrasting knowledge uptake and application across health units.

Overall, further examination of characteristics, such as organisational size, service area and structure may reveal an influence on organisational context and knowledge use. For the sake of this study, it was important to take note of the similar and differing characteristics of each health unit to identify other potential factors contributing to the individual sites' level of knowledge use and potential influences on evidence-informed practice.

5.13.2. Cross Case *Comparison-SHAPES Experiences*

Another factor to consider when comparing across cases is each health unit's experience and/or history with SHAPES and the amount of SHAPES data they had access to. Site 1 had previous experience with SHAPES, having conducted data collection twice in previous years. As a result, staff may have been more comfortable with utilising SHAPES results. Furthermore, two rounds of data collection had provided Site 1 with both baseline and comparison data which was useful in evaluating programs. The familiarity Site 1 had with SHAPES and the additional data collection may have benefited the organisation in their knowledge uptake and use and ultimately contributing to their achievement of high knowledge use on the KUU Scale. Sites 2 and 3 had only conducted one round of data collection and therefore, only had baseline data. This limited program evaluation and furthermore, staff had less time to become familiar with SHAPES results, contributing to low and moderate knowledge use on the KUU Scale.

Each site's previous experiences with SHAPES were potentially influential on their knowledge uptake and utilisation (of SHAPES evidence). These experiences ranged across sites and need to be considered when comparing individual levels of knowledge use. Overall, each site varied

in their characteristics (size, structure, service area) as well as experience with adopting SHAPES. These organisational characteristics play a role in knowledge utilisation but to what degree is not clear. Therefore, they must be considered part of the equation when drawing implications about knowledge use among Ontario Health Units (to be examined further in the discussion section).

5.14. Cross Case Comparison Summary

After comparing and contrasting the internal and external contextual factors of all three health units, it was apparent that several contextual factors were consistent across all three sites. Though the core theme varied, there were still the same prominent internal factors influencing knowledge use among the public health units examined. What appeared to be an important ingredient was the degree of each factor and its influence on evidence-informed practice. Site 1 with the highest knowledge use (greatest SHAPES uptake/application) also had the greatest degree of commitment/receptiveness, strongest leadership, and most extensive internal co-ordinated action specific to using SHAPES. Where as, Site 2 had the same factors but all on a smaller scale (i.e., less leadership, positive receptiveness but less commitment, less extensive internal co-ordinated action), resulting in more moderate knowledge use. In both cases, the (Sites 1 and 2), the degree of commitment/receptiveness as well as the leadership and internal co-ordinated actions complemented organisational mandates and priorities while being supported by a strong history of knowledge use. With respect to Site 3 (low knowledge use), the commitment/receptiveness, leadership and internal co-ordinated action were on the minimal end of the spectrum, especially when compared to Site 1 and 2. Furthermore, there was little to no reference of SHAPES complementing organisational mandates/priorities, in turn facilitating the partial or limited commitment/receptiveness, leadership and co-ordinated action. Site 3 did have a history of knowledge use but it did not strongly influence the other internal contextual factors, demonstrated by the sites with higher knowledge use (Sites 1 and 2).

In addition to the internal contextual factors, there were several external contextual factors consistently influencing the internal processes and knowledge use within all three sites. The external

factors, including external relationships, external processes/procedures, external mandates/priorities as well as external resources played a role in the uptake and use of evidence both internal to the health units as well as within external organisations/parties. As a result, external contextual factors must also be considered when identifying the key ingredients of a knowledge utilisation framework.

Finally, when comparing knowledge use across organisations other factors possibly played a role, such as organisational size, structure, and service area, as well as any previous experiences with the particular innovation for uptake (i.e., SHAPES). These factors, though perhaps less influential, were potentially contributing to the facilitation or impediment of knowledge use. As a result, organisational characteristics are still relevant and they too must be considered when looking at the bigger picture.

6. Discussion

The growing prevalence of chronic disease and the increased accountability to develop effective and efficient health programs and services has emphasised the need for knowledge utilisation among public health practitioners to inform and guide their practices (Lomas, 2000; The World Health Report, 2003; Canadian Tobacco Control Research Initiative, 2005). However, knowledge use does not result from simple dissemination of evidence, rather various factors come into play that ultimately facilitate or impede knowledge utilisation including the elements of the setting in which the evidence is being applied. Past research has increased our understanding of the fundamental ingredients necessary for knowledge use including identification of the key characteristics information must possess (i.e., relevance, relative advantage etc.), as well as insight into the individual level factors that determine knowledge use (i.e., previous experiences and information needs). Yet at the organisational level we lack understanding and clarity of contextual factors influencing knowledge uptake and utilisation. Limited research has been conducted on the organisational factors affecting knowledge use and even less focusing on the contextual factors specific to a public health setting. The current study has provided an initial glimpse of the contextual factors influencing knowledge use within public health. Though a complete picture cannot be drawn, the findings of this study provide insight into the internal and external context of public health including the facilitators and barriers to evidence-informed practice while providing implications for future research, public health practice and the role of context within an overall system of knowledge utilisation and exchange.

6.1. The Influence of Internal Contextual Factors

Several internal contextual factors were identified during the analysis of the three case studies. Though the core theme varied slightly, each site demonstrated similar contextual factors influential on knowledge use. The health unit with the highest level of knowledge use demonstrated the highest degree of commitment/receptiveness to utilise the information which was illustrated in their strong leadership and initiative to use SHAPES through calculated and planned internal co-ordinated action.

A strong history of knowledge use as well as the information complementing their existing organisational mandates and priorities helped to facilitate Site 1's commitment/receptiveness and leadership to take action and utilise SHAPES.

These same themes of commitment/receptiveness, leadership, internal co-ordinated action, organisational mandates and priorities as well as a history of previous knowledge use were also demonstrated by the health unit with moderate knowledge use (Site 2) but on a smaller scale when compared to Site 1. Site 2 demonstrated leadership on an individual level with one particular champion (versus leadership across programs and staff levels) as well as commitment/receptiveness to utilise the information. However, Site 2 did not establish routine use of SHAPES through specific co-ordinated action. Instead, Site 2 took action via dissemination of SHAPES results to existing internal co-ordinated action (i.e., existing working groups) and did not create specific actions to use SHAPES. The variance in internal co-ordinated action between Sites 1 and 2 resulted in differing levels of knowledge use and implies the importance of *explicit* co-ordinated action to facilitate the use of a specific innovation/knowledge (i.e., SHAPES). The greater the degree of specific action to utilise information creates greater uptake and utilisation of that information which reveals the role of organisational processes to ensure knowledge use. Moreover, establishing explicit actions may assist with continuous uptake and use of knowledge. Even though knowledge utilisation does not require an organisation to obtain every level of knowledge use as indicated by the KUU Scale, an organisation that does engage more levels may have more comprehensive and sustained uptake and utilisation of evidence (e.g., Site 1 establishing routine procedures to utilise SHAPES evidence).

In the case of Site 3, the themes of commitment/receptiveness, leadership, internal co-ordinated action, and a history of previous knowledge use were present but to a lesser degree, versus that of Sites 1 and 2. Site 3 continually demonstrated partial receptiveness and limited commitment to use SHAPES. This was evident in their limited leadership and initiative given to SHAPES utilisation, in turn restricting any internal co-ordinated action facilitating uptake and application. Little or no

internal action had occurred within Site 3 at the time of data collection therefore no processes had been outlined or developed that would ensure the actual use of SHAPES by relevant staff members. Once again this demonstrates the role of internal co-ordinated action while also indicating the strong influence of leadership on knowledge use.

The role of leadership was evident in all three sites. In the case of Site 3, limited leadership prevented internal co-ordinated action while also inhibiting the growth of a supportive knowledge use environment. In contrast, the strong organisational leadership to use SHAPES in Site 1 was vital to a supportive environment, even lending itself to a culture of implicit knowledge use. With respect to Site 2, the degree of leadership was less than that of Site 1, with one individual championing the use of SHAPES. However, an individual leader will have less impact on change and utilisation versus leadership demonstrated across an organisation. As a result, the degree of leadership within Site 2 was reflected in the degree of internal co-ordinated action and ultimately, a more moderate level of knowledge use. This notion of a champion/leader to utilise evidence is further supported by Manske's Knowledge Utilisation framework as well as by numerous other literature describing the importance of leadership in knowledge use (Kitson et al., 1998; Estabrooks, 2003; Davies et al., 2006).

In the end, leadership and internal co-ordination to take action was an important part of whether information was utilised as part of public health practice. The degree of both factors, leadership and internal co-ordinated action, was directly reflected in the levels of knowledge use while also facilitating or inhibiting organisational cultures supportive of evidence-informed practice.

The leadership and internal co-ordinated action to use evidence was not independent of the organisation's commitment/receptiveness to use knowledge. The greater the organisation's commitment/receptiveness toward utilising the information the greater the leadership given to initiate use, leading to more internal co-ordinated action to ensure uptake and application. However, each site's commitment/receptiveness to use SHAPES was influenced by their organisational mandates and priorities. The more the information fit with the organisation's mandates and priorities the more

receptive the staff was to using the information. This link between commitment/receptiveness and organisational mandates/priorities is similar to literature reporting public-health practitioners are more likely to use research evidence to inform program decisions when the evidence is relevant to their current priorities and decisions at hand (Dobbins et al., 2001). Organisations, such as Sites 1 and 2, who indicated the information was relevant with respect to what they were trying to achieve (i.e., mandatory programs and services, working with schools etc.) also had higher knowledge use. Interestingly, Site 3 did not indicate the information fit with their organisational mandates and priorities and accordingly, did not demonstrate the information having strong relevance to their interests and priorities.

Overall, mandates/priorities influenced organisational receptiveness/commitment toward using SHAPES. The less receptiveness the less commitment to use the information demonstrated through limited leadership and internal co-ordinated action. This exposes the reciprocal nature of factors within context and has two implications 1) the influence of contextual factors on other contextual factors and 2) the strong link between characteristics of the information, such as relevance, relative advantage etc. and organisational context such as mandates and priorities. Ultimately, the characteristics of information (i.e., relevance) influence an organisation's commitment/receptiveness to use information and consequentially organisational context such as leadership and internal co-ordinated action are also influenced, resulting in either increased or decreased use. However, context (i.e., organisational mandates and priorities) can also influence the characteristics of the information and whether the information is deemed useful of not, once again influencing the leadership and action taken for utilisation. The "back and forth" influence of these factors validates previous work by displaying the strong link between characteristics of information and the context of an organisation while also building on an existing knowledge use framework by illustrating the inter-relation between contextual factors such as organisational mandates/priorities and commitment/receptiveness.

Similar to organisational mandates/priorities, an organisation's previous experience with knowledge use was indirectly influential on knowledge use by influencing other internal contextual

factors. Earlier discussions revealed all three sites had a history of prior knowledge use. In the case of Site 1 and 2, their previous experiences with knowledge use provided a supportive environment conducive to using evidence and increasing the comfort level to use information and ultimately increasing the organisations' commitment/receptiveness to use SHAPES. However, Site 3 also had previous experience with utilising knowledge but placed greater emphasis on using more experiential/tacit knowledge versus scientific evidence, such as SHAPES, leading to a more limited commitment/receptiveness to using SHAPES. The use of scientific SHAPES data was not congruent with Site 3's previous experiences of using tacit/experiential knowledge which was reflected in their level of SHAPES uptake and utilisation. The influence of previous experiences on commitment/receptiveness to use the evidence influenced the degree of leadership and action taken and therefore indirectly influenced the level of knowledge use (i.e., SHAPES use). Furthermore, their previous experiences emphasising tacit/experiential knowledge may have inhibited a culture supportive of also using scientific evidence. Ultimately, each organisation's previous experiences with knowledge use did not guarantee future use of evidence. Rather, previous experiences influenced the type of information an organisation referred to, was comfortable using and their degree of commitment/receptiveness to use information and consequently altered the degree of leadership and co-ordinated action facilitating knowledge use.

In summary, the degree of internal contextual factors was influential on knowledge use both directly and indirectly. The most directly influential factors were commitment/receptiveness to use evidence, and the leadership and internal co-ordinated action given to facilitate uptake and use. The degree of each of these factors directly influenced the level of knowledge use. The more extensive the commitment/receptiveness, leadership and co-ordinated action the more extensive the knowledge use. Accordingly, the less extensive the commitment/receptiveness, leadership and co-ordinated action on behalf of the organisation, the less uptake and use of the information. Other internal contextual factors such as organisational mandates and priorities, as well as a history of knowledge use were also influential on utilisation but thorough a less direct route. Organisational

mandates/priorities as well as previous experiences with knowledge use were influential on the other contextual factors, as a result indirectly influencing knowledge use. Organisational mandates/priorities influenced an organisation's level of commitment/receptiveness to use information, in turn determining the level of leadership and action taken to ensure utilisation. Also, a history of knowledge use created a supportive knowledge use environment increasing an organisation's level of comfort with using specific types of evidence and increasing commitment/receptiveness, leadership and co-ordinated action. However, as seen in Site 3, a history of knowledge use does not necessarily ensure future uptake and utilisation depending on their previous experience and the type of information they prefer to utilise (e.g., scientific versus experiential). Overall, it appears the more extensive the contextual factor the more extensive the influence, directly or indirectly, on knowledge use.

6.2. The Influence of External Contextual Factors

The previous discussion identified the influence and inter-relation of internal contextual factors on knowledge use within Ontario health units. However, due to the nature of public health and its mandate to serve the greater population, health units are exposed to the influences of external factors. Throughout the analysis, all three sites repeatedly referenced external factors influential on the internal context and knowledge use within health units, including external relationships, external processes and procedures, external mandates and priorities as well as external resources.

One of the most influential external factors identified was the theme of external relationships. Across all three sites, emphasis was placed on maintaining a positive working relationship with external organisations, in particular schools and school boards. The need for an external relationship with local schools and school boards required each site to conform/adapt to other external factors, such as external processes and procedures, external mandates and priorities and external resources. The need to conform to these external factors had implication for each sites' internal processes and knowledge utilisation. More specifically, the internal processes established by a health unit may be

more or less conducive to knowledge utilisation and exchange. For example, all three sites referenced the need to seek school board approval. As a result, each organisation adapted their internal processes to gain school board approval and work with schools. These adapted processes were used to foster a working relationship and engage key stakeholders (e.g., Site 2's strategic committee and use of a liaison) to help facilitate knowledge exchange and use between health units and schools. Often, the sites with higher knowledge use (i.e., Sites 1 and 2) indicated utilising evidence in order to sell health unit programs and services. Sites 1 and 2 presented SHAPES data as part of their internal processes to gain school board/school support and approval whereas in the case of Site 3, the organisation's internal processes were adapted to be more simplistic and encouraged dissemination of services offered with little or no reference of utilising SHAPES to move programs forward. Site 3's internal processes to gain school/school board approval appeared more limited in the exchange and uptake of information shared between groups with less opportunity for the health unit to use evidence to justify past and future school based initiatives. Furthermore, it appeared Site 3's relationship with school boards/schools was more "one-sided" being largely driven by the schools/school boards. This may have limited the growth of a Community of Practice with both school and health unit members sharing a common goal and purpose and in turn limiting knowledge exchange and utilisation on behalf of both stakeholders.

In addition to adapting to external processes and procedures, all three sites also indicated adapting to external mandates and priorities. Similar to the influence of the internal organisational mandates and priorities, the external mandates and priorities of schools/school boards and communities were also influential on the health units. Sites 1, 2 and 3 referenced adjusting processes and information utilised to adapt to the needs and priorities of schools and ultimately influencing the evidence health units were able to utilise and share with schools (i.e., information must be relevant to both schools/school boards).

The final external factor influential on health unit processes and knowledge use was the issue of external resources. Parallel to the external processes/procedures and external mandates and

priorities, Site 1 often referenced adapting to or being aware of the limited resources schools/school boards must work within. As a result, evidence was often used to justify allocation of scarce resources and provided schools with conceptual awareness of health issues within their respective student population. Furthermore, the development of programs must take resource limitations into consideration, requiring programs to be adapted to meet these restrictions and rendering the evidence useless or perhaps not adaptable to external client context and/or needs. Therefore, the external resource limitation health units must work within has implications for the type of knowledge and how knowledge was utilised. The evidence must openly identify the issue at hand to increase client knowledge and grasp the need for health promotion initiatives while also justifying use of resources. As a result, this has implications for researchers, requiring awareness of these external factors in an effort to produce research/evidence that will be more adaptable to external contexts (to be discussed further in following sections).

In general, the need to adapt to external processes and procedures, mandates/priorities and limited resources is necessary in order for health units to have a strong working relationship with schools and school boards. This idea of an external relationship is congruent with a study conducted by Riley et al. (2003), examining changes in the implementation of effective heart health programs. Riley et al., conducted a cross case comparison of health units and found several "external system factors" including partnerships and contextual factors play a role in organisational practices for implementing programming. In the current study, each site examined had an organisational mandate to work with and service local schools and school boards evolving into a working relationship between parties. As a result of this relationship, health units were exposed to the contextual factors of schools/schools and therefore, health units conformed and adapted to external contexts such as the processes/procedures, priorities and resources of schools. In turn, this adaptation process influenced the type of information utilised by health units as well as how the information was used and to what degree. As a result of this influence, external contextual factors have potential implications for the commitment/receptiveness a health unit may have toward particular information and whether the

evidence is relevant to both the health unit and schools while justifying action on behalf of both parties. Considering the previous discussion on internal contextual factors, influences (external or internal) on commitment/receptiveness will ultimately affect the degree of leadership and action take to use that information. Nonetheless, at this point, the inter-relation between external contextual factors as well as direct connections to internal contextual factors is still not entirely clear and requires further examination. It is however, evident that external contextual factors are influential on knowledge use within public health and therefore, cannot be excluded from the overall system of knowledge use and exchange.

6.3. The Influence of Organisational Characteristics

The analysis of the current study has revealed the importance of internal contextual factors and external contextual factors in knowledge utilisation. However, when examining knowledge use at an organisation level, the unique characteristics of organisations must also be considered. Characteristics such as organisational size, structure and service area all contribute to the setting or context of an organisation and as a result may also be influential on overall knowledge use.

The organisations sampled in the current study revealed some interesting patterns between organisational characteristics and level of knowledge use. Congruent with previous literature, as the size of each organisation (number of staff) grew so did the level of knowledge use (i.e., specific to SHAPES) (Dobbins et al., 2002; Estabrooks, 2003). However, as size of service area increased and number of offices increased, the level of knowledge use decreased. From a rational point a view, the size of service area and spread of staff across satellite offices may stretch available resources while challenging the development of interactive processes necessary for knowledge exchange and utilisation (as seen in Site 3). Additionally, organisational structures that include research resources and departments, such as the PHRED departments within Sites 1 and 2, may also increase knowledge use. Logically, increased research access and resources would ideally help to facilitate and support a

culture of knowledge use, as evident in Site 1 with their high knowledge use and strong leadership for evidence-informed practice.

In brief, the characteristics of an organisation will contribute to the context of that organisation. Since internal context is influential on knowledge use it is important to also consider the characteristics of organisations. The current study brings attention to these characteristics; however, further research is needed to understand the role of these characteristics and their degree of influence on knowledge use specific to public health.

6.4. Building on an Existing Knowledge Use Framework

To date numerous knowledge utilisation models have been developed (Beyer & Trice, 1982; Huberman, 1987; Kitson et al., 1998; Manske, 2001; Dobbins et al., 2002); however there is no consensus as to which is the "ideal" model or framework. Past frameworks have often placed the elements of context in a holdall category with little refinement of the various attributes of context. Over time, as the importance of context in knowledge use has been acknowledged, frameworks have began to identify and define the attributes of context at an individual level but with limited clarification of organisational factors affecting knowledge uptake and utilisation, impeding our understanding of context on all levels. (Dobbins et al., 2002; Rycroft-Malone et al., 2004; Belkhodja et al., 2007). A recent study conducted by Rycroft-Malone and colleagues concluded that "individual approaches to implementing evidence-based practice will be ineffective without attention to organisational and environmental contexts" (Rycroft-Malone et al., 2004, as cited in Davies et al., 2006, p 2). The current study aimed to increase our understanding of organisational factors by building on Manske's existing framework and identifying internal contextual factors specific to Ontario health units and how these factors inter-relate while also acknowledging several external contextual factors influencing knowledge use in public health.

The analysis of three Ontario health units identified leadership and commitment/receptiveness as prominent themes influential on knowledge use, consistent with

Manske's framework. What the current study has presented is a clearer picture of the magnitude of both factors with respect to knowledge use and how these two factors inter-relate, with commitment/receptiveness demonstrated through extensive leadership to utilise the information. The less commitment/receptiveness to use the information, typically the less leadership given to using SHAPES, as demonstrated by the site with low knowledge use (Site 3). On the other end of the spectrum, the health unit with the highest knowledge use (Site 1) also demonstrated the most receptiveness/commitment to use the information through more intense leadership dedicated to initiating the use of SHAPES.

The contextual factors of leadership and commitment/receptiveness are not independent of other contextual factors and are linked to internal co-ordinated action to utilise knowledge. Ultimately, internal co-ordinated action is the procedures and processes an organisation undertakes to ensure evidence is disseminated and utilised. The more explicit and well calculated the action the greater the knowledge use. Existing frameworks do not focus on the procedures and processes necessary for knowledge use to occur. Manske's framework identifies the interactive processes necessary for knowledge exchange and utilisation but does not outline the specific actions within organisations to utilise knowledge. The internal co-ordinated action taken to use SHAPES are the processes outlined by the organisation in order for interactive processes (i.e., mutual engagement, joint enterprise etc.) to develop and nurture while integrating information across the organisation. A good example of this was the case of Site 1 and their internal co-ordinated action and development of a specific SHAPES working group that assisted in developing routine use of knowledge while also allowing for refinement and integration of the information to increase client impact and broaden organisational use of SHAPES. Other natural experiments in similar public health settings have demonstrated the importance of internal co-ordinated action. One Canadian Regional Health Authority, successful with increasing organisational evidence-informed practice, employed a specific committee/group with broad staff representation in order to specifically develop organisational plans for utilising research while creating links across all levels of staff (Promising Practices in Research

Use, 2007). Without premeditated action and processes in place, there is a limited foundation for interactive processes to grow. The concept of internal co-ordinated action may not be unique to a public health setting. Rather, this notion of internal co-ordinated action is in line with organisational learning that requires "roles, functions, and procedures that enable organisational members to systematically collect, analyse, store, disseminated, and use information relevant to their own and other members' performance" (Lipshitz et al., 2002, p 82). In other words, internal co-ordinated action can allow for the development of specific processes necessary for knowledge use and learning within an organisation. Such as the case in Site 1 with the highest knowledge use also demonstrating elements of organisational learning. As a result, internal co-ordinated actions (or at least acknowledgement of explicit processes and procedures for a more generalisable concept) should be considered as an addition to the various other contextual factors identified in Manske's framework.

In addition to commitment/receptiveness and leadership, Manske's framework also identifies organisational mandates/priorities and a history of previous knowledge use as contextual factors influential on knowledge utilisation. This study supports these factors as contextual elements of an organisation while articulating how organisational mandates/priorities and previous experiences with knowledge use influence uptake and utilisation specific to public health. As previously discussed, both factors are *indirectly* influential on knowledge use. In other words, they are influential on other contextual factors such as commitment/receptiveness and leadership and through this route can facilitate or impede knowledge use. As a result, the findings have identified first degree and second degree contextual factors influential on knowledge use in public health. The first degree contextual factors, considered pivotal in directly influencing knowledge use, include commitment/receptiveness, leadership and internal co-ordinated action. The second degree factors, those that influence other contextual factors, are influential on knowledge use through indirect affects and include organisational mandates and priorities as well as a history of knowledge use. This notion of context having direct and indirect influence demonstrates the inter-relation between internal contextual factors which work in association with one another. Furthermore, there is an association between

characteristics of the information and context as well as an association between context and interactive processes, demonstrated through the use of internal co-ordinated action and the development of interactive processes.

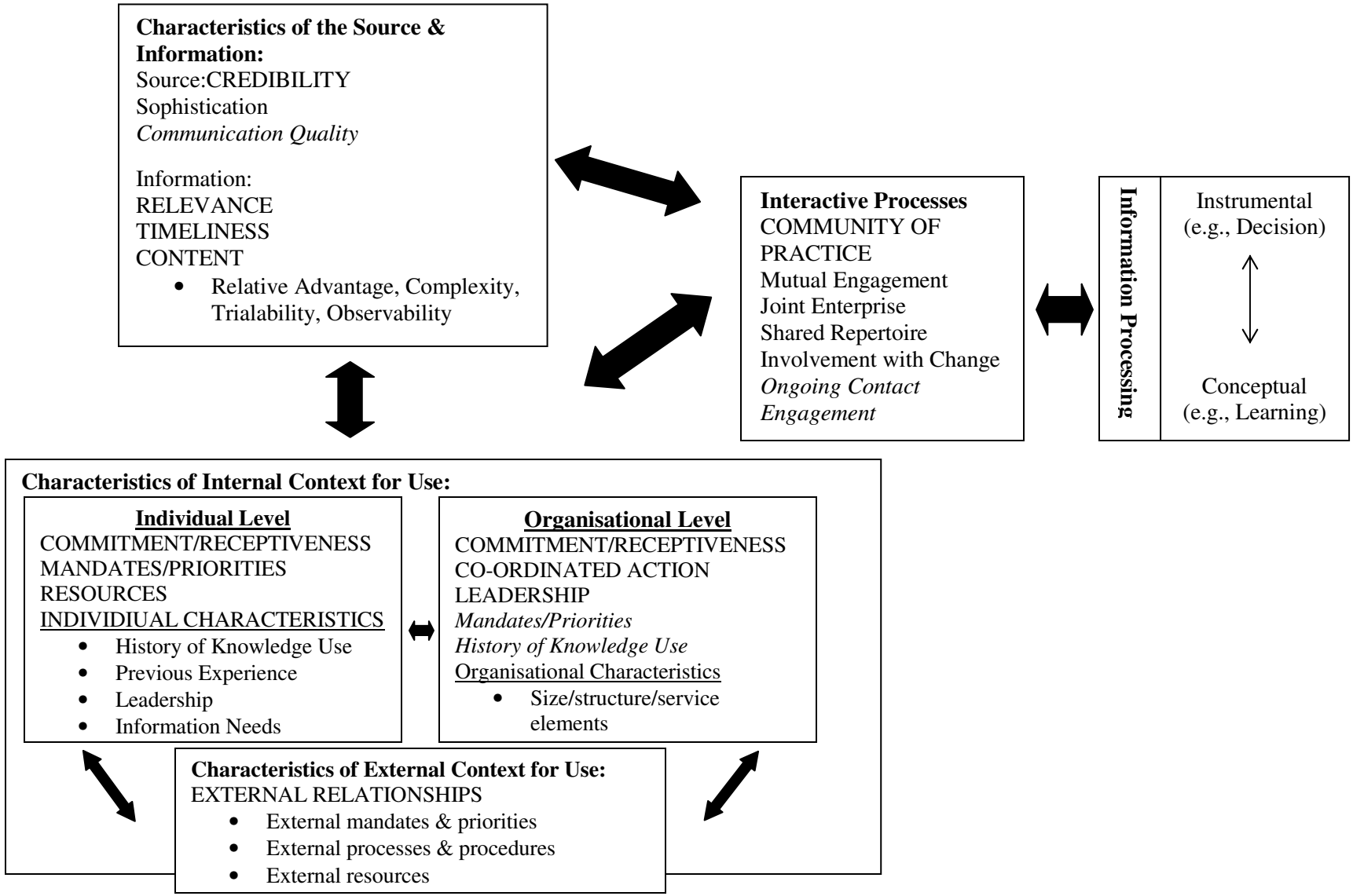
Additionally, there are other internal factors to consider with respect to context and its role in knowledge use. Organisational characteristics such as size, structure and service area are the unique attributes of an organisation. These types of elements contribute to the overall context of an organisation and can be influential on other contextual factors and knowledge use and therefore, must be outline in a knowledge use framework.

With respect to external factors, currently most knowledge use frameworks have excluded external context as a component influencing knowledge uptake and utilisation (e.g., Beyer & Trice, 1982; Huberman, 1987; Kitson et al., 1998; Manske, 2001) or have included external factors but with limited definition and clarity with respect to how they influence knowledge use (e.g., Dobbins et al., 2002). The findings from the current study validate the presence of external factors and their potential influence on internal context and knowledge use. Though the data used limited my ability to deduce the intensity of influence, the relevance of external contextual factors to knowledge use is undeniable, especially with respect to public health. For this study, external factors were influential on the internal context of health units and in turn, the internal context influenced knowledge use. Furthermore, the external contextual factors had implications for how information was utilised (i.e., conceptual, symbolic or instrumental), dependent on the external factors as well as the internal context of each organisation. These are preliminary findings that will require further research focusing specifically on the influence of external contextual factors however, they still cannot be ignored as an important component of a knowledge use framework.

In essence, a revised knowledge utilisation framework must continue to include elements already identified as essential to knowledge use, including the characteristics of information/innovation, such as characteristics of the source (credibility etc.) as well as characteristics of the information (relevant, timely, relative advantages etc.). It should also identify the interactive

processes within an organisation that allow for ongoing knowledge exchange and uptake (i.e., mutual engagement, joint enterprise, shared repertoire, etc.). The formerly defined contextual factors (e.g., leadership, commitment/receptiveness etc.) should also remain an essential part of a framework however, these factors need to be further refined to indicate how they inter-relate, the degree/intensity of influence and how they influence (directly or indirectly influential). This is especially important when examining the implications of context in the overall system of knowledge use (to be further described in a subsequent section). The framework must also include all levels of context including individual, organisational and environmental which are inextricably intertwined. The following Figure 11 depicts the incorporation of the aforementioned contextual factors to Manske's knowledge utilisation framework. The contextual factors, both internal and external have been incorporated in the *Characteristics of Internal Context for Use* domain. The domain now depicts contextual factors at the individual, organisational and environmental levels. The first degree (directly influential) organisational and external factors are indicated in upper case; second degree (indirectly influential) organisational factors are depicted in italicized lower case. The remaining factors in lower case (no italics) are relevant contextual factors but the degree of influence (direct/indirect) has not been determined (e.g., organisational characteristics such as size, structure and service elements).

Figure 11: Knowledge Utilisation Conceptual Framework Revised (Adapted from Manske, 2001, Cousins & Leithwood, 1993)



Though the current study aimed to identify organisational level factors influencing knowledge use it is imperative to also consider other levels of context such as individual attributes and external environment characteristics. Just as organisational context is important, so are individual level determinants of knowledge use since individuals make up an organisation, Without the right environment (i.e., supportive knowledge use environment), individuals may not be able to increase their use of knowledge to conduct evidence-informed practice (Estabrooks, 2003). Landry, Amara and Lamari (2001) examined the determinants and uptake of social science research in Canada. The results of their study found the user's context (i.e., individual level) as having a significant influence on all types of social science research (e.g., economics, sociology, anthropology, social work etc.). Landry and colleagues suggest that a user's context plays a more significant role in utilisation than the attributes of the information itself (i.e., characteristics of the information such as relevance, relative advantage etc.) indicating the importance of including all levels of context in a knowledge use framework. In addition to the individual level and organisational level context, previous discussion emphasised the need to consider elements of the external environment. As all three sites demonstrated, external context can be very influential on internal processes and ultimately internal knowledge use. The interplay between all three levels of context, individual, organisational and external environment, influences one another and therefore, must all be present in order for a model to depict accurate knowledge utilisation (Belkhodja et al., 2007).

In the end, it must be acknowledge that defining and incorporating the elements of context in a knowledge utilisation framework is a challenge. As Landry et al. (2001) argue, context is unique to each user and cannot be controlled by researchers or practitioners therefore, making it difficult to determine what contextual factors to include when further developing a knowledge use framework. However, the more we know and understand about all levels of context, including the interplay between each level and with other elements of knowledge use (e.g., characteristics of information), we will have a greater comprehension and appreciation for the complexity of knowledge utilisation to inform health promotion programs and policies. In turn, allowing for the development of a

knowledge use framework that outlines the necessary elements to facilitate evidence-informed practice.

6.5. Strengths & Limitations

Like all research, there were both strengths and limitations to the current study. Several strengths included my familiarity with the health units sampled. Even though I used what was termed as "secondary data", serving as the KE Extension Knowledge Broker I was responsible for data collection. Therefore, I had a solid understanding of the sample characteristics, selection and recruitment as well as expertise regarding the methods used for data collection. Having a strong background and familiarity with the health units helped me throughout the analysis when trying to develop a picture of each organisation's context and their respective factors influential on knowledge use.

A second strength to this study was the use of member checking to ensure that all interview responses were appropriately represented. As part of the KE Extension, all participants were asked to review their interview responses for appropriate representation which ensured a credible data set for coding and analysis.

A third advantage was triangulation of multiple sources (Patton, 2002) including interviews, internal documents and correspondence. This allowed for a more in-depth understanding of contextual influences on knowledge exchange and contributed to the credibility of the findings.

Finally, the use of multiple coders during the open coding analysis provided reliability of the methodology while peer debriefing established valid findings and control for subjective influences during the analysis (Lincoln & Guba, 1985).

Some limitations of this study included: potential response bias, sample selection, the time frame of the study, as well as the assumptions underlying the innovation measured (i.e., SHAPES).

As previously outlined, there were several strengths associated with the researcher filling the role of Knowledge Broker; however, this may also have led to response bias. The fact that I (as

Knowledge Broker) interviewed health unit staff about their level of SHAPES utilisation may have influenced participant responses seeking to please the interviewer. Ultimately, this may have influenced participants to imply greater use of SHAPES use than was accurate in an effort to fill social expectations. However, when interviewing individuals regarding the use of SHAPES, I asked participants to validate their responses and describe in detail how SHAPES was used. This helped to gain a clearer picture of exactly how SHAPES was being applied while justifying participant responses and attempting to control for bias.

Regarding sample selection, the Knowledge Utilisation Uptake Scale used to choose the health units with low, moderate and high knowledge use had not been validated at the time of data collection, increasing the risk of incorrect classification of each health unit's level of knowledge use. However, the study provided an opportunity to conduct preliminary validation of the scale while also ensuring the most appropriate health units were selected for the sample. The results of the validation did indicate the scale adequately measures level of knowledge use and therefore, correctly identified the health units with low, moderate and high knowledge use to make up the sample.

With respect to the data collection tools, the interview guide used to solicit participant responses was originally designed for the KE Extension which focuses specifically on internal processes employed for knowledge use. As a result, the amount of detail regarding external contextual factors was limited and may not have been fully captured, limiting my insight into the role of external contextual factors and knowledge use.

Another limitation was the study design. The current study included the examination of "one time" interviews with public health staff and therefore did not provide a picture of knowledge use over time. As indicated by Davies et al. (2006), sustained knowledge use is a long dynamic process that requires time in order to see change. The current study was a snap shot of knowledge uptake and utilisation and did not observe practice over time. As a result, future examination of the same three health units may reveal further knowledge utilisation, especially with respect to Site 3 who demonstrated early stages of preparation to use SHAPES. Studies examining practitioners' use of

evidence-based practice is a long process that continually evolves and changes (Davies et al., 2006). A study spanning over a longer period of time may provide a better picture of the role of context and the influence on knowledge use within public health.

Finally, the study examined the uptake of a specific innovation (SHAPES) with the underlying assumptions essential to knowledge utilisation. The format and information derived from SHAPES contains many of the necessary attributes outlined by knowledge use frameworks such as obervability, timeliness, relevance and so forth. As a result, this may have helped contribute to higher uptake and use compared to the uptake of other evidence in similar studies. Also, the health unit with the highest knowledge use had the unique opportunity of experiencing SHAPES over a longer period of time. This too may have contributed slightly to Site 1's higher degree of knowledge use versus the other health units with more limited experience using SHAPES.

It should also be noted that SHAPES evidence is a form of surveillance data which has implications for the way health units uptake and utilise the information. Surveillance data can be used to identify issues and inform decisions and assist in selecting interventions or best practices to address health priorities. As a result, the nature of SHAPES evidence differs from other sources of information (such as systematic reviews, better/promising practices etc.) which may have had an impact on how health units used the information (i.e., conceptual, instrumental or symbolic) or impacted the contextual factors influential on knowledge use.

Though there are some reservations regarding the methodology and data used for the study, the impact on the results are limited. The overall methodology and care taken to ensure valid and reliable findings (scale validation, member checking, peer debriefing and inter-rater reliability) add to the overall strength of the study, ensuring limited impact from any weaknesses.

6.6. Implications for the Future: Researchers, Practitioners & the Overall System

The results of this study leave several implications for future research and evidence-informed practice in public health. The influential role of organisational context on knowledge utilisation must be

acknowledged as a pivotal component within knowledge use frameworks. Consideration must be given to further examining and outlining the numerous internal contextual factors within public health, including in-depth understanding of the role of organisational leadership in knowledge utilisation, as well as investigating factors influencing leadership such as resources of time and capacity. Also, detailed examination of marrying leadership with organisational processes, size and structures to understand how to more readily link research utilisation leaders (e.g., epidemiologists) with other relevant programs/departments seeking such information would be beneficial. The more we understand internal processes (e.g., internal co-ordinated actions) we will be better equipped to build an infrastructure in public health that will function as an efficient knowledge exchange and utilisation system.

Due to the influence of context on knowledge use, researchers must also become forward thinking and produce evidence that not only has ideal attributes (such as relevance to end users) but also takes into account the contextual factors public health practitioners work within such as public health mandates and priorities (Dobbins et al., 2007). Producing more "useable" evidence within the public health context will effectively create increased receptiveness and commitment toward the uptake and utilisation of evidence in public health practice.

Future research should also focus on the external contextual factors influential on internal context and knowledge use. Knowledge exchange and utilisation is not conducted in a linear fashion but rather works back and forth between research producers and users within a sphere of multiple contexts (individual, organisational and environmental) that will ultimately influence utilisation. Research must begin to identify the external contextual factors, how they inter-relate and identify the linkages between all three levels of context to understand the influence each level has on the other (Belkhodja et al., 2007).

In addition to the implications for future research, the results from this study also have implications for public health processes and structures. The current findings and other literature suggest the need for leadership across staff and programs/services to increase uptake and use of

evidence. Moreover, health units need to develop adequate, planned processes that facilitate the use of evidence. Simply incorporating evidence-informed practice as an organisational policy is not enough. Appropriate leadership that provides a supportive knowledge use environment and guides processes and co-ordinated action to facilitate are also essential elements. Literature has suggested several strategies that incorporate both organisational and individual level factors to help maintain knowledge use. Some of these strategies include; commitment and leadership on behalf of the organisation as well as supporting staff in change efforts to incorporate knowledge into their practice (Received Wisdoms, 2007). Examples of organisations fostering a supportive knowledge use culture provide resources that cultivate leadership. One example is an Eastern Canada Regional Health Authority implementing executive training programs to facilitate leadership skills among management level staff. The results of this program have lead to managers' increased use of evidence as well as encouragement of fellow coworkers to use evidence in their practice (Received Wisdoms, 2007). Ultimately, such a program facilitates and demonstrates leadership at both the organisational and individual level contributing to an overall culture shift. The likelihood of sustained knowledge use requires an organisational culture supportive and committed to research use and evidence-informed practice, as well as ongoing staff training, supportive policies promoting research use and collaborative work with community partners and researchers (Davies et al., 2006; Belkhodja et al., 2007). As a result, public health units need to target both individual and organisational strategies to support knowledge use while also taking into consideration the influences from external contexts (i.e., the best way to meet their needs and client needs). By incorporating knowledge exchange and utilisation tools into professional development strategies/protocols, health units will demonstrate commitment of resources and time to evidence-informed practice (Tsui et al., 2006; Received Wisdom, 2007).

The development of leadership and internal processes to support knowledge use in public health units may be initiated and supported by organisational mandates and priorities. The findings from this study demonstrated the influence an organisation's mandate/priorities my have on

knowledge use. Creating a mandate and or policies that require judicious evidence-informed practice will help to facilitate knowledge use. Recent revisions to Ontario public health's guiding document, Mandatory Health Programs and Service Guidelines (MHPSG), have lead to the creation of an updated version of the document entitled *Ontario Public Health Standards*. The new health standards still outlines health unit mandated services and programs but also places a large emphasis on knowledge exchange and evidence-informed practice(Ontario Ministry of Health and Long Term Care, 2007). This shift toward required knowledge use, in conjunction with a growing field of knowledge use research, may prove to be very timely in our efforts to increase evidence-informed practice in public health.

In the end, there are numerous factors that come into play when examining knowledge use. The aforementioned contextual factors point to the varying contributors to the ebbs and flows of knowledge in an overall system in which changes in one component of the system may alter other components of the system. These factors, such as context, can greatly influence knowledge use in public health units, but researchers and public health units are not the lone players in an overall system. There are numerous stakeholders involved in public health and health promotion, such as ministries, non-governmental agencies, research funding agencies, health units, health care delivery systems, academia, community groups and the general populations/individuals who receive services. As a result, emphasising evidence-informed practice across all groups is essential. In order for a system to support and utilise evidence it must create knowledge that is relevant and practical to practitioners and decision-makers. In order for this to happen the system must support researchers in their efforts to produce and appropriately disseminate useful research findings. However, they cannot do this on their own. Granting agencies need to fund research proposals that incorporate knowledge use and exchange as part of their research outcomes. Knowledge exchange and utilisation needs to be incorporated into the research process while giving consideration to the most effective and relevant means of communicating evidence to the appropriate target audience (Tsui et al., 2006). Furthermore, the current academic system is an incentives/rewards based system, where academics

are rewarded tenure/promotion for publications, not for practicality or actual use of the evidence by practitioners. Such a system needs to support community-based research that engages and mobilizes end users to take action and utilise evidence to guide their decisions (Jacobson et al., 2003).

In order for researchers to create useable evidence, the overall system needs to support and nurture collaborative partnerships across stakeholders, including researchers, practitioners and decision-makers. Collaboration results in more applied research that will increase practitioners and decision-makers access to practical, relevant evidence. A system that emphasizes collaboration allows for sustained relationships to support knowledge exchange and access to resources (Gibson, 2007) while bringing awareness to the varying contexts in which research producers and users function leading to more effective problem solving (Tsui et al., 2006). Furthermore, the development of relationships and networks will foster knowledge transfer (Kramer & Wells, 2005b) and the growth of communities of practice, both within health units as well as across sectors. Communities of practice provide a natural learning environment that allows individuals and organisations to seek and share knowledge and insights while building on their existing knowledge (Wenger, 1998; Tsui et al., 2006). Moreover, Communities of Practice provide an opportunity of knowledge uptake including scientific as well as tacit/experiential knowledge, as clearly demonstrated by the findings in Site 1, the health unit with the highest knowledge use.

Finally, a system that provides the supports for increasing the skills of individual public health practitioners to use evidence will assist individual organisations to apply knowledge in their own unique contexts. Key players, such as ministries and agencies, must provide the resources and opportunities for health units to support professional development while also creating mandates holding practitioners accountable for evidence-informed practice (e.g., increase emphasis on knowledge use skills as part of public health core competencies).

Overall, the use of evidence (scientific and experiential) must be embedded in all components of a system. Governing bodies, including ministries, need to provide the resources and mandates that support evidence-informed practice at all levels (regional and provincial). While researchers and

funding agencies need to be held responsible for incorporating knowledge exchange and use in research outcomes. Finally, collaboration across all sectors will allow for knowledge exchange at all levels while informing research questions to produce more effective and relevant evidence that will be useable and adaptable to a user's context.

7. Conclusion

This study was designed to examine the role and inter-relation of contextual factors on knowledge use. To date very little literature has focused on context and this study is one of very few to examine context specific to knowledge use in a public health setting. Several contextual factors were identified as directly or indirectly influential on knowledge use. Of these internal factors, several have been identified by previous frameworks, validating the prominence of contextual factors such as leadership, commitment/receptiveness, organisational mandates and priorities as well as previous history of knowledge use. The identification of internal co-ordinated action was unique to this study and is congruent with research examining the elements of learning organisations. The identification of internal co-ordinated action to utilise evidence indicates the role of explicit plans and processes necessary for facilitating knowledge uptake and utilisation. Most literature focusing on context has neglected the role of processes or has not clearly defined what this might entail. This project outlines the link between contextual factors while identifying the essential elements of commitment/receptiveness, leadership and internal co-ordinated action as directly influential on knowledge use, supported by other contextual factors such as organisational mandates and priorities. Though this particular study focused on internal contextual factors, several external contextual factors were also found to be influential on internal health unit context and knowledge use.

More research focusing on the link between individual, organisational and environmental contexts is needed to fully understand the role of context in relation to knowledge use within a system of exchange and utilisation. By increasing our understanding of these factors we will be able to create a more informed and developed knowledge utilisation framework to inform researchers of the type of information needed as well as guide practitioners/organisations on the attributes and processes necessary for evidence-informed practice creating more effective and efficient health promotion programs.

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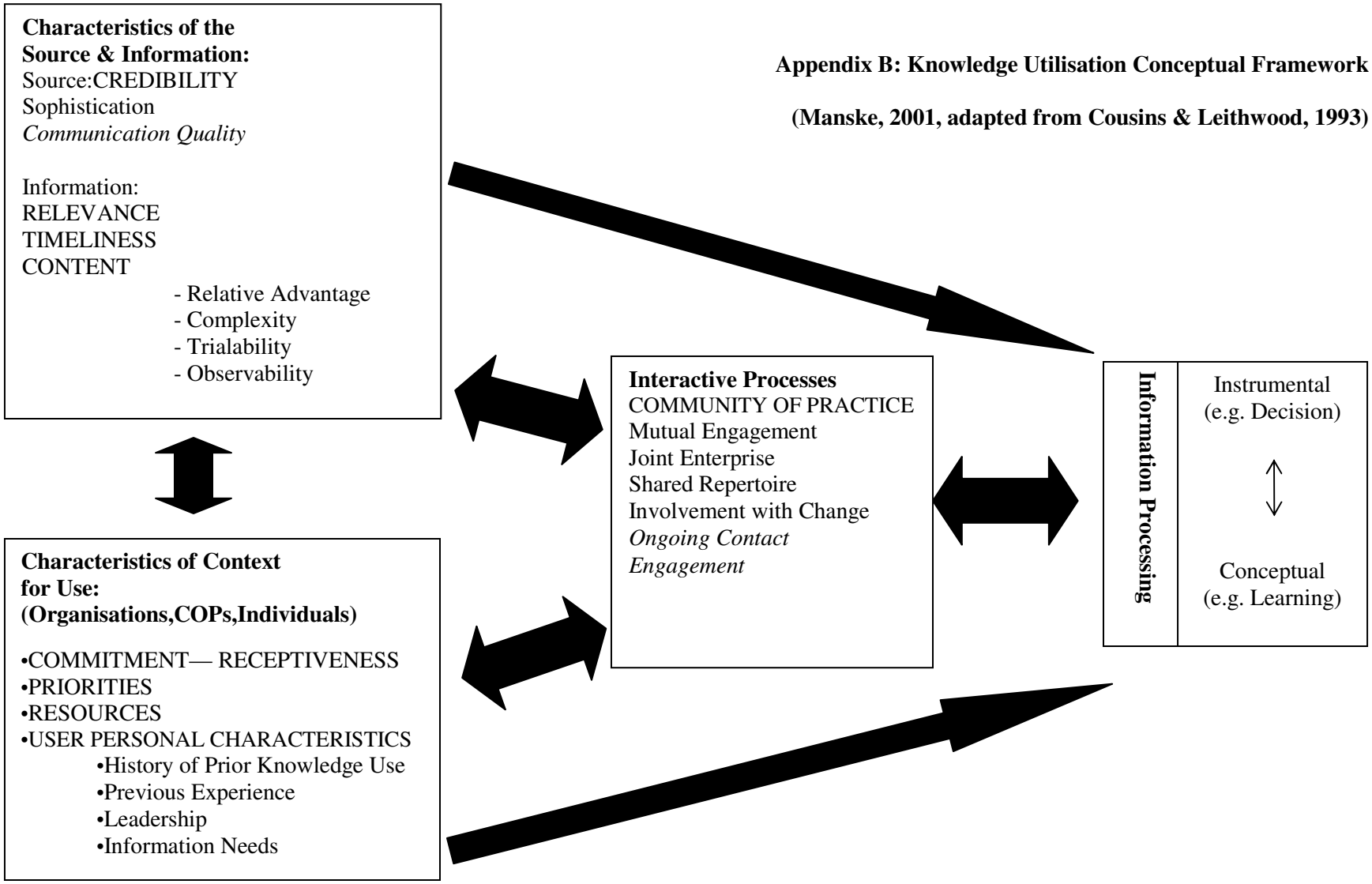
Appendix A: Literature Review Databases & Search Terms

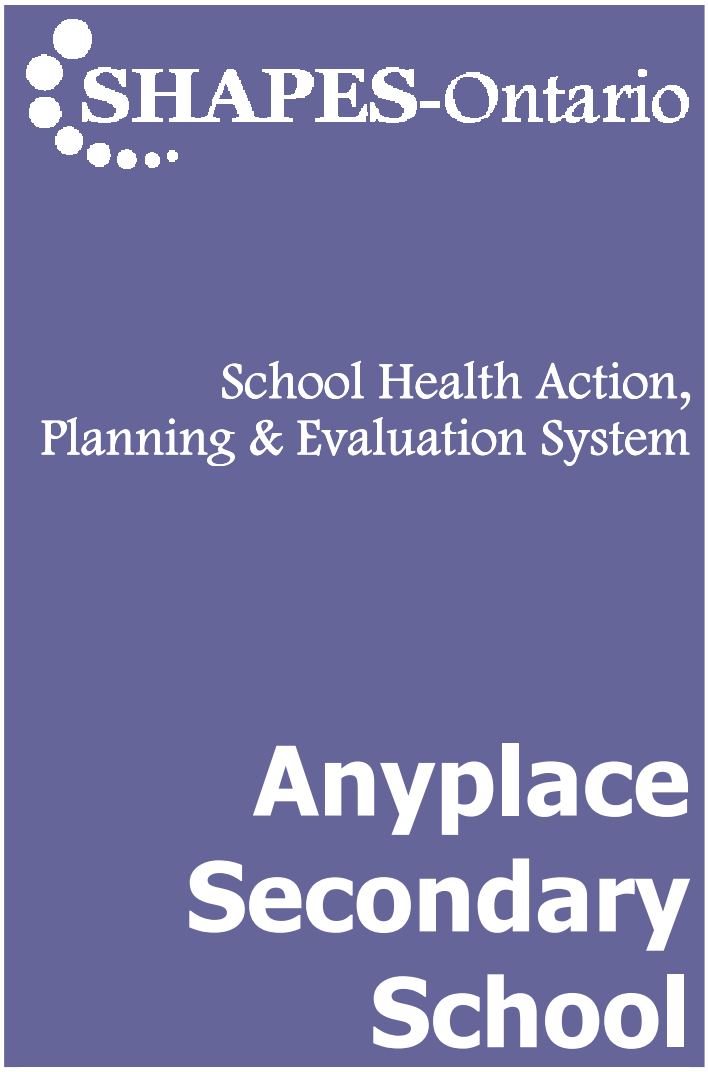
DATABASE/RESTRICTIONS	CONCEPT	SEARCH TERM
ABI/Inform Restrictions: 01/01/1999 to 08/16/2006, English only, Excluded: newspapers book reviews	Knowledge Use	knowledge management information management
	Context	organization* behaviour organization* capacity corporate culture
	Evidence-Informed Practice	evidence-based medicine evidence-based practice
	Public Health	public health
CINAHL Restrictions: 1999-2006, English only	Knowledge Use	diffusion of innovation professional knowledge information management
	Context	organization* culture organization* development
	Evidence-Informed Practice	professional practice, evidence-based
	Public Health	health promotion
Web of Science Restrictions: 1999-2006, English only	Knowledge Use	knowledge use knowledge exchange diffusion of innovation
	Context	organization* context organization* culture organization* climate organization* capacity
	Evidence-Informed Practice	evidence-based practice research utilization evidence-based medicine
	Public Health	public health health promotion public health practice
ERIC Restrictions: 1999-2007, English only	Knowledge Use	information utilization diffusion research utilization information management
	Context	organization* climate organization* culture
	Evidence-Informed Practice	evidence based practice theory practice relationship
	Public Health	public health health promotion

Sociological Abstracts Restrictions: 1999-2007, English only	Knowledge Use	knowledge utilization information dissemination diffusion
	Context	work environment organization* culture organization* development organization* structure
	Evidence-Informed Practice	evidence based practice theory practice relationship
	Public Health	public health health education
PsychINFO Restrictions: 1999-2007, English only	Knowledge Use	knowledge management knowledge utilization information management
	Context	organization* climate organization* learning organization* characteristics+
	Evidence-Informed Practice	evidence based practice
	Public Health	public health health promotion
MEDLINE (PubMed) Restrictions: 1999/01/01 to 2006/08/16, English only, humans only	Knowledge Use	health knowledge, attitudes & practice diffusion of innovation
	Context	organizational culture
	Evidence-Informed Practice	evidence-based medicine evidence-based medicine/organization & administration+ organizational innovation+
	Public Health	public health practice health promotion
Cochrane Library Restrictions: 1999-2006, English only	Knowledge Use	knowledge
	Context	organizational culture
	Evidence-Informed Practice	evidence-based medicine evidence-based practice
	Public Health	public health

Appendix B: Knowledge Utilisation Conceptual Framework

(Manske, 2001, adapted from Cousins & Leithwood, 1993)




SHAPES-Ontario
School Health Action,
Planning & Evaluation System
Anyplace
Secondary
School


University of
Waterloo
SMOKE
FREE
ONTARIO
cancer care
ontario
action cancer
ontario

Your Confidential Report

This School Health Action, Planning and Evaluation System (SHAPES) report presents the findings of a survey conducted by the Population Health Research Group at the University of Waterloo. We are pleased to provide this report of results for Anyplace Secondary School and thank you for your participation in May 2005.

This survey assists community leaders (educators, students, and public health workers) by providing school-level information about smoking and physical activity. This project was funded by the Ontario Ministry of Health and Long-Term Care and Cancer Care Ontario.

Our research team will be distributing this report to your school contact only, except with the written permission of your school administrator. Any results that are published or otherwise disseminated by the researchers will maintain the anonymity of your school. School officials should decide how best to distribute this report to meet needs. We do encourage you to partner with your local public health unit and voluntary organizations to take action on the findings reported here.

If the number of students responding in a school is small enough that it might be possible to identify individual student responses, findings are not reported. Please note that approximately half of your students completed each of the two questionnaires (Smoking Behaviours, Physical Activity), with core items included on both versions. Also, please note that in some cases, results in table columns or rows and charts may not add to 100% due to rounding.

For more information on this report, or the research project associated with it, please contact:

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Table of Contents

SHAPES-Ontario

Part A:

Smoking at Anyplace Secondary School

The Issue

Smoking is a School Issue

- Students who take up smoking show a decrease in academic achievement and motivation.[1]
- Smoking is associated with an increased risk of dropping out of high school; smoking is more predictive of dropping out than marijuana use or alcohol use.[2]
- Starting smoking at an early age is predictive of a number of other risk behaviours; these include carrying a gun or other weapon at school, fighting, and drug use.[3]

Smoking is an Adolescent Issue

- 85 percent of current smokers start smoking by the age of 19.[4]
- The average age at which students smoke their first whole cigarette is 11.[5]
- What starts as a bid for *independence* quickly becomes *dependence* on tobacco. Only 5% of students who smoke think that they will be smoking in 5 years - 5 years later, 80% of them smoke heavily.[6]

"Today's teenager is tomorrow's potential regular customer, and the overwhelming majority of smokers first begin to smoke while still in their teens… The smoking patterns of teenagers are particularly important to Philip Morris."

(1981 report by researcher Myron E. Johnson, sent to Robert E. Seligman, Vice President of Research and Development, Philip Morris)

Smoking is a Community/Public Health Issue

- 22% of all deaths in Canada are attributable to smoking.[7] Smoking causes 4 times as many deaths as car accidents, suicide, homicide and AIDS combined.[8]
- Half of all long-term smokers will die or be disabled by a smoking-related illness.[9]

Schools Can Make a Difference…

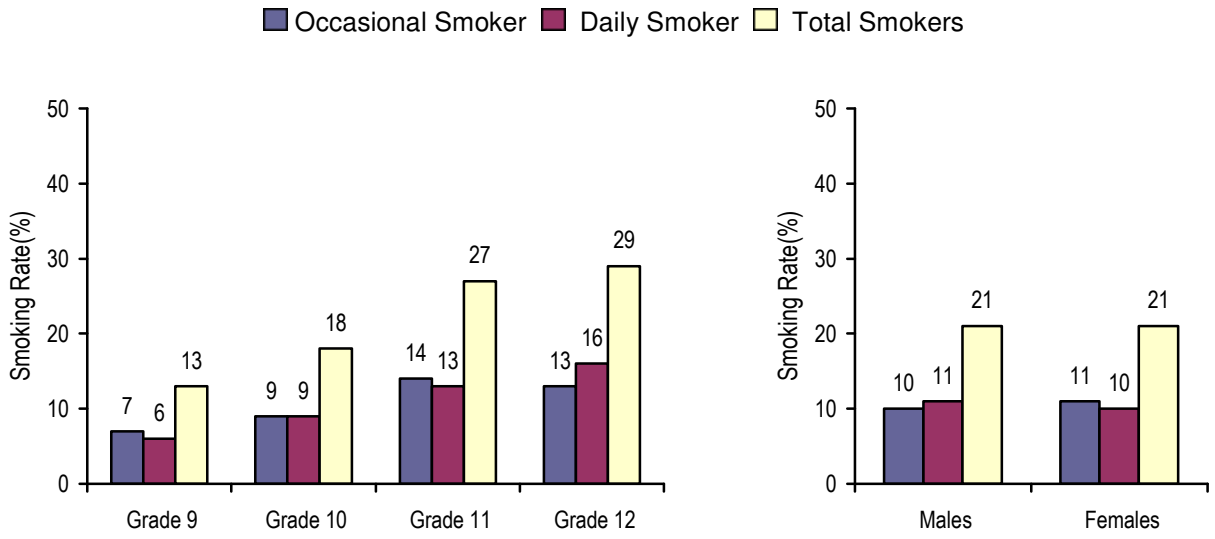
School efforts linked with local public health and community agency efforts can reduce problems related to youth smoking. Research has shown that successful efforts include education (coordinated curriculum), a supportive environment (clear, enforced rules about smoking), services and students who know people care.

See the SHAPES-Ontario website, www.shapes.uwaterloo.ca, for a list of useful resources and websites.

Who Smokes at AnyPlace

Overall, 24% of the students we surveyed at AnyPlace reported that they are currently smoking. The graphs below summarize the percentage of students who smoke by grade and by sex. For these graphs, a daily smoker is defined as a person who currently smokes cigarettes every day, and an occasional smoker is defined as a person who currently smokes cigarettes, but not every day.

Student Smoking Rates at AnyPlace



The Canadian Tobacco Use Monitoring Survey[10] indicates that 17% of youth ages 15-19 in Ontario are current smokers. When compared to this rate, the smoking rate at AnyPlace is:*

Very High	High	Average	Low	Very Low

*Smoking rates 5% to 9% above Ontario's provincial smoking rate for age 15-19 (17%) are considered "High."

Schools Can Make a Difference...

Implementing programs and/or policies that would lead to even a 5% absolute reduction in smoking prevalence at AnyPlace, would result in the prevention of an estimated 100 students from becoming long-term smokers. This would save 50 students from death or disability from a smoking-related illness. School programs to prevent tobacco use can make a major contribution to the future health of young people, especially when these programs are combined with community efforts. The resource list found on our project website (www.shapes.uwaterloo.ca) is a good starting point for planning interventions.

Social Influences for Smoking

Students take up smoking for a variety of reasons. Peers and family members are especially influential in the decision to start or continue smoking. These influences are sometimes direct (peer pressure), but are more often indirect (modeling). We asked students at AnyPlace a series of questions relating to peers and family.

All students were asked, "*How many of your 5 closest friends smoke cigarettes?*" Smokers are more likely to report that they have friends who smoke compared to non-smokers. In fact, 65% of non-smokers report that none of their 5 closest friends smoke cigarettes, whereas 49% of daily smokers report that ALL five of their closest friends smoke.

How many of your 5 closest friends smoke cigarettes?	Percentage of Students Responding		
	Daily Smokers	Occasional Smokers	Non-Smokers
0	5	24	65
1 or 2	15	43	27
3 or more	80	33	8

Students were asked if their father, mother, or older sibling(s) smoked. Again, there is a noticeable difference in the experiences of smokers and non-smokers. Smokers are more likely to have an immediate family member who smokes.

Family Member Smokes	Percentage of Students Responding		
	Daily Smokers	Occasional Smokers	Non-Smokers
Father Smokes	48	33	26
Mother Smokes	48	29	20
Older Sibling(s) Smoke	45	31	16

Schools Can Make a Difference...

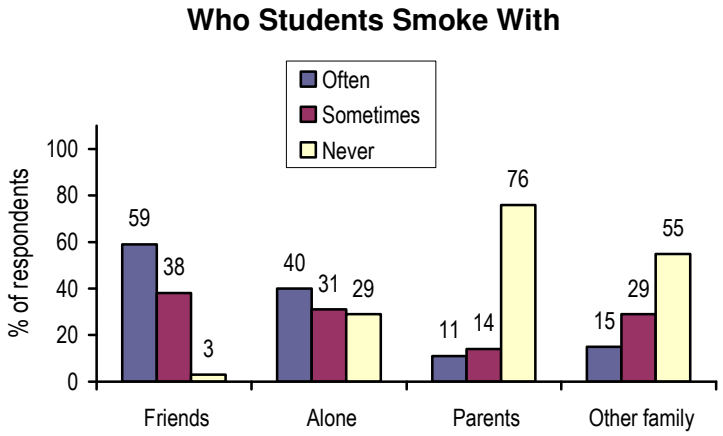
Smoking often occurs in social situations among peers. Programs that help students to develop skills for resisting social influences would be helpful. The most successful programs teach students refusal skills through direct instruction, modeling, rehearsal, and reinforcement. It is also important to increase awareness of the artificial atmosphere created in our society that leads students to see the cigarette as a rite of passage into adulthood and an emblem for rebellion.

Encourage staff, students and their families to promote a non-smoking norm even if they are smokers themselves. Let parents know that even when they smoke themselves, banning smoking in the home and speaking against smoking reduces the likelihood that their children will smoke.

Student Smoking Patterns

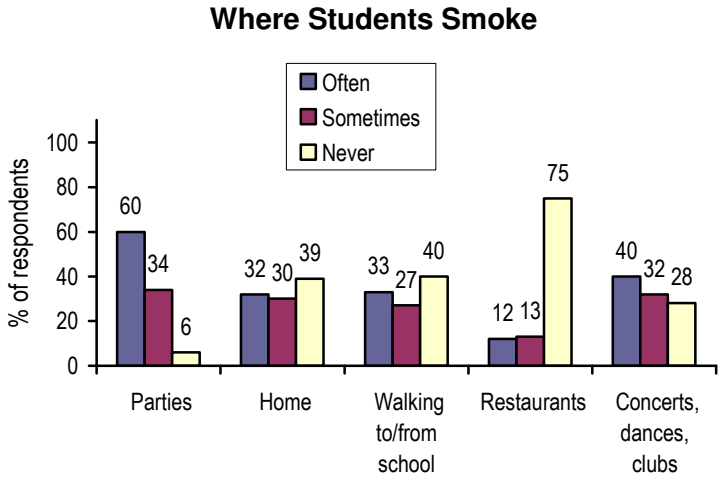
We asked students who consider themselves smokers where, when, and with whom they smoke. Their responses to these questions provide a more complete picture of smoking at AnyPlace and give indications of how to provide meaningful programming to address smoking.

Most students who smoke at AnyPlace report that they often smoke with friends and seldom smoke with parents or other family. Notice that 40% of students who smoke at AnyPlace report that they "***often***" smoke alone. This indicates that there is a notable group of smokers for whom smoking is no longer a social activity - an indication of addiction.



Students were more likely to report that they "***often***" smoke at social venues, such as parties and concerts, than at home. This is consistent with *when* students report that they "***often***" smoke:

- on weekends – 55%
- in the evening – 45%
- after school – 48%
- during the school day – 45%
- before school – 38%



Schools Can Make a Difference...

Students' perceptions of smoking in their school environment can influence their risk for smoking. Research has demonstrated that students are at increased risk for smoking if they often see students smoking near their school or often see students at their school smoking where they are not allowed.[11] Schools can try to reduce the visibility of smoking during the school day by developing policies that prevent students smoking on the sidewalk surrounding the school, or working to develop policies with neighbours and/or businesses around schools that prevent students from smoking on their property.

Preventing students from smoking during the school day could have a positive influence (e.g. decreased exchange of cigarettes with other students, decreased social modeling by other students, and less peer pressure to smoke).

School Smoking Policies

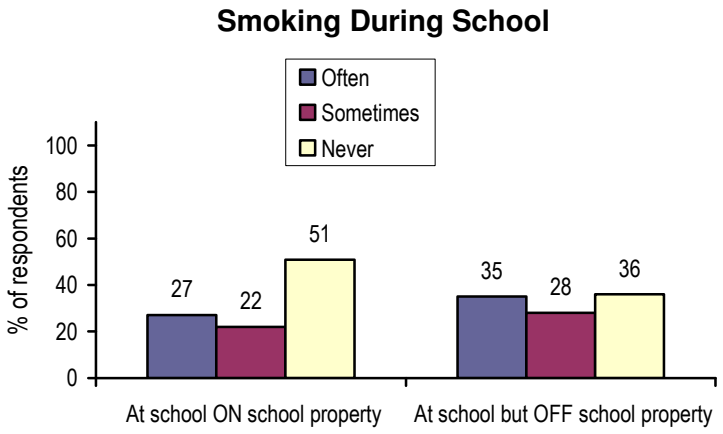
The 1994 Ontario Tobacco Control Act banned smoking on school property to reduce students' exposure to smoking during the school day. Survey results for your school show that although many students smoke while "at school," most leave school property to do so.

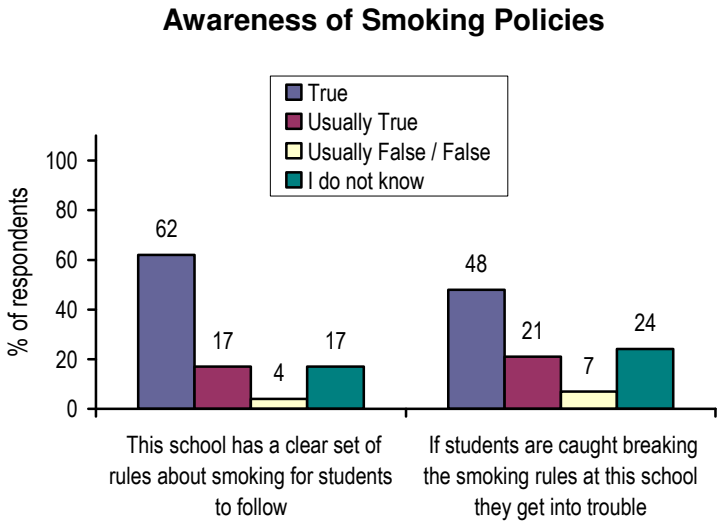
Still, 49% of smokers at AnyPlace reported that they often or sometimes smoke on school property during the school day.

Visibility of students smoking can be an important social influence. At AnyPlace, 84% of all students said that the statement, "*I often see students smoking near this school,*" is true or usually true.

All students were asked about their perceptions of school rules on smoking and their enforcement. When students were asked, "*How many students at this school smoke where they are not allowed to?*" 54% of them responded "a lot" or "some".

As the graph on the right shows, many students reported that the school has a clear set of rules about smoking, and that students caught breaking the rules face consequences. However, a number of students reported that they did not know about the rules and consequences at their school.





Schools Can Make a Difference...

The enforcement and perceptions of enforcement are crucial to the success of school smoking bans. A recent study found that school smoking bans that were strictly enforced were related to an 11% decrease in the uptake of smoking.[12] To obtain this type of a reduction, it is important that students perceive that most or all students obey the rules. It is important for students to understand that the rules are not arbitrary, but intended to protect the health of students.

Students' Perceptions of Smoking

We asked students, *"How many people your age do you think smoke cigarettes?"* The table below shows students' estimation of the smoking rate at AnyPlace compared to your school's actual smoking rate of 21%; responses that are an overestimation of the actual smoking rate are shaded in blue, accurate responses are shaded in yellow and responses that are an underestimation are shaded in burgundy.

Students' Perceptions of Peer Smoking Rates

Response options (%)	Percentage of Students Responding		
	Smokers	Non Smokers	All
91-100%	2	1	1
81-90%	7	2	3
71-80%	9	8	9
61-70%	12	11	11
51-60%	10	11	10
41-50%	12	15	14
31-40%	20	18	18
21-30%	15	18	17
11-20%	10	12	11
0-10%	3	5	4

The results show that most students (67%) at AnyPlace (72% of smokers and 66% of non-smokers) believe that smoking is more common than it actually is; 17% of students have an accurate perception of the smoking rate, and 15% underestimated.

Schools Can Make a Difference...

Correcting misperceptions can alter students' attitudes about smoking, especially those related to the creation of "peer pressure". Communicating these results in the school newspaper, on a bulletin board, in an assembly or in other ways may help to show students that smoking is not as common as they think. Remember that repeated long-term exposure to these new ideas will be necessary to change attitudes about smoking.

Susceptibility to Smoking

There is a relatively small window in life when one is susceptible to becoming a smoker. Most established smokers start experimenting with cigarettes between the ages of 10 and 18.[13] Once one starts to smoke it can be very difficult to quit. Therefore, it is important to intervene before susceptible students start smoking.

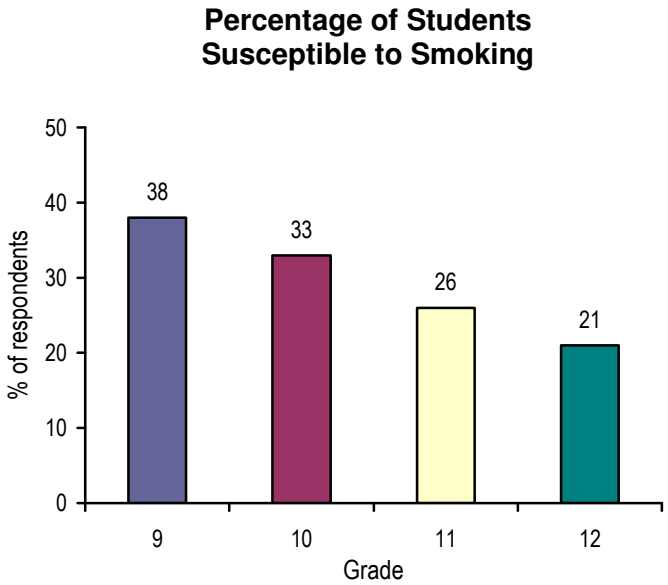
Students who feel strongly that they will not try smoking in the future and who feel they can resist peer pressure to smoke are less likely to begin smoking.

We asked students at AnyPlace who have never smoked two questions about their intentions to remain smoke-free:

- *"Do you think in the future you might try smoking cigarettes?"* and
- *"At any time during the next year do you think that you will smoke a cigarette?"*

We also asked one question relating to their confidence in resisting peer pressure:

- *"If one of your best friends were to offer you a cigarette, would you smoke it?"*



From their answers to these questions we determined that 32% of the students who have never smoked a cigarette have low confidence in their ability to remain smoke-free in the future, and are thus at high risk to begin smoking.

We also asked students who had never smoked if they had ever been curious about smoking a cigarette. At AnyPlace, 18% responded yes.

Schools Can Make a Difference…

Most experts agree that there are stages to smoking uptake including (1) a preparation phase in which intentions and expectations regarding smoking shift, (2) early experimentation, (3) regular but non-daily smoking and (4) established smoking. Students whose attitudes and beliefs predispose them to smoking may soon start to experiment. Smoking control efforts should focus on preventing students from becoming susceptible, preventing susceptible students from experimenting, as well as encouraging experimenters and established smokers to quit.

Trying to Quit Smoking

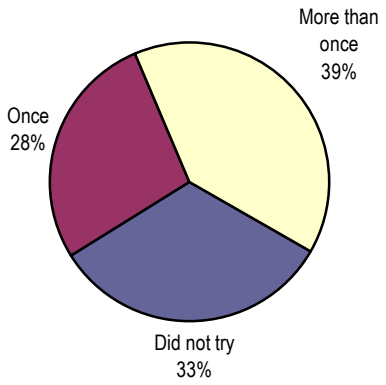
Quitting smoking is not an easy process for adults or for youth. New evidence indicates that the first symptoms of addiction to nicotine may occur as early as a few days or weeks after the beginning of even occasional smoking by youth.[14] Students can have a very difficult time quitting even when they have strong motivation to do so.

Students were asked about support for those who wish to quit smoking. When they were asked if there was help available at their school, 21% said yes, help is available, 13% said that there is no help available and 66% did not know. When students were asked if they would join a quit smoking program if one were offered at the school, 21% of smokers said that they would.

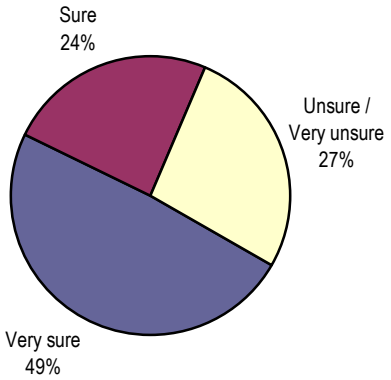
Many smokers make several quit attempts before successfully maintaining a long-term smoke free lifestyle. When daily smokers at your school were asked, "*How many times in the past year have you tried to quit smoking,*" Most (67%) reported one or more quit attempts.

Students were also asked how sure they were that they could quit smoking. Despite the large proportion of students who feel they could quit smoking if they wanted to, many students do not have a clear quit date in mind. When students who smoke were asked about their plans to quit smoking, 66% of females and 56% of males stated they plan to quit but are not sure when; 24% of females and 27% of males plan to quit within a week to a year; and, 11% of females and 17% of males have no plans to quit.

Number of Quit Attempts in the Past Year



How Sure are Students that They Could Quit



Schools Can Make a Difference...

Cessation services are an important aspect of a comprehensive approach to tobacco control. If AnyPlace provides such services, consideration should be given to promoting them. If there currently are no services in place, implementing a program would be of great benefit to the many students at AnyPlace who would like to quit smoking but find it difficult to do so. The resource list on the project website (www.shapes.uwaterloo.ca) suggests several good cessation programs that can be implemented by the school alone or in conjunction with your local public health department.

SHAPES-Ontario

Part B:

Physical Activity at Anyplace Secondary School

The Issue

Physical Activity is a School Issue

- Students who participate in school sports are less likely to drop out of school and tend to have higher educational aspirations.[15]
- Increased participation in physical education is associated with improved classroom behaviour, as well as increased enthusiasm toward school and school work.[16]
- Physical activity is associated with improved behaviour and cognitive functioning in youth with attention-deficit disorders and problems controlling impulsive actions.[17]

Physical Activity is an Adolescent Issue

- Over half of Canada's youth are physically inactive; 82% of youth are not active enough for optimal growth and development.[18]
- Physical activity strengthens the heart, bones and muscles, improves fitness and can help achieve a healthy body weight.[19]
- Physical activity is associated with increased self-esteem and decreased depression and anxiety.[19]

Children spend 40% less time being physically active than they did 15 years ago.

"If the trend isn't reversed, today's children could become the first generation that dies at a younger age than their parents."

(Dr. Rick Bell, Canadian Association for Health, Physical Education, Recreation and Dance)

Physical Activity is a Community/Public Health Issue

- Behaviours started in childhood and adolescence tend to carry over to adulthood[20]; 56% of Canadian adults 20 years and older are considered physically inactive.[18]
- Physical inactivity is associated with an increased risk of type 2 diabetes, obesity, coronary heart disease, cancer and osteoporosis, which can lead to decreased quality of life and premature death.[21]
- In 2001, the economic burden of physical inactivity in Canada was estimated at $5.3 billion. This represented 2.6% of all health care costs in Canada that year.[22]

Schools Can Make a Difference...

Effective action to increase youth physical activity will promote healthy lifestyles. Youth physical activity can be increased by letting students know that their school and community care, increasing awareness through education, as well as creating a supportive school environment and services (rules, facilities and programs that facilitate or promote activity). Schools, local public health and community agencies can work together to achieve common goals for physical activity.

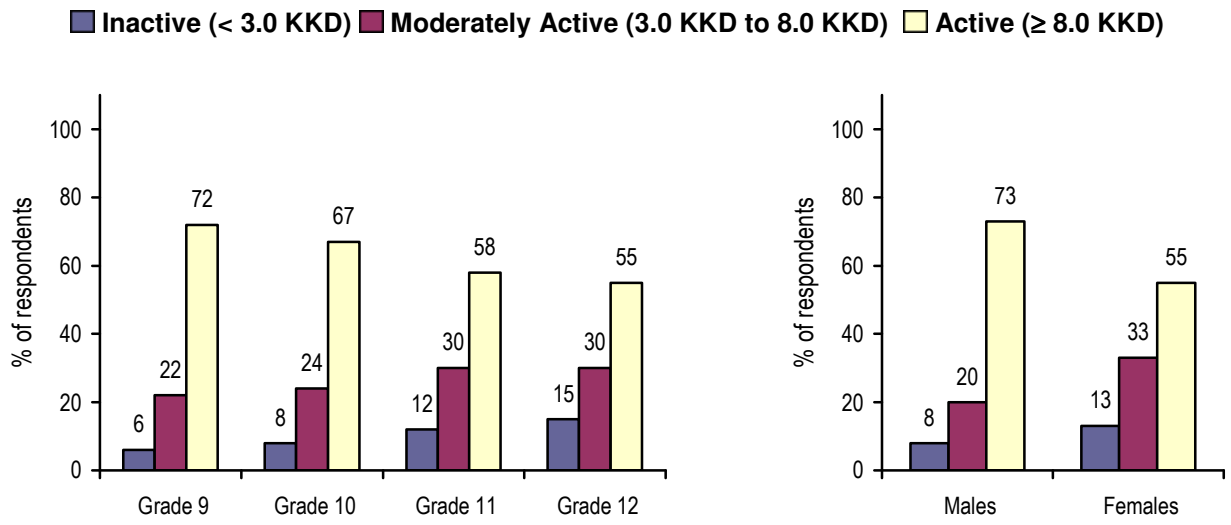
See the *SHAPES-Ontario* website at www.shapes.uwaterloo.ca for a list of useful resources and websites.

Physical Activity Levels at AnyPlace

Levels of activity for youth in Canada are low. In fact, only 44% of Canadian youth are physically active, and just 18% are considered to be active enough to meet recommendations for optimal growth and development.[18]

Physical Activity is measured in kilocalories per kilogram per day (KKD). KKD is a measure of how much energy a person expends in a day. It is recommended that youth expend at least 6 to 8 KKD for optimal growth and development.[23]

Physical Activity Levels at AnyPlace



Based on student reports, 64% of students at AnyPlace are active, and another 26% are considered moderately active. However, 10% of your students are physically inactive, and therefore of concern.

Please use caution when interpreting these results; our testing of the questionnaire indicates that students tend to over-estimate their time spent being physically active.

For example, time spent waiting in line for a ski lift or at lights to cross a street may be counted as active time on questionnaires.

Schools Can Make a Difference...

Schools can help to decrease the number of students who are physically inactive and increase the number of students who meet guidelines for optimal growth and development by providing opportunities to be physically active at school and by encouraging students to be active outside of school.

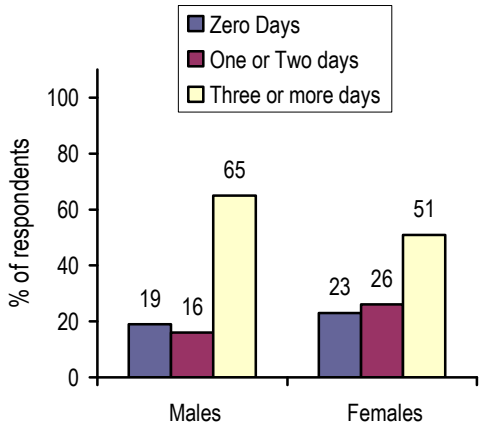
Strength and Flexibility Training

Strength Training

Strength training involves resistance training to enhance one's ability to exert or resist force, and helps develop and maintain strong muscles, healthy bones and healthy body weight and image. It is recommended that youth train 2-3 days per week to achieve gains in strength.[24]

At AnyPlace, 79% of students reported participating in strength training activities such as push-ups, sit-ups, pilates and weight lifting. Of students that reported participating in strength training, males reported that they strength train an average of 4.1 days per week, and females reported that they strength train an average of 3.7 days per week.

Frequency Per Week of Strength Training

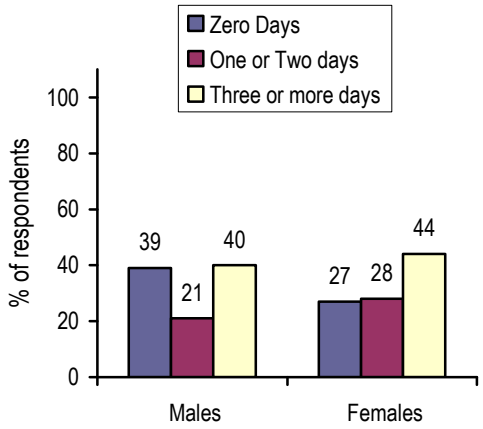


Flexibility Training

Flexibility training helps to maintain the ability to use joints through the full range of motion. It is an important component of living a healthy active lifestyle, but is often overlooked in physical activity programming. While there are no specific guidelines for youth, Canada's Physical Activity Guide recommends that adults do flexibility activities 4 to 7 days a week as part of a regular physical activity program.[25]

At AnyPlace, 67% of students reported doing exercises for flexibility such as stretching and yoga. Of students that reported participating in flexibility training, males reported that on average they exercise for flexibility 3.7 days per week, and females reported that they average 3.4 days of flexibility training per week.

Frequency Per Week of Flexibility Training



Schools Can Make a Difference...

Strength and flexibility are important components of being physically fit. As with any activity, students should know how to do these activities safely and properly. Students can be encouraged to do strength and flexibility training through exposure to these activities in physical education classes. Strength training clubs at school can also be useful. Consider a range of activities, such as weight lifting, pilates, yoga, plyometrics, and circuit training. Clubs should emphasize participation and proper technique (rather than amount of weight lifted). Students should use appropriate individual exercises and workloads, and regularly monitor their progress. It may be beneficial to start a girls-only club; this can allow girls to train without feeling intimidated by boys or self-conscious of their abilities.

When Students are Active

There are various times and ways that students can be active. We asked AnyPlace students questions about different opportunities they have for physical activity - transportation to and from school, intra-curricular activity and extra-curricular activity.

We asked AnyPlace students about how they usually get to and from school each day.

- 10% of students use active modes, such as cycling, walking, running or skateboarding,
- 72% of students use inactive modes, such as getting a ride or taking a bus, and
- 18% of students use a combination of active and inactive modes of transport.

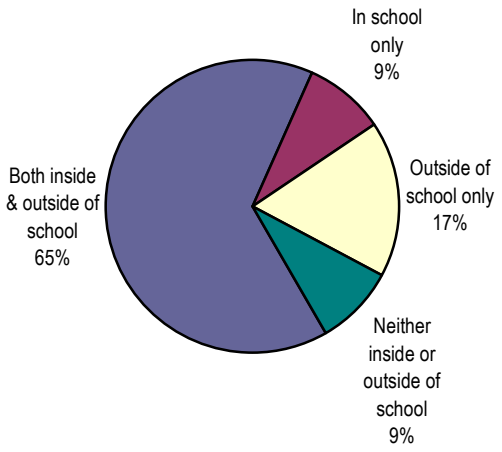
It is important to ensure that students are *active* as much as possible during Physical Education class time. A survey of school staff in Ontario determined that students are active approximately 79% of the time in Physical Education class.[26] In comparison, students at AnyPlace report the following:

- *less than 31 min* being active – 10%
- *31 to 45 min* being active – 23%
- *46 to 60 min* being active – 41%
- *more than 1 hour* being active – 27%

Extracurricular activities, both those offered at school and by other community groups, are important opportunities for physical activity.

This graph compares the percentage of students who participate in physical activity only in school, only outside of school, both inside and outside of school, and neither. At AnyPlace, 74% of students participate in physical activity in school; this illustrates the importance of school physical activity programs to your students. Nine percent of students do not participate in physical activity at either time, and could benefit from school programs.

Participation in Extracurricular Activity



Schools Can Make a Difference...

Remind students that active transportation - biking or walking to school - can help them to achieve their daily exercise requirements, and is also environmentally friendly. Schools can encourage active transportation by providing a safe bike lock area for students and providing secure areas where students can leave equipment (e.g. in-line skates, skateboards, helmets).

Increasing active time in Physical Education classes is a good way for schools to increase students' activity levels. One way to increase active time is using small groups to decrease wait times during activities. Physical activity should not be forced or taken away as a form of punishment, since this deters youth from participating in physical activity.[27]

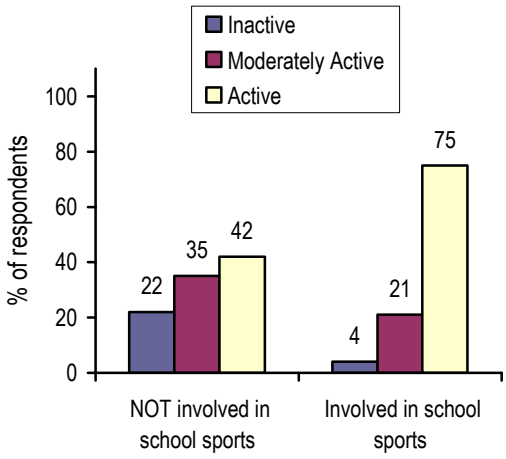
Involvement in School Sports

We asked students about their involvement in intramural/ house league sports, varsity/competitive school sports, and "other physical activities" at school (such as playing in the gym or outside). Here are rates of participation reported by students at your school:

- 32% in intramural sports (males 37%, females 26%)
- 41% in varsity sports (males 45%, females 37%)
- 64% in "other physical activities" (males 71%, females 58%)

Overall, 74% of students participated in at least one school sport (males 78%, females 69%); in this group, only 4% of students are considered inactive. Compare this to the 26% of students who do not take part in intramural or varsity sports (males 22%, females 31%); 22% of these students are classified as inactive. As the graph to the right shows, students who participate in school sports are more likely to be active.

Student Physical Activity Levels When Involved in School Sports



We also asked students what they thought about the number of sports offered at their school:

- 24% said there are too few sports offered
- 43% said the number of sports offered is just right
- 2% said there are too many sports offered
- 32% said it did not matter to them

Schools Can Make a Difference…

Intramural and varsity sports can be great ways for getting more students involved in physical activities. Students who are involved in these activities are more likely to continue being physically active throughout their adulthood.[28] Participation in intramural and varsity teams also has social benefits; it presents a great opportunity to meet new friends and build camaraderie amongst students, especially if teams are co-ed or represent multiple grades. Focus on broadening participation in varsity and intramural sports by offering a balance of both in a variety of sport and activity programs.

Increasing participation is often easiest through intramural activities since everyone at school is eligible to participate and students can have fun taking part in sports regardless of their athletic ability. An easy way for your school to increase intramural sport offerings would be for students to create their own intramural leagues for community service hours or for credit. Organizing and running an intramural program can be a great project for a senior student looking for experience in sport management.

Varsity teams can include more students by having practice squads, which can expand participation in team-based events and develop skilled players for subsequent years. Individual events, like track and field, can include everyone interested, or select students for meets based on performance or by rotating team members.

Other Activities

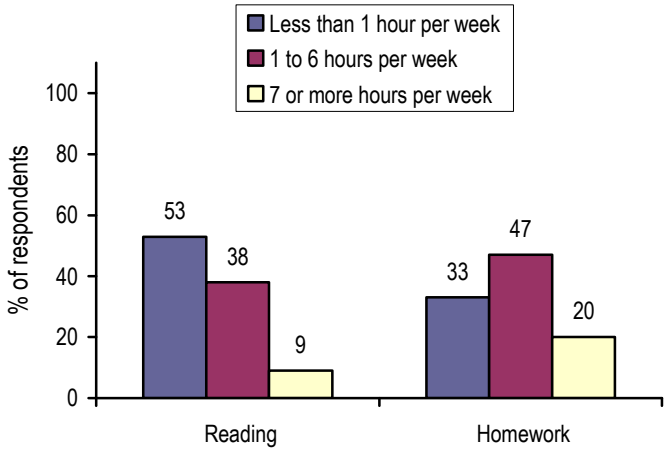
Sedentary activities include things such as watching television, using the computer, reading and homework. Some of these activities are counterproductive to physical activity, while others are beneficial. To promote overall health, students should decrease the total amount of time they are inactive while maintaining homework and reading time.

Leisure time reading has well known benefits to students. We asked AnyPlace students how much time they spend reading (not including for school or work) and doing homework per week. Results are shown in the first graph.

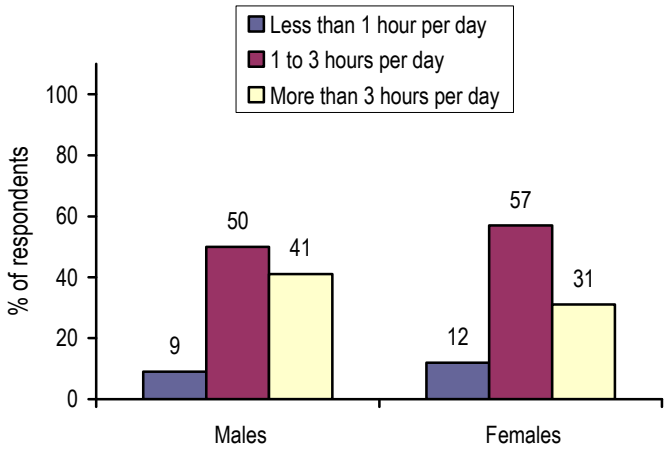
Sedentary activities, such as watching television, are incompatible with healthier, more active choices for leisure time activities. In addition, watching a lot of television has been linked to increases in smoking uptake in youth.[29] Students should aim to decrease their "screen time", which is time spent in front of the television, playing video games or on the internet.

The second graph shows (by sex) the amount of time per day that students spend watching television/movies, surfing the internet, playing video/computer games, talking on the phone and instant messaging. At AnyPlace, 36% of students report that they typically spend more than 3 hours on these activities per day.

Time Reading and Doing Homework per Week



Time on TV, Computer, and Phone per Day



Schools Can Make a Difference...

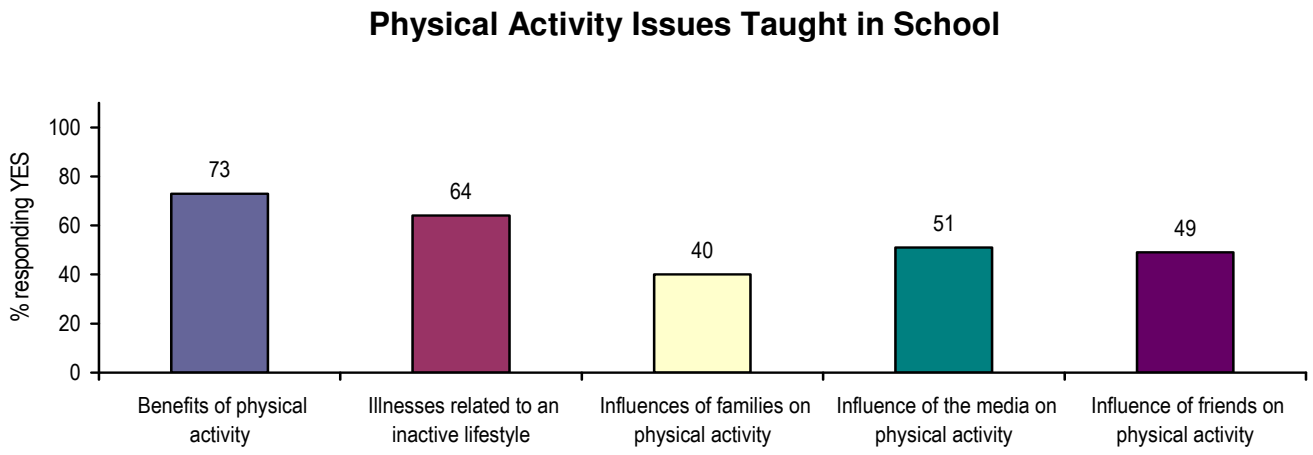
Help students build awareness of the time they spend inactively by having them keep track of their activities for a period of time. Students can set goals for reducing inactive time and record progress toward their goal. Consider running a personal challenge that has students commit to being active in place of one half-hour TV program for one or two weeks. Offer a discussion in class so students can share their activities with peers to encourage and provide new ideas.

Students' Perceptions of Physical Activity

We asked AnyPlace students for their opinions about physical activity and their perceptions of how, and if, physical activity issues are taught at school. Research has shown that a student's attitudes towards activity affect activity levels.[30] At AnyPlace:

- 68% of students felt that emphasis was placed on developing positive attitudes about physical activity and 63% felt that emphasis was placed on developing self-esteem.
- Almost all students (95%) felt students should have opportunities to participate in physical activity each day.
- The majority of students (76%) thought that physical education should be a required school subject.

It can be useful to remind students of the facilities available at their school, how physical activity and proper nutrition are taught at your school and how peers, family and other sources influence their activities. We asked the students if the subjects at school taught them about topics related to physical activity. The graph below shows the percentage of students who thought that these issues were taught at their school.



In regards to physical activity facilities at AnyPlace, students had these thoughts:

- 77% of students felt the indoor facilities met their needs,
- 74% of students felt the outdoor facilities met their needs, and
- 74% of students felt that the facilities at this school accommodated physical activity even when the weather is extreme (e.g., raining or snowing).

Schools Can Make a Difference...

Schools can help make students aware of physical activity issues in many ways. Physical education and health classes are not the only subjects where influences on activity can be taught. For example, English and Business classes can teach students about the influence of the media on their activities, and Social Studies classes can teach students about how their family and friends influence their level of activity. Teachers can also help students make the connection between physical activity and chronic diseases such as diabetes, heart disease and diseases such as anorexia, bulimia and obesity.[31] Reminders (announcements, bulletin board notices, etc.) about lunch time activities and after school programs can increase students' awareness of the facilities available at your school.

Social Influences for Physical Activity

Peers and family members can influence adolescents' behaviours directly (peer pressure) or indirectly (modeling). We asked students at AnyPlace a series of questions relating to peer and family physical activity.

All students were asked, "*How many of your 5 closest friends are physically active?*" Active youth are more likely to report that they have friends who are active compared to inactive students.

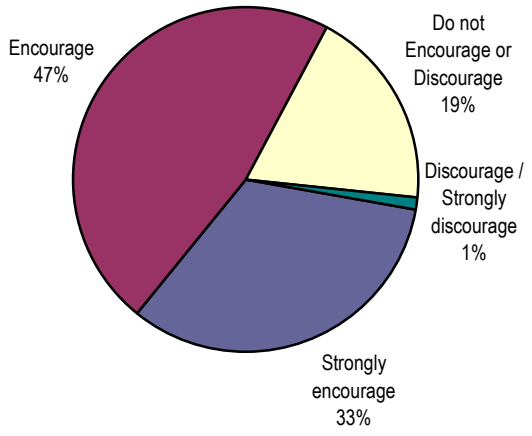
How many of your 5 closest friends are physically active?	Percentage Responding		
	Inactive Students	Moderately Active Students	Active Students
0	14	6	3
1 or 2	36	25	15
3 or more	50	69	82

Students were asked if their father and mother were physically active, somewhat active, or inactive. Generally, active youth are more likely to report that they have active parents.

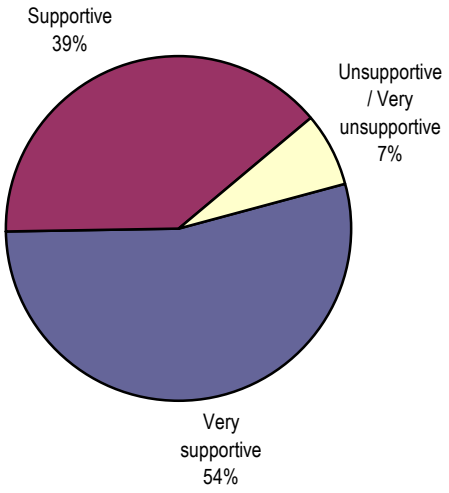
Student reports that Parent is "Active"	Percentage of Students Responding		
	Inactive Students	Moderately Active Students	Active Students
Father is Active	33	38	46
Mother is Active	26	27	33

Students were asked how much their parents encouraged and supported them to be physically active. At AnyPlace, 78% of students had parents who both encouraged and supported them.

Parental Encouragement of Physical Activity



Parental Support for Physical Activity



Physical Activity and Healthy Body Weight

Physical activity and nutrition are both important components in determining a person's body weight. This report focuses primarily on physical activity; however, healthy eating is important to consider when interpreting these results.

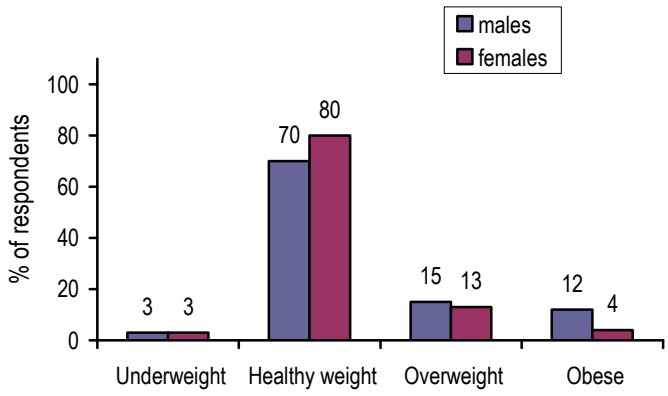
Healthy body weight can be determined using the body mass index (BMI).[32] BMI is a measure of a person's weight in comparison to their height.

Using BMI, 37% of Canadian youth are considered overweight.[18] Being overweight during childhood can lead to increased illness and risk of chronic diseases such as heart disease, cancer and type-2 diabetes.[33] Overweight and obese youth are often stigmatized by peers and adults.[34,35] These youth may experience psychological stress, and have a poor body image, as well as poor self-esteem.[36] Although this report does not detail issues related to being underweight, it is also important to be conscious of the risks of excessive exercising, improper dieting and eating disorders such as anorexia and bulimia.

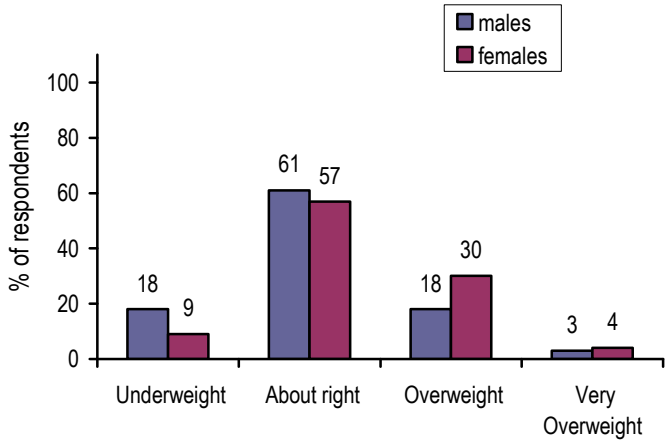
At AnyPlace, 75% of students fall within the recommended healthy weight category for their age. Many (59%) students feel their body weight is "about right".

A healthy body weight is one component of a well-balanced lifestyle. Accurate perceptions of one's weight are important, since perceiving one's weight incorrectly could lead to unhealthy eating and exercise habits and poor self-image. Approximately 63% of AnyPlace students had accurate perceptions of their body weight.

Students BMI Categories
(based on self-reported hieght and wieght)



Students Perceived Weight Categories



Schools Can Make a Difference...

In addition to achieving a healthy body weight, proper nutrition and healthy eating habits are important to the growth, development and cognitive function of adolescents. A Physical Education unit talking about nutrition and weight should include teaching students about proper weight and false perceptions. Having students keep a food diary for a few days can help them become aware of what foods they are eating and where they can improve their dietary habits. Canada's Food Guide to Healthy Eating and additional resources for teaching children and adolescents about healthy eating can be found on the *SHAPES-Ontario* website (www.shapes.uwaterloo.ca). Part of a comprehensive approach to student health is to help students make healthy food choices; schools can help by providing healthy food options in the cafeteria and vending machines.

SHAPES-Ontario

Part C:

The School Environment at Anyplace Secondary School

School Connectedness

In addition to programs and education, school rules and a sense of connection to the school can support students in making healthy choices. Students who feel an attachment to their school, and who consider their teachers to be supportive, are less likely to smoke or to engage in other unhealthy or risky behaviours.[35,36] Activities to build a positive school community are helpful in reducing and preventing smoking, and in increasing physical activity.

Here is what AnyPlace students said about their school environment:

How strongly do you agree or disagree with the following statements?	Percentage of Students Responding			
	Strongly Agree	Agree	Disagree	Strongly Disagree
I feel close to people at my school.	26	54	15	5
I feel I am part of my school.	22	56	16	5
I am happy to be at my school.	23	52	17	8
I feel the teachers at my school treat me fairly.	20	61	14	6
I feel safe in my school.	24	61	10	5

Schools Can Make a Difference...

Providing students with opportunities to provide input in the decision-making and organization of school activities can help them feel more connected to their school. For example, students could help to decide on new equipment or facility upgrades, and then organize and run a fundraising event for it. Students will feel like they have contributed something to their school and that their opinions are valued. They will also be more enthusiastic about fundraising and will be more likely to use the new equipment or facilities.

Another suggestion is to have students brainstorm ideas to decrease the smoking rates or increase physical activity at school. By working together towards a common goal, students will feel closer to each other and will feel like their school cares about their health.

The School Environment

The school environment plays an important role in helping students make healthy lifestyle choices. Research shows that school-level factors influence smoking rates independent of family, economic and community factors.[36] Schools are uniquely positioned to influence the health and well-being of students, ideally in partnership with home and community, but even independently.

Smoking Prevention

One of the most obvious ways schools can support students to stay smoke-free is through tobacco control education. Considerable research has been done to determine the elements of successful smoking prevention curricula. Compare the curriculum and teaching time devoted to smoking prevention in your school with the elements in the box below and consider ways to improve or maintain your programs.

Youth who participate in higher levels of physical activity are less likely to smoke, or they smoke fewer cigarettes. Team sport participation seems to be especially associated with decreased likelihood of smoking. Some schools have students sign contracts to not smoke while they are representing the school in a sporting event.

School-based smoking prevention programs should:

- include at least 10 sessions devoted specifically to tobacco use prevention
- be delivered in at least two school years (sessions may be blocked or distributed over the year)
- begin immediately before the age when uptake of tobacco is highest, usually just before the transition to middle or secondary school
- focus on short-term health and social consequences (e.g., shortness of breath and smelly clothes)
- include training in refusal skills including modeling and practice of resistance skills
- include information on social influences on tobacco use especially peer, parent and media and demonstrate that smoking is not normative for adolescents
- involve students in the delivery of the program (teacher led with student involvement works best)
- include adequate teacher training and a high level of teacher commitment to the program

Source: Health Canada and the Canadian Cancer Society -- efficacy criteria used in the assessment of smoking prevention programs.[37]

Schools Can Make a Difference…

- Correct misconceptions about the benefits of smoking and emphasize the short-term downsides and social consequences of smoking.
- Consider focusing on media literacy and consumer savvy. Several successful youth led campaigns have focused on exposing tobacco industry tactics for attracting youth. See *www.smokefreeottawa.com/expose/* and *www.thetruth.com* for examples of innovative programs.
- Provide an environment where smoking is clearly not acceptable, where smoking is not convenient, and where smoking by older students is not visible. Students are especially influenced by and often find a source of cigarettes in older peers.

Increasing Physical Activity

School-based physical activity programs should:

- Involve stakeholders. By including various perspectives and voices in your planning, you can expect increased buy-in by all stakeholders. You will also find that you will build capacity as well as achieve your main objective.
- Use coordinated approaches, such as the Comprehensive School Health Approach (http://www.schoolfile.com/cash/consensus.htm).[38] Within CSH there are three sub themes: *(1) physical education, (2) physical and social environment,* and *(3) services*. In order to change behaviour, we need to address all components of CSH. Communication through education is *necessary but not sufficient.*
- Lead through evaluation. Develop a culture in which evaluation from all stakeholders guides future planning. You can use SHAPES as an evaluation process for students and staff to assess current and novel programs and activities. Via evaluation of your school programs, you can become a leader for your school and other schools.

Here are some examples for how to involve youth, community members, parents, and staff members in physical activity initiatives:

Youth
- Modify the physical education curriculum to be partially unstructured and encourage students to create their own units within the class.
- Encourage youth to start sport and activity clubs.

Community / Parents
- Use expertise from the community where the community member's role relates to youth activity. For example, invite a personal trainer to be a guest speaker in your class to help students create personalized activity programs.
- Offer a coaching course to allow parents or community members to be a part of school teams.
- Offer an open house inviting community groups so as to help increase student awareness of these programs.

School staff
- Brainstorm ideas for how to incorporate physical activity into all subjects.
- Create opportunities for staff to model appropriate behaviours.
- Provide staff with pedometers so that they get feedback on the value of physical activity in their own lives.

Schools Can Make a Difference…

- Implement an "Active Living Week". This involves students and teachers participating in a special physical activity event each day of this week. Have the students help plan the events, such as relays or obstacles, jump rope contests or scavenger hunts.
- Post "fact sheets" in halls and stairwells that remind students and staff of the benefits of taking the stairs or walking the length of a hall <u>one extra time.</u>
- Include a physical component to a class *other than* physical education, such as Geography or History. Make physical activity part of the lesson plan for an interesting way to get kids involved and active. For example, geography lessons might relate to distance travelled, direction or outdoor education.

More About this Report:

The Population Health Research Group at the University of Waterloo produces individual school reports for each of the schools participating in the *SHAPES-Ontario* project. It is our intention to produce useable reports at low cost. To do this we have sought the input of educators, researchers and public health practitioners. We have created a largely automated system with quality control and editing procedures to ensure that the data you receive is accurate and can be returned to your school in a timely manner.

We value your input and would welcome your feedback on this report and/or on your school's participation in this project. Please contact us on the web at **www.shapes.uwaterloo.ca** or by e-mail: **shapeson@healthy.uwaterloo.ca**.

THANK YOU FOR YOUR PARTICIPATION.

Electronic Access Information:

To access an electronic copy of your school feedback report through our secure website login, you will need the following:

School ID:

User name:

Password:

Go to: www.shapes.uwaterloo.ca/ontario

Please follow these steps:

1. On the Shapes-Ontario site menu (left hand side) click on the School Login tab.
2. Find and click on your ***School ID***.
3. When prompted, enter your ***User name*** and ***Password***.

NOTE: You will need "Adobe Reader" to view and/or download your report (free download available on the web-site).

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Appendix D: SHAPES-Ontario & Knowledge Exchange Extension Backgrounder

SHAPES-Ontario

The School Health Action, Planning and Evaluation System (SHAPES) is a local data collection and feedback system for monitoring health-related behaviours among youth. The SHAPES system involves: 1) administration of school-based student questionnaires to assess youth smoking and physical activity, 2) a school-level administrator survey on school policies and programs for tobacco and physical activity, and 3) generation of school-level feedback reports which can be used by schools and local health agencies to plan and evaluate programs and interventions.

The SHAPES-Ontario project used two modules of SHAPES to measure and provide school-level feedback on youth smoking and physical activity in Ontario secondary schools served by eight public health units. Students in grades 9 through 12 at participating secondary schools completed either a tobacco-focused questionnaire or a physical activity-focused questionnaire. In addition, up to two administrators/staff members at each school were asked to complete a survey regarding school policies and programs concerning smoking or physical activity. Within six to eight weeks of survey administration, schools (and with permission, their health units) received a feedback report describing the physical activity levels and smoking rates of students in the school, and linking survey results to implications for activities. Boards and health units also received feedback reports after all schools within their area were surveyed.

With the goal of collecting more meaningful local data, the health units sampled were invited to become partners. Health units were involved in various aspects of the project implementation. With school's permission, they were given access to school survey data to enable them to make evidence-based decisions about their programming.

The data from SHAPES-Ontario serves at least two purposes:

- Target and plan school-based tobacco control and physical activity promotion activities; and
- Help evaluate new or ongoing activities at schools.

SHAPES may be repeated to measure the outcomes of provincial tobacco control and physical activity strategies. This study has the ability to provide stakeholders and the research community with a better understanding of how school environments can influence student behaviour, and may guide the development of new prevention initiatives to improve the health of the Ontario student population.

SHAPES-Ontario was funded by the Ontario Ministry of Health and Long-Term Care under the Smoke-Free Ontario Strategy, and Cancer Care Ontario.

**Citation:*

SHAPES-Ontario Project. (September 2006). *Report on the SHAPES-Ontario Project,* University of Waterloo, Waterloo, Ontario, Canada.

SHAPES-Ontario Knowledge Exchange Extension

The Knowledge Exchange Extension (*KE Extension*) builds on the SHAPES-Ontario project by facilitating and studying knowledge exchange processes intended to enhance evidence-based practice in public health. The original SHAPES-Ontario project presented two key knowledge exchange opportunities: (1) it provided school-level feedback reports to participating high schools (for planning and evaluating school-based activities), and (2) it combined school data at the public health district level (making it useful for health units in planning, targeting and evaluating their programs - i.e., facilitating evidence-based practice. SHAPES-Ontario funds allowed the collection of school data, but did not provide technical support to assist the health units to translate the research findings into practice. The KE Extension attempts to fill this void and aims to establish relationships to capitalize on the knowledge exchange opportunities provided by the SHAPES-Ontario Project.

The KE Extension has three core objectives including the following;

- To build public health unit capacity for evidence-informed practice (i.e., make the best use of the SHAPES-Ontario findings, both at the school level, and the health unit level.)
- To facilitate the development of Communities of Practice consisting of decision-makers (public health unit staff) and knowledge producers (research unit-UW) that leads to sustainable knowledge exchange.
- To study the process of formation of a Community of Practice as a model for knowledge exchange.

As part of the relationship process, public health units and University of Waterloo researchers jointly determine the best application of the local SHAPES data, facilitated by interaction with a knowledge broker who has experience in both research and public health. The Knowledge Broker (also Project Manager) is responsible for supporting health units with the exchange and use of the SHAPES-Ontario results in program planning and evaluation. Other responsibilities include development of tools and resources, data collection and day-to-day management of the KE Extension project. Participating health units dedicate in-kind staff time for the *KE Extension* to the SHAPES-Ontario project, including activities such as reflective practice groups, working with schools to determine suitable responses to the school-feedback report, incorporating SHAPES data into their planning cycle, and other knowledge exchange activities. Moreover, designated health unit staff members participate in interviews with the Knowledge Broker. The purpose of the interviews is to collect data on the knowledge exchange processes occurring within health units.

The SHAPES-Ontario Knowledge Exchange Extension is funded by the Canadian Institute of Health Research and the National Cancer Institute of Canada's Sociobehavioural Cancer Research Network, with in-kind contributions from participating health units.

**Adapted from*

SHAPES-Ontario Knowledge Exchange Extension Project. (2006). *Knowledge Exchange Extension Project Summary.* University of Waterloo, Waterloo, Ontario, Canada.

Appendix E: Ethics Clearance

Knowledge Exchange Extension Ethics Clearance

From: ORE Ethics Application System [OHRAC@uwaterloo.ca]
Sent: Monday, March 06, 2006 10:48 AM
To: manske@healthy.uwaterloo.ca; scott.leatherdale@cancercare.on.ca; dsteinma@healthy.uwaterloo.ca
Subject: Full Ethics Clearance after provisional, no comments (ORE # 12781)

Dear Researcher:
The recommended revisions/additional information requested in the initial ethics review of your ORE application:
Title: Encouraging Evidence-based Practice by Creating and Assessing a Public Health Community of Practice in School-based Chronic Disease Prevention ORE #: 12781
Principal/Co-Investigator: MANSKE, Steve (manske@healthy.uwaterloo.ca)
Principal/Co-Investigator: LEATHERDALE, Scott (scott.leatherdale@cancercare.on.ca)
Principal/Co-Investigator: STEINMANN, Darla (dsteinma@healthy.uwaterloo.ca)
Principal/Co-Investigator: MURPHY, Maureen ()
Collaborator: Joyce Fox ()
Collaborator: Darlene Mecredy ()
Collaborator: Kevin McDonald ()
Have been reviewed and are considered acceptable. As a result, your application now has received full ethics clearance.

A signed copy of the Notification of Full Ethics Clearance will be sent to the Principal Investigator or Faculty Supervisor in the case of student research.

ADDITIONAL REVISIONS OR RESPONSES TO COMMENTS: N/A
****
Note 1: This clearance is valid for four years from the date shown on the certificate and a new application must be submitted for on-going projects continuing beyond four years.
Note 2: This project must be conducted according to the application description and revised materials for which ethics clearance have been granted. All subsequent modifications to the protocol must receive prior ethics clearance through our office and must not begin until notification has been received.
Note 3: Researchers must submit a Progress Report on Continuing Human Research Projects (ORE Form 105) annually for all ongoing research projects. In addition, researchers must submit a Form 105 at the conclusion of the project if it continues for less than a year.
Note 4: Any events related to the procedures used that adversely affect participants must be reported immediately to the ORE using ORE Form 106.

Best wishes for success with this study.
Susanne Santi, M. Math.,
Manager, Research Ethics
Office of Research Ethics
NH 1027
519.888.4567 x7163
ssanti@uwaterloo.ca

How Context Influences Knowledge Use in Public Health Units Ethics Clearance

Date: Thu, 29 Mar 2007 16:19:55 -0400
From: ORE Ethics Application System OHRAC@uwaterloo.ca
Reply-To: ORE Ethics Application System <OHRAC@uwaterloo.ca>
Subject: Full Ethics, No Provisional (ORE # 13826)
To: manske@uwaterloo.ca
Cc: enbonin@ahsmail.uwaterloo.ca

Dear Researcher:
This note is to advise you that the ethics review of your ORE application:

Title: How Context Influences Knowledge Use in Public Health Units ORE #: 13826 Faculty Supervisor: Dr. Steve Manske (manske@uwaterloo.ca) Student Investigator: Elissa Bonin (enbonin@ahsmail.uwaterloo.ca) has been completed, and on the basis of this review, the project has received full ethics clearance. Below is a summary of recommendations for revisions as well as any related comments or questions.

Recommended Revisions and/or Comments:
no comment

Researcher(s), this summarizes the feedback from the ethics review of your application. Revised materials should be provided within ten days to the Office of Research Ethics in hard copy or by email to ohrac@uwaterloo.ca

Please indicate the ORE number to which the changes refer when submitting revisions and highlight the revised section(s) to expedite the ethics review of these documents.

Please feel free to contact me at the extension given below about any of the above comments.

Note 1: This clearance is valid for four years from the date shown on the certificate and a new application must be submitted for on-going projects continuing beyond four years.
Note 2: This project must be conducted according to the application description and revised materials for which ethics clearance have been granted. All subsequent modifications to the protocol must receive prior ethics clearance through our office and must not begin until notification has been received.
Note 3: Researchers must submit a Progress Report on Continuing Human Research Projects (ORE Form 105) annually for all ongoing research projects. In addition, researchers must submit a Form 105 at the conclusion of the project if it continues for less than a year.
Note 4: Any events related to the procedures used that adversely affect participants must be reported immediately to the ORE using ORE Form 106.

Best wishes for success with this study.
Susanne Santi, M. Math.,
Manager
Office of Research Ethics
NH 1027
519.888.4567 x 37163
ssanti@uwaterloo.ca

Appendix F: Knowledge Utilization Uptake Scale

SECTION 1	
Awareness (I know the SHAPES feedback report exists)	
1	**Are you aware of the SHAPES feedback report?** YES (go to question 3) NO (go to question 2)
2	**Would you like to learn more about the SHAPES feedback report?** YES (discontinue questions and distribute information) NO (discontinue questions)
Reception (I have a copy of the SHAPES feedback report OR know how to access the SHAPES feedback report)	
3	**Have you received a copy of the SHAPES feedback report?** YES (go to question 6) NO (go to question 4)
4	**Did you retrieve a copy of the SHAPES feedback report?** YES (go to question 6) NO (go to question 5)
5	**Do you plan to access the SHAPES feedback report?** YES (go to question 6) MAYBE (go to question 6) NO (discontinue questions) DON'T KNOW (go to question 6)
6	**Even before viewing it, did you think the SHAPES feedback report may be useful?** YES (go to question 7) MAYBE (go to question 7) NO (go to question 7) DON'T KNOW (go to question 7)
Cognition (read, digest and understand SHAPES feedback report)	
7	**Have you read the SHAPES feedback report?** FULLY (go to question 9) PARTIALLY (go to question 9) NOT AT ALL (go to question 8)
8	**Do you plan to read the SHAPES feedback report?** YES (go to question 13) MAYBE (go to question 13) NO (discontinue)
9	**Was the material in the SHAPES feedback report presented in a way you could understand?** YES NO DON'T KNOW
10	**Have you thought about the contents of the SHAPES feedback report since you read it?** NEVER RARELY SOMETIMES OFTEN
Discussion (altering frames of reference to the SHAPES feedback report)	
11	**Have you made other colleague(s) aware of the SHAPES feedback report?** YES NO DON'T KNOW

12	**Have you discussed the SHAPES feedback report with colleagues within your organization?** YES (go to question 14) NO (go to question 13)
13	**Do you plan to discuss the SHAPES feedback report with colleagues within your organization?** YES MAYBE NO
14	**Have you discussed the SHAPES feedback report with colleague(s) outside of your organization?** YES (go to question 16) NO (go to question 15)
15	**Do you plan to discuss the SHAPES feedback report with colleague(s) outside of your organization?** YES MAYBE NO
16	**Have you sought the opinion(s) of other(s) who have used the SHAPES feedback report (e.g. through discussions, visits, or workshops)?** YES NO
Reference (SHAPES feedback report influences action/adoption of information)	
NOTE: "SHAPES Results" refers to the collective information and results from SHAPES feedback report and/or SHAPES data	
17	**Have you cited the SHAPES results in your own reports or documents?** YES (go to question 19) NO (go to question 18) N/A (go to question 18)
18	**Do you plan to cite the SHAPES results in your own reports?** YES MAYBE NO DON'T KNOW
19	**Have the SHAPES results influenced your decisions/choices in your program planning, development and implementation?** YES NO
Effort (efforts made to favour the SHAPES feedback report)	
20	**Have you favoured SHAPES results over other report(s)/sources of information?** YES NO
Adoption (SHAPES feedback report influences adoption of evidence-informed planning)	
21	**Have you made a decision to use the SHAPES results in your public health planning and/or evaluation?** FULLY (go to question 24) PARTIALLY (go to question 24) NOT AT ALL (go to question 22)
22	**Do you plan to make a decision whether to use the SHAPES results in your public health planning and/or evaluation?** FULLY (go to question 23) PARTIALLY (go to question 23) NOT AT ALL (discontinue questions) –go to section 2: deliberate non-use NOT SURE (discontinue questions)-go to section 2: deliberate non-use

23	**Do you know when you will begin to use the SHAPES results in your public health planning and/or evaluation?** YES (discontinue questions) NO (discontinue questions)
24	**Has the use of the SHAPES results contributed to your efforts at evidence-informed planning?** YES NO
Implementation (adopted information, i.e. SHAPES results, becomes practice)	
25	**Overall, in the past 1, (6, 12, 18) month(s), how fully have you used the SHAPES results in your planning and evaluation?** NOT AT ALL A LITTLE A LOT A LOT, BUT ADAPTED FROM THE SHAPES results
26	**Have you employed short term strategies for facilitating the use of the SHAPES results (e.g. workgroups, meetings with school boards, revised operational plans or logic models)?** YES NO
27	**Do you spend your time managing the use of the SHAPES results?** YES (go to question 28) NO (go to question 29)
28	**How do you spend your time managing the use of the SHAPES results? Check all that apply.** __ENSURING CONSISTENCY __INTERPRETING RESULTS __ENSURING STAFF ARE USING RESULTS __OTHER
29	**What are the long-term strategies required for using SHAPES results in planning and evaluation? Check all that apply** __SECURING FUNDING __ALLOCATION OF RESOURCES __POLICY DEVELOPMENT __ADVOCACY FOR EVIDENCE-INFORMED PLANNING __OTHER
30	**Has using the SHAPES results for planning and evaluation become routine (i.e. practice runs smoothly with minimal management problems)?** YES NO
31	**Has a tailored analysis of the SHAPES results been done?** YES (go to question 32) NO (go to question 33) N/A (go to question 33)
32	**Has the tailored analysis been used in an effort to increase the impact on evidence-informed planning?** YES NO

33	**Have you collaborated with colleagues and/or other organizations (i.e. schools) targeting the same population to implement using SHAPES results in your planning and evaluation?** YES NO
34	**Have you explored other evidence that could be used in combination with, or in place of SHAPES results, to improve the effectiveness of your program planning and evaluation?** YES NO
Impact (increase or decrease in evidence-informed planning)	
35	**Has SHAPES increased evidence-informed planning and evaluation, either in the health unit or with other groups (e.g. schools)?** YES MAYBE NO DON'T KNOW N/A
36	**Since working with the SHAPES results, have you encouraged a colleague(s) to adopt the practice of using research evidence in their planning and evaluation?** YES NO (go to 38)
37	**Since offering encouragement, have you persuaded a colleague(s) to adopt the practice of using research evidence in their planning and evaluation?** YES NO
38	**Are there any additional comments you would like to make about the SHAPES feedback report or your use of research evidence in planning and evaluation? (Your comments do not need to be related to an adopted and implemented practice)**

SECTION 2: Deliberate Non-use
This section only applies to answers NOT AT ALL or NOT SURE to Question 22.
x **Please indicate ALL of the following reasons why you chose not to adopt this new source of information (SHAPES report/data).**
Innovation Characteristics
Relative Advantage
I have equivalent evidence/information I already use
The innovation (SHAPES) was not perceived to be better than the current evidence/information
The innovation (SHAPES) did not show any economic advantage from adopting it
The innovation (SHAPES) was more time consuming and required more effort than the current evidence/information used
Compatibility
The innovation (SHAPES) was not consistent with the current values of my program or organization
The innovation (SHAPES) did not meet the needs of my program or organization
Complexity
The innovation (SHAPES) was too difficult to understand
The innovation (SHAPES) was too difficult to implement or use
Trialability
The innovation (SHAPES) could not be implemented on a small scale to determine its advantages or disadvantages
I have not heard of any other organization(s) related to mine that have adopted this innovation (SHAPES)
Observability
I have not seen this innovation (SHAPES) successfully implemented
Organizational Characteristics
Size and Resources
My organization is too small or too large to adopt this innovation (SHAPES)
My organization does not have enough personnel resources (staff) to adopt this innovation (SHAPES)
My organization does not have enough financial resources to adopt this innovation (SHAPES)
Location
My organization was not in an appropriate location to adopt or implement this innovation (SHAPES)
Hierarchy
I do not have enough decision-making authority in my position to decide to adopt this innovation (SHAPES)
I was not able to prove to my supervisor that this was an important innovation (SHAPES) to adopt
Formalization
This innovation (SHAPES) did not follow the rules and procedures of my organization
There was not enough evidence that this innovation (SHAPES) would be effective or successful
Environmental Characteristics
There is not enough collaboration or potential for networking with other organizations to be able to adopt and implement this innovation (SHAPES)
Individual Characteristics
This innovation (SHAPES) did not seem relevant to my practice
It is not an appropriate time to be adopting this innovation (SHAPES)
This innovation (SHAPES) does not coincide with my values or beliefs about what is effective
I have insufficient time to adopt and implement a new innovation (SHAPES)
Other
Other reasons not mentioned above have resulted in non-adoption of this innovation (SHAPES)
These other reasons are:

Appendix G: KUU Scale Coding Index

LEVEL/DECISION POINT	CODING INDICES
Non-use: Limited or no knowledge of SHAPES, no involvement with SHAPES, no action to move toward use of SHAPES	*Knows nothing of SHAPES *Little/no action to solicit info beyond reviewing descriptive info (e.g. feedback report) about SHAPES *Not communicating with others about SHAPES beyond acknowledging it exists *Takes no time to analyze SHAPES, its characteristics, possible uses, consequences of use *Schedules no time & specifies no steps for using SHAPES *Reports little or no personal involvement with SHAPES *Takes no discernible action toward learning about or using SHAPES
DECISION POINT: Takes action to learn more detailed information about the SHAPES	
Orientation: Has acquired/is acquiring information about SHAPES and/or explored/is exploring its value and demands upon user	*Knows general info about SHAPES including: characteristics, origin, implementation requirements *Seeks descriptive materials about SHAPES (i.e. feedback report). Seeks opinions and knowledge of others. *Discusses SHAPES in general terms or exchanges descriptive info/ideas about SHAPES and implications of use *Analyzes compares material, content, requirements for use, potential outcomes, strengths, weaknesses of SHAPES *Plans to gather info/resources to make decision for/against SHAPES *Reports orienting self to what the SHAPES is/is not *Explores SHAPES and requirements for its use by talking to others, reviewing, observing others using it
DECISION POINT: Makes a decision to use the SHAPES by establishing a time to begin	
Preparation: Preparing for first use of the SHAPES	*Knows logistical needs, resources and timing for initial use of SHAPES and details of initial experiences of clients *Seeks info & resources related to preparation for use of SHAPES in own setting (i.e. HU/School) *Discusses resources/pre-use training/logistics needed for initial use of SHAPES *Analyzes detailed requirements and available resources for initial use of SHAPES *Identifies steps/procedures in obtaining resources/organizing activities for initial use of SHAPES *Reports preparing self for initial use of SHAPES *Studies reference materials in depth, organizes resources and logistics, receives training in initial use of SHAPES
DECISION POINT: Begins first use of the SHAPES	

Mechanical Use: User focuses most efforts on the short-term/day-to-day use of SHAPES, little reflection. Changes made to meet user needs vs. client needs. User primarily engaged in stepwise attempt to master tasks required to use SHAPES, often disjointed and superficial use.	*Knows day-to-day requirements for using SHAPES. More knowledgeable on short-term activities/effects vs long-term *Solicits mgmt info about logistics, ideas to reduce amount of time/work of user *Discusses mgmt & logistical issues related to use of SHAPES. Resources shared to reduce issues related to use. *Examines own use of SHAPES wrt problems of logistics, time, schedules, general reactions etc. *Plans for organizing/managing resources, activities and events related to ongoing use of SHAPES *Reports that logistics, time, mgmt, resources are focus of personal efforts to use SHAPES *Manages SHAPES with varying degrees of efficiency. Flow of actions in the user and clients disjointed. Changes made in response to issues.
DECISION POINT: A routine pattern of use is established	
Routine: Use of SHAPES is stabilized. Few if any changes are being made in ongoing use. Little prep/thought to improving SHAPES use or its consequences.	*Knows both short & long-term requirements for use of SHAPES (and how to use SHAPES with min. effort) *Makes no special efforts to seek information as part of ongoing use of SHAPES *Describes current use of SHAPES with little/no reference to ways of changing use. *Limits evaluation activities to those administratively required, little attention to findings for the purpose of changing use *Plans intermediate & long-range actions with little variation in how SHAPES is used. Planning focuses on routine use of resources, personnel etc. *Reports that personal use of SHAPES is going along satisfactorily with few if any problems *Uses SHAPES smoothly with minimal mgmt problems. Little variation in pattern of use over time.
DECISION POINT: Changes use of the SHAPES based on formal or informal evaluation in order to increase client outcomes	
Refinement: User varies the use of SHAPES to increase impact on clients. Variations based on knowledge of both short-term & long-term consequences for clients.	*Knows cognitive and affective effect of SHAPES on clients and ways for increasing impact on clients *Solicits info and materials that focus specifically on changing use of SHAPES to affect client outcomes *Discusses own methods of modifying use of SHAPES to change client outcomes *Assess use of SHAPES for purpose of changing current practices to improve client outcomes *Develops intermediate/long-range plans anticipating needed steps, resources & events to enhance outcomes *Reports varying use of SHAPES in order to change client outcomes *Explores and experiments with alternative combinations of SHAPES with existing practices to maximize outcomes
DECISION POINT: Initiates changes in use of SHAPES based on input of and in coordination with what colleagues are doing	

Integration: User is combining own efforts to use SHAPES with related activities of colleagues to achieve collective impact on clients within common sphere of influence.	*Knows how to coordinate own use of SHAPES with colleagues for collective impact *Solicits info and opinions for purpose of collaborating with others in use of SHAPES *Discusses efforts to increase impact through collaboration with others on personal use of SHAPES *Appraises collaborative use of SHAPES in terms of outcomes and strengths and weaknesses of integrated effort *Plans specific actions to coordinate own use of SHAPES with others to increase impact on clients *Reports spending time & energy collaborating with others about integrating own use of SHAPES *Collaborates with others in use of SHAPES to expand impact on clients. Changes in use are made in collaboration.
DECISION POINT: Begins exploring alternatives to or major modifications of SHAPES presently in use	
Renewal: User reevaluates quality of use of SHAPES, seeks modifications/alternatives to SHAPES to increase impact on clients, examines new developments in the field, explores new goals for self & system	*Knows alternatives to change or replace SHAPES to improve quality of outcomes of its use *Seeks information and materials about other innovations as alternatives to SHAPES or for making major adaptations *Focuses discussion on id of major alternatives/replacements for SHAPES *Analyzes advantages & disadvantages of major modifications/alternative to SHAPES *Plans activities that involve pursuit of alternatives to enhance/replace SHAPES *Reports considering major modifications/alternatives to use of SHAPES *Explores other innovations used in combination with/in place of SHAPES to develop more effective outcomes

Appendix H: Knowledge Exchange Extension Interview Guide

1. **Are you familiar with the SHAPES Ontario Project and the data? (May need to define SHAPES feedback report/data)**
    - What is your personal impression of the SHAPES data or feedback report? What do you think of the SHAPES data or feedback report?
    - What do you perceive is the organization's impression of the data and feedback report?

    ADDITIONAL PROBES:
    - Easy to comprehend?
    - Credible?
    - Timely?
    - Relevant to their needs?
    - Did you learn anything from the data?

2. **How have you used the SHAPES results?**
    - Personal use and/or organization use
    - Could you give some examples of how you or the organization has used the results (e.g. data, feedback report etc)? *(provide them with examples of what you are looking for--refer to example card)*

GO THROUGH/REFER TO EACH EXAMPLE FROM NO.2 AND APPLY IT TO QUESTIONS 3, 4, & 5

3. **You mentioned _____, could you expand on the interaction of/among this group, committee?**
    - How is this response typical or different from previous experiences? Influential contexts?
    - Nature of the interactions/relationships (social vs. strictly work-oriented)

4. **How do you get things done in your health unit (or is it how do things get done?). Refer back to examples or ask for examples.**
    - Formal processes & policies?
    - Informal processes?
    - How do both help or hinder the use of evidence/data in the HU.
    - Other personal or organizational factors influencing how things get done
    - What do they consider as evidence?

    ADDITIONAL PROBES:
    - Factors at HU or beyond that might influence how organization deals with new information?
    - Who makes decisions/ How are decisions made?

5. **How does your health unit get things done in schools? Examples?**
    - Do you see a valid use of the SHAPES data in schools?
    - Formal vs informal processes?
    - Factors helping or hindering process

Appendix I: Knowledge Exchange Extension Consent Forms

Medical Officer of Health Consent Form

[date]

[address]

[Name]

SHAPES-Ontario Knowledge Exchange Project

Your health unit is participating in the SHAPES-Ontario Project, which measures youth smoking and physical activity. [name],[title],[department], has been our main contact for this project. Data collection in high schools in your area occurred in [date]. These surveillance data are being fed back to individual schools and we are seeking permission to release the raw data to your health unit.

As an extension to the current project, we have received funding to conduct the *SHAPES-Ontario Knowledge Exchange Project.* The research project will facilitate and study the knowledge exchange processes intended to enhance evidence-based practice in public health and to study the process of formation of a community of practice as a model for knowledge exchange. We would like to invite your health unit to participate in the project.

Over the next two years, we hope to continue working with your health unit to facilitate and support the use of SHAPES-Ontario data. The *Knowledge Exchange Project* will allow us to provide participating health units with support to analyze and interpret the data. Health units will have access to a Ph.D. Statistician familiar with the SHAPES data system, access to a Knowledge Broker, who is a MHSc prepared with ten years of health unit experience, and ongoing contact with project activities throughout Ontario through the reflective practice group and electronic communication. In addition, each health unit will receive $4000 to help support additional activities associated with knowledge exchange. Potential expenses include training staff, hosting meetings/presentations, as well as travel expenses for conferences or meetings. By participating in this project, we hope to extend our understanding of the processes and structures within and between organizations that contribute to evidence based practice.

Attached is a detailed list of both the knowledge exchange and research components of the project. Participation is voluntary and your organization can choose to participate in as many or as few components as you wish. We respect your wishes. Your participation in this aspect of the project will not influence the support given to use the SHAPES-Ontario data.

We will hold all information provided in strict confidence. Information collected via paper and tapes during this study will be retained for seven years in a secure area at the University of Waterloo to which only researchers associated with the project have access. Electronic data will be retained on a secure server for seven years and then destroyed. If you choose to participate in any aspect of the research, you/your organization can withdraw at any point by contacting me at the number below.

We expect that participation in this knowledge exchange research will involve only minimal organizational and individual risk. Due to the small number of health units participating and the variability in size and capacity, special consideration will be put in place to protect organizations and individual participants. Safeguards to protect anonymity will include locked storage of all data (including password protected electronic files) and replacement of identifying information with code numbers to protect participant identification in all interviews, observations and reports produced. Furthermore, investigators and staff will not share or discuss information they obtain during interviews and observation, beyond the research team. Prior to making any results public, we will consult with each participating health unit. Health units will be given the opportunity to review the findings for their own health units and grant written permission to UW/PHR to release. In any case, where individual health units or staff could be identified, the health unit or staff will have the option of removing those data.

This project has been reviewed by, and has received ethics clearance through the Office of Research Ethics at the University of Waterloo. If you have any concerns about the study, you can call Dr, Susan Sykes, Director of Research Ethics at the University of Waterloo at (519) 888-4567 ext. 6005.

We will follow this letter up by telephone to clarify any outstanding issues within two weeks.

We thank you for taking the time to consider this project. If you have any questions about this study, you may contact Elissa Bonin, Project Manager, at (519) 888-4567 ext 3354 or enbonin@healthy.uwaterloo.ca.

Sincerely,

Dr. Steve Manske
Scientist
University of Waterloo

Elissa Bonin
Project Manager
Population Health Research Group

Attachments: Knowledge Exchange Project Components, Consent Form for Health Unit Participation

---

Study Investigators

Dr. Steve Manske
CBRPE
University of Waterloo

Dr. Scott Leatherdale
Cancer Care Ontario

Dr. Roy Cameron
CBRPE
University of Waterloo

Study Collaborators

City of Hamilton Department of Public Health and Community Services
Kingston, Frontenac, Lennox and Addington Public Health
Ottawa Public Health
Simcoe-Muskoka District Health Unit

Knowledge Exchange Project Components

The Knowledge Exchange Project consists of separate components: Knowledge Exchange component and the Research component. You may agree for your organization to participate in any of the following ways over the next two years.

Knowledge Exchange Project

- Various staff to participate in joint UW/health unit meeting to identify planning and evaluation questions and appropriate analysis (up to 3 hours for meeting with identified HU personnel – this could be Chronic Disease Manager, Tobacco and Physical Activity Staff, Epidemiologist, or others)
- Various staff to make use of the data through planning and action with schools (internal meetings or school meetings)
- Primary contact to attend a central meeting on SHAPES-Ontario Project
- Primary contact to participate in a small reflective practice group which meets every 2 months by audio or web conference.
- Health unit will receive $4000 to support knowledge exchange. Potential expenses may include training staff, hosting meetings/presentations, as well as travel expenses for conferences or meetings.

Research Component

- Primary health unit contact would be asked to participate in four 60 minute audio-taped interviews (in 1,6,12 and 18 months) that describe knowledge use with respect to the SHAPES-data within the health unit (meetings, plans, activities, evaluations)
- Up to 5 health unit staff would be asked to participate in two 60 minute audio-taped interviews (in 1 and 18 months) that describe knowledge use with respect to the SHAPES-data within the health unit (meetings, plans, activities, evaluations)
- Collect and review internal organizational documents and correspondence relevant to understanding the use of SHAPES-data; for example Public Health Unit organizational charts, strategic plans, minutes, meeting agendas, related correspondence.
- Permit a request of the primary contact to be observed during participation in the reflective practice group. The reflective practice group will consist of staff from participating health units, such as epidemiologists, public health nurses, public health promoters, and program evaluation officers as well as UW research staff & project investigators.

The primary health unit contact would help identify the key health unit staff to interview and the pertinent organizational documents pertaining to the SHAPES-Ontario data use. Each staff member would be provided with an information letter and their consent would be sought prior to participation. These staff could include Director, Program Managers, Epidemiologists, Public Health Nurses or others.

Consent Form for Health Unit Participation

I have read the information presented in the information letter about the SHAPES-Ontario Knowledge Exchange Project being conducted by Steve Manske of the Centre for Behavioural Research and Program Evaluation at the University of Waterloo, Scott Leatherdale of Cancer Care Ontario and Roy Cameron of the Centre for Behavioural Research and Program Evaluation at the University of Waterloo. I have had the opportunity to ask any question related to this study, to receive satisfactory answers to my questions, and any additional details I wanted. I am aware that our organization may withdraw from the study without penalty at any time by advising the researchers of this decision.

This project has been reviewed by, and received ethics clearance through, the Office of Research Ethics at the University of Waterloo. I was informed that if I have any comments or concerns resulting from our participation in this study, I may contact Dr. Susan Sykes, Director of Research Ethics at the University of Waterloo at (519) 888-4567 ext. 6005.

With full knowledge of all forgoing, I agree, of my own free will, for our organization to participate in this study in the following ways (check each item to which you agree):

Knowledge Exchange Component:

__ I agree to permit various staff to participate in the knowledge exchange component of the project as determined appropriate by our health unit.

Research Component:

__ I agree to allow researchers to approach health unit staff to participate in the following components:

- __ 4 audiotape interviews with the primary health unit contact (at 1, 6, 12 and 18 months);
- __ 2 audiotape interviews with <u>up to 5</u> health unit staff (at 1 and 18 months); and
- __ observation of the reflective practice group in which the primary contact would be invited to participate on behalf of our organization.

__ I agree to permit researchers to collect and analyze health unit documents and correspondence.

_____ _____

Print Name Medical Officer of Health's Signature

_____

Dated at (insert location)

Primary Contact Consent Form

[date]

[address]

[insert name]:

SHAPES-Ontario Knowledge Exchange Project

Your health unit is participating in the SHAPES-Ontario Project and data collections occurred in [insert date]. These surveillance data are being fed back to individual schools and we are seeking permission to release the raw data to your health unit. As an extension to the current project, we have received funding to conduct the *SHAPES-Ontario Knowledge Exchange Project.* The research project will facilitate and study the knowledge exchange processes intended to enhance evidence-based practice in public health and to study the process of formation of a community of practice as a model for knowledge exchange. We have received the permission of your Medical Officer of Health to conduct this project within your health unit. This letter invites you, as our primary contact, to participate in the research project.

Over the next two years, we hope to continue working with your health unit to facilitate and support the use of SHAPES-Ontario data. The *Knowledge Exchange Project* will allow us to provide participating health units with the support in using and interpreting the data. Health units will have access to a Ph.D. Statistician familiar with the SHAPES data system, access to a Knowledge Broker, who is a MHSc prepared with ten years of health unit experience, and ongoing contact with project activities throughout Ontario through the reflective practice group and electronic communication. In addition, each health unit will receive $4000 to help support additional activities associated with knowledge exchange. Potential expenses include training staff, hosting meetings/presentations, as well as travel expenses for conferences or meetings. By participating in this project, we hope to extend our understanding of the processes and structures within and between organizations that contribute to evidence based practice.

Attached is a detailed list of both the knowledge exchange and research components of the project. Participation is voluntary and you can choose to participate in as many or as few components as you wish. We respect your wishes. Your participation in this aspect of the project will not influence the support given to use the SHAPES-Ontario data.

We will hold all information provided in strict confidence. Information collected via paper and tapes during this study will be retained for seven years in a secure area at the University of Waterloo to which only researchers associated with the project have access. Electronic data will be retained on a secure server for seven years and then destroyed. If you choose to participate in any aspect of the research, you can withdraw at any point by contacting me at the number below.

We expect that participation in this knowledge exchange research will involve only minimal organizational and individual risk. Due to the small number of health units participating and the variability in size and capacity, special consideration will be put in place to protect organizations and individual participants. Safeguards to protect anonymity will include locked storage of all data (including password protected electronic files) and replacement of identifying information with code numbers to protect participant identification in all interviews, observations and reports produced. Furthermore, investigators and staff will not share or discuss information they obtain during interviews and observation, beyond the research team. Prior to making any results public, we will

consult with each participating health unit. Health units will be given the opportunity to review the findings for their own health units and grant written permission to UW/PHR to release. In any case, where individual health units or staff could be identified, the health unit or staff will have the option of removing those data.

This project has been reviewed by, and has received ethics clearance through the Office of Research Ethics at the University of Waterloo. If you have any concerns about the study, you can call Dr, Susan Sykes, Director of Research Ethics at the University of Waterloo at (519) 888-4567 ext. 6005.

We will follow-up this letter by telephone to clarify any outstanding issues within two weeks.

We thank you for taking the time to consider this project. If you have any questions about this study, you may contact Elissa Bonin, Project Manager, at (519) 888-4567 ext 3354 or enbonin@healthy.uwaterloo.ca.

Sincerely,

Dr. Steve Manske
Scientist
University of Waterloo

Elissa Bonin
Project Manager
Population Health Research Group

Attachments: Knowledge Exchange Project Components, Consent Form for Health Unit Primary Participants

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Study Investigators

Dr. Steve Manske
University of Waterloo

Dr. Scott Leatherdale
Cancer Care Ontario

Dr. Roy Cameron
University of Waterloo

Study Collaborators

City of Hamilton Department of Public Health and Community Services
Kingston, Frontenac, Lennox and Addington Public Health
Ottawa Public Health
Simcoe-Muskoka District Health Unit

Knowledge Exchange Project Components

The Knowledge Exchange Project consists of separate components: Knowledge Exchange component and the Research component. You may agree to participate in any of the following ways over the next two years.

Knowledge Exchange Project

- Participate, along with other health unit staff, in joint UW/health unit meeting to identify planning and evaluation questions and appropriate analysis (up to 3 hours for meeting with identified HU personnel – this could be Chronic Disease Manager, Tobacco and Physical Activity Staff, Epidemiologist, or others)
- Make use of the data, if appropriate, through planning and action with schools (internal meetings or school meetings)
- Attend a central meeting on SHAPES-Ontario Project or designate another health unit representative
- Participate in a small reflective practice group which meets every 2 months by audio or web conference.
- Health unit will receive $4000 to support knowledge exchange. Potential expenses may include training staff, hosting meetings/presentations, as well as travel expenses for conferences or meetings.

Research Component

- Participate in four 60 minute audio-taped interviews (in 1,6,12 and 18 months) that describe knowledge use with respect to the SHAPES-data within the health unit (meetings, plans, activities, evaluations)
- Identify up to 5 health unit staff that would be asked to participate in two 60 minute audio-taped interviews (in 1 and 18 months) that describe knowledge use with respect to the SHAPES-data within the health unit (meetings, plans, activities, evaluations) Each staff member would be provided with an information letter and their consent would be sought prior to participation. These staff could include Director, Program Managers, Epidemiologists, Public Health Nurses or others.
- Identify and collect internal organizational documents and correspondence relevant to understanding the use of SHAPES-data; for example Public Health Unit organizational charts, strategic plans, minutes, meeting agendas, related correspondence.
- Permit us to observe you in the reflective practice group (if you choose to participate in that group). The reflective practice group will consist of staff from participating health units, such as epidemiologists, public health nurses, public health promoters, and program evaluation officers as well as UW research staff & project investigators.

Consent Form for Interviews and Correspondence for Health Unit Primary Participants

I have read the information presented in the information letter about the SHAPES-Ontario Knowledge Exchange Project being conducted by Steve Manske of the Centre for Behavioural Research and Program Evaluation at the University of Waterloo, Scott Leatherdale of Cancer Care Ontario and Roy Cameron of the Centre for Behavioural Research and Program Evaluation at the University of Waterloo. I have had the opportunity to ask any questions related to this study, to receive satisfactory answers to my questions, and any additional details I wanted. I am aware that I may withdraw from the study without penalty at any time by advising the researchers of this decision.

This project has been reviewed by, and received ethics clearance through, the Office of Research Ethics at the University of Waterloo. I was informed that if I have any comments or concerns resulting from our participation in this study, I may contact Dr. Susan Sykes, Director of Research Ethics at the University of Waterloo at (519) 888-4567 ext. 6005.

With full knowledge of all forgoing, I agree, of my own free will, to participate in this study in the following ways (check each item to which you agree):

Knowledge Exchange Component:

__ I agree to participate in the knowledge exchange component of the project to the level I deem appropriate

Research Component:

__ I agree to participate in up to four audiotape interviews (in the next 1,6,12 and 18 months).

__ I agree to identify up to 5 health unit staff for consideration of two audiotape interviews (in the next 1 and 18 months).

__ I agree to identify and collect pertinent health unit documents and correspondence for the researchers to analyze.

__ I agree to permit researchers to audiotape my phone conversations with research team staff (i.e. knowledge broker).

__ I agree to permit researchers to observe and audiotape me during the reflective practice group

_____ _____

Print Name Signature

_____

Dated at (insert location)

Secondary Contact Consent Form

[date]

[address]

Dear [insert other health unit contact name]:

SHAPES-Ontario Knowledge Exchange Project

Your health unit is participating in the SHAPES-Ontario Project, which measures youth smoking and physical activity. [name], [title, dept], has been our main contact for this project. Data collection in high schools in your area occurred in [insert time period]. These surveillance data are being fed back to individual schools and we are seeking permission to release the raw data to your health unit.

As an extension to the SHAPES-Ontario project, we have received funding to conduct the *SHAPES-Ontario Knowledge Exchange Project*. The research project will facilitate and study the knowledge exchange processes intended to enhance evidence-based practice in public health and to study the process of formation of a community of practice as a model for knowledge exchange. We have received the permission of your Medical Officer of Health to conduct this project within your health unit. This letter invites you to participate in the research project.

Over the next two years, we hope to continue working with your health unit to facilitate and support the use of SHAPES-Ontario data. The *Knowledge Exchange Project* will allow us to provide participating health units with the support in using and interpreting the data. Health units will have access to a PH.D. Statistician familiar with the SHAPES data system, access to a Knowledge Broker, who is a MHSc prepared with ten years of health unit experience, and ongoing contact with project activities throughout Ontario through the reflective practice group and electronic communication. In addition, each health unit will receive $4000 to help support additional activities associated with knowledge exchange. Potential expenses include training staff, hosting meetings/presentations, as well as travel expenses for conferences or meetings. By participating in this project, we hope to extend our understanding of the processes and structures within and between organizations that contribute to evidence based practice.

Attached is a detailed list of both the knowledge exchange and research components of the project. Participation is voluntary and you can choose to participate in as many or as few components as you wish. We respect your wishes. Your participation in this aspect of the project will not influence the support given to use the SHAPES-Ontario data.

We will hold all information provided in strict confidence. Information collected via paper and tapes during this study will be retained for seven years in a secure area at the University of Waterloo to which only researchers associated with the project have access. Electronic data will be retained on a secure server for seven years and then destroyed. If you choose to participate in any aspect of the research, you can withdraw at any point by contacting me at the number below.

We expect that participation in this knowledge exchange research will involve only minimal organizational and individual risk. Due to the small number of health units participating and the variability in size and capacity, special consideration will be put in place to protect organizations and individual participants. Safeguards to protect anonymity will include locked storage of all data (including password protected electronic files) and replacement of identifying information with code numbers to protect participant identification in all interviews, observations and reports produced. Furthermore, investigators and staff will not share or discuss information they obtain during interviews and observation, beyond the research team. Prior to making any results public, we will consult with each participating health unit. Health units will be given the opportunity to review the findings for their own health units and grant written permission to UW/PHR to release. In any case, where individual health units or staff could be identified, the health unit or staff will have the option of removing those data.

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We thank you for taking the time to consider this project. If you have any questions about this study, you may contact Elissa Bonin, Project Manager, at (519) 888-4567 ext 3354 or enbonin@healthy.uwaterloo.ca.

Sincerely,

Dr. Steve Manske
Scientist
University of Waterloo

Elissa Bonin
Project Manager
Population Health Research Group

Attachments: Knowledge Exchange Project Components, Consent Form for Other Health Unit Participants

---

Study Investigators

Dr. Steve Manske
University of Waterloo

Dr. Scott Leatherdale
Cancer Care Ontario

Dr. Roy Cameron
University of Waterloo

Study Collaborators

City of Hamilton Department of Public Health and Community Services
Kingston, Frontenac, Lennox and Addington Public Health
Ottawa Public Health
Simcoe-Muskoka District Health Unit

Knowledge Exchange Project Components

The Knowledge Exchange Project consists of separate components: Knowledge Exchange component and the Research component. You may agree to participate in any of the following ways over the next two years.

Knowledge Exchange Project

- Participate, along with other health unit staff, in a joint UW/health unit meeting to identify planning and evaluation questions and appropriate analysis (up to 3 hours for meeting with identified HU personnel – this could be Chronic Disease Manager, Tobacco and Physical Activity Staff, Epidemiologist, or others)
- Make use of the data, if appropriate, through planning and action with schools (internal meetings or school meetings)
- Health unit will receive $4000 to support knowledge exchange. Potential expenses may include training staff, hosting meetings/presentations, as well as travel expenses for conferences or meetings.

Research Component

- Participate in two 60 minute audio-taped interviews (in 1 and 18 months) that describe knowledge use with respect to the SHAPES-data within the health unit (meetings, plans, activities, evaluations)
- Identify and collect internal organizational documents and correspondence relevant to understanding the use of SHAPES-data; for example Public Health Unit organizational charts, strategic plans, minutes, meeting agendas, related correspondence.

Consent Form for Interviews and Correspondence for Other Health Unit Participants

I have read the information presented in the information letter about the SHAPES-Ontario Knowledge Exchange Project being conducted by Steve Manske of the Centre for Behavioural Research and Program Evaluation at the University of Waterloo, Scott Leatherdale of Cancer Care Ontario and Roy Cameron of the Centre for Behavioural Research and Program Evaluation at the University of Waterloo. I have had the opportunity to ask any questions related to this study, to receive satisfactory answers to my questions, and any additional details I wanted. I am aware that I may withdraw from the study without penalty at any time by advising the researchers of this decision.

This project has been reviewed by, and received ethics clearance through, the Office of Research Ethics at the University of Waterloo. I was informed that if I have any comments or concerns resulting from our participation in this study, I may contact Dr. Susan Sykes, Director of Research Ethics at the University of Waterloo at (519) 888-4567 ext. 6005.

With full knowledge of all forgoing, I agree, of my own free will, to participate in this study in the following ways (check each item to which you agree):

__ I agree to participate in up to two audiotape interviews (in the next 1 and 18 months).

__ I agree to permit researchers to audiotape my phone conversations with research team staff (i.e. knowledge broker).

__ I agree to identify and collect pertinent health unit documents for the researchers to analyze.

__ I agree to permit researchers to save and analyze email correspondence with the researcher.

_____ _____

Print Name Signature

_____

Dated at (insert location)

Appendix J: Data Analysis Inter-Rater Coding Index

<u>CODE DESCRIPTIONS:</u> CHARACTERISITICS OF SOURCE & INFORMATION

*C & L, 1993 = Cousins & Leithwood, 1993

Domain A	
Characteristics of Source~Info: Characteristics of the source and innovation influencing knowledge transfer/exchange. Knowledge exchange depends on perceptions of how compelling the information is for the practice (e.g. its relative advantage over previous practice), and the credibility of the source of the information. (Knowledge Broker Manual (KB) Manual)	
Source: (Characteristics of the source)	**Information:** (Characteristics of the information/innovation)
Credibility of Source: Perceived believability and validity of source of help, and those responsible for dissemination (e.g. expertise, previous track record etc.) (C &L 1993) Source: U of Waterloo	**Content~ Relative Advantage:** Nature and substance of the actual knowledge being disseminated. Especially important is whether or not the content is perceived to be congruent with existing knowledge, valued, positive and of sufficient scope (C & L, 1993) The <u>comparative</u> benefit of the new information to their options-the degree to which information is perceived as better than the idea it supersedes. (Rogers, 1995) Relative advantage: Hi – low Local data – provincial/national data
Sophistication of Source: Perceived quality of the source of information including its technical sophistications, appropriateness, rigour, etc. (C & L, 1993) *Note: Feedback report seen as a "source"* *Referenced/science based* *Note: results collected from local participants/students considered appropriate* Range: Appropriate-inappropriate Rigour:Rigorous-Lax	**Content~ Complexity:** Degree to which an innovation is perceived as difficult to understand and use (Rogers, 1995) Complexity: Complex-Simple

Communication Quality of Source: The perceived clarity, style, readability, flare and the like with which the knowledge is conveyed to the intended audience (C & L, 1993) *Note: Feedback report seen as a "source", i.e. communication clarity of the feedback report.* Clarity: Clear-unclear	**Content~Trialability:** The potential or ease with which one may test the new information, the degree to which the innovation may be experimented with on a limited basis. (Rogers, 1995) E.g. Health unit able to test the data (e.g. data set) on a temporary basis. Trialability: Easy-Hard to Try
	Content~ Observability: The degree to which the results of an innovation are visible to others. Easier it is to see the results of an innovation, more likely it will be adopted. (Rogers, 1995) Easily see the results/overall picture information is portraying.
	Relevance: The extent to which the audience for whom it is intended, perceives the knowledge to be pertinent to their needs (practical) (C & L, 1993) E.g. Health unit use SHAPES to do their "work", planning, programming etc. and can see the potential uses of SHAPES & how it meets their needs. Relevance: Relevant-irrelevant
	Timeliness: Extent to which knowledge is perceived to be disseminated at an appropriate time and delivered in an ongoing manner (i.e. access to information when needed). E.g. Timely with current health unit mandates/strategies/efforts. Appropriateness: Appropriate(ongoing)-Inappropriate(short term) Complements: Complements current focus/strategy- does not complement current focus/strategy

CODE DESCRIPTIONS: CHARACTERISITICS OF CONTEXT

Domain B	
Characteristics of Context for Use: Knowledge exchange is influenced by personal and organisational networks (i.e. CoP). These enable appropriate analysis and contextualisation of information. (CoP may be viewed as social capital required for knowledge exchange) (KB Manual)	
Individual Context (Referring to the level of Context for Use)	**Organizational Context:** (Referring to the level of Context for Use)
Commitment/Receptiveness: The extent to which the attitudes of the target audience are favourable to the use of the disseminated information. (C & L, 1993). @ INDIVIDUAL LEVEL Receptive-Unreceptive *Positive-negative*	**Commitment/Receptiveness:** The extent to which the organization's attitudes are favourable to the use of the disseminated information. (C & L, 1993). @ ORGANIZATIONAL LEVEL Receptive-Unreceptive *Positive-negative*
Mandate & Priorities (M & P): Explicit and implicit mandates & priorities established within the setting and the associated weight attributed to different sources of information (C & L, 1993). (M & P OF INDIVIDUAL) *Individual emphasis on particular priorities (e.g. focus on PA vs tobacco)* Type: Explicit-Implicit Degree: High-Low Value Given to Scientific Info: High-Low Source: Internal-external	**Mandate & Priorities:** Explicit and implicit mandates & priorities established within the setting and the associated weight attributed to different sources of information (C & L, 1993). (M & P OF ORGANIZATION) *Reference to organizational focus/strategies/mandates & priorities-what drives their work (e.g. Mandatory Programs & Service Guidelines-MPSG)* Type: Explicit-Implicit Degree: High-Low Value Given to Scientific Info: High-Low Source: Internal(e.g. HU strategic plan)-external (Ministry mandates-MPSG)

Resources: References to money, staff or time, *capacity (workload)* that may impact knowledge use (i.e. using SHAPES/or other evidence). (INDIVIDUAL LEVEL-i.e., personal time restrictions) Amount: extensive – minimal (e.g. minimal money & time, extensive workload/capacity*)*	**Resources:** References to money, staff or time, capacity (workload), organizational supports (PHRED unit) that may impact knowledge use (i.e. using SHAPES/or other evidence). (ORGANIZATIONAL LEVEL-i.e., health unit is not appropriately staffed). Amount: extensive – minimal (e.g. minimal money & time, extensive workload/capacity, extensive organizational supports)
	Organizational Structure: Reference to the set-up or structure of the organization including structuring of staff, teams/divisions, departments. As well as linkages between staff, team/divisions & department and bureaucratic processes. May include references to past structure, reorganization and amalgamation.
	Organizational Processes: Processes/procedures (explicit & implicit) internal to the organization (HU) in order to conduct work and meet mandates/priorities. Part of these processes may involve the use of evidence, e.g. SHAPES. Often refers to planning and decision making processes, set procedures to work with partners, appropriate allocation of resource, and communications. Type: formal – informal Format: Collaborative/Teamwork – independent
	Organizational Atmosphere: Reference to the culture/atmosphere of the organization/team. Examples include a supportive environment, emphasis on collaboration/teamwork, creativity, autonomy, culture of EBP, nature of working within the organization, the way things are done. Note: organizational atmosphere may or may not be a direct result of organizational procedures & processes

	Organizational Readiness: Reference to the stage of readiness of the organization/team to use SHAPES/evidence. Examples include difference between health units, between programs/teams in health units, with each varying in their processes and readiness to use/implement SHAPES.
	Internal Accountability: Reference to monitoring/processes that hold the organization (HU) accountable for actions/decisions etc.
Individual Level: Personal Characteristics	**Org Level: Organization Characteristics**
Personal Characteristics: Characteristics of knowledge users including sex, years worked, education, role at health unit and focus of work. *Some reference to individual skills.* Sex: Male-Female Education: Bachelors, Masters/PhD Role: Administrator-User Position: Mgmt, frontline staff, liaison etc. Focus of Work: Education, Health Promotion, Tobacco-PA, staff supervision, etc.	**Organization Characteristics:** Characteristics of organizational context including role of the health unit, number of years existing, experience etc. Boundaries: service area, rural, urban Geographic Location: North, South, East, West Language(English OR French): Unilingual– Bilingual
History of Prior Knowledge Use: Evidence of prior history of information use (C & L, 1993). Demonstrate prior use of knowledge/evidence. Amount: Extensive-Little Evaluation: Positive-Negative	**History of Prior Knowledge Use:** Evidence of prior history of information use (C & L, 1993). Demonstration of organizational use of knowledge/evidence (including organizational requirements to be EBP) Amount: Extensive-Little Evaluation: Positive-Negative

Previous Experience: References to training, work and personal experience of the participant or other member(s) of the health unit. (C & L, 1993). Amount: Extensive-Little Evaluation: Positive-Negative	**Previous Experience:** References to training, work and personal experience of the participant or other member(s) of the health unit. (C & L, 1993). (i.e. offering of training session to staff) *Including reference to organizational requirements/how to do things/ basing actions on past experiences.* Amount: Extensive-Little Evaluation: Positive-Negative
Leadership: Evidence that there is initiative for leadership concerning knowledge use (application of SHAPES). (i.e. individual takes initiative to apply/disseminate SHAPES) Amount: Extensive-Minimal	**Leadership:** Evidence that there is initiative/leadership concerning knowledge use (application of SHAPES). (i.e. management support). Amount: Extensive-Minimal
Information Needs: Gaps in PERSONAL knowledge and expertise perceived by intended audience. (C & L, 1993). *Reference to limited evidence available/accessible (including evaluation).* Amount: Extensive-Minimal	**Information Needs:** Gaps in ORGANIZATIONAL knowledge and expertise perceived by intended audience. (C & L, 1993). *Reference to limited evidence available/accessible (including evaluation).* Amount: Extensive-Minimal
	Level: Environment
	Environmental Context Characteristics: Characteristics of the external environmental context (beyond Health Unit)including factors such as: Boundaries: service area, rural, urban Geographic location to the HU Language: Unilingual (English OR French) – Bilingual (French & English) Economic stability: good – poor Population: large – small

	Mandates or Priorities: Explicit and implicit mandates & priorities external to the organization and the associated weight attributed to different sources of information. (adapted from C & L, 1993) Source: client M & P (i.e. schools) community M & P (i.e. city priorities/strategies) governing M & P (i.e. legislation, by-laws) Type: explicit & implicit Degree: high – low Accountability- high – low (i.e. monitoring of implementation of priority/mandate)
	Partnerships/Relationships: Reference to partnerships/relationships with external organizations including NGOs, government agencies, community groups etc. Type: collaborative (2 way), supportive (one way) Formality: formal – informal
	Nature of Relationship: The nature or type of relationship the organization (HU) has with external agencies Type: positive – negative History: new rtp – established rtp Trust: trusting – untrusting Description: coalition, working group, individual
	Political Agenda(s): Reference to political agenda(s) influencing internal organizational strategies/actions as well as external setting strategies/actions. (e.g. by-laws, strategies)

	Leadership: Evidence that there is external initiative/leadership concerning knowledge use (application of SHAPES/other evidence). Often by a key stakeholder-i.e., schools/principals etc..
	Commitment/Receptiveness: The extent to which external attitudes are favourable to the use of SHAPES/evidence in general (adapted from C & L, 1993). (external to the organization/HU) Receptive-Unreceptive Positive-negative
	External Resources: References to resources external to the organization (HU) such as money, staff, time, & capacity (workload), that may impact knowledge use (i.e. using SHAPES/or other evidence/programming etc.). Amount: extensive – minimal (e.g. minimal money/ time, extensive workload/capacity)
	External Processes: Processes/procedures (explicit & implicit) conducted external to the organization (HU) that influence external how internal processes/procedures are conducted. E.g. Required processes on behalf of external partners that determine processes necessary for the health unit to work with those external partners, i.e. school board approval. Type: formal – informal
	Timing: Reference to a "hot topic" external to the organization (HU). For example, PA is a hot topic in the community/media and public in general which an influence the health unit's priorities etc.

	Public Opinion/Readiness: Public attitude/readiness toward particular evidence. For example, public's attitude/readiness for smoke-free bylaws. The attitude/readiness can influence HU ability to apply/use evidence. Attitude: positive – negative
	Accountability: Degree of monitoring/maintenance to hold external organization accountable for their actions/decisions etc.

<u>CODE DESCRIPTIONS:</u> INTERACTIVE PROCESSES

Domain C
Interactive Processes: Knowledge exchange is influenced by the types, quality and amount of communication between the CoP/group and the outside world. These interactive communications are critical for assimilating new info and developing appropriate actions/strategies. and build broad understanding in context.
Processes
Mutual Engagement: CoP enable and support regular interaction among their members. This continuous interaction allows inter-personal relationships and trust to develop. (KB Manual)
Joint Enterprise: Collective negotiations among members, reflecting the complexity of mutual engagement. Community operates under explicit resources and constraints and are defined by the manner in which members respond to these conditions. Members within a CoP hold each other accountable to this negotiated meaning. (KB Manual)
Share Repertoire: CoP develop shared practices and communal resources that reflect the history and tradition of the community, as well as their continuous negotiation of meaning. CoP acquire resources such as shared language, specific styles (e.g. dress), use of learning stories and common sense of appropriate actions. (KB Manual)
Involvement with Change: Direct participation in the dissemination OR initiating the push for change (C & L, 1993). Duration: Short-term, long-term # Involved: Involves few-many Amount: Extensive-minimal
Ongoing Contact: Interaction with the initiators of change (either internal or external to the organization), especially local ones that increased accessibility, knowledge of local context and personal stake in change effort (C & L, 1993).
Engagement: Active involvement in implementation or dissemination follow-up activities. (C & L, 1993). Duration: Short-term, long-term # Involved: Involves few-many Amount; Extensive-minimal

<u>CODE DESCRIPTIONS:</u> KNOWLEDGE USE

<table>
<tr><th colspan="2">Domain D</th></tr>
<tr><td colspan="2">Knowledge Use:
Different types of knowledge use including conceptual, instrumental and symbolic. Can be further broken down into procedural and structural.
Note: instances coded as knowledge use are typically indications of knowledge use but lack information regarding type of knowledge use, i.e. conceptual, instrumental etc.</td></tr>
<tr><td colspan="2">Conceptual:
More general application of knowledge to provide basic enlightenment while creating a change in users' awareness and bringing attention to new ideas. (Beyer & Trice, 1997)
New ideas, awareness. Some coded instances are conceptual at the school level but bay be “effort to use” on behalf of the health unit. Often when the health unit is making an effort to use the knowledge to create awareness (conceptual) among the schools.
Learning & acquiring knowledge occurs in small bits knowledge related to each other, forming new patterns. (Most easily noted in changes in language use) (KB Manual) (Kramer & Cole, 2001)</td></tr>
<tr><td rowspan="3">Instrumental:
Instrumental knowledge use involves the direct application or research evidence in specific ways, such as developing a policy as a product of a research finding(s). (Beyer & Trice, 1997)</td><td>Effort to Use:
Effort to use--making an effort to use knowledge, (Manske, 2001)
Reference to efforts to see whether the information/research could solve a problem or making attempts to use research/information. It implies some kind of action such as, but not limited to, communication between people. Discussing something. (KB Manual)</td></tr>
<tr><td>Procedural Use:
Procedural use-creating procedures that facilitate the use of knowledge(Manske, 2001)
Making decisions: policy changes, initiating meetings, etc. to make use/try and implement the research/information. Making a decision. (KB Manual)
Set procedures/plans to facilitate use, e.g. Ppt presentations, working groups etc.</td></tr>
<tr><td>Structural Use:
Structural use-implementation and adaptation of knowledge to the relevant context (Manske, 2001)
Implementing what they've learned and making visual/noticeable changes. Implementing something. (KB Manual)</td></tr>
<tr><td colspan="2">Symbolic:
Symbolic knowledge use (also known as "political use") is the utilization of research evidence to "justify a position or action that has already been taken for other reasons" (Lavis et al., 2003)
Verifying existing beliefs/actions.</td></tr>
<tr><td colspan="2">Non-Use:
Not making use of knowledge (information, research, etc.) (KB Manual)</td></tr>
</table>

Appendix K: Theme Definitions Table

TYPE OF FACTOR	THEME	DEFINITION
Internal Context Factors ● *Factors/characteristics of the internal environment specific to the organisation under study.*	Commitment/Receptiveness	The extent to which the user's attitudes are favourable to the use of the disseminated information. (Manske, 2001)
	Leadership	Evidence that there is initiative concerning knowledge use. (Manske, 2001)
	Internal Co-ordinated Action	Explicit organisational processes and procedures developed and carried out as a means of facilitating action on a particular issue.
	Organisational Mandates & Priorities	Explicit and implicit mandates and priorities established within the setting and the associated weight attributed to different sources of information. (Cousins & Leithwood, 1993, as cited in Manske, 2001)
	History of Prior Knowledge Use	Evidence of prior history of information use. (Cousins & Leithwood, 1993, as cited in Manske, 2001)
External Context Factors ● *Factors/characteristics of the environment external to the organisation under study.*	External Relationship	A state involving mutual dealings with people or organisations external to the organisation under study.
	External Processes & Procedures	Specific process and procedures developed and implemented by external parties/organisations, e.g., policies and protocols,.
	External Mandates & Priorities	Explicit and implicit priorities established within the setting and the associated weight attributed to different sorts of information. (Cousins & Leithwood, 1993, as cited in Manske, 2001). *i.e., specific to organisations external to the unit of study
	External Resources	References to money, staff or time that may impact knowledge use. (Manske, 2001) *i.e., specific to organisations external to the unit of study