Exploring Dental Hygiene Clinical Decision Making—

A mixed methods study of potential organizational explanations

by

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Abstract

Background and Purpose: Dental hygienists are targeted for practice expansion to improve public access to oral health care and, therefore, must demonstrate decision making capacity. This study aimed to identify and test the impact of factors influential in dental hygiene decision making. Organizational and gender factors were hypothesized to be most influential.

Methods: A phased mixed methods approach was used. Phase I: A series of focus groups were conducted to inform a dental hygiene decision making model, which included key predictor variables and the outcome variable: decision making capacity. Phase II: Aspects of the model were tested via an electronic questionnaire and key informant interviews. Statistical and qualitative thematic analyses were conducted and then findings were merged for interpretation.

Results and Interpretation: Focus groups yielded over 75 codes and 6 themes (+ 1 theme from the literature) comprising the model and guiding the survey. The survey had a 38% response rate, and moderate to weak correlations between predictors and the outcome measure were shown. The final statistical model demonstrated Individual Characteristics and graduating from a 3-year program together significantly predicted decision making capacity. When merged with the key informant qualitative data, Individual Characteristics were shown to be a product of broad environmental factors and educational preparation had a particularly strong influence.

Conclusions: Individual characteristics and education are predictive of decision making capacity but are outcomes of broad structural influences. Thus, it is recommended that modifications are made to these structures to support dental hygiene decision making in expanded practice.

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Introduction

Oral health is increasingly being recognized as being integral to overall health and well being with the oral-systemic link being further substantiated in the literature.(1) While Canadians have benefitted from universal health care for decades, oral health care is mostly excluded from Medicare. As a result, Canadians are largely responsible for their own oral health care, which many successfully accomplish through employer sponsored private insurance and their own means. However, a substantial proportion of Canadians are unable to access oral health care due to financial and various other constraints, and this has negatively impacted both their oral health and general well being.

Lack of access to oral health care manifests itself in much poorer oral health status measures, relative to those who do access care. (2) For example, higher incidence and prevalence of dental caries (decay), including early childhood caries, periodontal (gum and surrounding bone) disease, tooth loss and oral cancer are all associated with poor access to oral health care.(3;4) More disconcerting is the recent recognition of the associations between poor oral health with cardiovascular disease, respiratory conditions, diabetes and various other systemic diseases. Together, these outcomes have negative implications for quality of life, ability to thrive, systemic health, survival and eventually public policy given their contribution to the taxpayer burden.(4;5)

Inequitable distribution of oral health care creates disparities in health outcomes in specific population groups such as those who are uninsured, the working poor, low socio-

economic groups, the elderly, First Nations, the disabled and people living in remote areas. In Canada, such disparities are considered unacceptable and have been targeted in various ways in order to mitigate disproportions. While it is recognized that such disparities are generated via broad social determinants, it is also accepted that the provision and utilization of health care are important for improving disparities particularly as larger social changes are more complicated and slower to implement.(6)

One increasingly utilized approach for improving health care delivery has been government-implemented changes to legislation that expand allied health care providers' scopes of practice and their delivery models.(7) Allied health care providers comprise a large proportion of the health care workforce in North America and therefore stand to make a significant impact on mitigating some of the specific issues that contribute to a lack of access to health care such as availability and costs. Dental hygienists are the primary allied oral health care profession and have been targeted within various jurisdictions both in the US and Canada for such an expansion.

Despite the potential impact dental hygienists could make towards improving access to oral health care, some groups have questioned whether dental hygienists are capable of the clinical decision making required in an expanded practice, which would make demands beyond their technical skill set. Decision making is recognized as the central component of professional health care practice. Decision making capacity is being able to make and carry out decisions as intended. It falls within the broad field of knowledge translation, which is the process of generating, disseminating and implementing knowledge in its various forms to improve health outcomes. All health care professions,

from the most elite to the more emergent allied groups, have been identified as being severely delayed in appropriately translating new knowledge into practice, and this has led to failures in patients receiving the most current, evidence-based health care. Thus, expansions to dental hygiene practice will need to be well supported from a safety and quality perspective.

This study was designed to explore the knowledge translation processes of dental hygienists. Specifically, the purpose was to understand dental hygiene decision making capacity in order to establish if it supports an expansion to dental hygiene practice. In addition, the aim was to determine what factors are associated with the capacity to make sound clinical decisions. The hypothesis was that the organization exerts the primary influence on knowledge translation within the dental practice in contrast with the influence exerted by the individual clinician herself. In addition, it was the contention that gendering of health care workers is a significant component of the overall influence of the organizational dynamic. Thus, an organizational gendered theoretical approach was applied to the research.

In order to achieve the study aims, a mixed methodological approach was used. In the first phase of the two phase study, a series of focus group interviews were conducted to build a decision making model that would guide the development of a survey instrument. In the second phase, to test the decision making model, the electronic survey questionnaire was implemented with practicing dental hygienists in Manitoba, Canada. Finally, key informant interviews were conducted to further render the results of the

survey data and provide additional insight surrounding broad environmental influences on decision making that were not expected to emerge from the survey respondents.

For the Phase II survey questionnaire, one single item was used to measure the dependent variable, decision making capacity. The independent variables, each constructed from the focus group data with one exception, fell within 7 categories: individual factors, organizational attributes, organizational limitations, distillery of practice, incorporating new knowledge, characteristics of decisions and practice structure. The latter variable emerged primarily from organizational theory. These predictor variables were each measured via several questionnaire items with each formulating its own measurement scale.

The dissertation is organized with Chapters 1 to 4 providing a review of the literature. Specifically, chapter 1 provides a detailed review of oral health disparities and elaborating on the potential for expansions to dental hygiene practice for reducing disparities. This chapter also introduces the field of knowledge translation and decision making in regard to how they pertain to expanding dental hygiene practice. The chapter closes with a discussion of the specific study aims and policy goals of the research.

Chapter 2 provides a more comprehensive account of some of the research parameters of this study such the dental hygiene profession, decision science, capacity, practice variation and early knowledge translation science. Chapter 3 provides a discussion of the theoretical approach for the research. Specifically, a discussion is provided of organizational theory and gendering and how together they framed the study. Chapter 4

is a theoretical discussion that makes a case for using a mixed methods approach for the research and a closer examination in ensuring rigor within such an approach.

Chapter 5 outlines the research methodology, Chapter 6 provides the results and Chapter 7 provides the interpretation of the findings and discussion surrounding these. Chapter 8 addresses the limitations to the study and Chapter 9 closes with the researcher's concluding remarks surrounding the policy implications of the research findings, recommendations regarding future work and dissemination plans.

Literature Search Strategy

To provide an understanding of the history, development and current perspective on the research topic and guide the overall research design, a comprehensive review of the literature was conducted. Such a review provides a summary of research findings.(8-10) The literature review used key words, singularly and in combination, and included mixed sources of literature. The key words were: knowledge translation, knowledge transfer, knowledge implementation, clinical decision making, oral health care practice structure and autonomy.

The search was limited to the English language from 2003 to 2011. The selection of relevant material was determined using titles, abstracts and the full text when necessary. Data was gathered through a search that included, but was not be limited to, the following databases: MedLine, CINAHL (Cumulative Index of Nursing and Allied Health Literature) and the Cochrane controlled trials register. The literature search included all types of relevant documents and research including randomized controlled trials (RCTs),

descriptive studies, qualitative studies, meta-analysis/systematic reviews, reviews, and various other sources including media, government and professional reports and websites.

Other pertinent literature was continuously identified and included and involved manually checking for additional materials in the bibliographies and references in all papers identified by the initial search or were triggered through other readings or research findings. At the later stage of the search and subsequently once the research was underway, the retrieval criteria were more purposeful and less restricted to the original keywords because the literature was necessary for additional understanding, guiding the research and providing background information.

Chapter 1: Oral Health Disparities, Knowledge Translation and Study Aims

Oral Health Disparities

Oral health is increasingly being recognized as integral to overall health. This acknowledgement gained the attention of the larger health care audience in response to the 51st United States Surgeon General's report in 2001—the first ever on oral health, which made the mouth body connection explicit. (6;11;12) Since then, evidence has been steadily accumulating supporting the link between oral health and systemic wellness.(13;14) While the recognition of this association has been important in improving awareness and attention to oral health care, the health gradient evident in overall health status is also found to occur in oral health where a correspondence exists between declines in socio-economic status (SES) and oral health.(14-16)

In the 2001 Surgeon General's report, oral disease was called a "silent epidemic".(11;17) The report outlined the importance of oral health care and how its neglect has contributed to significant oral health disparities.(12;18) Furthermore, unlike many health conditions, the report highlighted that oral disease is largely preventable.(11;12) The Surgeon General's Report called for increasing efforts to be directed at oral disease prevention and health promotion to be more aggressively incorporated into oral health care delivery and policy.(11;12) The Surgeon General's Report suggested that public-private collaborative efforts be increased and committed dialogue between government, dentistry, educators and allied oral health care providers would occur.(19)

While the Surgeon General's Report did not directly mention oral health professionals' role in mitigating the epidemic, subsequent reports and responses did.(20) For example, of the several significant papers that emerged in response to the report, the 2003 "Call to Action" outlined how oral health could be improved by removing barriers to oral health services.(17;18) State legislators, in some situations, responded by recommending increasing dental hygiene scopes of practice.(18) Most recently, the Institute of Medicine (IOM) in the US held a momentous conference addressing the (in)sufficiency of the oral health care workforce in meeting oral health care needs of the nation.(7) The recommendations emerging from the meeting included new workforce models such as changing scopes of practice and supervision requirements.(7)

Oral health care has a long history of being excluded from Canadian and American health care policy agendas. The body's systems and health care, while once separated, have become increasingly integrated, but the disconnection of the mouth from the remainder of the body has persisted resulting in less public resources being available to oral health care, as evidenced by its exclusion from national health care funding (i.e. Medicare).(21) There is no biological or theoretical basis for the separation, and the integral need for cranio-facial complex for overall well-being is substantiated.(21)

In Canada, health care policy has been somewhat preoccupied with the sustainability of its public health care system and has lacked federal and provincial leadership in the oral health care realm until very recently.(13;14) While several reports, including the Health Council of Canada's response to the 2003 First Ministers' Accord and the Romanow Report have been produced highlighting the need to improve access to health care, reduce

disparities and integrate prevention, these focused on the public health system with only a marginal associated with oral health care.(22;23) Government has not been made well aware of oral health access issues and disparities or the oral systemic link,(14) and nor have they been compelled to intervene until very recently.

According to the World Health Organization (WHO), health is a basic human right.(21) The philosophical debate that follows this surrounds what is considered health. The American Dental Educators' Association have stated that oral health is a human good that is experienced and needed in order to flourish in life.(24) Poor oral health is recognized as diminishing human potential in reducing one's capacity to learn, enjoy social relations and succeed overall.(18)

While a large proportion of Canadians have experienced substantial improvements in oral health, striking disparities in oral health status exist between the general population and some subpopulation groups.(25) Both general and oral health disparities are largely rooted in societal determinants of health, but are also recognized as being at least partially due to an inequitable distribution of health care and oral health care respectively.(6;15;16;25;26) It is asserted that when something is not only unfortunate, but also unfair, there is a moral obligation to do something about it.(27) Health policy makers and interest groups, including organized dental hygiene, have recognized that oral health disparities are both unfortunate *and* unfair.

In oral health care, traditional models of delivery have contributed to the marked polarization between the oral health status of the most and least advantaged Canadians

with the latter failing to access care to the same extent as the former. (13;14) The status quo has not alleviated the current condition and, in fact, oral health disparities are increasingly evident.(7;28) The failure to equitably distribute care is an important factor to recognize for providing direction to health policy and has helped fuel the development and implementation of oral health programming and delivery that challenges the status quo.(6;12-14;16)

In the recent IOM's Consensus report, several strategies to address the inequities in oral health care delivery thereby improving the health of disadvantaged population groups were identified while stressing that no single strategy is a panacea.(29) One key approach that has been repeatedly identified is to revise government legislation with the intent of broadening scopes of practice of specific health care providers and/or provide options for alternate delivery models.(6;7;14;26;28)

Dental hygienists, the subjects of this research, have been targeted for such an expansion,(6;14;26;28;30) but there has been resistance from various stakeholders based on arguments surrounding the ability of dental hygienists to provide safe, quality oral health care within alternate delivery models.(6;31;32) Dental hygienists have not historically provided primary care and have had limited independence in clinical decision making. Little is known about their decision making capacity in traditional and alternate settings alike. Thus, while new approaches to providing oral health care are warranted, dental hygienists potential role within new models requires further investigation.

An expansion of dental hygiene practice would constitute a considerable policy change in most Canadian jurisdictions and significant resistance from some stakeholders, particularly from organized dentistry, has surrounded it thus far. Dentistry has a history of political legitimacy, and, therefore, it has entrenched the confidence and trust of the state and the public. While the government is interested in policy change in order to mitigate oral health disparities, it will need to be compelled by strong, evidence-based arguments to foster a supportive political climate and counter the status quo. Policy change requires research to be available throughout the process, and both qualitative and quantitative research studies are important at various stages of the policy cycle.(33)

Knowledge Translation and Decision Making

Virtually all patient care surrounds clinical decision making—making decisions about what to do and what not to do in light of one's current knowledge, skills and attitudes. Therefore, decision making has an important influence on the safety and quality of care particularly for primary care providers who are responsible for making independent patient care decisions.(34) Having decision making capacity can be summarized as having the freedom to intentionally act within one's environment to achieve positive outcomes.(35;36) Clinical decision making is not an insulated event but rather falls within a large and expanding field of inquiry known as knowledge translation or 'KT'.(37;38) Knowledge translation is defined by the Canadian Institutes of Health Research (CIHR) as:

> "*...a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically sound application of knowledge to improve the health of Canadians, provide more effective health services and products and strengthen the health care system.*"(39)

More simply, it means getting sound current research findings appropriately into health care practice in order to improve health outcomes. However, the knowledge translation process is a complex progression requiring generated knowledge to be disseminated to intended users for appropriate and timely implementation. Implementing current knowledge as expeditiously as possible has the potential to profoundly impact what we refer to generally as quality health care. Thus, knowledge translation is an important area of research inquiry because it has the potential to improve health services delivery and subsequently the health status of the public.(40;41) Knowledge translation research has been recognized as being so important to improving health that several key health research agencies, such as the CIHR, Canadian Health Services Research Foundation and World Health Organization among others, have incorporated it in their mandates.(42)

Sound decision making that ensures current knowledge is translated to practice is foundational to providing safe, quality care—one cannot talk about one without referring to the other. While evidence-based decision making is inherent in knowledge translation, decision making capacity is increasingly being recognized as not only including the rational application of research to practice, but also taking into account one's personal values (human agency) and the broad environmental and local organizational features one operates within (structure).(35;43;44) While rationality has been described as the anchor for decision making, the point that something else is going on is known to be influential.(35;45) Thus, the cognitive component of the decision making process occurring in individual clinicians is the area of knowledge translation that in particular requires exploration.

Recent years have signified an unabated knowledge explosion, but advances to health care practice have not kept pace with knowledge generation or technological developments thereby losing opportunities to improve patient outcomes—the ultimate in quality health care. Previous research investigating knowledge translation, while not conducted with dental hygienists, has largely been founded on simple diffusion models and has left unexplained phenomenon surrounding practice variation.

Historically, knowledge translation research has targeted elite professionals (i.e. dentists, doctors) likely due to a perception that these primary health care providers are the relevant clinical decision makers and possess stronger 'rights' to knowledge and its application. Knowledge can be viewed as property and rights to it are socially defined and limited by privilege.(46) However, allied health care providers, such as nurses, nurse practitioners and, now, dental hygienists, are increasingly providing primary care and have been required, often through legislation, to take greater responsibility for clinical decisions.

Dental hygienists have become self-regulated throughout Canada over the last two decades, and, with this status, have been able to slowly make advances toward providing direct public access to their services—initiating an erosion of gate-keeping privileges of dentistry to dental hygiene care.(26;32) Unique compared to health care providers operating within the public health care system (Medicare), dental hygienists have historically been regulated and employed by dentists within privately delivered and privately funded health care arrangements.(26;32)

Dental hygiene's developing status and increasing political legitimacy were achieved incrementally due in part to both the profession's and the state's common desire to expand dental hygiene's role with the aim of improving access to care, albeit under considerable resistance from organized dentistry.(26;32) Because limited research has been conducted examining dental hygiene practitioners' approach to practice and their clinical decision making capacity, research conducted in physician and nurse practice supplies a somewhat parallel phenomenon providing a foundation for the questions, hypotheses and research framework deployed here.

Understanding the Knowledge Translation Black Box

The failure to implement "what is known" (but not necessarily understood, believed, accepted, tried, etc.) is referred to as the "knowledge translation black box"—the part of the knowledge translation process where decisions about patient care are deliberated on and subsequently acted upon (or not).(37;47;48) This is a critical area of inquiry for understanding how health care providers make decisions about patient care as it will determine the safety and quality of that care. As dental hygienists are being considered to take a larger role in providing primary care, their capacity to make sound decisions is undergoing increased scrutiny.

Many theories exist that help make sense of why decision making breaks down and why best evidence is not readily implemented into health care practice. Grol and Grimshaw (49) reviewed several of these theories including cognitive, behavioural, adult learning and organizational theories to name just a few. They suggested that these various theoretical perspectives are important in considering what strategies exist to address specific barriers to change.(49) Many of these theoretical perspectives attribute the

individual in various ways to be responsible for these failures, but it is asserted here that social and organizational influences may be at least as important.

Health promotion and disease prevention have been underutilized in virtually all health care disciplines, and government has been challenged in implementing policy that supports proposals surrounding these types of initiatives.(12) For example, the enormous oral health benefits of community water fluoridation have been known since the 1950's, but approximately half of Canadians still do not have access to it.(12;50) Health care in general has a history of being biased towards curative or treatment oriented options to disease rather than prevention.(12) Because almost all dental disease is preventable,(13) there exists a huge potential to prevent considerable disease, associated dysfunction and related costs. While dental hygienists do provide therapeutic oral health care, a considerable proportion of their scope of practice is considered preventative.

While significant oral health improvements have occurred in the last 30 years, these have mostly occurred in the middle and high socio-economic groups.(14) Approximately one-quarter to one-third of Canadians have a disproportionate amount of oral disease, and this has been largely attributed to a failure to access oral health care.(13;14) As briefly discussed earlier, these disparities are referred to as the oral health gradient where there is a positive linear relationship between one's oral health and socio-economic status.(51) The oral health gradient reflects the overall health gradient, but oral health disparities are two times larger than health disparities, and affects all mortality and morbidity measures of all common diseases in all ages, sexes, races and countries.(16;20)

Recently, oral health disparities have been increasingly recognized by policy makers. For example, the US, "Healthy People 2010" document indicates that the reduction of oral health disparities has been set as a national goal.(17) In Canada, while not policy setting, the "Canadian Oral Health Strategy" (COHS) was developed in 2005 under wide consultation with the purpose of elevating the oral health of all Canadians by indentifying existing inequities in the health care system that impose barriers to accessing professional oral health services.(14)

In 2007, the death of a 12 year-old American boy made international headlines because he died of a brain infection that was a complication of preventable but untreated tooth decay resulting from his family being unable to access timely dental care.(6) This unfortunate and unfair tragedy brought childhood oral health care into not only government focus,(6) but also it came under the broad and critical lens of the public.

Several specific examples of oral health disparities exist. Dental caries (tooth decay) rates are highly concentrated in lower socio-economic groups.(52) The prevalence of Early Childhood Caries (ECC) in Canada, which is an aggressive and devastating form of childhood tooth decay, has rates approaching 100% in some disadvantaged sub-population groups, while being virtually nonexistent in others.(13) In elderly populations, dental root caries is an increasingly significant problem particularly for disadvantaged elderly populations having prevalence rates approaching 90%.(53) Periodontal disease, which affects supporting structures of teeth, is also associated with socio-economic status. It is linked to several systemic conditions including diabetes,

cardio-vascular disease, respiratory infections and pre-term low birth weight babies and is also largely preventable.(13;54;55)

Poor oral hygiene, which contributes to various oral diseases including caries and periodontal diseases, is also associated with low socio-economic status.(28;56) Tooth loss is positively associated with disadvantaged population groups, all classic socio-economic status measures and minority status.(57;58) More subjective oral health associated measures such as oral wellness and quality of life have demonstrated associations with socio-economic status.(59) Oral-pharyngeal cancer affects lower socio-economic population groups with a higher incidence, later stage diagnosis and higher rates of metastasizing and is predominantly been related to tobacco and alcohol use and poor access to oral screenings.(17;55) Strikingly, deaths from oral-pharyngeal cancer have increased continuously for the last 25 years.(55) Thus, the costs of oral disease to individuals and society can be devastating.

Barriers to accessing oral health care broadly surround financial, geographic and social issues, while being reinforced by legislative restrictions.(13) Poor access to oral health care is related to various sub-population groups such as the working poor, individuals with special needs, developmentally disabled, institutionalized (those residing in long term care), unemployed, elderly, racial minorities, new Canadians, remotely located, First Nations, less educated and uninsured, and these factors often cluster together compounding the challenges.(6;17;28) Additional factors influencing access to care include previous bad experiences with the oral health care system, cultural issues and a

lack of perception of treatment needs.(54) Those suffering the greatest oral health care needs appear to have the greatest barriers to accessing care.

Study Aims and Policy Goals

The literature surrounding oral disease and sub-population groups has been important in informing the policy agenda. In addition, there has been recent success in developing leadership for oral health care in Canada with the formation of the Federal, Provincial, Territorial Dental Directors whose mandate is to increase the effectiveness of public health dental programs.(13) So far, the group has completed or is in the process of working on several projects including a national oral health survey, various reports and a Canadian Oral Health Strategy.(13) Additional evidence through further research and surveillance to support policy that challenges the status quo in oral health care delivery will likely be a continuing need.

The research conducted for this dissertation was aimed at generating knowledge that can be used to inform the development and formulation of policy recommendations. One key expectation is that the knowledge gleaned will support recommendations to utilize regulation as a policy tool to improve access to oral health care and mitigate oral health disparities. The Canadian government has been working with the dental hygiene profession in re-writing provincial Dental Acts in almost all provinces and granting self-regulated status to over 95% of Canadian dental hygienists.(60)

While this has represented an important step in legitimizing dental hygiene in the health policy community, self-regulation itself did not directly yield a change in oral health care

delivery. However, self-regulated status did place dental hygiene in the policy arena and positioned the profession so that it was able to negotiate some expansions to practice in several jurisdictions, most notably in Alberta and Ontario. More recently, self-regulated status has situated dental hygiene in Manitoba on a more level playing field with other health care providers, including dentistry, as it negotiates both common and profession specific language in the new Health Professions Act. (61)

Historically, and with few exceptions, organized dentistry has been able to powerfully lobby government and ensure its continued monopoly over oral health care delivery.(62) Through restrictive clauses in each new dental hygiene related Act, the public were in effect prevented from directly accessing dental hygiene services.(62) The rationale, as argued to government by some key stakeholders, surrounded the assertion that dental hygienists cannot safely self-initiate quality oral health care and, thus, require some level of supervision by others (i.e. dentistry).(62) In other words, it is argued that dental hygienists do not have the capacity to make clinical decisions that ensure the provision of safe, quality care as primary care providers and restrictive legislation is appropriate and necessary.

In order to self-initiate and provide safe quality care it is essential that clinicians make sound decisions based on appropriately applied current evidence. Evidence-based decision making is the process of making decisions about client care based on the most current evidence and taking into account patient factors and clinical experience, and is considered to be the hallmark of ideal health care.(63) Despite this, much variation exists in health care delivery that is largely attributed to the practitioner decision making

process, and the resulting long delays in integrating new research into practice have been observed in virtually all professions examined.(64) Given the volumes of literature on the topics of evidence-based practice, research utilization and knowledge translation, it is evident that the health professions have begun to scrutinize their contribution to health care variation.

This study, over two phases, aims to comprehensively and systematically generate knowledge surrounding the perceived variation in dental hygiene clinical decision making, what structural factors influence variation and what influences support good clinical decision making under expanded conditions of practice. While contrary to previous thinking prevalent in the knowledge translation literature, research is now clearly indicating that knowledge acquisition is not the typical deficiency in the knowledge translation process.(65;66) Meaning, health care providers do not typically lack the information to make good clinical decisions, but rather, despite having the necessary knowledge, fail to implement it. The knowledge translation black box has been increasingly recognized as being a highly complicated process operating through the practitioner-structural interface of clinical decision making. This study will afford an exploration into the dental hygiene decision making process and permit subsequent policy recommendations to be made about expansion of dental hygiene practice.

Solid policy recommendations backed by good research does not necessarily translate to policy change because policy change is a multi-dimensional arena where research is only one minor, albeit important, component.(33;67). Agenda setting, which has been described as possibly the most critical stage of the policy cycle, is about specific issues

getting the attention of policy makers and the recognition by government that a problem exists.(67) 'Windows' of opportunity periodically emerge permitting existing issues to reach the political agenda where they previously had been blocked, and interest groups must be at the ready with appropriate research to take advantage of these occasions.(67) Dental hygiene has been working on accessing the policy agenda both nationally and provincially for decades and has recently begun to find opportunities to gain access. This is likely due to the recognition of unacceptable oral health disparities emerging from influential sources.

In the policy arena, decision making occurs on two major levels. The first is comprised of broad overarching government actions that are largely political events and where the influence of policy research is minimal.(33) An example of decision making at this level would be incorporating oral health care into Medicare or universal coverage for post-secondary education. These policy changes are "upstream" approaches because they address "the causes of the causes" or social determinants of health, for example health care and education respectively.(16;68) The second level of policy decision making occurs when more specific issues that reach the policy agenda occur and intentions become actual policy and subsequent programs.(33) Policy decisions at this level are found occurring at the more "down-stream" end of the policy making continuum, meaning they address the outcomes of social influence.(16;68)

The broad level of policy making has been virtually ignored in regard to oral health care at least partly because of the general preoccupation with the biomedical curative model of dentistry and the individual risk factors focus popular from a clinical epidemiology

perspective, which has historically advocated a behavioural approach to health care.(16;68) Such a view associates personal behaviours to health status and therefore attempts to change individual behaviours rather than the overall social conditions people exist within. While seemingly counterintuitive, this approach has actually served to increase the severity of the health gradient in that more advantaged groups tend to make better use of these individual behavioural approaches (i.e. personal preventive measures) for improving health than their less advantaged counterparts.(16)

Government has historically been less supportive of broad social policy change in that positive outcomes are typically slow in coming and less directly measurable and attributable to the administration that initiated them.(16) Instead, government is more inclined to implement individually targeted behavioural interventions like increasing tobacco taxes and the cost of tobacco products to reduce negative individual behaviours despite the fact that these behaviours are attributable to large social phenomena. Problems associated with policy developed at this end of the range are becoming increasingly recognized for tending to decontextualize individualized risk behaviours, (68) meaning that that they fail to consider broad social factors into policy. However, at this level, research has the most direct influence on policy. (33)

Regarding oral health policy, the Canadian and American Dental Associations have responded similarly to unmet oral health needs and widening disparities in oral health status. While both are in agreement that oral health is important to overall wellness and access to care is key, the response has largely been a maintenance of the status quo.(6) For example, in 2008, the American Dental Association adopted a resolution on

"Improving Oral Health in America" that reinforced current structure by "building on current success" and, specifically, educating the public about oral health and improving reimbursement systems for dentists.(6) While reimbursement systems could be improved, passive dissemination methods to educate the public have largely failed to be successful for improving access for marginalized populations.

Dental hygiene's response has been more radical in that it demands a move away from the status quo towards increasing the use of preventive measures, decreasing costs, expanding the workforce scopes and increase settings where oral health care can be accessed.(6) Dental hygiene has been actively engaged in reaching the policy agenda. For example, the Canadian Dental Hygiene Association (CDHA) has been publicly articulating its critical view of existing structures that perpetuate barriers to access preventive dental services and oral health disparities.(26;60) The CDHA has been working with the Canadian Competition Bureau in formally identifying dentistry's monopoly over oral health care services and that this policy has not been in the best interest of consumers in that it has perpetuated the status quo and maintained disparities.(60;69)

In policy changes such as those recommended above, it is important to define small, multiple incremental and more achievable objectives required to meet the broader goals. This approach will require collaboration between government, the Federal Provincial and Territorial Dental Directors and organized dental hygiene, and, if amendable to change, dentistry as well. Together, these groups can set and prioritize measures appropriately keeping in mind resources will constrain overall evaluation. When resources are limited,

it is particularly important that overlap does not occur and cooperation between groups is critical.

A major omission in oral health care in Canada until recently has been the surveillance of oral health status measures on a population level.(13) To monitor the implementation of the policy recommendations emerging from this research, surveillance will be critical. From a national level, the Federal Provincial and Territorial Dental Directors will be periodically assessing oral health status and oral health care needs and will be able to monitor if needs decline. Research on a smaller more targeted level into specific settings will be important to determining the effectiveness of these policy recommendations if implemented. For example, long term care institutions, schools and communities are ideal targets for measuring oral care needs and oral health status, rather than focussing assessment on already generally healthy populations.

While it is somewhat perplexing that the oral cavity has been largely excluded from health care, it is understandable given the influence of various complex historical events. However, it appears that a trend integrating oral and general health care delivery is occurring in that the oral-systemic health link has acquired increased research interest.(70;71) This shift may be supportive in oral health care policy change as it will improve the optics of the importance of oral health care and oral health status.

One of the best indications that a health care system is successful is by producing a positive health status of the entire population.(72) Therefore, to ensure a successful oral health care system in Canada, substantial improvements in the oral health status of sub-population groups are necessary. In order for this progress to occur, access to oral health

services needs to be improved. It is anticipated that this study will generate research that will inform policy recommendations that centre on expanding dental hygiene practice because these changes have the potential to substantially diminish unmet oral health care needs and disparities. Attention to all social determinants of health, which include health care delivery, is required, and the focus needs to increasingly be on preventive strategies and oral health promotion programs targeted to marginalized subpopulation groups.

The position taken here is that a need exists to further improve understanding of the knowledge translation process of dental hygienists, specifically in the area of clinical decision making, through an improved knowledge surrounding of organizational influences. This has the potential to provide much needed research support for policy change in oral health care delivery. The primary research aim for this thesis is:

To identify and then test the impact of factors explaining the variation in dental hygiene clinical decision making processes.

With this primary aim, the thesis will endeavour to meet the following more specific objectives:

1. To describe the variation in dental hygiene decision making within traditional settings;
2. To identify the potential structural factors that affect dental hygiene decision making processes in traditional settings;
3. To develop and test a model designed to be effective in explaining dental hygiene clinical decision making and associated actions;
4. To determine what structural factors will be required to support dental hygiene decision making.

Chapter 2: Research Parameters

The Dental Hygiene Profession

This study was conducted with dental hygienists for three main reasons. First, the investigator as a dental hygienist by profession has first-hand experience as a dental hygiene clinician and within the dental hygiene community and an associated intuitive curiosity surrounding the profession and its members. Such personal professional linkages can enhance the researcher-researched relationship and provide a deeper understanding of the study subjects while avoiding the sense of 'otherness' of research subjects.(73;74)

Second, as previously discussed, dental hygiene is an emergent profession that has been targeted to for an expansion to care and increasing demand to proivide primary care, but it has traditionally had limited decision making capacity due to various structural constraints including its subordination to another professional elite group. In addition, dental hygienists are predominantly female, and this has been hypothesized to be an influential factor to the knowledge translation process of dental hygienists. Thus, dental hygienists are in an ideal position to participate in research examining organizational and gender influences on decision making capacity. While dental hygienists are unique relative to other health care workers in several ways, they likely also share some commonalities with other, emergent health care professional groups and this will permit some generalizations to other groups to be inferred.

The third rationale for conducting this research with dental hygienists is based on the increasing opportunities and responsibilities occurring in the profession as a result of legislative changes aimed at improving access to oral health care and diminishing disparities. The importance of oral health has intensified due to recent research demonstrating an association between diseased oral tissues and compromised systemic well-being.(75) Thus, the inequities in oral health care delivery and related disparities in oral health status are becoming increasingly less acceptable. While dental hygienists are well positioned to make an impact on oral health disparities, it is asserted here that the expansion of dental hygiene's role will require increasing responsibility and accountability for decision making and this has created a tension between new expectations and existing capacity.

Decision Making

Quality of care depends on the quality of decision making and of how those decisions are carried out, but, reportedly, the former has been much less well addressed than the latter.(34) There is a long standing bias that health care workers make and carry out their clinical decisions as a rational process.(43;44) Briefly, the concept of rationality and rational choice is often defined narrowly and maintains formulaic conditions such as maximizing one's own self-interests and demonstrating internal consistency of choice.(44) While Sen asserts rational choice theory can provide a basis for predicting, understanding and explaining human behaviours, he and others have recognized the limits of rational choice, particularly when interpreted within a narrow view.(44;67) For example, some of these limitations include that rational choice focuses on choice

outcomes while neglecting process, it is based on the finite limits of one's knowledge and that maximization of one's self-interests may be in itself wholly irrational.(44)
Sen suggests that people possess broad goals and socially oriented values that can explain what otherwise appear to be irrational choices.(44) In contrast to rationality, social choice theory centres on the idea that reason can be used to promote more acceptable societies by eliminating intolerable deprivation and that social preference can reflect a social good through social judgements.(44) The concept of altruism is central to examining health care providers choices and behaviours because of the expectation that professions, in varying degrees, are ultimately dedicated to patient welfare over the practitioners' personal gain.(76)

However, it is important to note that social choice is pluralistic in that individuals are not entirely in pursuit of promoting a selfless 'social good' but nor are they only motivated by personal self-interest.(44) Physicians, for example, have been described as "double agents" in their attempt to balance commitments and responsibilities between patients, payers and their own interests.(76) Thus, while appreciating rational and social choice theoretical perspectives, a continuum of other theoretical influences ranging from the broad macro-level environment to the organization on down to the micro-level of the practitioner herself are suspected to be influential to practitioner deliberations, decision making and behaviours.

Therefore, like other health care workers, dental hygienists can be assumed to make largely rational decisions about patient care based on their clinical knowledge and experience, but other influences are believed to impact clinical decision making in a

substantial manner. Together, the outcomes of these influences have been conceptualized for the purposes of this study as *decision making capacity*. As the outcome measure, this term was carefully considered and selected for use in this research.

Inherent in the knowledge translation process are the primarily imperceptible, cognitive components of practitioner deliberation and decision making and the more observable manifestation of practitioner behaviour action or change, where the former shapes the latter. Medical decision making has been described as converting information into action.(34) For knowledge translation to proceed, new research or technology must be generated and disseminated to a broad audience of potential users who in turn make decisions about implementing the knowledge appropriately in practice or not. While the major precursor to knowledge translation research surrounded the study of practitioner behaviour change theory, knowledge translation can also appropriately result in inaction.

Good clinical decision making has been described as the greatest attribute that health care providers can bring to their patients,(77) and it largely determines the quality of health care practice.(34) Decisions have been categorized as those that surround assessing the patient and making a diagnosis and how to treat the patient.(34) More fitting to the dental hygiene context, decisions surround the dental hygiene process of care: assessing and diagnosing the patient, planning care, implementing care and evaluating the outcomes and making necessary adjustments.(78) In the course of an hour-long appointment with a dental hygiene, or any other professions', patient, a multitude of varied decisions will need to be made under varying levels of certainty.(34)

Much of the literature in the field of decision making comes from the psychology domain and various theoretical frameworks for the decision making process have been described.(77;79;80) Inherent in decision making is making judgements about patient care.(79) Hammond classified decision research into two "meta-theories": correspondence and coherence theories, which pertain to empirical accuracy and rationality respectively.(77) More recently, Hardy and coworkers describe categories of decision making emerging from the literature and appear to have some consistency with rational and social choice theories.(79) Specifically, they describe normative decisions as those that are based on logical and rational thinking within an ideal context, whereas a second category, descriptive decisions, is concerned with the decision making process and the individual influence on decision making.(79)

There has been some discussion in the literature surrounding differences in decision making that are dependent on profession specific elements , such as gender and surround the femininity and emotionalism of decision making and how the value of these decisions are subsequently perceived.(79) The concept of intuition in decision making has been analysed in the literature with wide ranging views on its definition and value.(79) The importance of decision making to primary care workers cannot be overestimated, and, therefore, its' importance is key to advancing practitioners developing within new health care models.(79)

Eddy has written about the "anatomy of a decision" and asserts decisions are based on achieving desirable patient outcomes.(35) According to Eddy, empirical evidence is the anchor for all decision making (i.e. rationality), but how this is interpreted is based on

personal values and preferences (i.e. social choice, agency), and it is these two components that provide the source for most decision making errors.(35) Practitioners are pushed and pulled according to various influences such as the type of evidence available, the degree of certainty, current practice, the seriousness of the condition, novelty, patient factors, financial implications and others.(35)

Complicating understanding of decision making is the recognition that decisions vary according to task and context and decision makers are adaptive employing different mental models as required.(80) Decision making for health care providers is complicated in that clinicians must make value judgements without clear and robust evidence.(77) Information is often complex, imperfect and incomplete and provides practitioners with a level of uncertainty that must be balanced with patient desires and issues of cost effectiveness.(77) Both individual characteristics and contextual factors have been cited as affecting the decision making process.(77)

In addition, new knowledge versus information that one has more experience with are stored in different areas of the brain, the hippocampus and cortex respectively, and are used differently.(81) New information is actually perceived as being disruptive to the decision making process and is readily ignored or, alternately, it must compete with existing knowledge and rules in order to become embedded into one's thinking.(81) From the psychological perspective, several major approaches to studying decision making, specifically surrounding diagnostic reasoning and treatment choices, have dominated the research and contributed to various decision theories that largely support rationality.(77;80)

However, considerable debate and discourse still exists surrounding decision making especially under conditions of uncertainty.(77;80) A growing body of evidence is developing in the fields of cognitive psychology surrounding the lack of rationality in decision making and in health services research surrounding variation that together support assertions from the social perspective that 'something is going on' in decision making beyond the practitioners' application of science, which cannot be rationalized.(80) The sciences of medical decision making and problem solving are often framed as specific examinations of a particular clinical problem and then analysing the how the practitioner makes diagnostic and treatment decisions.(45) The findings from these experimental studies have largely supported the use of practitioner pattern recognition and automatic retrieval systems rather than judgement and estimating probabilities per se.(45)

In light of this, it is not totally surprising that much of the challenge surrounding clinical reasoning has been found to surround "opinion revision" and updating one's internal database or in other words, changing practitioner's minds and behaviours.(45;81) Interestingly, differences between practitioners' decision making is believed to be a result of both cognitive capacity and cognitive processing, or, in other words, intelligence and thinking styles respectively.(77) Recent theorizing has proposed that even prior to decision making, a screening process occurs within individuals as an outcome of contextual issues and can lead to dismissal of new information prior to it becoming a viable choice.(77)

Capacity

In contrast to decision making, relatively little has been written about capacity in terms of the health care worker. The term 'capacity' has many different understandings because it lacks a broadly-accepted singular definition, common language or related terms.(36) Further, the study of capacity is not an academic discipline and therefore lacks its own theoretical underpinning.(36) It has its more recent grounding within several North American fields of study including organizational thinking.(36) It remains an assumption that capacity is an "identifiable state or condition" and is further challenged by a lack of tools or frameworks for its utility.(36)

In Morgan's case research on the concept of capacity, it was reported that a widely held view is that capacity is a human resource issue surrounding skills building and training at the individual level, but it was also highlighted that capacity can be much more broadly interpreted to include the macro level of national and even global competence.(36) Morgan suggests five central characteristics of the concept of capacity that begin to shape the theory and practice of capacity and have some application to this research.(36) These characteristics were developed from an organizational perspective, but they can be seen to apply at the micro, meso and macro levels of health care practice.

First of these capacity characteristics is about "empowerment and identity", which are described as key properties that support organizational survival, growth and evolution.(36) For such development to occur, it is asserted that people within systems require power and control over their lives. (36) The second characteristic is having ability within the collective; in other words, being effective in doing something with

some level of intention and scale over time.(36) This point covers the aspects of ability or capability one intuitively thinks about as being inherent in the concept of capacity. Third, capacity is recognized as a systems phenomenon, meaning that it emerges from interaction and through the dynamics of systems within their own context, which includes human functioning that is beyond the technical. (36) Next, capacity is described as a "potential state", meaning that it is "elusive and transient", and because of this "latent quality", it is described as being difficult to induce, manage and measure.(36) Finally, capacity is characterized as the "creation of public value" in that it permits people to have the ability "to make positive contributions to public life".(36)

Put very simply, Morgan asserts that capacity is about "...the ability to do something."(36) Further to the five characteristics of capacity, Morgan describes capacity in terms of its separate but interdependent core capabilities that include the capability to:

- act,
- generate development results,
- relate,
- adapt, and
- integrate and achieve coherence. (36)

From the perspective of this study, the influence of these core capabilities is variable. The first capability, to act, perhaps has the most obvious application to this research. This capability includes having volition, choice, influence and intent, and to possess these attributes in the presence of resistance from others. Put another way, it is free from being stuck or immobilized. It is intentional behaviour that is supported to invoke action.(36) Morgan identifies several key issues associated with the capability to act, which include

the degree to which decisions are implemented, the use of autonomy and action, integrity and mobilization within the organization.(36)

Morgan describes the second capability, to generate developmental results, as the most widely used way of thinking about capacity.(36) Interestingly, one of the first types of developmental results Morgan refers to is building capacity itself so that individuals can make progress in their work and activities. (36) This is interesting because capacity building is recognized to be essential to developing the organization, but it is questionable to what extent health care workers experience capacity building given the challenges of legislation and turf protection. Another developmental result identified by Morgan is the actual outcomes of an organization.(36) Outcomes such as better oral health of dental hygiene patients are an obvious goal and imply that capacity needs to result in something positive.

Morgan describes the capability to relate as being able to interact with others within one's context.(36) While this ability is described as needing to occur in the local or micro-environment of practice, Morgan also identifies the need to also relate to others and develop alliances in the broader context in order to achieve legitimacy and credibility in the policy arena.(36) In this broader environment, health care groups need to learn to compete for power, support and resources and deal with conflict in order to achieve political goals. Both of these perspectives have been important to dental hygienists' capacity building over the years and are central to this research.(36)

In the latter two capabilities, to adapt and to integrate and achieve coherence, Morgan points out that key to capacity building is the need for the individuals and their respective collectives to evolve, change and self-renew. (36) Regarding the latter capability, Morgan asserts that control and centralization is increasingly being recognized as being unsupportive to achieving coherence within the organization and among the individuals within it. Rather, good leadership, shared vision and operational guidelines are recommended.(36)

Morgan describes capacity as both an end and a means to other objectives. In other words, he asserts that capacity building is necessary in its own right, but it is also necessary to do other things better.(36) Sen also supports the concept of capacity building for the purpose of improving human potential, increasing their options and developing their freedom.(82) Thus, in summary, capacity is described as being emergent developing from its own contextual interactions and encompassing a range of aspects from the technical to the human to the political.(36) For this study, it reflects a construct that encompasses a collective of freedom to intentionally act within one's environment with the aim to achieve positive outcomes.

Uncertainty and Variation

Medically related decisions are extremely complex and uncertainty surrounds many elements of decision making.(34) Certainly, some variation in health care delivery is expected and appropriate.(34) Specifically, the complexity surrounds the nature of disease, its signs and symptoms and the virtually infinite probabilities that are created by the relationships that are possible in addition to the uncertainty surrounding potential

treatments.(34) In addition, resources such as costs and time affect decision making.(34) It is these various features of uncertainty that are believed to account for much of the practice variation.(34) However, other equally important elements, which are more or less explained by human cognition, surround bias, motives and values.(34)

While not a well researched area, the dynamic relationship between the individual and structural factors may explain some of the variation in decision making that exists among health care providers.(64) Evidence of failures in knowledge translation and decision making are seen in observable variations in the delivery of care, and specifically, in issues of overuse, underuse and misuse of health care interventions.(64) Variations in health care have been largely attributed to the practitioner decision making process, and many providers have been found to overestimate the level their practice adheres to accepted standards of care.(65) It has been asserted that the single most important health care advance would be to broadly implement what is already known.(83) While not all new knowledge should be indiscriminately implemented into practice, behaviour change is a disproportionately rare event relative to knowledge acquisition.(84)

The lag time between research discovery, dissemination and its general application to practice is estimated to be sometimes decades long and is variably referred to as the theory practice gap,(85) knowledge-to-action gap (47), knowledge transfer gap (86) and the know-do gap.(87) Regardless of the term used, there appears to be a consensus in the literature that this 'gap' is not due to a lack of available knowledge, but, rather, it reflects a failure to implement one's knowledge in practice. Because knowledge surrounding how practitioners, and in this case dental hygienists, make and carry out decisions is

limited, further identifying how structural factors influence decision making capacity within the knowledge translation process has the potential to advance current understanding and inform policy.

Ambiguity is only increasing as new conditions, syndromes and diseases are defined.(88) Even when clear criteria regarding diagnosis and treatment exist, it is often not consistently followed. In fact, practitioners demonstrate variation in repeated measures of their own decisions.(88) Several known factors contribute to variation including bias towards one's own practice successes and have been well documented.(88) In addition, when uncertainty does arise, overutilization is the typical outcome because it is generally accepted that doing too much is better than doing too little.(88) This response is magnified because there is usually a financial reward for doing so, which is the case in private environment of oral health care.(88) Further, if a practitioner is uncertain about how to proceed in practice, she will usually follow traditional practice, which is often regionally defined by the community standard and explains regional variations.(88)

Knowledge Translation Research in Health Care Professions

Rogers, best known for his theory of diffusion of innovations described in the 1960's as the process of innovations being communicated through various social channels among its members over time.(89) From his sociological worldview, Rogers described the process as occurring through five stages: knowledge, persuasion, decision, implementation, and confirmation, and the innovation is either disseminated widely or not. What is particularly relevant to this research is the point that the innovation is typically evaluated from a subjective rather than rational scientific perspective.(89)

However, Rogers has diffusion occurring in individuals that are characterized as ranging from innovators to early adopters through to laggards.(89)

In health care specifically, early or 'first generation' knowledge translation research predominantly surrounded physician change theory and held the assumption that practitioners behaved in rational ways. These theories were based on the view that practitioners are knowledge-based, 'rational' decision makers actively seeking new information to readily apply to practice.(84) The corresponding knowledge translation models were similarly linear underpinned by theory based on versions of simple diffusion models, which are viewed as variations of linear and rational views of the change process.(42;90-92)

It was believed that indiscriminate diffusion of knowledge would sufficiently trigger its expedient uptake by practitioners and application to practice. A belief that health care providers behave more rationally when compared to their patients has predominated the research. These simple diffusion and change models began as early as the 1950's (i.e. Lewin) but were mostly being developed in the late 1980's and 1990's (i.e. Geertsma, Pathman, Slotnick).(93) Change models designed for patient behaviours have to a greater extent recognized and incorporated the complexity of change.(94)

First generation linear knowledge translation models were predominantly either "knowledge-driven" where unsolicited information is disseminated and believed to lead directly to use or were "problem-solving" models where the clinician recognizes a practice-based problem that requires her/him to seek out and implement a solution.(42)

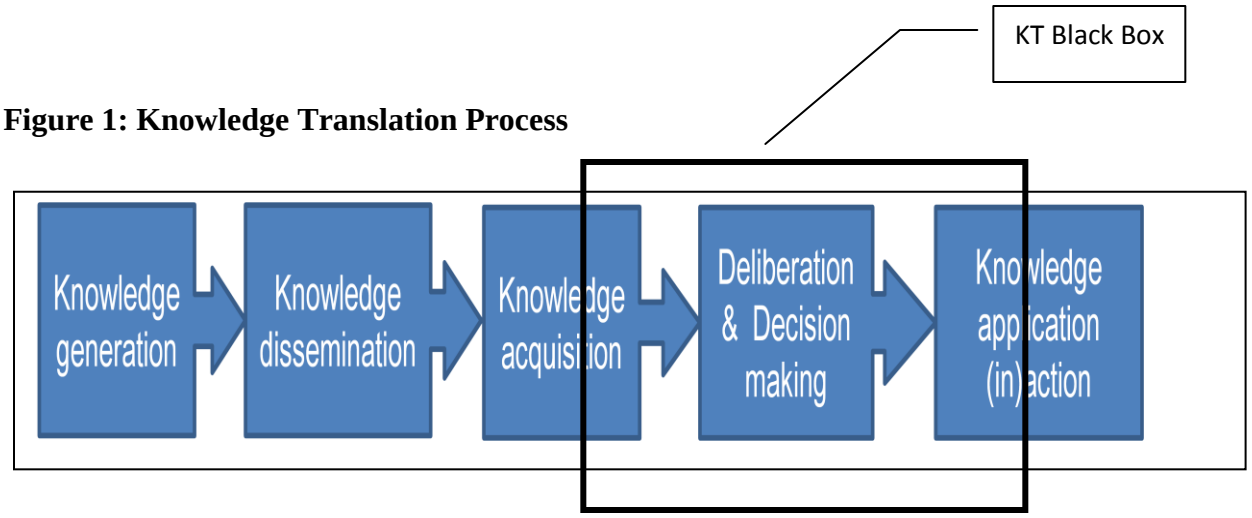
Both of these models are based on a stimulated cognitive dissonance or tension within the practitioner who has passively or actively encountered information that conflicts with her/his current understanding and practice behaviour thereby motivating a rational change to practice.(42;95) This belief inspired the still largely entrenched quality assurance and continuing competency mechanism known as "Continuing (Medical/Dental/Nursing etc.) Education" (CE) that is used by professional regulatory bodies with the aim of maintaining health care provider competency.(96) Continuing education programming surrounds the requirement of health care providers to take part in ongoing learning activities to create cognitive dissonance and ensure that practitioners are keeping up to date and remaining competent.(97-99)

Numerous research studies and subsequent systematic reviews tested these early models in an effort to determine the best way of disseminating knowledge (i.e. CE/lectures, academic detailing, clinical guidelines etc.) guided by the principle that creating tension between knowledge and practice would result in rapid implementation.(98;100-102) Findings consistently showed that passive diffusion methods were ineffective for changing (primarily physician) behaviour, and more active strategies when used in combination were only modestly effective.(98;100-102) It has become increasingly apparent that acquiring information, particularly when it occurs passively, does not typically result in practitioner behaviour change.(65;66)

Various health care disciplines, such as nursing, dentistry and dental hygiene among others, also began to question and research their respective health care professions with similar findings surrounding knowledge translation failures.(103-105) It was determined

that knowledge acquisition was typically not the deficiency in the knowledge translation process, but rather it was 'something' occurring (or failing to occur) subsequent to knowledge awareness. This unknown entity has been more recently referred to as the knowledge translation 'black box',(47;48) which refers to the breakdown in the knowledge translation process.(Figure 1)

Figure 1: Knowledge Translation Process



This realization explained why the knowledge-practice gap had not, despite ongoing efforts, perceptibly closed and provided the impetus for a shift in the knowledge translation research agenda and a concomitant shift in quality assurance programming. 'Second generation' knowledge translation research among health care providers occurred because not only were the failures in closing the knowledge-practice gap apparent to professional groups, but the knowledge translation field had gained the attention of major research funding agencies and other key organizations.(42) Further, a new distinction was made between knowledge transfer and knowledge translation with the former being a linear, unidirectional and passive process and the latter encompassing a more interactive exchange and engaged process between research generation and its ultimate application to practice.(42)

Early knowledge translation models are now often criticized based on concerns that humans generally, and health care providers specifically, should not be expected to fully separate human bias and other limitations in cognition that are accepted as violating rationality principles in the choice process. (77) In short, ideal models based on a linear and/or rational process of decision making and practice change likely do not account for the complexities and context specific features affecting clinical decision making.(86;90;106) While the shift in the research agenda has begun to take into account the complexity of the knowledge translation process resulting in a less linear view, it has predominantly maintained an expectation of rationality from clinicians and has, with some exceptions, retained an overall positivist paradigm in its approach.

The gap occurring between health care knowledge and practice appears to be similar to the situation observed in other fields such as public policy and organizational theory.(107) For example, public policy researchers in the 1970's observed an assumption that was held within the literature that when government made a policy choice, the decision was put into practice as intended.(67) The implementation stage of the policy cycle was believed to be unproblematic because scholars had neglected the roles of actors and assumed that government administration would readily implement policy decisions.(67;108)

However, Miljan (108) explains that bureaucrats, like all human beings, had values that influenced the way they implemented policies. Later, research demonstrated policy was not being implemented as intended and an empirical gap was evident between a political decision and implementation.(67) The erroneous assumption that those responsible for

implementation simply behaved in rational ways was recognized.(67) These earlier beliefs ignored structural factors that are now understood to exert an influence in any organizational sphere, and more recent policy research has begun to systematically examine those factors.(67)

Similar to those in public policy, knowledge translation researchers are shifting their emphasis towards identifying and addressing barriers to implementing knowledge into practice including exploring structural factors that may be influential in clinical decision making. The simple diffusion models relied upon earlier held assumptions about human agency and assumed clinicians navigate the social-structural world as autonomous free moral agents.(109) This view disregards practitioner clinical decision making occurs in the social world and is a social act where the entire knowledge translation process, from its generation to its implementation, is a social process influenced by the structural forces of social life (110).

These social forces include the broad environment and the more specific organizational contexts both of which influence professional, legislative, practice/setting hierarchal, payment and gender issues. (41;63) However, the few knowledge translation studies conducted that have included contextual elements have shown that most practice variance is attributed to individual.(111) Individual characteristics such as cognitive competence, views of evidence, commitment levels and other attitudinal influences also contribute to the complex interplay between individual agency and structure.(63;64;77;103;112) Thus, knowledge and experience that comprises rational thinking informs one's decision making process but does not wholly dictate it. (110) Research into the structural features

that operate within the social world of clinicians has the potential to explain variations in clinical decision making beyond what is explained by rational/linear perspectives contained in rational choice models.

With this aforementioned shift in research focus, researchers have noted that the theoretical underpinnings and methods of knowledge translation research need improvement.(48;87) As a result, researchers have begun to more explicitly incorporate theory in their research and to look more closely at contextual factors that influence practitioner capacity for decision making and knowledge translation.(86;92) One of the more developed theoretical knowledge translation models that incorporates contextual influences is the Promoting Action on Research Implementation in Health Services (PARIHS) framework.(113) It has context comprised of three dimensions: culture, leadership and evaluation.(113) While it is asserted here that virtually all health care practitioners, from the most elite to the least authoritative, demonstrate gaps between their current knowledge and practice application, the factors influential in contributing to this gap likely exhibit differences across disciplines.

In summary, knowledge translation science is essential to understanding and improving how health care providers make and implement clinical decisions. While knowledge acquisition has been historically central to decision making research, it appears that this focus does not appreciatively explain decision making and resultant practice variation. It is projected that other influential constructs exist in the knowledge translation process, which are shaped by the complex interplay of individual and social/structural factors. A greater insight into these factors that may be affecting decision making of dental

hygienists has the potential to improve comprehension of the overall knowledge translation process of this transformational profession. Having an improved understanding of the knowledge translation process can be used specifically to direct policy surrounding the expansion of dental hygiene's role in improving oral health outcomes and, more generally, to mitigate the observed delays and deficiencies in the application of current research into practice.

Chapter 3: Theory—An Organizational and Gendered Approach

Organizations are a key structural force influencing the decision making capacity of health care providers, including dental hygienists, by effecting clinical decision making and the application of knowledge to practice. Kanter asserts that it is the organizational structural forces that influence worker behaviours rather than her/his individual personality or socialization processes.(114) Thus, organizational theory can provide a valuable framework for understanding the opportunities and constraints surrounding clinical decision making of health care providers. However, the application of organizational theory to broaden the understanding of clinical decision making in the health care sphere, particularly with a gendered lens, has been significantly underutilized and may explain why researchers have been somewhat stalled in attempting to better understand knowledge translation in health care.

Knowledge translation and decision making research may be limited, at least partially, by a preoccupation of thinking about individuals rather than about health care providers as collectives operating within organizations that exist in the broader environment. This study used a gendered organizational perspective to inform research into the knowledge translation process and clinical decision making capacity of dental hygienists. An examination of the 'whole', meaning the full contextual environment of dental hygiene clinicians, through contemporary organizational theory can contribute to understanding clinical decision making and associated behaviour by, first, describing the structure and position in the organizational and general environments of the health care/dental worker; and second, by discussing the multiple interests and relationships of workers within the

health care/dental practice organization and how these shape issues of power, control and conflict surrounding the achievement of goals.

Organizational Environment: Structure and Positioning

In any organization, including health care organizations in general and dental organizations specifically, various structured relationships exist between those within the organization (i.e. people, positions and units), the organizational environment (i.e. patients, competitors and partners) and the larger general environment.(115) Taking this 'complex web' into account when researching the thinking and behaviours of individual clinicians helps develop an understanding about why clinical decision making and related action has not been more closely aligned with individual, sometimes rational, thoughts and attitudes. It is a key point to recognize that decision making occurs within individuals, but only *through* the larger contextual environments of the organization and society.

Organizational theory provides the researcher with a systematic way of examining individual health care workers operating within the structural complexity of the organization they provide care in. Insight at a basic level is considered by examining the structural order of the health care organization and determining how it influences decision making capacity of the individuals within it. This refers to the micro-level differentiation within an organization such as its level of horizontal differentiation, which describes the number of different departments, and the extent of vertical differentiation, meaning the number of levels of hierarchy within an organization.(115)

While a hospital can be readily interpreted as a structurally complex organization in that they typically have both high levels of vertical and horizontal differentiation, a small private dental practice initially appears to have a less differentiated configuration. However, if the latter is looked at more closely, while having smaller numbers of overall players, it too may be highly differentiated. Albeit less obvious, traditional dental practices can be interpreted as having several 'departments', which could include top management (dentist), middle management (office manager, receptionists, treatment co-ordinators) and clinical staff (dentist associates, dental hygienists, dental assistants). Possibly even more concealed, vertical differentiation can also be distinguished in the dental practice organization from the top (dentist owner/operator) down through the ranks, which, as of yet, remain empirically unknown, but likely influence decision making capacity of all the players.

Examining organizational social structure also helps to illuminate the level of centralization of a health care organization.(115) Centralization, a term rarely if ever referred to in regard to the small doctors' or dentists' practice, speaks to where decisions are made. Centralized decisions come from a high level of management rather than being diffused throughout the organization.(115) Knowledge translation literature within the health care sector has historically led the reader to believe that decision making is an individualistic and rational activity.

Thinking about the failures surrounding knowledge application to practice, one may suspect that a great deal of decision making is centralized to upper management and largely out of the hands of the individual clinician. However, Hatch (115) makes the important point that decision making is not a homogeneous construct and decisions differ

within and across organizations, and, therefore, it is likely that control over decision making also varies. Little is known about the various conditions of decisions or how they are carried out in the health care delivery field.

A third area that the structural aspects of organizational theory assist in understanding health care decision making is from the level of formalization.(115) Hatch(115) describes formalization as the level that regulations, procedures and policies prescribe organizational activities. Again, one might assume health care institutions such as hospitals or research/educational settings like medical/dental schools would be more formalized health care organizations compared to smaller health care delivery settings, and these respective levels of formalization would have an impact on decision making with formalized operations allowing less individual discretion. Such assertions have not been examined in the dental context.

Hatch (115) also describes organizational structure according to relationships: simple structures are described as occurring when relationships between organizational members are flexible and typically will exist within organizations with low levels of differentiation (vertical and horizontal) and therefore require little formalization. In contrast to simple structured organizations, Hatch (115) describes functional structures, which are organizations that cope with increasing organizational complexity by grouping workers and their activities according to similar functions. For example, marketing, research and sales are all functions within a large and complex industrial organization. These functional groups can become so large that they require the overall organization to be broken down into divisions, which are sub-headed each with its own point of

centralization. More simply structured health care organizations, such as the traditional dental practice, should provide a platform permitting more personal discretion in decision making, but again this has not been examined in the research using this theoretical perspective.

Hatch (115) provides two examples of simple organizations, one being newly formed entrepreneurial entities and the second being perpetually small organizations such as, her example, the one-dentist dental practice. However, health care organizations, even traditional dental practices, may be characterized as functional structures. For example, in hospitals, functional groups can occur by physiological health systems like obstetrics and paediatrics or by tasks like radiography and human resources. Even in some larger dental practices functional groups can be identified such as a dental hygiene group with its own assistants, treatment coordinators and receptionists. Using organizational theory for examining these structures could provide insight to understanding decision making processes and capacity.

Hatch(115) further delineates two types of organizational structures: mechanistic, which is complex in differentiation, has centralized decision making and formalized operations; and organic, is comparatively simple, decentralized and informal. These distinctions surrounding organizational features which operate together make intuitive sense and one would assume that more centralized organizations would also have more formalized structures. However, the inverse has been demonstrated in bureaucratic organizations, such as government, being highly formal but having decentralized decision making.(115) Hatch(115) asserts that highly bureaucratic organizations can be offensive to

'professionals' because they typically have internalized standards that make external rules and regulations redundant. Thus, health care professionals may experience challenges within a highly bureaucratic organization.

While determining where various health care organizations and health care workers fall within these descriptive structural continuums and how such structures affect decision making capacity and knowledge translation has not been examined in a meaningful way, this approach was undertaken in this thesis. It is asserted here that applying an organizational theoretical underpinning to knowledge translation research will generate new insights that have previously been hidden from observation.

In addition to organizationally situating the health care worker, one must recognize that health care organizations all exist within a larger organizational environment.(115)While different organizational theories provide unique views surrounding the ontology and definitions of what constitutes the larger environment, they are in agreement that such an environment exists (in reality, symbolically or otherwise) and that the organizational structure and its outcomes all respond to this larger environment.(115) Encompassing all organizations and organizational environments is the larger general environment, which includes the social, cultural, legal, political, economic, technological and physical sectors of life.(115)

Thus, the interactions of the organizational and general environments have interesting implications for the decision making capacity and knowledge translation process of health care providers like dental hygienists. For example, in response to changing

conditions within the general environment, such as a major economic downturn, the state has responded by developing legislation that broadens the scopes of practice and decision making capacity for less expensive health care providers. Larger environmental pressures contribute to creating environments that the health care organization must respond to, and none of these environmental forces has been more revolutionary than the changing role of women in society. Some forces have a rapid onset and acute affects whereas others are slowly developed and have small incremental affects. Tools from organizational theory, such as “network analyses", put these environmental forces into focus.(115)

Organizational Environment: Multiple Interests and Relationships

In addition to examining the structured order of an organization, using organizational theory to investigate the multiple, often competing, interests and relationships that exist within the organization has the potential to provide additional insights in knowledge translation and clinical decision making capacity. These relationships surround the achievement of goals, shape struggles over power and control and are a source of conflict in virtually all health care organizations. Every organization possesses overarching goals and has developed strategies to achieve them.(115) While goals are the reason that organizations exist overall, often, within the same organization, several goals are competing.(115)

Organizational control seeks to have its member workers, like dental hygienists, primarily conform to the overall organizational interests rather than one’s self-interests.(115) Clearly, all individuals will have different reasons for belonging to a particular

organization, but conflict occurs when these interests diverge and compete with those of the organization or others within it.(115) Some literature has highlighted the multiple and competing interests occurring within the same individual and also across various health care workers causing both internal and external conflicts,(31;76) but little if any empirical work has been done examining the influence of these competing interests on decision making capacity.

While several models of control exist, their use has been missing from the knowledge translation literature although it has much to offer to improve the understanding of how power and control can influence constraints on decision making. For example, models of control focus on various processes including monitoring worker outputs, incentives or rewards, standardization and conforming to cultural/clan values.(115) Control over health care workers and their decision making processes can be formalized and obvious or, alternately, more covert and difficult to detect.

Non-health care organizations have met competing interests and pressures (i.e. being 'green' and being financially productive) relatively directly by developing strategies such as the differentiation of the organization to achieve multiple, divergent goals.(115) In contemporary organizational theory, conflict is accepted as a functional attribute in organizations, but one that must be managed.(115) Contrastingly, in health care organizations both large and small, challenges, such as production versus altruism in the private sector and rationing over patient-centred care in the public sector, are more concealed. In both cases, these conflicts can be highly charged and political.

Much can be learned through using organizational theoretical approaches about why and to what degree dichotomous goals exist and, also, what impact they have on decision making capacity. It is this researcher's assertion, as has been similarly emphasized elsewhere,(31;76) that the health care milieu provides a unique set of organizational challenges surrounding societal and professional expectations that have altruism superseding all other goals, and the tension created may provide an unintentional disincentive for further research examination of the field.

While organizations themselves have an overall culture that is a product of all those who participate within it, subcultures exist within the organization that are based on several factors including the core values and norms of one's occupation or profession.(115) Subcultures can be very diverse and fragmented within the organization, and these can act as a strong source of competing interests and hierarchal structure.(115) While it may be inferred that dental hygiene like dentistry acts as a sub-culture harbouring its own intrinsic goals within the dental practice, this has not been studied. Decision making in organizations is complicated by competing goals and those with the most power will dominate decision making processes.(115) Power is used to attain one's goals, which may be in one's self-interest, to benefit the organization, society overall or a combination of stimuli as humans are rarely considered purely single-minded.(44;115)

Power can be overtly applied and structurally imposed through the authority of hierarchy of work positions, but it can also occur more covertly through other sources, like expertise and access to influential people.(115) Health care organizations are likely as influenced as any regarding power and control over decisions and yet this has remained a

largely unexamined field within knowledge translation research. By using organizational theory, researchers can begin to gain knowledge about the organizational structure where positions and relationships govern the distribution of available resources and determine who makes critical decisions.(115) For example, this study aims to gain insight about where dental hygienists, among others, are positioned within the organizational hierarchy to begin to determine what authority they have over their own and others' decisions.

In one qualitative study, it was demonstrated that dental hygienists' decision making over their patient care was over-ruled by administrative workers having no clinical expertise or formal clinical knowledge.(63) While this finding is informative, investigators lack empirical evidence about how such negotiations over power and authority occur or what the outcomes are on decision making, patient care and health care quality. According to organizational theory, power is expected and accepted, but it is also redistributed as various organizational and environmental conditions change.(115)

In health care and in dealing with professionals, conflict and power can be mediated in other ways where organizational theory is helpful in exploring. For example, power is sometimes construed as having autonomy in carrying out one's work. In organizational conflict, struggles are sometimes manifested as interference rather than an obvious battle over favourable conditions to achieve one group's goals.(115) Interference occurs when the actions of one group interfere with the efforts of others,(115) and this perspective may be important in understanding the political struggles occurring amongst health care workers.

A Gendered Organization: Using a Feminist Approach to Understanding Dental Hygiene Decision Making Capacity

The contribution of feminist thinking to organizational theory has the potential to inform knowledge translation and clinical decision making research of dental hygienists as the profession goes through an expansion of their work. A discussion surrounding organizational theory, and specifically issues of power and control, would not be complete without engendering the examination and applying the critical lens of feminism. Gender refers to "...patterned, socially produced, distinctions between male and female...it is a daily accomplishment", rather than something someone is.(116) Organizational theory has a history of being "gender-blind", and, because of this, it is asserted that significant errors have been made surrounding interpretations of the organization.(117) Mills and Tancred (117) assert that all of organizational analysis must be rethought in light of "a fundamental gendered substructure". Knowledge translation research has not embraced an organizational perspective, and not surprisingly, has also not used a gendered approach. Because of the seemingly gendered world of health care occupations, it is expected that an improved understanding could be gained about knowledge translation through applying both of these approaches.

Beginning with Weber, a socialist and political economist profoundly influential to social theory, organizational analysis was aligned with efficiency and management and was marked by a complete absence of gender.(117) It was not until the mid-1970's that organizational theory began to take gender into account in its analyses. Radical approaches to interpreting the organization slowly emerged with a focus on its structures and initiated an exposition of its gender oppressive systems.(117) While this severed the

collaboration between research and management, this early examination still continued within a male perspective.(117)

While research had begun examining women in the workplace, a feminist organizational research approach did not emerge until Acker and Van Houten gendered organizational analysis and are credited with transforming organizational theory.(117) During this same period, while Kanter focused on the conditions within the organization, others began to recognize the larger macro-environment and began to appreciate the sexist influence of larger society on both organizations and organizational research.(117) In feminist organizational theory, the organization, its setting and how gendered people are constructed are central to understanding.(117)

Applying gender within organizational analysis is essential to provide fuller explanations of organizational phenomena by encompassing issues of male dominance, female opportunity, or a lack thereof, and how women view their self-worth within organizational structures.(116;117) Early studies conducted on women's work provided descriptive accounts of the problems women encountered in the workplace but were unable to provide deeper explanations.(116) While feminist thought is far from homogeneous, it is universally based on the dual conviction that, first, power is used to dominate and subordinate, and, second, that it is done so wilfully.(115)

According to Hatch, (115) feminists contend that power is used to "marginalize the powerless" and suppress their views that might otherwise oppose the claims of the powerful, and this results in legitimizing the latter's continued authority and maintenance

of the status quo. In their research, feminist organizational theorists are aiming to increase women's voice and views, use pluralistic representations of women and focus on women as both subjects and audiences.(115)

Feminists are increasingly concerned about organizational life, and feminist theory is focused on the observation that decision making, policy making, holding leadership positions and overall ruling is done by men and served by women.(115) While some modest changes have occurred, the observation that a disproportionate number of women work in lower levels of the organization is readily apparent in most settings, including health care organizations. The pipeline bringing women into the organization contributes in a large way to the disproportions because what constitutes 'women's work' is stereotyped and feeds the organizational needs for low paid, low opportunity jobs. These stereotypes are devalued in both the work and the remunerations attached.(115) Gendered processes are a part of overall social processes and these are highly influential in organizations taking shape with a range of manifestations from being overt to being deeply concealed and therefore difficult to detect.(116) Gender patterns typically involve the subordination, control and exploitation of women on the one hand and perpetuate male symbols of power, greater autonomy and maintenance of their advantage on the other.(116) Gendering of work is evident through language, symbols and what is accepted as knowledge.

Concrete examples of women's disadvantage in the organization are reflected in women typically experiencing an inequitable distribution of poorer paying positions and career opportunities.(115) Managerial positions that women do hold typically allow less

discretion and decision making power.(116;117) Acker (116) describes four processes that gender organizations: 1) the production of gender divisions through ordinary organizational practices, which result in patterning of jobs, wages and hierarchies; 2) symbolic production of gender occurring in and outside of the organization; 3) interactions between people in multiple forms and 4) the internal mental activities of individuals. These gendered processes reproduce the "gendered substructure of organization".(116)

In organizations where women have attained professional roles, a gendered focus illustrates the sharp division between established male professions comprising the professional elite and the more emergent socialized female "semi-professions" that are characterized by emotionality.(117) For example, males dominate the professions of law, medicine and dentistry, while women have filled the ranks of nursing, teaching and dental hygiene—professions with intrinsically socialized nurturing and emotion.(117) Through a feminist organizational theory, it has become evident that historically organizational research has either neglected gender altogether by subsuming the "universal individual" as the relevant study subject or by applying gender with only the simplest treatment.(117) Thus, research has been conducted with a male perspective, on males, interpreted with a male lens and with an overall limitation on what is considered knowledge, and this bias has permeated the understanding and realities of the organization.(117)

In response to this critique, feminist researchers have provided a way forward. Suggestions for developing feminist organizational theory and research include exploring

the division of labour, relationships of ruling, authority, power and sexuality.(116;117) In addition, it is recommended that gender neutral structures that persist in organizational interpretations are deconstructed, and that this is done through revealing and removing the objectification of the organization, in its textual tools and associated research, and improving conditions of work.(116;117) Finally, feminist theorists advocate for action in organizing women as groups and also empower individual women through knowledge enhancement about their workplace texts, rules and procedures and, in effect, aim to reduce hierarchies and enhance a democratic process.(116;117)

The current feminist view that all relationships, including those within the organization, are gendered clearly drives the point that gender analysis must be part of a comprehensive organizational analysis. Examining the health care organization, and dental hygiene practice in particular, with a feminist perspective is important to fully understanding the systemic forces generating and perpetuating engendered relationships particularly those of domination. To disregard this perspective is to neglect the context that female health care providers work within and those potentially critical factors constraining or enhancing dental hygiene decision making capacity specifically.

In summary, by utilizing feminist organizational theory, the researcher is provided with a systematic approach to untangle the complexity of the organization. For example, feminist organizational theory orients the researcher to the structural domains of organizational life and permits empirical investigation of the effect of this structure on dental hygiene decision making. Dental hygienists can be studied, using various qualitative and quantitative techniques, to determine their organizational location, both

horizontally and vertically, within the dental practice. Further, the level of centralization regarding decision making, determining whether there are different types of decisions and if decision 'type' influences decision making control are all factors that merit analysis. Exploring the structural domains of the organization also allows the researcher to distinguish the degree of formalization in the practice and whether this acts as a hindrance or enhancer for dental hygiene decision making.

As previously stated, organizational theorists are cognizant of the influence of external organizational or general environmental factors on the organization and incorporate this broad perspective to knowledge translation research. For dental hygiene decision making research, and particularly with the view of expanding practice, incorporating this full societal view can illuminate external pressures and opportunities. For example, broad factors such as the economy, access to care issues and state pressure to diminish oral health disparities all shape the dental hygiene organizational setting.

Feminist organizational theory obligates the researcher to think beyond the aforementioned concrete structural components and examine gendered relationships, goals and conflict that exist in the dental practice, and the resultant control issues that emerge in day to day practice. Central variables to examine include the types of goals dental hygienists have, if these goals are professional and altruistic versus being more individualistic and self-interested and what types of conflict are generated as a result of these various goals. Of particular interest are the perceptions of dental hygienists surrounding the influence of production (i.e. billings—a traditional organizational

motivation) on goals and conflict and whether conflict is experienced as an external battle, as an internal struggle or both.

Because of the multiple, sometimes competing, goals that were suspected to emerge through this research, using feminist organizational theory appropriately directs the researcher to issues of control and power that are exerted when conflict arises. This is important because control and power are believed to have a direct relationship to the capacity to make and carry out decisions. Thus, a need exists to investigate dental hygienists' perceptions surrounding the practice hierarchy and its influence in response to conflict. Understanding whether power is manifested as 'sticks' (punishments) or 'carrots' (rewards), who exerts the incentives or punishments and whether these reflect interference or more contentious clashes provides valuable insight into how decision making typically occurs.

To utilize feminist organizational theory means that thinking about dental hygiene decision making capacity is to some degree influenced by gender. With most dental hygienists being women and most dentists owning and operating dental practices being men, the gender distinction is obvious even to the casual observer. This is in addition to the fact that most of the other workers in the dental practice are women: dental assistants, receptionists and others. Gendered positions are typified by the powerful, rational male on the one hand and the nurturing, emotional female on the other. To argue in support of an expansion of dental hygiene practice, meaning increasing scope and/or practice settings, it is imperative to examine the existing gendered decision making context and make predictions about how the process would unfold were dental hygienists in more independent, primary care situations.

Research into the workforce 'pipeline' and examine how dental hygienists decide or alternately are persuaded to enter the field is not a focus of this thesis, but once in the workplace, a gendered analysis should explore how dental hygienists value their work, their perceptions surrounding how others value it and what, if any, opportunities exist in their practice for their advancement. Women's work is typically undervalued relative to men's,(117) but the valuation of women's work is largely unknown within the health care context. This valuation may simply reflect the larger environment and social valuing of mother's (nurturer/emotional) and father's (breadwinner/rational) roles in the family, but it may also be reflective of health care environment specifically.

Further to this, a gendered organizational approach can provide insight into how dental hygienists view their rights to knowledge and knowledge use. Knowledge can be viewed as property with associated rights to its generation and use.(118;119) Males in more elite positions may assume a greater legitimacy to not only constructing knowledge but determining what knowledge is used and who uses it. ,(118) Women's capacity in the knowledge translation process is dependent on their involvement in knowledge production and use. In that some stakeholders have questions about the capacity of dental hygienists within expanded models, it will be important to explore dental hygienists' involvement with knowledge use.

A key construct to be investigated within a feminist organizational approach is to determine dental hygienists' perceived autonomy, and, where autonomy is lacking, investigating dental hygienists feelings of oppression, subordination, and who is doing the dominating. It will need to be explored whether autonomy is determined by position,

such as those occupations or professions traditionally held by men, or alternately determining if gender predicts autonomy and women and men in the same job position experience differing levels of autonomy. In addition, claims that dental hygienists are unwilling to assume the necessary autonomy for functioning in expanded roles will need to be investigated.

A feminist organizational approach will direct the researcher towards investigating whether dental hygienists in practice feel their views are suppressed and, if they are, how is this oppression learned to be accepted. Is such learning, for example, from broad societal conditioning or is it more contextual arising in the academy, workplace norms that one is acculturated to or a combination of these. For further understanding the knowledge translation process and clinical decision making specifically, it is helpful to learn more about where control over decision making, policy making, leading and ruling originates from and how it is distributed. While these are traditional male organizational responsibilities,(120) the dental practice is unique in that it often times has one male head and several, theoretically, subservient female workers, providing an interesting milieu for analysis. From a feminist perspective, traditional leadership and ruling characteristics are undesirable and unnecessary for effective primary care delivery.(109)

A feminist perspective would not be complete without investigating what role sexuality has within the organization. Sexuality is described as part of the overall production of gender.(116) Determining the influence of sexuality on overall experience in the dental organization and more specifically with dental hygienists' decision making capacity is a completely unexplored field. The feminist organizational researcher should examine how

gendered subcultures have been constructed in the dental hygienists' experience. For example, using Acker's description of four sets of gendered processes, the researcher will want to gain insight into what gendered organizational practices exist, the symbols that are created, the interactions that transpire and the mental activities that occur. Only through the recognition and description of these processes can they be accounted for and begin to be mitigated within existing and expanded dental hygiene roles.

Organizational theory provides a systematic way of examining the complexity of these potentially influential organizational structures from the concrete strata of work to the more abstract relationships surrounding goals, conflict and control that emerge in the health care practice of dental hygienists. Gendering this approach through feminist organizational analysis permeates the overall theory rather than just adding an additional variable to the analysis providing an approach for examining influences on dental hygiene decision making and behaviour under current conditions and also make predictions about how dental hygienists may function in expanded roles. Through a comprehensive empirical examination provided by gendered organizational theory, insight into opportunities and constraints in decision making of dental hygienists can be gained.

A researcher's worldview provides the foundation for her scientific inquiry, and it is particularly important to be explicit when a researcher is considering a less well known methodology such as mixed methods.(121) While some caution should be exercised when using labels to define one's research approach,(122) the investigator's research paradigm reflects her ontology, epistemology and methodology and is based on her

presumptions.(123) Positivism has been recognized as being inappropriate for studying complex social phenomenon because it holds the view that a reality exists that can be measured through a "one way, value-free mirror". (123) In fact, applying a positivist, quantitative approach to social science research has now undergone virtually a complete rejection.(122) Constructivism and critical theory, on the other hand, argue that the individual constructions of reality are the key influence on one's own behaviour, thus an external reality is relatively unimportant.(123) In these latter two paradigms, individual views of the world exist and result in multiple constructions of reality.(123)

In using an organizational and gendered approach to one's research, one develops a socially constructed reality where context becomes paramount. Context has been referred to as the 4p's: people, place, period and process.(123) It has been defined as the environment or setting in which knowledge translation and change is implemented.(113) In contextual phenomena, cause and effect relationships are rare, and are instead discussed as being causal tendencies.(123) Thus, from this perspective, having one negative research outcome, does not disprove a theory or hypothesis, but might instead be reflecting a particular contextual issue.(123;124) Researchers are encouraged to look at 'why' a result may be found to better understand the hidden reality.(123)

While some research approaches are purely inductive and emergent, from an organizational gendered approach, this investigator enters her research with prior theory at least regarding some aspects. Mixed methodological research is often conducted in stages in that the earlier work is typically exploratory and can inform later work. Having some prior knowledge gained from reviewing the literature and from utilizing a staged

approach has obvious benefits for guiding the methods. Sobh and Perry recommend that the aims of the stages are different in that the latter stage(s) should build on, predict reasons for and/or (dis)confirms earlier findings.(123) In this way, this research is aligned with what Creswell has referred to as "pragmatism" as a worldview that draws on methods that make sense for the study aims, and such aims often necessitate both qualitative and quantitative methods.(121)

From an organizational gendered theoretical approach, it is recognized that a value free inquiry is impossible and undesirable, but it is acknowledged that one's preconceptions and bias need to be made explicit For the researcher, on one hand there is an advantage to being in the unique position of being an 'insider' to the study phenomenon and population because she understands the context, and on the other hand she worries about her predispositions that may influence the quality of the research.(33;125) Thus, one accepts that complete objectivity is impossible and undesirable, but must be explicitly confronted. Concern surrounding reliability and validity and some level of objectivity and understanding how one's values and biases influence the research will need to be addressed with some attempt to mitigate this.(122) Together, these points highlight the tensions and challenges that are inherent in the utility of a mixed methodological research approach.

Creswell states that qualitative methods draw out many varying perspectives leading to complex answers versus quantitative methods that aim to test theory about how specific variables interrelate.(121) Further, the researcher's role within each distinct methodology is also different particularly surrounding managing bias and ensuring validity.(121;122) Designing a mixed methodological study is based on the need to utilize both qualitative

and quantitative approaches because neither can provide a sufficient explanation or answer to the problem, if the study would be enhanced overall by doing so or a need exists for preliminary qualitative exploration.(121)

The application of multiple methods, referred to in general as triangulation, is sometimes incorrectly thought to be synonymous with mixed methodology.(123) It has been asserted that triangulation is only appropriately used in realist research where a single reality exists, but (123)it is particularly useful to help unfold multiple contextual aspects of a research phenomenon and is helpful for understanding the complexities of a single reality.(123) As Pawson and Tilley put it, triangulation provides a "family of answers" covering the various contexts of that single reality.(123) If different perceptions from these varied sources arise, Sohb and Perry caution that this should be viewed as fostering understanding surrounding the complexities of that reality rather than failing to support one's hypothesis.(123)

Sobh and Perry warn that quantitative findings from positivist approach are not the most well suited for providing this deeper understanding, and, recommend rather one should concentrate on the meanings.(123) From the organizational and gendered theoretical perspective and mixed methods viewpoint, it is argued that quantitative and qualitative philosophies can coexist and doing so makes sense from the perspective of what one is attempting to achieve.(126)

Chapter 4: A Theoretical Case for a Mixed Methodology

The primary aim of this thesis is to develop and test theory specific for a non-elite health care provider group, specifically dental hygienists, through dialogical means. In other words, by immersing one's self in the field, the researcher is able deepen and enhance her understanding of the phenomenon and allow theory to emerge.(122) The implementation of appropriate methods, and combination of methods, can help ensure that mechanisms providing a "*causal description* of the forces at work" are in place.(122) When making the determination to approach one's research utilizing a mixed methodology, Creswell states that one must consider her worldview and whether both qualitative and quantitative methods are both appropriate to achieve the research aims.(121)

Because of the theory generating and explanatory aims of this study, many unknowns exist at the inception of the research process. Thus, a qualitative approach is suitable for initially exploring the phenomenon, but this approach is insufficient to complete the aims of the study and requires a second phase that includes the development and implementation of a quantitative instrument.(121) Therefore, as recommended in mixed methodological approaches, the researcher designed and implemented a staged but integrated strategy in order that the initial phase of the inquiry could be used to inform the latter phase. This study was carried out in two major phases each with distinct but complimentary methodological approaches. The researcher asserts that this research is a good example of a true mixed methodological study, and this assertion will be more fully discussed and substantiated.

Methodology is secondary to a researcher's ontological and epistemological paradigm with the latter two guiding the former.(73;123) The methods utilized in this study were applied sequentially but integrated together as part of an overall mixed methodology and used in the following combination of methods and corresponding analytical techniques: 1) focus group interviews: qualitative thematic analysis; 2) survey study: quantitative statistical analysis; and 3) key informant interviews: qualitative thematic analysis. The appropriate methodological approach was selected based on accomplishing the research objectives and together provides a robust methodology and the rigor expected in quality research.

Qualitative researchers have diverse backgrounds of epistemological positions and these positions are often a central factor for a researcher using qualitative methods.(73) While methods must be aligned with the researcher's worldview or research paradigm, the research approach needs to also match the research purpose and specific objectives and the researcher's experience and the anticipated audience.(73;127) Taking these factors into consideration, for this study, the researcher applied her worldview based on a socially constructed understanding of knowledge translation and decision making to orient the research and applied both qualitative and quantitative techniques within a mixed methods design. In addition, because all methods are fallible, an additional reason for the use of a mixed methodology includes that in doing so will help to overcome any single technique limitation.(122)

Using multiple methods in one study is not necessarily new, but to put qualitative and quantitative data together as distinct research design is a more novel approach and

presents various advantages and challenges.(128) Some researchers refer to mixed methodology as a philosophical assumption guiding their research whereas others simply focus on the methods used for the study.(128) This researcher is aligned with Creswell's middle ground interpretation that has mixed methodology serving as a framework for the overall research process and imposing some of its own philosophical assumptions.(128) A central premise Creswell highlights is that the combination of qualitative and quantitative approaches provides a better understanding surrounding the phenomenon than one would on its own.(128)

Creswell makes the case for the synergistic effect of mixed methodology based on various points. First, using mixed methods mitigates the limitations inherent in any one study method.(128) The significance of those limitations depends on the particular study and research problem, but using a mixed methods approach may be able to overcome the deficiencies of any singular method. A second point is that mixed methods provides more evidence than either method would on its own,(128) and, therefore, the argument is that more, is more. Third, mixed methods can address different research questions in one study that cannot be answered by a singular method. (128)

From a more overarching perspective, Creswell also argues that mixed methods will strengthen the inter-relationships between qualitative and quantitative researchers by increasing appreciation across the research methods chasm.(128) Finally, Creswell asserts that mixed methods is practical in that the researcher is not limited by paradigm constraints, but rather the researcher uses what is appropriate and makes sense; the researcher is 'free' to use what works for her research problem.(128)

Using mixed methods, particularly with the view of it being its own separate research paradigm, is not without controversy.(127) Problems surround how it is defined, what is driving it, does it create an unnecessary distinction, does it privilege post-positivism and various other issues.(127) Researchers have been cautioned against mixing methods within a singular paradigm.(129) For example, approaching one's science from a positivist paradigm and using focus group data with thematic analysis (qualitative approach) would likely cause the researcher to cope with internal philosophical tensions and contradictions that would compromise the rigor of her/his study. Mixed methodologists do not discriminate between qualitative and quantitative research techniques and have the philosophical foundation to apply them as appropriate according to the aim and objectives of the study and are, therefore, in an ideal position to apply mixed methods.

Despite the expanding body of knowledge, several common misconceptions surround the use of a mixed methodological approach. In mixed methods, both qualitative and quantitative data is collected and subsequently analysed, with the former method having collected open-ended type information versus more closed-ended collected in quantitative techniques.(128) The first misconception surrounds the controversy of combining of two major research paradigms in one large research project. This was one of the early debates surrounding mixed methodology referred to as the "paradigm debate period" during the 1970's and 1980"s.(128)

While this argument still persists with some researchers today who argue that mixing paradigms is incompatible, acceptance has been increasing.(128) However, such an

approach needs to be made explicit and each paradigm honoured in its own right, and, importantly, one's own worldview must be able to support it.(127) Recently, support for mixed methodology being its' own separate and third research paradigm has emerged.(128) In the US, the National Institutes of Health and the National Research Council have acknowledged and shown their acceptance of mixed methods by publishing guidelines for mixed methods research and a Journal of Mixed Methods is now being published by Sage.(127;128)

A second misconception is that simply using two separate methods in one research project constitutes a mixed methodological study design, but a true mixed methods study is the sequential or concurrent integration of two or more methods having a synergistic effect.(127) The line between having one integrated mixed methods study versus several individual but linked studies with different methods can sometimes be blurred.(128) Creswell also points out an important facet in that both forms of the research must be sufficiently robust to qualify as mixed methods research.(128) Creswell describes various and specific ways mixed methods designs can be conducted, and he highlights several grey areas where the researcher may be mistaken in thinking she is applying a mixed methodological approach.(128)

While using mixed methods has many advantages when appropriately applied, Creswell points out that it is difficult approach and is resource intensive.(128) Further, most researchers have training and experience in only one major type of inquiry, thus challenges will arise when attempting to conduct mixed methods research.(128)

Therefore, the advantages of using the approach must be clear in order to justify the challenges.

How one mixes multiple methods should be determined by the specific needs of the research problem. Creswell argues that data from qualitative methods can be converged with, connected to, or embedded within quantitative data.(127) In the case of this research project, focus groups were conducted in the first Phase generating qualitative data that were analysed and used to develop the components for the second Phase of study. In Phase II, the survey questionnaire and the key informant interviews were designed and conducted generating both quantitative and qualitative data, and comprised a mixed methods study embedded within the larger mixed methods study. In the second Phase, these data sets were each analysed according to their own paradigm and then interpreted together according to specific techniques, which will later be further elaborated on.

Creswell highlights some key attributes that should be present in order to confirm one has a 'true' mixed methodological study.(130) These include:

- use of the term 'mixed methods/methodology'
- collection of both qualitative and quantitative data
- use of both qualitative and quantitative analytic procedures
- a rationale for using a mixed methodology
- references to mixed methodology literature
- inclusion of elements of both qualitative and quantitative research

Creswell states that once a researcher has determined that she will use a mixed methodology, she must then decide what research design to proceed with to achieve her

study aims.(131) Mixed methodologists have spent considerable efforts in classifying mixed methodology designs.(131) Creswell has advanced four major mixed methods designs: triangulation, embedded, explanatory and exploratory designs.(131) The "exploratory sequential" design, which this study most closely reflects, is conducted in two-phases and has the intent of the initial qualitative study to help develop or inform the latter quantitative phase.(131) The need for the exploratory phase is based on a lack of appropriate instruments, key variables are unknown and/or there is no guiding framework or theory.(131) Thus, the qualitative findings build to and connect with the quantitative phase often placing greater emphasis on the initial, qualitative piece.(131)

Two main variants of this design exist surrounding how the two phases are linked, and both variants, at least partially, informed this study. Based on the outcomes of the qualitative phase, one variant focuses on the development of items and scales for a quantitative survey instrument, and the other variant is focused on the identification of key variables, relationships and emergent theory with the quantitative phase is designed to test these findings.(131) Contrastingly, the former variant emphasizes the qualitative first Phase while the latter variant emphasizes the quantitative aspect of the study.(131) The researcher in this study employed both of these variants in that she used her qualitative findings to identify the key variables, their relationships and to develop a conceptual framework that was subsequently tested through the theoretically derived quantitative survey instrument.

Creswell has identified several challenges that are intrinsic in the exploratory method used in this study.(131) These challenges primarily surround the time required to conduct this type of research and the inherent lack of clarity surrounding the second phase at the

beginning of the study.(131) Once the researcher consciously selects one of the four mixed methods based on her research aims, she must consider three main issues: timing, weighting and mixing of the study components.(131)

Timing refers to the temporal relationship between the two phases, and signifies the ordering of data collection, analysis and interpretation.(131) Creswell describes concurrent and sequential designs as the two possibilities for timing one's mixed methods project.(131) For example, in this study, the primary qualitative piece (focus groups) is completed prior to the primary quantitative piece (survey questionnaire) that is embedded with a secondary qualitative piece (key informant interviews). Timing is not an arbitrary decision, but rather should be determined based on the study aims.

Decisions surrounding weighting refer to the emphasis of the research approaches used within the study.(131) Specifically, the researcher should think about the relative importance of the qualitative and quantitative methods used in the study.(131) In answering what is referred to as the "priority question", one can determine that methods can have equal importance or one method can have greater priority or emphasis within the study.(131) The issue of weighting can be influenced by the researcher's worldview, the specific research aims or more pragmatic issues such as one's resources, expertise in a given field or audience.(131) Regardless of how the study is weighted, the researcher should be explicit about this in her reporting. Creswell depicts the emphasis of method by capitalizing it within one's schematics (i.e. Qual/quan).

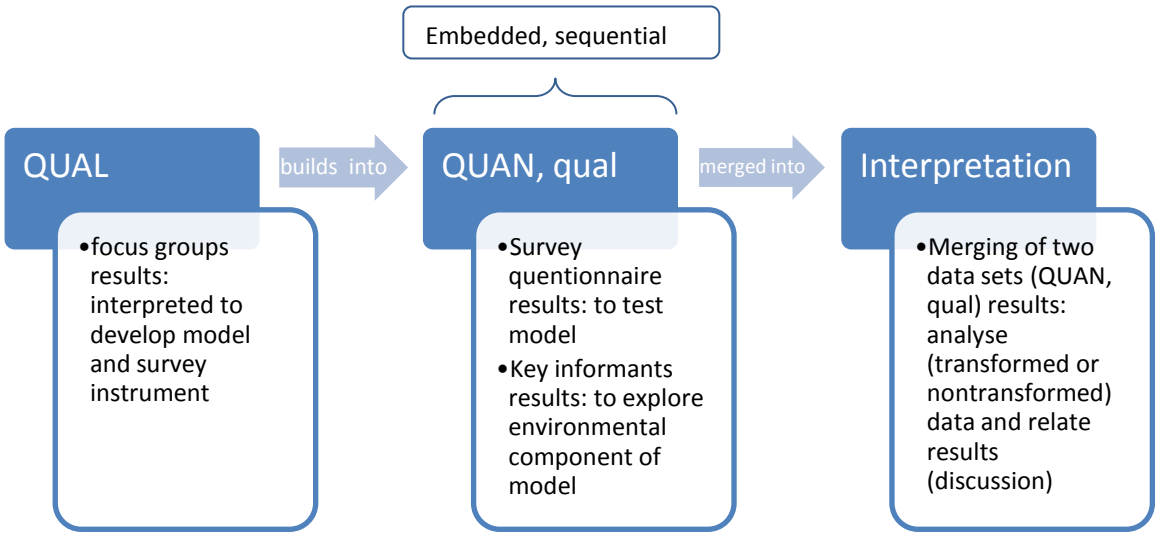
Creswell describes the third procedural consideration as the mixing decision, meaning how the qualitative and quantitative data sets will be related.(131) Of all of the inherent challenges of a mixed methodological approach, this presented the most difficulty in this research, particularly in the interpretation of the mixed data in the second Phase. If the data sets are not mixed in some way, the researcher will simply have a collection of methods and the synergistic quality will be lost.(131) To help ensure one has a rigorous mixed methods design, this choice must be made explicit.(131) Creswell presents three possibilities surrounding these procedures: connecting, merging or embedding the data.(131)

In the first possibility, the data are connected through an initial and separate analysis and complete interpretation of one method, which subsequently leads or connects to the design, collection and analysis in the second method.(131) Creswell describes merging as having the data sets explicitly brought together either during the analysis with a singular results section or, alternately, after conducting the analysis with separate results sections and then merged during the interpretation.(131) In the last possibility, embedding data occurs at the design level, where the two types of data are collected, but one method takes on a more secondary role to the other.(131) The two types of data can be collected concurrently or sequentially, but in the former case the researcher will make her interpretations by bringing the data sets together or, in the latter case, interpretation will occur with the data sets kept separate.(131)

One of the main challenges inherent in mixed methods is that the researcher must be able to not only analyse the qualitative and quantitative components of her research using

appropriate techniques, but this must occur under the conditions of the specific mixed methodology employed.(124) Thus, a major challenge is how the researcher uses her data sets in interpreting the results. As mentioned previously, this study presented a particular level of complexity in it had a somewhat complicated design even from a mixed methods perspective. (Figure 2)

Figure 2: Mixed Method Design



While Phase I of this study worked well with Creswell's conceptualizations of mixed methods, Phase II of the study posed a particular challenge when attempting to fit it into one of Creswell's various models. As discussed above, Phase II comprised both a quantitative and qualitative method occurring within the larger mixed methods study. Because this was not a configuration that Creswell suggested or dealt with,(124) the researcher chose to treat this Phase as its' own embedded sequential mixed methods design and use Creswell's procedures accordingly.

A second major challenge to the researcher surrounded how to best mix the methods in Phase II. Both methods (QUAN: survey; qual: key informants) were necessary to 'test' all aspects of the Phase I model, with the qualitative piece examining the environmental influences on clinical decision making, which could not be effectively tested with the practicing dental hygienists making up the survey. While theoretically sound, this methodological approach presented a challenge because two different types of data were to be generated that would be subsequently needed to be interpreted regarding the same model. While unorthodox to many researchers, mixed methodology allows for such a task through a couple of different techniques.

As introduced previously, according to Creswell's categorizations, the overall design of this study was an exploratory, sequential design, but the latter 'QUAN' piece had an embedded, sequential 'qual' piece that together were approached as its' own small version of a mixed methods study.(124) Because these data sets were examining the same theoretical model, it was clear that the data needed to be merged. As described above, merging has the data sets being brought together either during the analysis or after during the interpretation.(131)

Creswell presents two techniques for merging the data in this way, which both present with inherent challenges. (124) The first is to "transform" one of the data sets so that the quantitative and qualitative pieces are readily comparable or the second is to proceed with one's comparisons without transformation through the discussion or other means.(124) If one is going to transform a data set, it typically would be the more supportive, secondary data that would be transformed into that of the primary data set.(124) An

example of this procedure would be transforming secondary qualitative data into numerical data that can be statistically analysed with the primary quantitative data. In this study, the researcher did not feel it desirable or feasible to transform the qualitative data into quantitative data because the qualitative data were not readily transformable and the rich nuances of the narrative key informant data would be lost.

Thus, the researcher opted to proceed without transformation and conduct her interpretation through the discussion. This frequently used approach is carried out by examining the similarities and differences of the quantitative and qualitative results in the discussion section.(124) According to Creswell, this can be carried out by first reporting a descriptive or inferential statistical finding and then provide information from the qualitative thematic analysis that confirms or refutes the quantitative results.(124)

In summary, in this study, the mixing occurred in the following manner:

> Phase I: Qualitative data interpreted and **connected to** Phase II Quantitative/Qualitative methods
>
> Phase II: Quantitative data **merged to** Qualitative data during Interpretation

Integrating Qualitative and Quantitative Research Approaches

While diverse audiences sometimes access one's research, it is stressed that research should be judged according to its own paradigm.(129) However, where multiple audiences are anticipated, it is incumbent upon the researcher to report sufficient methodological detail demonstrating the rigor of the study. Knowledge translation research has a very broad and expanding audience spanning from basic scientists who are

increasingly encouraged to supplement their research to facilitate 'bench to bedside' applications, to social scientists, health care clinician scientists, health profession regulating bodies and public policy analysts. Therefore, its' methods must have a broad appeal and be well comprehended. This being said, a major challenge to utilizing mixed methods is that the investigator must adequately describe that paradigm along with both qualitative and quantitative methods. In most cases, any given audience will be cognizant of only one of these three methodological approaches.

It is challenging to report methods explicitly in qualitative research because its' methods are not formulaic when compared to quantitative methods.(122) This is not to imply that a qualitative approach is not a disciplined science, but it is also creative and reflexive.(122) A logical positivist research paradigm typically employs experimental methods using statistical measures to test the hypothesis.(129) This approach is concerned with measurement and analysis to prove a causal relationship between variables and has a long history including in social research based on the assertion that the social world has an objective reality.(129) Logical positivists have often been critical of qualitative research and deem it less "scientific" than quantitative methods.(73)

In naturalistic qualitative research, the phenomenon is encouraged to unfold naturally with the aim of improving understanding about it and potentially extrapolate that knowledge to other settings.(129) It is naturalistic in that there is no attempt to manipulate the phenomenon into an experimental template and no statistical applications;(129) numbers are largely unimportant to the process.(132)

Qualitative research is ideally suited to exploratory situations when the topic is new, there is no existing theory available, the key variables are unknown and/or if the sample is new to examination.(127) Additionally, those phenomena that are processes, such as decision making and knowledge translation, rather than events, require contextual features to be part of the conceptual framework of the research.(33) This holistic approach providing the "thick, rich description" of the setting and relationships is the basis for qualitative research.(122) Creswell views research as being interactive and often non-linear and mixed methods as being responsive to this.(127)

When one attempts to make social phenomenon conform to the positivist worldview and associated methodology, it undergoes a distortion where social phenomena are fragmented into a limited number of categories that reflect a much wider range of social aspects.(129) In essence, the approach requires social phenomena to be standardized in order to conduct comparative measures.(129) Because such an approach emphasizes quantifying social phenomena, such as policy and knowledge translation processes, many of the critical contextual aspects for understanding are excluded,(33) and as a result maintains its patriarchal knowledge forms.(73)

While some researchers may contend that subjecting the social world to quantitative standards provides more rigor, this can be countered by arguing that forcing social phenomena into artificial categories and scales can provide a less valid and reliable approach to research.(73;129) Utilizing a mixed methodology, such as that used in this study, has the advantage of bringing the various strengths of both paradigms to such complicated social issues like clinical decision making and yielding multiple forms of data, but, as described above, this approach can lead to controversy because researchers

familiar with only their own paradigm may have a bias to their respective approach and methods.(33;73)

In order to attenuate the concerns of those from both, or all three, paradigms, it is important to be as transparent as possible when reporting one's methods, while keeping in mind it is not possible to flawlessly replicate the analytical thoughts and procedures and confirm the reliability and validity of the findings in qualitative research as one may expect from quantitative methods.(125) In fact, from some qualitative researchers' perspectives it is not desirable to do so, and, therefore, discussing issues of validity and reliability can be problematic.

Some qualitative researchers would argue that the concept of validity has positivist roots and reliability is specifically associated with statistical measurement and therefore has no relevance to qualitative research.(129) Reliability and validity are considered tools from the positivist epistemology with the former referring to the stability or repeatability of the study findings and the latter refers to whether the measure is measuring what the research intended it to.(129) However, others assert that reliability and validity can be used in the qualitative paradigm albeit differently.(129)

From this investigator's research orientation and in using a mixed methodological approach, it makes sense that the researcher instils a concern with validity, reliability and objectivity,(122) and that validity is recommended as being handled in a context specific manner. (124) This means for quantitative data and qualitative data, issues of validity are dealt with separately within their own paradigm. (124) Sometimes in mixed methods literature the terms "inference quality" or "legitimization" are used instead of validity, but

Creswell recommends maintaining the use of the term validity while being careful to explicitly define the term within its qualitative and quantitative contexts and within the specific overall mixed method used.(124)

From the qualitative perspective, reliability and validity are sometimes viewed as one construct, referring to the overall rigor and quality of the study, but even when set apart, the terms are often interchanged and not well distinguished.(129) When examining reliability and validity as separate entities, reliability has a different nuance in qualitative research and is more closely linked to dependability and trustworthiness.(129) Whereas validity may be associated with quality, rigor, and also trustworthiness.(129) Together, the concepts are related to precision, neutrality, and consistency, which provides the confirmability, credibility and trustworthiness of the findings and to potentially permit their transferability to other settings.(129) Clearly, explicitly defining one's use of these concepts must occur particularly when using a mixed methodological approach to one's research.

Qualitative researchers aim to confer that their data, analysis and findings are dependable, and it has been asserted that the most important 'test' of qualitative research is to judge its quality.(129) Because the researcher is the 'instrument',(129) all evaluation stems from how and what the researcher does (or does not) do. High quality qualitative research ultimately should generate understanding surrounding a complex and/or confusing phenomenon.(129)

Qualitative research that is considered trustworthy is more credible and defensible and therefore has greater potential for transferability to other contexts, but some qualitative researchers would dispute the aim to produce generalizable findings and is a distinguishing feature of qualitative research.(129) Generalizing qualitative findings to other contexts is often not an objective of qualitative research projects, and therefore a qualitative researcher should be explicit about their intentions to do so and how specifically they hope to achieve this. For example, in this study, while generalizability was not a primary aim, because of the similarities in experiences suspected to be occurring between the study subjects and other dental hygienists in Canada and other female dominated emergent health care professions, some generalizability to other groups has been suggested.

As introduced previously, triangulation is a key technique used in mixed methods research projects. In qualitative research specifically, triangulation is a technique used to improve the overall rigor and quality of the work. While triangulation is asserted as being an essential means to improve the generalizability of qualitative research, it will strengthen studies regardless of having this as an aim.(129) As previously discussed, triangulation refers using multiple and differing combinations of data, methods, analysis, investigators and/or research paradigms.(129) Thus, it is not a set method, but rather a technique for mixing of methods and research tools dependent on the overall research objectives.(129)

Triangulation was heavily relied upon in the current study through combining research approaches (qualitative and quantitative), data collection samples and methods (focus

groups, survey research and key informant interviews) and corresponding appropriate analytic techniques (thematic analysis and statistical applications). Through triangulation, the researcher can seek convergence among the different sources of findings, and, where agreement occurs, the researcher can potentially have more confidence in her findings.(129) However, as mentioned previously, where alternate findings are found, the researcher may infer that a different 'window' to reality has been viewed reflecting other contextual aspects of the phenomenon.(123;124)

The various principles relied upon in positivist quantitative research designs to ensure rigor are not readily available in qualitative applications. However, in order to ensure the highest level of quality in one's qualitative research, some recommendations are available and were followed in this study. For example, Schutz describes three postulates, although used in a different qualitative context, that the qualitative researcher can follow to improve the overall rigor of the study.(132) These postulates are logical consistency, subjective interpretation and adequacy.(132)

According to the first postulate, the researcher should provide a high level of clarity in the overall conceptual framework of the study to ground the selection of methods.(132) In this study, many unknowns existed at the beginning of the research and therefore the conceptual framework was relatively nebulous. As discussed previously, such ambiguity required a staged approach to be utilized in the study, and this had the benefit of earlier steps informing the latter in addition to triangulating the data and findings.

In addition, to achieve the first postulate the researcher developed a causal network. This is described as an analytic display that concretely reflects the conceptual framework of the study by depicting the key variables (themes) and the relationship between them.(133) It is an often recommended step in qualitative research that provides an evolving narrative depictions of information in a spatial format.(133) The main purpose of displays is to force analytic activity and to begin to reduce the volumes of data that are accumulating—one hour of interview can result in over one hundred pages of data.(133)

Examples of displays include summarizing tables, matrixes, charts and figures, and the selection is based on suitability to one's research.(133) This study proposed the development of a causal network, which is a specific example of a display providing a visual representation of the key independent and dependent variables and their inter-relationships.(133) The development of the causal network was built into the study design as an outcome of the focus group analysis in order to guide the researcher in the remainder of the research. For example in this study, the causal network was essential in grounding the development of the survey instrument and the key informant interviews.

The second postulate refers to preserving the subjective meaning or subjects' points of view in the researcher's findings.(132) While this may appear counterintuitive from a positivist perspective, in qualitative research, demonstrating that findings are based on study participants' perspectives and acknowledging the contextual factors influencing their experience is essential particularly from a feminist organizational theoretical approach.(132)

Equally important is that the researcher clearly demonstrates the interpretative process between the raw data and findings.(132) To achieve this transparency, the researcher provides selections of the raw data, memos, coding tables and other interpretive work from the focus group interviews and the key informant interviews in subsequent reporting so that the reader can confirm, or at least follow, how the findings were formulated. Providing this transparency in reporting improves the rigor of the research by maintaining the subjective experiences of study subjects while not diminishing the researcher's interpretive account.

The third postulate is related to the second and centres on establishing consistency between the researcher's interpretations and the study subjects' experience; in other words, the researcher's constructions should be recognizable to the study subjects.(132) This was achieved in the current study by a form of 'member checks', where at the end of both focus groups and key informant interviews, the researcher attempts to summarize the key points and reiterates them to the study participants to confirm accuracy. In addition, field notes are taken during data collection procedures to capture nuances that occur during the interviews but are not outwardly apparent. During later analysis, the researcher is encouraged to contact study subjects at any point necessary to confirm meanings and interpretations.

While there are many distinct approaches to qualitative research each having its' own theoretical underpinning, several of these share their methods because they all collect narrative data. Thus, beyond the preceding postulates, the process of analysing this textual data often takes on similar somewhat sequential steps that assist qualitative

researchers in improving the rigor of their research. Miles and Huberman (133) provide one of the more complete descriptions of qualitative analytical techniques, and this was largely relied upon in this study for both the focus group and key informant interview data analyses.(133)

Generating meaning out of qualitative data is likely one of the most mystifying processes in qualitative research, particularly from a positivist's perspective, but several strategies exist for improving the quality, meaning reliability, validity and objectivity, of the findings. As discussed earlier, the term validity is sometimes avoided within the qualitative research, but because many sources for bias exist due to the interpretative conditions of qualitative research, tactics are recommended for confirming findings.(133) Miles and Huberman (133) outline twelve tactics for confirming one's conclusions made from qualitative data analysis all of which were referred to in this study to overcome researcher bias.

In the application of quantitative techniques, validity and reliability measures are more customary. For survey research, the design and implementation of a survey instrument requires a solid demonstration of validity and reliability. These measures are described as the fundamental psychometric qualities of how the survey is conducted and the specific instrument used.(134) Measurement quality will affect the size of statistical effects and the eventual meaning of one's results.(134) In survey scale construction, reliability surrounds the precision of scores, validity is about accurately reflecting variables and dimensionality reflects the number and nature of variables assessed within the scale.(134) In addition, the actual scale construction process should be thoughtfully and carefully conducted.

Ad hoc scales refer to the creation of a new scale for measuring a construct not previously measured and/or for a group not previously measured.(134) This is less preferable to using a previously validated scale, and Furr states that if one opts to develop an ad hoc scale one must evaluate it beyond face validity.(134) Validity has been described as the most crucial aspect of a scale's psychometric quality, and it relates to the interpretation and inferences one makes of the scale score not of the instrument scale itself.(134)

Much of survey research has been conducted based on a traditional approach to validity referred to as tripartite validity, which includes content, criterion and construct validity.(134) Contemporary validity requires greater attention to the application of evidence and theory to demonstrate the validity of a survey instrument.(134) By utilizing a mixed methods design, empirical evidence and theory, where previously lacking, were generated from the first Phase of the study and used to ground and validate the survey instrument. Thus, the actual scale content includes empirically and theoretically important aspects of the phenomenon: no less and no more.(134) Therefore, the scale goes beyond the researcher's opinion or face validity.

A second fundamental facet of psychometric quality is dimensionality or factor structure.(134) A survey instrument can be uni-dimensional, reflecting a single variable, or multi-dimensional, reflecting more than one variable.(134) If the scale is to be multi-dimensional, to prevent ambiguity, each dimension should be scored separately and reflect its' own variable.(134) Thus, an instrument may have various sub-scales each being reflective of a range of aspects associated with the overall phenomenon.(134) It is not possible to accurately interpret scores derived from an ambiguous scale, and doing so

has profound research implications.(134) If the uni-dimensionality of a scale is in question, testing can be done statistically (i.e. Exploring Factor Analysis- EFA).(134) The other fundamental facet of psychometric quality is the scale's reliability.(134) A true score is the score the researcher would like to detect and would calculate if the scale was perfectly precise: meaning the actual standing on a particular construct.(134) Measurement error is the random inflation or deflation of observed scores and the aim is to detect whether the variability of observed scores reflects that of true scores.(134) This must be estimated by using one of several statistical methods, which includes tests of internal consistency such as Cronbach's α (alpha).(134) Scales that are comprised of more items are shown to have better reliability because they provide a greater opportunity for random error to balance out.(134) In addition, the researcher can improve correlations between items in a scale by using clear language and having items be relevant to the variable.(134)

Other considerations when constructing a well designed survey instrument encompass the use of a systematic process that includes examination of the quality, understanding the scale of measurement (i.e. interval), thinking about the response formats and careful item writing.(134) Response format surrounds an item's number of response options, labels or anchors for the responses (i.e. strongly agree to strongly disagree), mid-points, neutral options and the consistency across items in the scale.(134) Item writing means the content and clarity, number of items and the balance between positively and negatively keyed items.(134)

While detailed previously, one of the most important recommended tactics used in this study was triangulation. The use of multiple measures was heavily relied upon in this study as several methods were used to build on, refute and confirm findings (i.e. focus groups, survey, key informant interviews).(133) However, it is important to state that the value of triangulation is dependent on the rigor of each of the methods despite their divergent qualities.

Chapter 5: Methods

Understanding of the knowledge translation process and clinical decision making has been gained through traditional approaches, but it is asserted here that the research has been limited, at least partially, by the general assumption that health care providers proceed rationally and linearly as free moral agents. Because knowledge awareness does not ensure expedient translation to practice, (135;136) a disconnection exits between what practitioners know and what they do. This phenomenon, known as the theory practice gap, is attributed to that which occurs within the largely unobservable knowledge translation black box where deliberating and decision making occurs.(47;48)

A mixed methodological approach was applied in this study in order to advance understanding surrounding the organizational and gender influences on the knowledge translation process of dental hygienists. Largely utilizing Creswell's (127) mixed methods approach as an overall framework for collecting and integrating qualitative and quantitative data, the study was carried out in two Phases: Phase I included a series of focus group interviews and Phase II involved an electronic survey questionnaire and key informant interviews.

Phase I: Focus Groups

Focus group interviews are a method that has been historically used for, and continues now, to provide in-depth data when exploring poorly understood topics like, in this thesis,

the structural influences on dental hygiene decision making capacity.(137) In conducting focus group interviews, the researcher learns about a range of experiences surrounding context, complex influences, thinking, motivations and behaviour, and, as a research method, it has been used extensively for developing survey instruments.(137) In the most basic terms, focus groups provide a starting point about 'what's going on out there'.

Because little empirical work has been done in the area of structural or organizational influences on decision making of any health care provider group, focus group interviews were relied upon to ground the study. Participants were, for the most part, not well known to the researcher/moderator or to each other and were not aware of the research project prior to being approached to participate. Recruitment is central to the success of a focus group interview and allowing sufficient time to carry out a systematic approach is recommended.(137) Appropriate ethical approval for this part of the study was attained from the University of Manitoba Health Research Ethics Board (HREB).

Potential focus group study participants were selected from a list of dental hygienists in Manitoba from a publicly available source. Dental hygienists on the list were identified according to their year of graduation and categorized into three groups according to experience. Then, potential participants were randomly selected to be contacted by telephone to participate in the study. Many attempts to recruit individuals were required necessitating going back to the list to select other potential participants. Over-selection was carried out in case of last minute cancellations or no-shows for the focus group.
A brief description of the study was provided over the telephone and if individuals were interested in participating, information about availability and scheduling was collected.

Letters of information and informed consent were provided via electronic mail and collected at the time of the interview. In preparation for the focus group interviews, the researcher conducted a pilot focus group with educator colleagues to test questions, develop her moderating skills, test logistics and get general feedback from the participants.

A minimum of three focus groups are typically recommended each with six to eight participants in order to hear many different views and opinions. The aim is to achieve saturation of themes or ideas, meaning that a failure of new data emerges, while minimizing resources (time and finances).(137) It was determined that each group would have a homogeneous composition of participants (i.e experience level) and unique relative to other groups in order to allow various views to surface and provide comparative data across groups.(137) Focus group interviews were scheduled to take approximately 90 minutes to allow adequate time for all participants to share their views and to capture a range of opinions.

The purpose of the focus groups is, in this study, exploratory, but it must also remain focused; therefore, the moderator must be skilled in allowing appropriate sharing, while keeping the topic central.(137) A high quality moderator should understand the issues being discussed and encourage the expression of different views and discourage conformity as there is no desire in focus groups to reach consensus.(137) Interviews took place at the University of Manitoba, Health Sciences Centre as it was convenient to the groups and to the moderator. The primary investigator acted as the sole moderator for all

of the interviews; Interviews were audio-taped for transcription and field notes were taken as needed.

Methods of analysis in qualitative research suffer from being not well formulated and reporting often lacks sufficient description.(133) Data analysis in qualitative research is typically ongoing and informative cycling back and forth within phases and from phase to phase of the research.(133) Strategies will occur during the research process for collecting better/newer/more data and specific techniques have been detailed for maximizing the potential of this.(133) Additionally, computer software has been developed in the last few years to be used as a tool by the qualitative researcher to assist in managing the large volume of narrative data that is generated. The use of NVivo ™ qualitative research software (version 8), which is compatible for all of the following analytic steps, was used as a data management tool for this study.

Focus Group Analysis—Coding Data

In qualitative research, data collection and analysis are not as clearly differentiated from each other compared to quantitative approaches, and there is often overlapping and cycling back and forth between phases to improve the overall quality of the study.(125;133) As narrative data accumulates during field work (i.e. interviews), analysis often begins with coding of data. Codes are labels classifying a group of words, phrases or more and act as organizing devices that are often pre-derived from the research questions, conceptual frameworks and previous research or can be emergent.(133) For example, codes can be more deductive and predetermined based on prior knowledge, previous research and/or theory and the specific research questions and conceptual

models, or, alternately, codes can inductively emerge from the data itself.(132;133) A combination of the two techniques can also be used, as was done in this study, where both a deductive and inductive approach is applied.(132)

Codes evolve over time and can take on a few different forms from being purely descriptive to more interpretive. (133) Regardless, codes should always have some type of structure or meaning being focused around a singular or group of variables rather than meaningless collectives.(133) Definitions of the codes are therefore determined before or after the research respectively.(132;133)

As recommended by Miles and Huberman (133), codes were defined and given clear operational definitions for consistent application. It is recommended that coding occur as research is conducted and that data from one focus group is coded before the researcher conducts the next focus group .(133) This has the potential to inform subsequent field work and also enhance the quality of coding by preventing the analyst from burning out later if all coding was left until the end of the research process.(133)

For good coding, it is important for the analyst to get a sense of the 'whole' by immersing oneself in the data.(125) Doing one's own interviewing and transcribing the data provides opportunities for such concentration, but due to time constraints, professional transcription was used in this study. The process of induction to determine codes and the subsequent themes from the raw data is described as a humanistic activity,(125) and is difficult to describe in formulaic terms. This being said, objectivity is enhanced and the

legitimacy of codes is improved by the researcher being open minded and trying to minimize 'seeing' what one expects to see.(132)

For example, when the researcher comes to the raw data, she should let codes emerge that help to make sense of the data rather than attempting to force the data to fit with her preconceived ideas.(125) The literature indicates that it is evident that the researcher has not strained the data into correspondence when findings are non-confirmatory. In the early stages of research, the researcher should be interested in elucidating and organizing rather than 'proving' her understandings.(125)

While having an open mind is essential to maintaining objectivity in the coding process, the qualitative researcher usually comes to the raw data with a set of "sensitizing concepts", which are ideas about the phenomenon and are helpful for orienting and providing a sense of reference to what can be overwhelming masses of raw data.(125) Because in this study the researcher had developed some conceptual ideas about the phenomenon while developing the research proposal and conducting the narrative literature review, several well thought out sensitizing concepts were at hand prior to beginning the focus groups. These ideas were focused on the gendered organizational influences on dental hygiene decision making capacity, which was of course the overall theoretical perspective of the study.

Focus Group Analysis—Pattern coding (Developing Themes)

Typically, the next step in analysing narrative or textual data is "pattern coding", which is where analysis becomes more explanatory in determining the "why's" and the underlying

patterns that are believed to be occurring.(133) This qualitative process is often referred to as thematic analysis, where themes are advanced that are believed to be important to the phenomenon under study.(132) The process is unlike that of quantitative work, which tends to be linear, in that thematic analysis is iterative and reflexive.(132)

These "meta-codes" are more inferential and pull much data together by distilling the first level of coding into more overarching groups through the identification of emergent themes.(133) A researcher can expect from 3 to more than 10 pattern codes to emerge, but these themes also evolve through the research process and therefore one should not be too quick to rule out or commit to pattern codes.(133)

Throughout both the coding and thematic analytic procedures, the qualitative researcher uses a technique called "memoing", which is simply writing up ideas about codes and their relationships immediately as they occur without self-censoring one's thoughts.(133) This process reportedly helps to ensure that subjective experiences are not lost over time from when field work is done and when interpreting and reporting take place. Memoing takes priority over anything else that the researcher is doing so that important insights are not lost.(133)

To ensure rigor in qualitative analysis, several strategies can be applied including the use multiple researchers in the coding and interpretation of the data because it can be helpful in ensuring multiple perspectives and limiting bias.(133) It can also present challenges surrounding negotiations and reaching consensus in interpretation, and was not an option for this study given that the study was in the context of PhD research. Second, study

participants can be referred back to as needed to ensure accuracy of coding, and participants can be prepared for this while obtaining informed consent and forewarning them that they may be asked to review notes and interpretations subsequent to the interviews. In addition, to ensure the best quality coding and interpretation is through careful scrutinizing of the codes and themes by the researcher herself.(132) This is done by going back to the raw data several times including when the researcher initially conducts the interviews, transcribes the data, reads and re-reads the transcripts while analysing the data and by using the memoing technique to make sure no insights are lost.(125) Plausibility testing, making metaphors, determining intervening variables, building a logical chain of evidence and assuring theoretical coherence were some of the strategies used to improve the credibility of the findings.(133) In summary, codes should be plausible, inclusive to the data, reproducible by others and credible to the subjects.(125)

Focus Group Analysis—Displays

A recommended step in qualitative research is to create displays, and a causal network is a specific example of a display; it is a visual representation of the most important independent and dependent variables (i.e. themes/pattern codes) and the relationship between them.(133) While not inferring causality, the relationships identified are deterministic and explanatory.(133) This type of display is well suited for this thesis as it facilitated the development of the model for the next step of the study.

While a commitment to developing a causal network should happen at the onset of the study, it is recommended that it be the last analytic exercise.(133) For the purposes of this

study, constructing the causal network was carried out when focus groups were completed as a precursor for the development of the model and the Phase II survey instrument prior to the survey research. The process generally begins with assembling one's codes and reflective comments as inter-relationships in a meaningful way.(133) The approach used in this study was a build up the network through the narrative literature review and focus group analysis and then subsequently "shook it down" through the survey study findings.(133)

Focus Group Analysis—Generating Meaning and Verifying Conclusions

Several strategies exist for generating meaning in qualitative research, and these have been outlined in detail previously.(133) However, there are some subtleties in analysing and making meaning from focus group narrative data specifically. For example, each focus group provides the unit of analysis rather than the individuals comprising the groups.(138) In addition, analysis is occurring even while the interviews are being conducted and allows for an iterative process with earlier focus groups interviews informing latter ones.(138) While in this case the researcher was working independently and was not conferring with a research team, she was able to confirm her understandings by communicating directly with the research subjects during and after the interviews.(138)

Another unique feature of focus groups, is that at the onset the researcher often only has a vague idea of how many interviews will occur, and it is part of the analytic process to determine when saturation has occurred, meaning no new ideas are emerging, and the interviewing can end.(137) A key point worth reiterating here is that distinct lines between collecting, analysing and interpreting data are not available for the qualitative

researcher to signify the transitions from one stage of research to another, which provides the researcher with much flexibility but also a level of uncertainty.

For the purposes of this mixed methods study, the focus groups were conducted to generate meaning in the form of a theoretical model or framework for understanding organizational influences on dental hygiene decision making that would be tested in the second Phase. Thus, the validity of the model was to be tested in Phase II, but as discussed earlier, formatively confirming focus group findings are recommended.(133) While, unlike that of quantitative research, there are no canons for testing validity in qualitative research, Miles and Huberman(133) provide tactics for confirming one's conclusions all of which will be referred to in this study to overcome researcher bias. As highlighted previously, one of the major strategies recommended is triangulation, which is inherent to some degree in mixed methods, and this method was relied upon heavily in this study as several sources of data, methodological approaches and corresponding analytic techniques are being used to confirm or refute findings (i.e. narrative review, focus groups, survey, key informant interviews).(133)

Phase II: Model Development, Survey Study and Key Informant Interviews

Based on those influences on dental hygiene decision making identified in Phase I of the study, a model designed to effectively explain the variance believed to exist in dental hygiene clinical decision making and behaviours was developed and subsequently tested in Phase II through a survey instrument. In addition, key informant interviews were included to reflect upon the survey findings, capture data surrounding the overall

environmental influences on decision making and allow for predictions to be made about those factors that are believed to be required to support dental hygiene decision making in expanded practice.

Based on findings from Phase I of the study and drawing specifically on the display, a clinical decision making model was to be developed designed for dental hygiene practitioners. Developing qualitative models is a graphic articulation of knowledge about processes, such as clinical decision making, and central to scientific reasoning. A qualitative model is defined as a "…synthetic visualization of a process or a system theorized on the basis of data from social science research."(139) Typically, models are based on the identification of key variables or components involved in the phenomenon and the relationships or interaction between them.

Some models surrounding knowledge translation have been developed,(47;105) but details surrounding the methodology and validity are limited. It has been asserted that the traditional emphasis on statistical forms of data within modelling have limited how researchers think about certain phenomena and that more global views will prompt new ideas surrounding existing concepts.(139) This study aimed to develop a model more entrenched in the structural components of decision making in order to more fully understand the complexities of clinical decision making.

It was anticipated that from the focus group data analysis, several key themes serving as independent or predictor variables would be identified and used to develop a hypothetical

conceptual framework modeling the inter-relationships between themes and the outcome measure—clinical decision making capacity. This model was then tested through the survey study. Various instruments and scales exist for organizational elements such as organizational climate, commitment, communication, ideology, involvement, power, autonomy and worker satisfaction.(140) In addition, scales are available for measuring gender and professional influences in various contexts.(141;142);(143) At the proposal development phase of the study, there was consideration of modifying and utilizing an existing instrument for this research, but, as will be further discussed in the findings, this did not end up being the approach used.

For Phase II of the study, there was consideration of sampling from two jurisdictions (two provinces) having differing legislative practice restrictions (i.e. Manitoba) and freedoms (i.e. Alberta) with varying educational backgrounds and years of clinical experience together providing an interesting set of independent variables. However, it was later determined that the sample would be limited to one jurisdiction. Such a limitation prohibits comparisons, but was deemed appropriate based on emerging literature from the nursing context on evaluating knowledge translation models.(105) For example, within a series of publications on knowledge translation research in nursing, it was identified that knowledge translation research is in its infancy and the research agenda should begin with further theory development and better understanding surrounding contextual and individual influences.(48)

Thus, this phase of the study implemented an electronic survey instrument utilizing a primarily closed-item questionnaire format and was sent to a cohort of practicing dental

hygienists using a census rather than a sampling technique. At least one open-ended item was to be also included to provide additional narrative data for qualitative analysis and to provide study subjects an outlet for further expression of experiences. The development and implementation of the survey applied Dillman's and Aday's methods to a large extent where possible, albeit through electronic methods.(144;145) Specifically, a step-wise systematic approach including providing instructions, purpose of the study, ensuring anonymity and multiple, pre-planned follow-up at appropriate intervals of time to encourage non-responders were each applied.(145)

The survey was to have three main components:

1. Questions for collecting demographic data (independent variables);
2. Questions designed to determine the respondents' perception of various structural and individual features' influence on her/his clinical decision making capacity (independent variables);
3. Question(s) designed to measure the outcome variable—clinical decision making capacity (dependent variable).

The ad hoc survey instrument was created by the researcher based on psychometric principles surrounding construction, validity, reliability and dimensionality. Appropriate ethical approval for the study was attained from the University of Manitoba Health Research Ethics Board (HREB) and the survey questions/items were pilot tested with a small purposeful convenience sample. Of note was the decision to use one single item to capture the dependent variable, decision making capacity. Arguments have been made both for this approach and an approach using multiple items and creating a scale. The rationale and limitations for the approach used in this study is discussed later in the findings and the limitations chapters.

The survey questionnaire was circulated by the College of Dental Hygienists of Manitoba (CDHM) to all "active—practicing registrants". The investigator was not made aware of registrants' e-mail addresses as this is confidential information. At specific intervals (i.e. after one and two weeks), a reminder e-mail was given to prompt non-respondents. Submitting the completed survey questionnaire signified consent to participate. After 3 weeks, the survey was closed and survey data was imported into PASW® Statistics Version 18 software for descriptive and inferential statistical analysis. Analysis of survey data was planned out in order to conduct descriptive and inferential statistics (Table 1) and was expected to include frequencies, proportions, correlations, means calculations and ordinal logistical regression analysis.

Quantitative statistical procedures are summarized in Table 1. Demographic data underwent tests for frequencies, proportions and associations with various variables including the outcome variable. Frequencies, means and tests for associations were calculated for other independent variables. Summary scale scores were calculated based on the key themes/variables included in the qualitative model (see Box 3). Means and tests for associations were calculated for the summary scales. The outcome variable was tested for frequencies, associations with various demographic and other independent variables including the sub-scales (summary scales). Multivariate analysis was conducted with all variables in the full model using ordinal logistical regression analysis. The final model was calculated with only those variables found to be significant.

Table 1: Analytic Matrix

VARIABLE/type	DEFINITION	SCALE/MEASUREMENT	STATISTICAL ANALYSIS
Demographic Variables			
DH Program/Ordinal	Type of DH program graduated from	1 yr diploma, < 2 yr diploma, 2 yr diploma, 3 yr diploma, 4 year degree, other	Frequencies, proportions, associations
Educ Level/Ordinal	Highest level of education	Diploma DH, Bachelor DH, Bachelor other, Masters DH, Masters other, PhD	Frequencies, proportions, associations
Experience/Ordinal	Practice experience years	< 1 yr, 1-3 yrs, >3-5 yrs, >5-10 yrs, >10 yrs	Frequencies, proportions, associations
Age/Ordinal	Age	<25, 25-35, >35-45, >45-50, >50	Frequencies, proportions
Sex/Nominal	Biological sex (male/female)	Male, female	Frequencies, proportions, associations
Hours/Ordinal	Number of days worked	< 1day, 1 day, >1day-3 days, >3-5 days, > 5days	Frequencies, proportions, associations
Practice type I/Nominal	Type of practice setting (primary)	General group, general solo, independent solo, specialty group, specialty solo, institution, other	Frequencies, proportions, associations
Practice type 2/Nominal	Type of practice setting (secondary)	General group, general solo, independent solo, specialty group, specialty solo, institution, other	Frequencies, proportion, associations
Seniority/Ordinal	Perceived practice status	Least, middle, most senior, n/a	Frequencies, proportions, associations
Relative Work/Ordinal	Work level relative to other DHs	Least, less, same, more, most hours compared to others	Frequencies, proportions, associations
Outcome Variable/ Ordinal	DM capacity	4-Always, 3-frequently, 2-mostly, 1-sometimes, rarely	Frequencies; associations with scales; Logistical regression analysis (to test model)
Independent Variables (all Scales)			

IndividCharactScale	Individual Characteristics Summary Scale	11 items; Max 33; ↑score=↑positive individual characteristics	Mean, associations, logistical regression
PractLimitScale	Practice Limitations Summary Scale	15 items; Max 45; ↑score=↑limiting practice	Mean, associations, logistical regression
PractAttribScale	Practice Attributes Summary Scale	15 items; Max 45; ↑score=↑practice attributes	Mean, associations, logistical regression
PractStructScale	Practice Structure Summary Scale	4 items; Max 10; ↑score=↑structured organization	Mean, associations, logistical regression
PractDistScale	Practice Distillery Summary Scale	12 items; Max 36; ↑score=↑supportive practice	Mean, associations, logistical regression
KnowIncorpScale	Knowledge Incorporation Summary Scale	10 items; Max 30; ↑score=↑DH knowledge incorporation	Mean, associations, logistical regression

Phase II: Key Informant Interviews

The key informant interviews provided a unique form of qualitative in-depth data only available from diverse community members with a specific expertise and insight.(146) Key informants refer to individuals who provide opinion and detailed information on a particular issue. Conducting the key informant interviews in this study provided the benefit of further triangulating data by minimizing the bias inherent in any single method, improving the validity of the findings overall and providing additional views.(146) The key informant interviews were conducted to provide further insight into the previous findings and to provide complimentary data from specific knowledge sources that would

not necessarily emerge from the majority of grass roots practitioners, which is reportedly particularly important to policy change.(33)

The decision making model, developed as an outcome of Phase I, included broad environmental factors as influential on the overall knowledge translation process, but this assumption was based on speculation and generalizations from other contexts. Thus, part of Phase II of the study was to substantiate this hypothesis. Key informant interviews provide qualitative in-depth data from diverse community members with a specific insight.(146) Key informant interviews were to occur with several individuals purposively selected based on their having specific expertise and insight into broad societal/macro-environmental issues affecting dental hygiene practice. These individuals were to include key dental hygiene educational experts, regulators, professional leaders and other dental hygiene practice stakeholders.

The first step in conducting key informant interviews is to determine the information the researcher aims to gather and then develop an interview guide for this purpose.(146) Key informants are purposely selected given their diverse and significant organizational or professional roles related to the overall research topic. Topics for discussion were expected to surround various broad environmental societal trends and issues believed to have impacted dental hygiene practice such as legislation, education, economy, gender issues, remuneration structures and oral health care. The Key Informant Interview Guide was not developed until

Phase I of the study was complete.

The key informant interviews were to be carried out using accepted published methods,(146) which included the use of the aforementioned semi-structured interview guide informed by prior data and analysis and interviews were conducted face-to-face where possible. Interviews were taped and field notes taken and were expected to be approximately 60 minutes in length.(146) Key informants were recruited initially by a personal telephone call from the researcher who contacted the potential participant and provided details surrounding the study and a request for participation in an interview. Those individuals interested in participating were then mailed/emailed an information and consent letter prior to the interview. At an agreeable time and location, the researcher ensured informed consent and then was able to proceed with the interview of the key informant. The researcher served as the interviewer given her knowledge of the topic and background as a dental hygienist.

It is recommended that questions and discussion in the interview, based on the previously collected data from earlier phases of the study, begin with more straight-forward, factual questions followed by more opinion based and contentious questions.(146) It is important to ask questions that draw on the key informants' unique perspective and expertise. (146) Advantages of the study researcher conducting the key informant interviews herself were that she was able to capture the benefits of early immersion into the data. Even while the interviews are taking place, thematic analysis is beginning to occur. This being said, during key informant interviews, the researcher should be careful not to influence and potentially bias the interviewee during the course of the interview.

Analysis of key informant interview data was based on established qualitative techniques, which were discussed earlier in regard to the focus group data,(133) and the aims of the thesis,(147) but a 'tighter' more deductive approach to analysis was merited because the researcher would be fairly well acquainted with the phenomenon at this point and was therefore more cognizant of the omissions in information and data.(133) More specifically, considerable amounts of data (narrative literature review, focus groups, conceptual framework/survey research) were all collected and analysed providing a well informed platform for analysis.

One diversion in the analysis of the key informant interviews when compared to that of the focus group interviews was that key informant data was analysed directly from the audio-tapes and/or field notes (i.e. while detailed notes were made, transcriptions were not). While "coding" textual data to classify and organize groups of words or sentences is often the first step in thematic analysis, researchers can alternately use a less structured approach and begin identifying recurring patterns *during* the interviews.(133) This method of theme analysis continues after the interviews by listening to the audio-tapes and re-reading field notes over several times and identifying themes as they emerge.(133)

This inductive-deductive and interpretive process is informed by knowledge of "sensitizing concepts"—ideas about the study topic one has acquired through familiarity of the literature and other sources prior to the study, (133) which first help shape the interview topics guide and then are explored during the interview. Thus, sensitizing concepts are confirmed, modified or rejected (deductive elements) and additional unexpected themes may surface (inductive element).

Throughout the entire study, utmost confidentiality and security measures were maintained while protecting the data from being lost or destroyed. Anonymity was ensured for all study participants in that data was presented in aggregated formats and study respondents were not linked to their personal responses. Hard copies of audio-tapes are securely stored and will be destroyed after an appropriate length of time according to University policy. Electronic data files, including transcripts, field notes, memos and analytic materials, are securely stored in a password protected computer and electronic back-up copies are secured separately. All identifying features of participants have been removed from the data and replaced and stored with a unique identifying number (ID number). Only the primary investigator has access to the identities of the research participants with the exception of the survey data; in this latter case the investigator did not have access to the identities of the participants and this material was only in the possession of the CDHM technology expert.

In summary, the researcher maintains that the mixed-methodological approach used in this study is appropriate for the research aims of the study. One's study methods should not be arbitrarily chosen, but rather the research problem and purpose direct the methodological approach along with considerations of the researcher's world view, experience and the anticipated audience. It merits pointing out that in this study the use of a mixed methodology occurred, according to Creswell, in its' true sense, meaning that this was a singular study employing multiple methods and through a synergistic effect achieved the overall aim of the study within one research paradigm. (127)

Chapter 6: Results

Results and Interpretation of Phase I: Focus Group Interviews

Prior to the focus group interviews conducted for the study, a pilot interview with 8 colleagues from the School of Dental Hygiene was carried out on February 25, 2010. The pilot interview not only provided the opportunity to trial the interview questions and practice moderator skills, but participants also provided feedback at the end of the interview on the questions, timing and other logistical issues. This data was not included in the analysis, but it did provide information for refining the interview guide and improving moderating skills.

Subsequent to the pilot, three dental hygiene focus group interviews were conducted on March 29th, April 6th and April 12th 2010 with eight, six and six participants present in each group respectively. Dental hygiene participants were randomly selected from purposively developed pools of individuals with similar experience levels. The first group was comprised of recent graduates having approximately one year of work experience, the second group had over one year to approximately five years experience and the third group had the most experience having worked in the field for more than eight years.

The topics guide (appendix 1) developed for the study provided areas of inquiry that emerged from the literature primarily in organizational and gender theory. That is, questions surrounded the structural features of the organization or practice setting. These topics specifically examined horizontal and vertical differentiation, level of centralization

and level of formalization as these factors were all hypothesized to influence dental hygiene decision making capacity. In addition, organizational relationships, negotiating multiple interests and the gendering of practice were all included as topics for discussion. Focus group interviews were audio-taped and field notes were taken by the researcher who acted as the focus group interview moderator for all of the interviews.

Audio-taped narrative data from the focus group interviews were professionally transcribed and returned as an electronic word documents. Although the initial intent was to analyse the data from one focus group prior to conducting subsequent interviews, this was not possible due to the delay (> 1 week) in receiving completed transcripts. Thus, the analysis was conducted after the completion of all three interviews, but the first stage of analysis (described below) was conducted on each individual interview transcript prior to beginning analysis of the subsequent interview, which was at least partially aligned with ideal practice. By the end of the third interview, the researcher tentatively proposed that no additional interviews would be necessary as ideas emerging were primarily repetitive or variations of similar ideas found in earlier groups despite the heterogeneity of the groups.

The researcher imported the electronic transcriptions into NVivo 8™ qualitative research software for analysis. While the researcher conducted the interviews herself, and, therefore, was not coming to the data for the first time, the analysis formally began with first reading each individual interview transcription through in its entirety, and, then, the transcription was re-read this time with the intent to begin coding the narrative. This

iterative and largely inductive process entailed identifying fragments of narrative data having a collective meaning and giving the selection of text a fitting label referred to in qualitative research as a 'code'. This began initially as a free-flowing process with no intent to force data into preconceived categories. Text with similar meaning and that fit together were, as is customary, given the same code.

Some of the text had no relevance to the research and such 'noise' was left un-coded. This was fairly minimal in that the interviews were found to be dense with pertinent data. More than 75 codes were initially identified from the three interviews falling within one, or two or all three transcripts (table 2). During the entire coding procedure, the researcher recorded 'memos', which as mentioned previously, are notes the researcher makes to herself as she goes through the analytic process. These uncensored thoughts occurred spontaneously in response to the research at any point in the process and were then used for thinking about the data in subsequent phases of the study, during further analytic procedures and final interpretations. Several of these came to mind during the interviews, coding and analysis and became important while the researcher was interpreting her Phase I, focus group, results (Box 1).

Table 2: Focus Group Codes

allegiances in decision making
appreciation for work
autonomy in knowledge use
business relationship
challenging the status quo
communication

complacency

confidence in decision making

conflict affecting patient care

conflicting goals

consideration in decision making

covert behaviours

decision impact

decision making contribution

decisions affecting patient care

dental hygiene step to dentistry

dental hygienist as change agent

dentist as decision maker

dentist as facilitator of good decision making

desire for more autonomy

devaluing non-reimbursable care

discomfort with decision making DH

dominance and control

evidence to facilitate decision making

financial incentive

financial issues

formal process

freedom

freedom with constraints

freedom with time

gender influences

gender non-influence

getting support

giving patients choice

inappropriate decision making power

incorporating new knowledge and technology

investment in practice

lack of assistance in work

lack of awareness

lack of confidence in work

lack of DH assertiveness

lack of respect

leadership lacking

leadership present

limited decision making freedom

management

negotiation with dentist-owner

occupation confusion

other relationships

patient issues

patient issues payment concerns

perception of dental professions

permission and inferiority

personality and attitudes

practice culture facilitative

practice culture inhibitory

practice hierarchy

practice philosophy non-conducive to DM

practice philosophy positive

practice receptive to change

practices routine

problem solving

protecting goals

seniority issues

sexuality

size of practice

specialization

subgroup leadership

teamwork

timing of decision

treatment incongruence

trust issues

worker as expert

Box 1: Memos and Memo Properties

Memo Name	Memo Properties (Description in Researcher's Words)
Time	Time seems to be a major contributor to these conflicts in decision making...DH wants more time to do care, DMD (or through receptionist) wants to give them less time; all due to providing ideal care on the one hand and increasing production on the other
Meetings & Communication	It's hard to know what's going on here without observing these [meetings]; they could be facilitative, but they may not be depending on the dynamics of the practice; There is an assumption that communicating (i.e. through meetings) results in facilitating positive decision making; i.e. a meeting = improved decision making outcomes for dental hygienists
Investment in Practice	Keeps coming up...how many days a week you are there and for how many years...determines your control over decision making
Flat organization	There seems to be a common perception that it [workplace] is a level playing field and all of the staff is a team; but what really seems to be going on is the dentist is the head and everyone else is 'expected' to fall below on a level playing field i.e. "the girls"; dental hygienists that don't conform are considered "prima donnas"; it's sort of a

	psuedo-team; it is also interesting that the DHs affiliate with the other allied/female **support staff** as oppose to the other **providers/clinicians** (i.e. the dentists)
Dentist initiates the change	Over and over again it is the dentist bringing in the new ideas for change...he's going to conferences, he's doing the readings etc.; DHs act as "receivers" passively waiting for new knowledge
Silence on gendering	I just read that qualitative research is interested in the "silences" surrounding a phenomenon...this intrigued me because I had been perplexed by the "silence" in the focus groups surrounding gendering of the dental organization; I heard virtually not one acknowledgment that it existed or had an influence on practice—even with prompting...perhaps it is "built in" to practice operating more on a macro-social level.
Group Differences	During the interviews it became apparent that the groups were different...the new grads were enthusiastic and happy to do the work they were trained to do; they had little awareness beyond their own clinical challenges; the middle group were undergoing years of discontent...trying to find their way and challenging the way things were; the experienced group were no-nonsense, beyond those early challenges....and seemingly had found their way.

After the initial coding procedure, thematic analysis was conducted where coded material was grouped according to similar themes. The process of coding and developing themes becomes increasingly interpretive. While themes emerged inductively, both coding and thematic analysis were informed by the comprehensive literature review and framed according to organizational and feminist theory. Six major themes were initially revealed plus a miscellaneous category housing data that did not readily fit elsewhere but seemed too important to disregard. All of the themes were given operational descriptions for ongoing referral (Box 2).

Box 2: Themes and Theme Descriptions

Theme	Theme Description
Individual Factors	Features or traits of dental hygienists as individuals that contribute to decision making capacity in a positive or negative way
Organizational Attributes	Micro-level features of the organization that contribute in a positive way to the capacity of decision making of dental hygienists
Organizational Limitations	Those features of the organization that limit decision making capacity of dental hygienists
Distillery of Practice	These encompass those attributes of the practice that could be facilitative of dental hygiene decision making capacity but alternately could further stifle capacity depending on the unique dynamics of the practice
Incorporating New Knowledge	This surrounds the qualities of knowledge, who and how knowledge is brought into the practice and how it is used
Characteristics of Decisions	The actual qualities of the decision that is being considered and how that affects the decision making process
Miscellaneous	Others not fitting well elsewhere

After the themes were initially developed, the researcher went through all of the coded data within the themes for further refinement; i.e. some codes were changed, amalgamated or deleted altogether. For example, some sections of raw data were found to be overlapping and falling into more than one code and/or theme. Where possible, codes were further fragmented to reflect single codes and diminish the overlap of themes. In addition, one theme in particular ("practice distillery") seemed to appear to be a 'catch all' and risked being potentially meaningless. The researcher went back to the coded data within the theme again in an attempt to tease out more specific themes. However, it became evident that the theme was an accurate reflection of the coded data housed within it and was subsequently left as it was. The miscellaneous theme was looked at again to determine if the data could be more appropriately situated, and while many of the codes were moved, some still remain here unable to fit elsewhere.

During the coding procedure and theme analysis, the researcher alternated between the dual processes of 'immersion', where the researcher immerses herself in the collected data by examining some portion of it in more detail, and 'crystallization', where she temporarily suspends the immersion process to allow for reflection on the analytic experience and permit patterns to more fully emerge and develop. Because this study was part of a PhD dissertation, there were no co-investigators per se to collaborate with on coding and developing themes, and, therefore, the need to alternate between immersion and crystallization becomes more critical. For example, after a period away from the data, the researcher comes back to the data with a fresh perspective and this helps to see the data in new ways and limit bias.

As mentioned above, memos emerged throughout the coding and thematic analysis and informed subsequent interpretation and the development of the Phase II model and survey instrument. Memos emerged as several important issues that took the attention of the researcher as she conducted the research at various points of time, particularly during the analysis of the focus group data, and as recommended within the literature, the researcher immediately recorded a memo. Although, not known or confirmed at the time, the content of the memos would not necessarily have emerged as a key theme when interpreting the findings for this study. The researcher can only suspect that some memos will inform the interpretative process, some will fade in importance and not end up being critical to the overall results and, finally, some, as is the case here, are important interpretative findings in their own right.

The first of these memos is the influence of 'time'. Time is a finite resource that health care providers report on when discussing knowledge translation challenges. (148)

Repeatedly, it is identified as a barrier to changing practice and implementing evidence-based care.(149) Time is a reality that all health care providers must deal with. For dental hygiene decision making capacity, time influences dental hygienists in a unique manner. In the oral health care environment, time literally equals money. For dental hygienists, it is not so much a lack of time, but that all time must be accounted for with fees.

In dentistry, time is about production, and how dental hygiene care is billed determines how dental hygiene time is spent. Interestingly, from the focus groups it appears the responsibility over controlling time is delegated to the receptionist. The receptionist is an administrative worker and has little direct knowledge about dental hygiene care or clinical care in general. Therefore, as the controller of time, she is delegated with a lot of power over the practice environment. The dental hygienist, depending on her practice environment, may have more or less control over her time and, from a qualitative perspective, the amount of time she has seems to have some impact on her decision making capacity.

The second important researcher memo was the interpretation of the study subjects regarding the organizational hierarchy. Most of the study subjects reported that their practice setting had a flat organizational hierarchy. In the memo the researcher states:

> "There seems to be a common perception that it [workplace] is a level playing field and all of the staff is a team; but what really seems to be going on is the dentist is the head and everyone else is 'expected' to fall below on a level playing field i.e. "the girls""

This observation was surprising because to the researcher, what was being described seemed not to be reflective of a team and yet the study participants did not recognize the authoritarianism. From the researcher's perspective, this practice configuration appeared to be a systematic way of maintaining the dentist's control while at the same time subjugating dental hygienists and minimizing their autonomy and decision making capacity.

For example, it was commented on that if dental hygienists are non-conforming to their role as "one of the girls" or "don't pitch in", they are referred to as "prima donnas". In this manner, dental hygienists are expected to affiliate with the other allied/female support staff as opposed to the other providers/clinicians (i.e. the dentists), despite the point that dental hygienists are clinicians and are considered to be 'producers' or 'providers'. Dental hygienists appeared to have virtually no choice in this placement in the practice and to accept their position or their day to day experience will be unfavourable. During the focus groups, helping out the support staff was viewed as a positive characteristic for dental hygienists.

From the researcher's perspective, one of the most surprising findings arising from the study memos was that the dental hygienists were not found to be active in bringing in new knowledge to the practice. Repeatedly, within various contexts, it was the dentist bringing in the new ideas and knowledge for practice change. For example, it was reportedly the dentist/employer going to conferences, doing the readings and suggesting changes to practice. The dental hygienists assumed the role of "receivers" and passively awaited new knowledge to be presented and in turn be implemented.

It was striking to the researcher, and later when shared with the key informants, that the dental hygienists largely relied upon the dentists to bring new information and knowledge to the practice. The dental hygienists relied upon their employing dentists as a knowledge source and this finding was perplexing to both the researcher and the key informants. It appeared that the dentists/owners were the primary 'knowledge owners', but it was less clear whether this had been established as a tradition that dental hygienists were unable or unwilling to challenge or whether dental hygienists simply never asserted themselves in the role of knowledge source. Regardless of how dentists achieved and maintained primary rights over knowledge in the dental organization, it was apparent that this condition had an impact on dental hygiene positioning, power and decision making capacity.

One of the most intriguing findings that emerged from a qualitative researcher's perspective and established itself as a memo was the "silence" surrounding the influence of sexuality on decision making capacity. During the focus group interviews, despite prompting from the researcher, the researcher was unable to draw data from the study subjects surrounding the influences of gender and sexuality on dental hygiene decision making and practice. In qualitative research, investigators are cautioned to not disregard such silences.(150;151) The researcher became somewhat suspicious because the silence on the subject was so profound. It seemed in reflection improbable that no such influence existed. The researcher hypothesized that gendering is "built in" to practice operating more on a macro-social level and affecting the dental hygienist on a sub-conscious level.

During the focus group interviews, the final memo emerged as it became apparent that the focus groups themselves were different: the new grads were enthusiastic and happy to do the work they were trained to do having minimal awareness of the organization beyond their own clinical challenges; the mid-level experience focus group was undergoing years of discontent as they reported trying to find their way and challenging the way things were; the most experienced group was no-nonsense, seemed to have moved beyond their earlier challenges and seemingly had found their way.

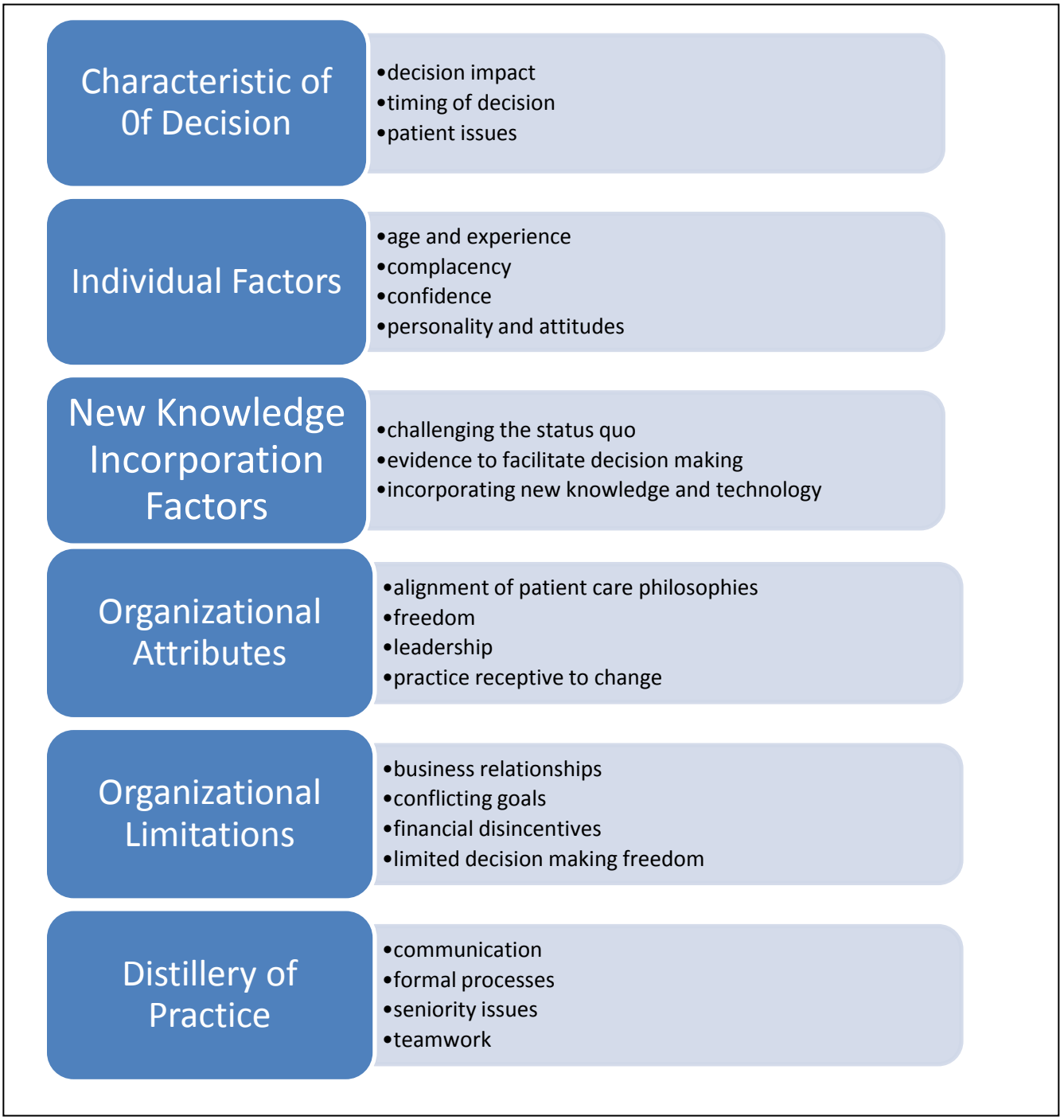
While the pilot group data was not analysed, it could not be ignored by the researcher that this group had a very unique perspective when compared to the other three focus groups. The pilot group was much more critical of practice and their sentiments echoed those of the key informants' rather than even the most experienced of the three focus groups. The researcher suspects that this is because the pilot group was comprised of educators and those within organized dental hygiene professional groups, and, therefore, they were more critical of practice.

With the memos, codes and themes developed to this point, the researcher began the development of a dental hygiene clinical decision making model. The development of a model is a recommended step in qualitative research for facilitating the development of the survey component of the research project. Specifically, the model provides a causal network helping the researcher to identify the key variables (themes) and how they relate to each other.

According to the literature,(133) at this stage of development, this display is more accurately referred to as a conceptual framework given its generalities. Regardless, the

model/framework emerged from the identification of the major themes from the data and thinking about how these variables appeared to relate to each other and to the outcome measure, clinical decision making capacity (Box 3). In the next section, the researcher provides her interpretation of the Phase I findings, which provided the connection from Phase I to the model and survey instrument that served in Phase II.

Box 3: Example Codes for Themes



Interpretation and Discussion of Phase I and Connecting to Phase II

Reflecting back to the individual focus groups, the three groups were homogeneous from an experience perspective in that the participants were purposively organized into their

respective groups according to years in practice. It was somewhat unexpected, but it became apparent to the researcher during the focus group interviews that there was an inherent difference between the groups in their perceptions surrounding their work. The least experienced group seemed enthusiastic and content to be doing the work they were trained to do and they reportedly had less awareness beyond their own clinical challenges of the organizational influences on their decision making capacity. The following examples demonstrate their nascent attitude:

> *"We have a hygiene manager and she takes care of all the hygiene, coordinating and arranging our schedules, ...so she's kind of the liaison between us and the, and the dentists kind of thing, ...she's kind of the go to person."*
>
> *"...there was so many hygienists at my office that all had more experience than me, like my first year was all about like, ...asking them certain things about what they do in this situation, you know because you come up across stuff like that's not in your textbook...it was nice being able to talk to somebody who had more experience..."*
>
> *"My dentist graduated in the seventies...I think that he has a certain way of doing things, like he sort of does a recall exam and then dictates treatment, now you can write what you want him to take a look at on a post-it note but I think that he sort of knows what he knows in the sense he'd never be demeaning or ever be mean about it, but he sort of, like I don't feel like there's very much discussion....."*
>
> *"When I first started...they didn't really do a lot of perio referrals, so there were certain patients that I would have thought right away would benefit from a perio referral but they didn't... at the beginning I think I was seeing patients that, I would bring them back for you know four appointments and...I think that, that probably they were affected negatively because it probably wasn't a perfect job that they could have gotten in a perio office..."*

Whereas the middle-level group seemed to be going through some challenges and discontent as they attempted to try to challenge the status quo and find their way in their practice. Participants in this group seemed acutely aware of organizational impositions placed upon them in their clinical decision making as demonstrated in the following:

” I’d say the main contributing factor would be production and my boss as well has mentioned a few times if we are bringing people back for a three or four month recall just as a scaling not to book like fifty minutes or an hour, squeeze them into a half hour or forty minutes.”

“if we really think a change needs to be made, it has to be like formally typed out, like what, why we want it to change, what the proposal, like what we want it to actually be and how it’s going to work and then we just give it to the dentist and he usually just decides”

“...last time when we all needed new instruments and he had just ordered in this big crown machine, so budget is tight and she said no”

“I just want Banish at my office and it’s just one of those things where it’s like I’ve asked him, I’ve told him about it, like I just want it, it just makes more sense than like Duraflor, but I can only say it so many times and if he doesn’t want to order it “

“A lot of the instruments that we use could probably use replacing but I know that she’s kind of stingy with her money so we don’t; we just sharpen them until they fall apart pretty much. So there probably is some need where we need to speak up more and ask for things or ask for things to change but we just don’t for whatever reason, we feel like we won’t be, won’t be received well.”

The most experienced group on the other hand were apparently beyond these challenges and had seemingly found their way in that their practice more closely reflected their ideals. The following demonstrate a higher level of confidence and autonomy:

“We each have our own responsibilities and everybody just does what they need to do. I actually feel like I have a lot of autonomy because I’m allowed to make decisions about what I do without having to go and consult somebody whose higher cause there isn’t anyone above me, we’re kind of all in the same place, so my employer really supports making my own decisions.”

“When it comes to something dental hygiene related the dental hygienists in my practice are kind of able to make those decisions on their own, and generally if we’re discussing it with him it’s more like this is what we would like to do or this is what we’re planning to do, not is that okay with you or there’s no permission involved”

“I think that you know the dentists they think you know like if the dental hygienist is making a decision then its, you know we have more training than they do in that field so they’re quite ok with that because they don’t have the training that we have, so they feel yes we’ll listen to you for what you want for that client.”

However, the researcher was somewhat suspicious of the transformation that was evident between the middle and most experienced groups and doubted that these power and autonomy issues had been completely resolved as readily as appeared to be the case.

Interestingly, in the pilot focus group conducted with a convenience sample of dental hygiene educators and dental hygiene leaders, the critical perceptions surrounding autonomy and decision making capacity were powerfully revealed. While the pilot group was extremely unique in that they had very high levels of experience and training, it was somewhat mystifying that the most experienced of the focus groups did not report experiences more aligned with the pilot group. Although the pilot group data was not included in the analysis, it provided a stark contrast to the other focus group interviews, with, surprisingly, the exception of the middle-level group who demonstrated a similar critical view.

If dental hygienists were becoming more autonomous as they became more experienced, as the focus group data was demonstrating, the researcher hypothesized about how this transformation occurred. Two primary potential scenarios were possible: first, dental hygienists could be staying in the same controlling environments but 'learning to become' more autonomous as part of a maturation and confidence building process; or, second, dental hygienists could be moving to new practice settings that were more accommodating to their needs for autonomy and decision making freedom.
A third possibility was that it was reflective of study selection bias, but this was not easily accepted in that these findings did not appear in the other focus groups. Another alternative is that perhaps being more experienced prevented dental hygienists in this

group from being critical of their practice environments and their lack of autonomy given they had reached what was analogous to 'adulthood' relative to their 'adolescent' and 'childhood' counterparts. The study participants in this most experienced group could be reporting on their feeling of a social pressure to have achieved a certain level of autonomy and may believe it to be socially unacceptable to report otherwise.

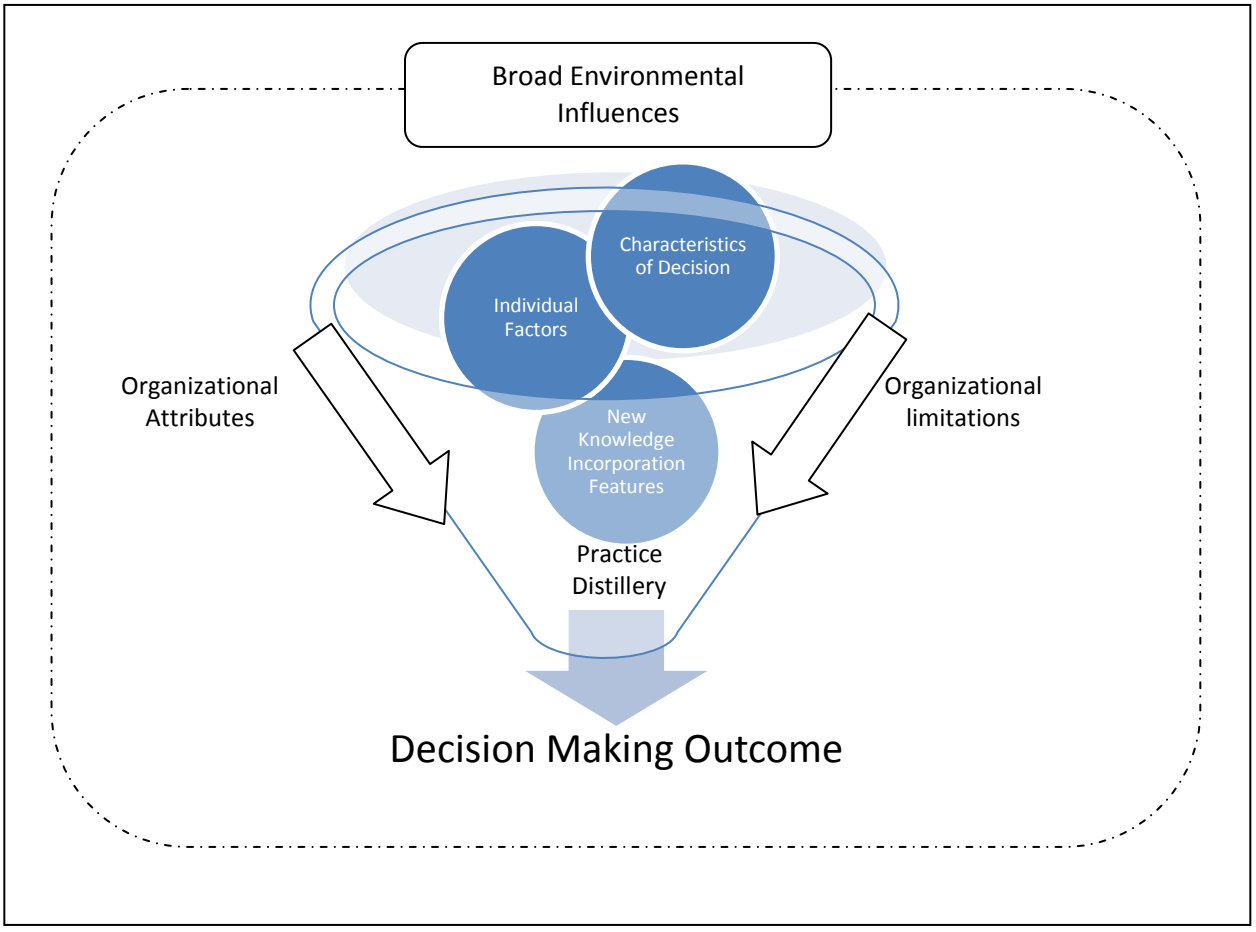
Through a thematic analysis of the codes developed from the focus group narrative data, six major themes emerged. Of particular significance was that, in spite of the theoretical underpinning of the study, one of the major themes that emerged was the individual characteristics of the participants. The remaining 5 themes were more aligned with the hypothesized expectations in that they were organizational in their orientation.

From the grounding of the focus group data interpretation and employing a heuristic approach, the researcher applied all of these 6 variables in the model in addition to an additional variable, "organizational structure", in that this latter variable was a key theoretical construct from the literature. It would not be expected that organizational structural elements would have emerged from the participants, and yet was considered to be an important component to be included for examination in Phase II.

In the model (figure 3), the researcher attempted to demonstrate that decision making within the dental hygiene context is a non-linear process, which is in alignment with more recent knowledge translation literature describing the process.(112) The model illustrates that it is thought that the specific characteristics of the decision, meaning its perceived importance or impact, provides a general 'push' for the entire decision making process.

Such a force was believed to be mediated by individual clinician factors and knowledge incorporation features. Together these were hypothesized as being influenced by varying levels of organizational attributes, which are facilitative to decision making, and organizational limitations, which are inhibitory to knowledge translation. The distillery of practice was believed to be those other organizational factors that are unique to the practice and can be either enhancing or stifling to one's decision making capacity.

Figure 3: A Hypothetical Model of Dental Hygiene Decision Making



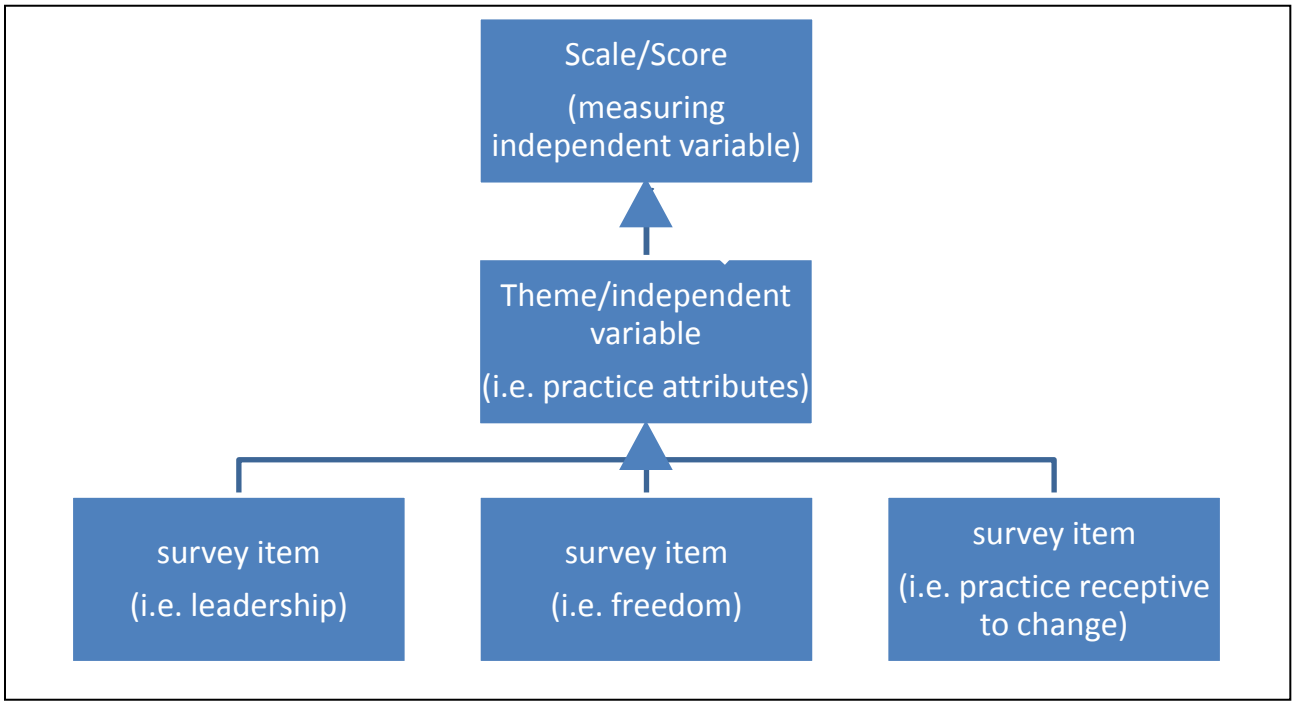
Box 3 provides some examples of codes that comprised each of the themes that make up the model. In addition, there is an assumption that the entire decision making process is influenced by broad environmental and social conditions, and this element was included in the model and further examined as part of the key informant interviews being carried out in Phase II.

In order to test the hypothetical model developed as an outcome of Phase I of the study, an ad hoc survey instrument was designed to be implemented with a larger study cohort in Phase II. Specifically, the instrument is designed to examine the interrelationship of the major themes that have been identified (key variables). While some models and frameworks exist in the areas of organizational theory, decision making, research utilization and knowledge translation, they are fairly domain or context specific and not directly applicable for this study and necessitated the development of an original instrument.(77;105;112;152)

Thus, the dental hygiene decision making model emerging from Phase I has been employed in developing the survey instrument in this study and began with the development of individual questionnaire items concentrating on the codes and themes from the focus group data and analyses. As mentioned, an additional construct, organizational structure, was added to the survey instrument as it was being developed. This was deemed appropriate as there was a desire to more specifically examine organizational theoretical concepts that emerged from the literature but did not surface from the focus group data.

Therefore, for this study, the survey encompassed several (7) subscales that each measured one of the major themes hypothesized to be interacting as an independent variable. For example, a "supportive practice attributes" sub-scale was developed by categorizing several individual questionnaire items that surround that particular construct or dimension (i.e. good leadership), which can ultimately be tested for associations with the dependent variable, decision making capacity (Diagram 1).

Diagram 1: Schematic of the development of Survey Instrument Scales



This is likely because these features are theoretically nuanced and would not be readily perceptible by the clinician in practice. Thus, the final survey (appendix 3) was designed around 6 organizational themes, one individual theme and the outcome measure. In addition to the single item outcome measure, these themes were reflected as 7 unique dimensions or sub-scales within the overall survey each comprised of number of items

designed to fully reflect the construct. As described previously, the final design of the survey was piloted on February 25, 2010 with a small convenience sample and was submitted as part of the Phase II ethics application to the University of Manitoba Health Research Ethics Board (HREB) and required only minor subsequent changes.

Statistically, a need has been identified in the knowledge translation research to move beyond descriptive statistics and bivariate correlational designs towards more advanced modelling,(153) such as using multivariate regression analysis, in order to account for interactions among various factors affecting the dependent variable. Thus, it was imperative to ensure while the survey instrument was being designed that it could support the analysis that was proposed. Statistical consultation was taken after the initial survey development to confirm that the design of the survey instrument could support the desired statistical analysis.

Phase II: Survey Results

As previously discussed, Phase II of the study involved the dual function of conducting a survey of Manitoba dental hygienists and interviews with key informants together to test the theoretical model of decision making capacity. In order to encourage a good response rate for the survey, the CDHM agreed to include a notice informing registrants of the upcoming survey study in their mail-out newsletter sent in September 2010 that would inform registrants about a study being carried out by an independent dental hygiene researcher from the University of Manitoba. The Manitoba Dental Hygienists Association (MDHA) also agreed to place a notification of the survey study in their hard copy newsletter being sent out in the same time frame. The MDHA is a non-mandatory

professional organization having 507 members in 2010, but again, not all of these members are on the MDHA electronic list serve.

According to the CDHM at the time of the survey study there were 584 dental hygienists on the practicing register. However, only 462 registered dental hygienists are included in the College's electronic list serve, and these comprise both practicing and non-practicing registrants. The electronic survey questionnaire was disseminated to the CDHM electronic list serve from the CDHM by an external consultant already employed by the College on October 7th, 2010 via electronic mail inviting registrants to take part in the independent survey study and provided a direct link to the survey. Therefore, 462 dental hygienists would have received the email invitation to take part in the survey. The invitation indicated that the registrant had three weeks to complete the survey if she/he chose to participate and the survey would close on October 21, 2010.

In an effort to include practicing dental hygiene registrants not included on the list serve into the study, a link to the survey was also available on the CDHM website. The theory was that a small number of additional registrants would be captured by either reading the hardcopy College and/or Association newsletters and then independently seek out the survey link on the College website or, alternately, may have accidentally come across the survey link while visiting the College website regarding other matters. The idea was that this would minimize selection bias by including all registered dental hygienists rather than just those who subscribe to receiving electronic mail from the College, which is currently an option for their registrants.

A reminder email was sent to those on the list serve one week after the initial mail out and again three days before the survey closed. At midnight on October 21, 2010, the survey was closed by the consultant; electronic access by registrants to the survey was no longer possible. Throughout this period, the researcher was able to monitor the response rate via the Survey Monkey™ tools as a subscriber to their services.

At the close of the survey, 178 surveys were submitted. It is unknown with certainty how many of these were respondents from the list serve and how many accessed the survey independently via the College website. It is presumed that respondents primarily accessed the survey via the email invitation as it more likely that these individuals would be aware of the survey having received the invitation and also may have better computer access and be more adept at and receptive to electronic communications. Using the list serve, this would represent a 38% response rate. This may reflect a conservative proportion given that the electronic invitation was sent to non-practicing registrants who were not eligible to participate in the study. However, it also does not take into account those that may have accessed the survey who were not on the list serve.

Once the survey closed, the survey data collected through the Survey Monkey™ program was immediately downloaded into a Microsoft Excel ™ spreadsheet and then was imported into a PASW® Statistics Version 18 data file. Once housed within the PASW® Statistics software, the data was cleaned. Of the 178 responses, 17 were excluded because of a failure to complete more than the first few items, leaving 161 completed surveys available for analysis. Items were labelled into variable labels and defined for future reference (Box 4).

Demographic variables were primarily comprised of ordinal and nominal data. The outcome measure, decision making capacity, was comprised of one forced response question in the form of ordinal data. The outcome variable and most of the remaining items comprising the independent variables were calculated as numerical, ordinal data for the purpose of performing statistical analysis including the calculation of measurement scales.

As described previously, the measurement sub-scales are direct reflections of the qualitative themes, which were hypothesized as being the main predictor variables in the model. To provide one example, 11 individual characteristics-oriented questionnaire items, each with ordinal responses (strongly agree to strongly disagree) were calculated as ordinal numerical scores from 0 to 4. These were consolidated and comprise the "Individual Characteristics Scale", which had a maximum ordinal score of 33. Several summary measurement scales were calculated in the same way each reflecting a major element of the model (Box 4).

Demographic Data

Of the final number of included responses (n=161), 95% were female. The respondents were predominantly between the ages of 25 to 35 (34%) and 35 to 45 (27%). More than 30% were older than this, with almost 20% in the over 45 to 50 category and slightly over 10% were over 50, while the remaining were under 25 (table 3). Almost 61% of the total cohort had over 10 years experience as a dental hygienist, and the remaining had less than 10 years experience (table 4). The dental hygienists responding in this survey

predominantly graduated from a two-year diploma program (52.2%) or a three-year diploma program (34.8%), which is not surprising given the history of programmatic offerings in Manitoba. The University of Manitoba, School of dental Hygiene, the only dental hygiene program ever available in the province, offered the two-year diploma up until 1992 and then began offering the three-year diploma (pre-professional year plus 2-years dental hygiene).

Table 3: Age Demographic of Participants

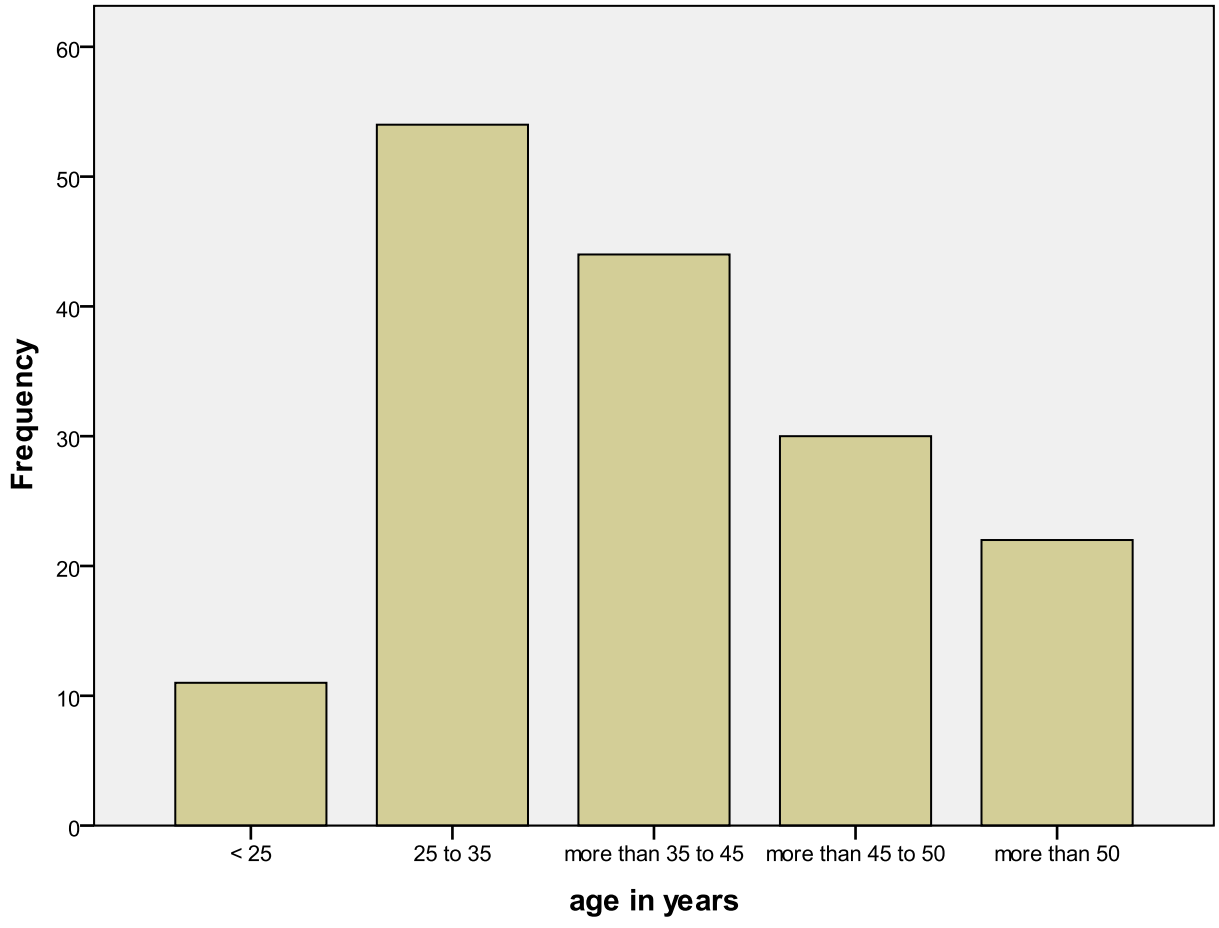
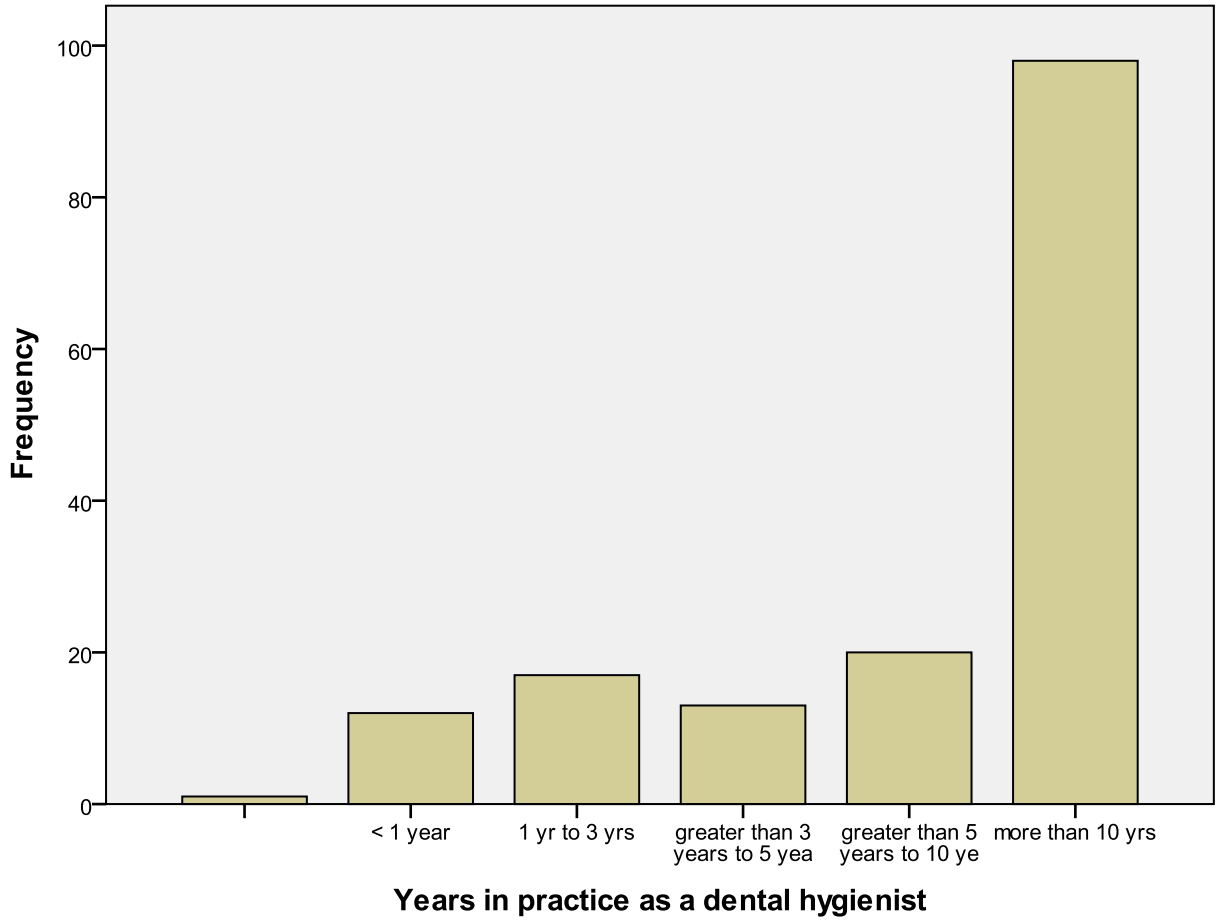


Table 4: Years of Experience

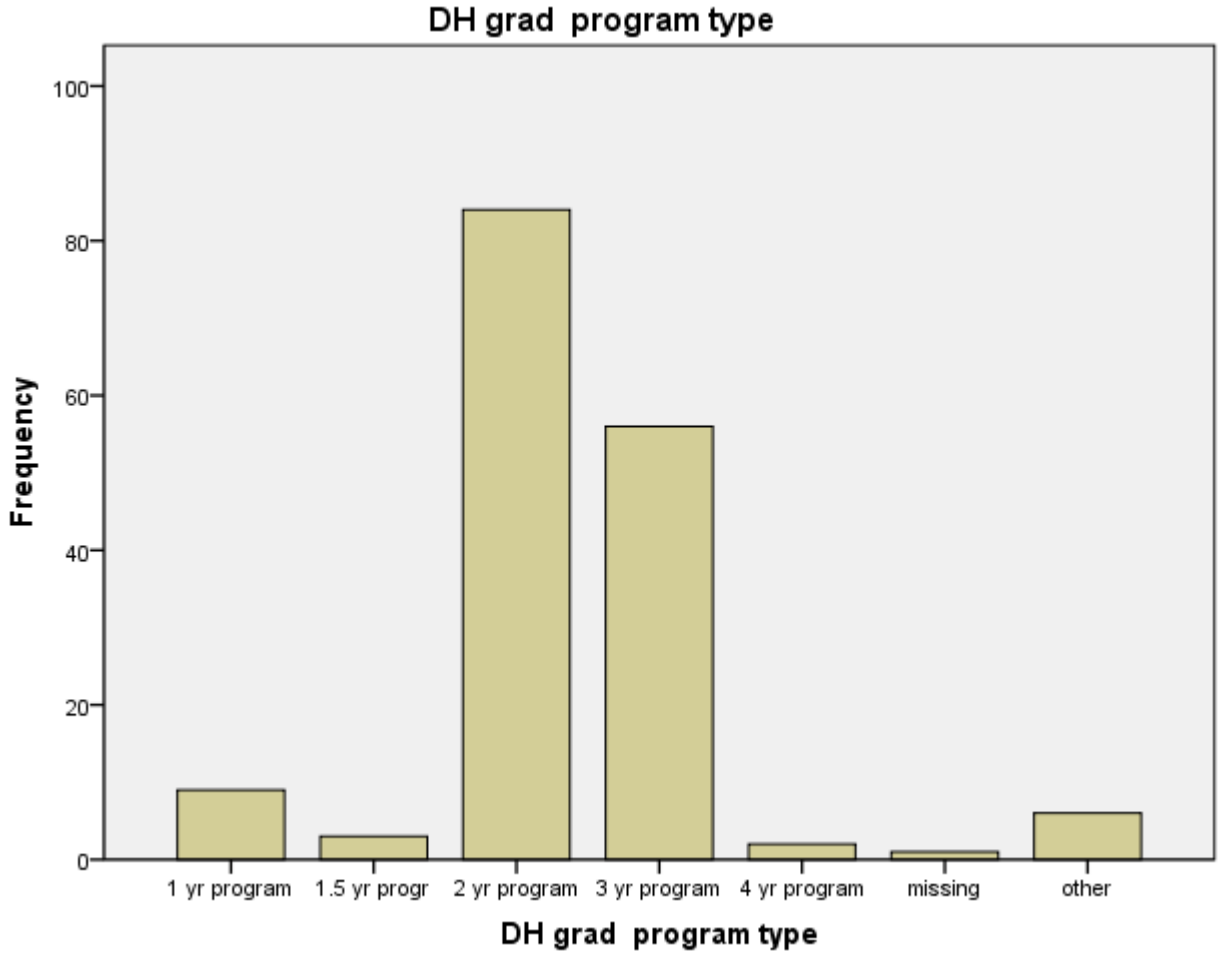


Only 6% of respondents had graduated from a 1-year diploma program, which is referred to as a 'one-plus-one program' in some jurisdictions because students were required to complete a one-year dental assisting program prior to entering the one-year dental hygiene program. This program type was offered in Ontario when vocational training began in the 1970's. The few programs that previously existed were removed from university settings (i.e. University of Toronto) and were replaced with community college programs. Only about 1% of study subjects had graduated from a 4- year bachelors program, which is not surprising given that this type of program has only recently

become available in Canada. Only 3% of respondents indicated graduating from some other type of program, which were primarily comprised of individuals graduating from dental therapy programs and then completing dental hygiene or individuals completing dental hygiene training within Quebec's slightly different programming.

Study participants were also asked about any additional education obtained keeping in mind that a Bachelors degree is currently the terminal degree in dental hygiene in Canada. More than three quarters of the participants indicated that their dental hygiene diploma was the highest level of education obtained (77%). However, 12% of respondents had earned a Bachelor's degree in another discipline. Less than 5% of the dental hygienists had reported earning a Master's degree or higher in any discipline (table 5).

Table 5: Educational Preparation



Study participants were asked about their dental hygiene practice work load and experience. A predominant proportion of respondents (70%) reported practicing more than 3 to 5 days per week, and 22% indicated working more than 1 day to 3 days. Approximately 5% practice less than this and 2.5% work more than 5 days per week. The vast majority of respondents work in general practice (> 80%) and more than half of these are situated in group practices, which is typically understood as meaning a practice with more than one dentist. Slightly less than 10% work in specialty practice whereas

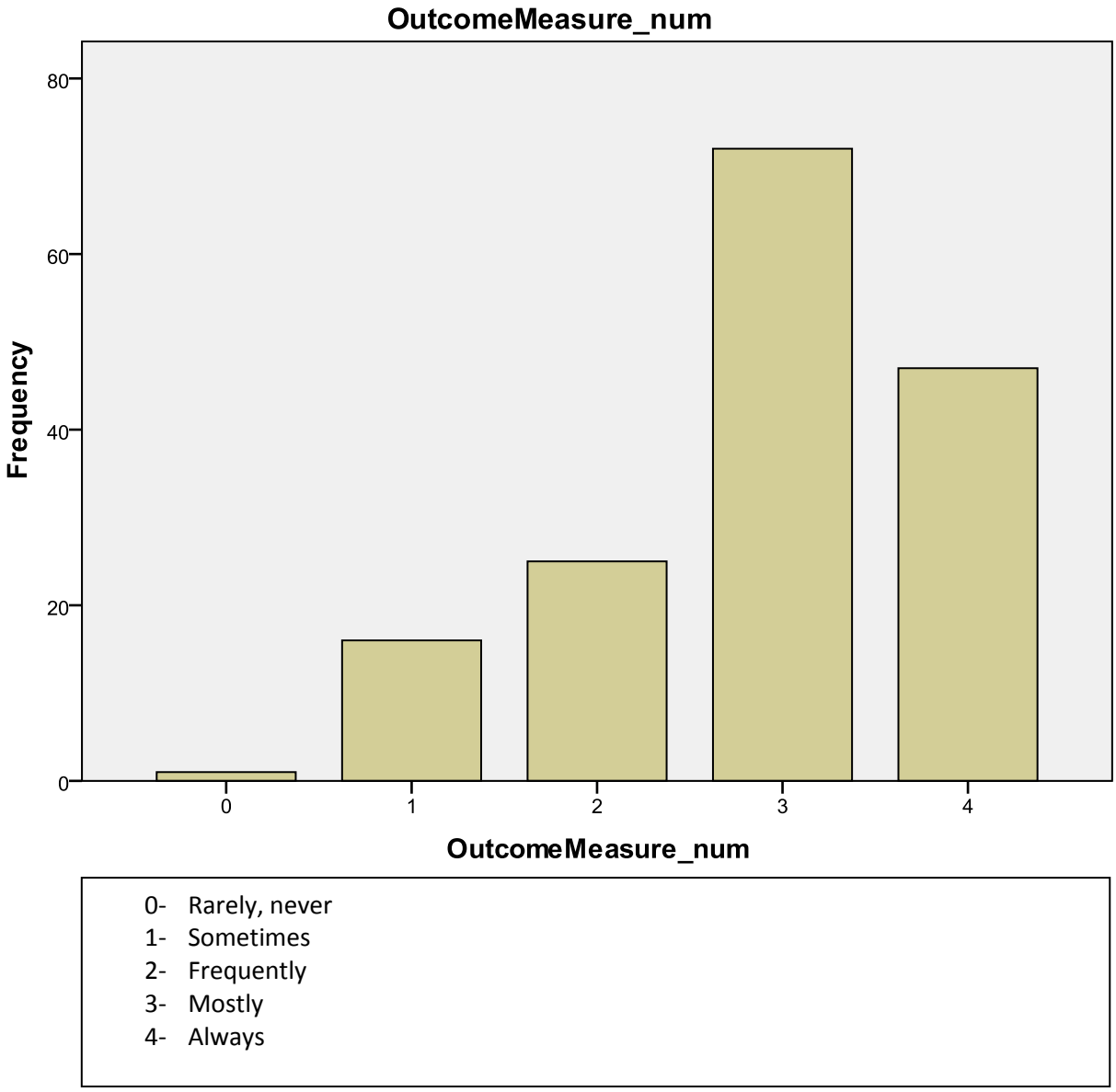
just over 5% work in institutional settings such as academic settings. Of the study participants, 21% reported working in a secondary practice with these being, from most to least, in group general practice, group solo practice and institutional settings.

All demographic data from this study were compared to *the National Dental Hygiene Job Market and Employment Survey, 2009* to test for representativeness.(154) For each demographic variable, age, sex, education level, work setting and hours worked, demonstrated comparable data indicating that this sample of dental hygienists were representative.

Outcome Measure

Study respondents were asked about their decision making capacity, which represented the key outcome variable of interest. Almost three quarters of participants indicated that they 'always' or 'mostly' had decision making capacity (44.7% and 29.2% respectively), whereas 15.5% reported 'frequently' having decision making capacity. Almost 10% of the respondents reported only 'sometimes' having decision making capacity and less than 1% reported 'rarely or never' (table 6).

Table 6: Outcome Measure (Decision Making Capacity)



Univariate Analysis

Analysis between the various demographic variables and the outcome measure, decision making capacity, was calculated with Fisher exact tests. Of all of the tests calculated (age, practice type, education program type, education level, work experience, work hours, seniority, relative work load), none demonstrated statistically significant associations between the individual demographic variables and the outcome measure.

Only gender approached significance on the Fisher's Exact Test (p= 0.0655) (table 7) with males, in general, demonstrating significantly greater decision making capacity; or in other words, the probability of males falling in the higher level of decision making capacity was significantly greater. This was not found to be significant using the Cochran-Mantel-Haenszel test (p=0.7168), and it should be noted that there were very few males in the sample (n=5).

Table 7: Univariate analysis: Gender and Outcome Measure

The FREQ Procedure: Table of Sex by OUTCOMEMEASURE

Frequency Row Pct	Rarely, never	sometimes	frequently	mostly	always	Total
Female	0 0.00	13 9.56	21 15.44	61 44.85	41 30.15	136 96.45
Male	1 20.00	0 0.00	0 0.00	2 40.00	2 40.00	5 3.55
Total	1 0.71	13 9.22	21 14.89	63 44.68	43 30.50	141 100.00

P = 0.0655 for Fisher's Exact Test

Key Individual Predictor and/or Intervening Variables

Vertical and Horizontal Differentiation (levels of hierarchy), Centralization and Formalization

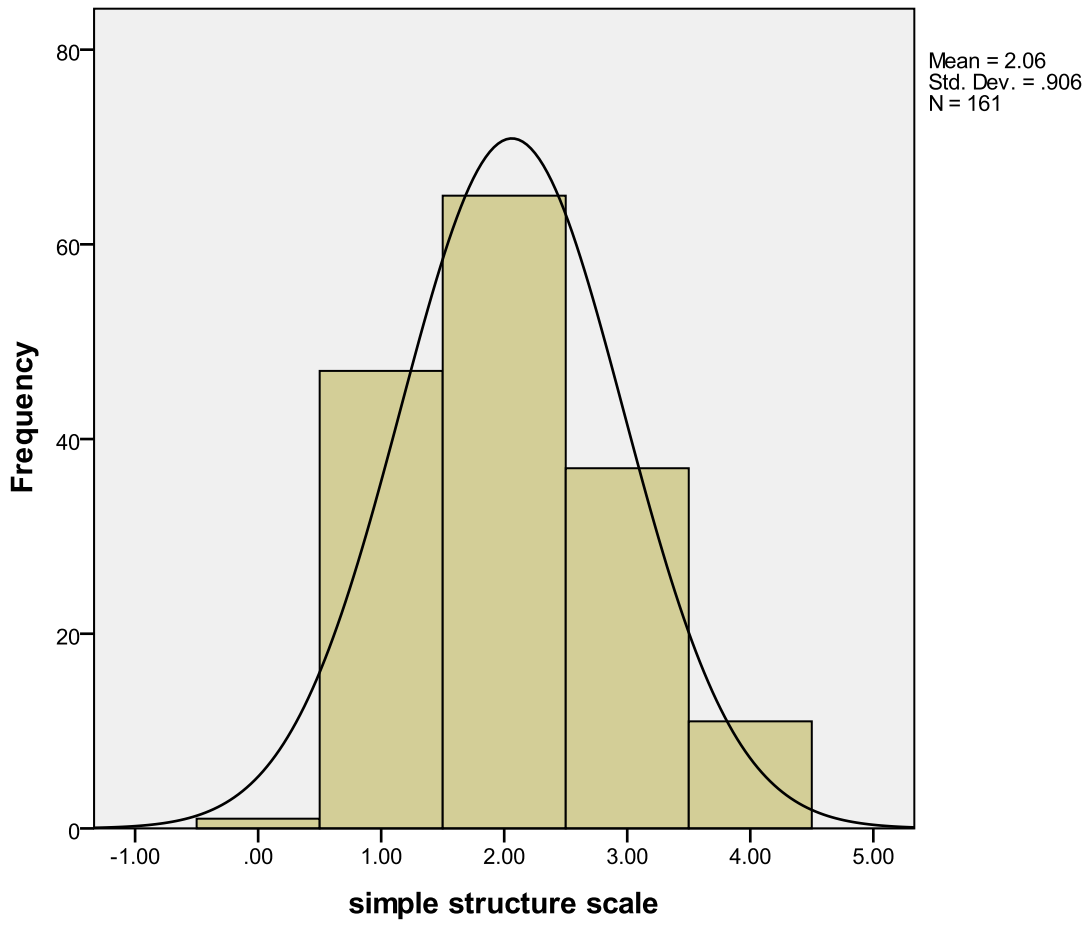
While more than two-thirds of the respondents reported that they did not perceive a hierarchy in their practices, one-third did. In addition, over 60% of respondents indicated that they had control over how they do their jobs. This suggests their working within a somewhat flat organizational structure, and the remaining 40% of respondents indicated that they did not.

Conversely, a large proportion, almost 70%, of the respondents reported that decision making and control over the practice were centrally located (out of workers' hands) with the remaining third indicating that centralization was not the norm. Similarly, almost 70% of study participants indicated that their practice is formally organized whereas the remaining dental hygienists indicated that their practice operated more informally.

Simple Structure

Simple structures are described as those organizations that have low levels of differentiation and low levels of formalization. A scale was calculated measuring the level of structure simplicity with a higher value indicating a more simple structure, which is associated with more decision making autonomy and associated control for the practitioner. With a range of 0 to 4, almost 30% of the participants indicated a score in the 3-4 range and just over 30% scoring 0-1. The remaining 40% fell within the middle range, which was deemed to be neutral, being neither simple nor complex. The mean score was 2.06 (stand dev= 0.906) (table 8).

Table 8 : Frequencies Simple Structure Scale



To test for a correlation between the outcome measure and the level of structure simplicity, Kendall's Tau statistic was calculated as it measures the strength of the relationship between two variables for ordinal data using ranks. Like other measures of correlation, Kendall's Tau will have values between -1 and +1. A positive correlation will indicate that the ranks of both variables increase together versus a negative correlation that means there is an inverse relationship having the rank of one variable increasing, while the rank of the other decreasing.(155)

While the values calculated with Spearman's rank correlation will be very close to that calculated with Kendall's Tau and lead to similar conclusions, the latter test is recommended for having better statistical properties and some interpretation advantages,(155) although, in this study, Kendall's tests yielded much more modest results than did Spearman's. Kendall's tau calculates probabilities and there are three types. Kendall's tau-c, like tau-b will adjust for ties, and, in addition, is better suited for more rectangular (larger) tables such as is the case with the variables tested in this study. Thus, using Kendall's tau-c test, the correlation between the outcome measure and level of structure simplicity was calculated and demonstrated a very weak, positive association ($\tau = 0.084$, $p=0.144$) (table 9).

Table 9: Correlation Analysis Simple Structure Scale and Outcome Measure

Count

		OutcomeMeasure_num					
		0	1	2	3	4	Total
simplestructurescale_num_nomiss	.00	0	0	0	0	1	1
	1.00	0	8	9	18	12	47
	2.00	1	6	9	31	18	65
	3.00	0	2	5	16	14	37
	4.00	0	0	2	7	2	11
Total		1	16	25	72	47	161

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Kendall's tau-c	.084	.058	1.459	.144
N of Valid Cases		161			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Organic Structure

An ‘organic’ organizational structure is described as having a simple structure (low differentiation, low formalization) and being decentralized regarding decision making. A scale was calculated to measure whether the dental hygienists in the study perceived practicing in more organic organizations, which are believed to more readily support autonomy in decision making, or, alternately, whether they felt they belonged to more ‘mechanistic’ organizations, which are more complex, centralized and formal and reportedly less supportive of autonomy in clinician decision making.

The possible range was 0 to 6, with more organic organizations scoring 4-6 and more mechanistic organizations ranging from 0-2 and those scoring closer to 3 being neutral. The mean score was 3.14 (std dev= 1.42) with 34% of respondents scoring in the mechanistic range and 38% scoring in the organic range. Again, using Kendall’s tau-c test, negligible associations were shown between the degree the organization was organic to the outcome measure ($\tau = 0.045$, $p = 0.443$).

Conflicting goals and Decision Making

Dental hygienists in the study were asked about conflicting goals occurring in their practice and how this interferes with patient care. With a range of 0-3 with 0 being no conflicting goals and 3 being a high level of conflict, the mean was 1.2 (std. dev= .732). 77% of respondents indicated that they did not typically experience conflict, whereas just over 20% did frequently experience conflict. Similar results were found surrounding perceptions about how conflict affects patient care with a mean of 1.09 (std. dev= .754)

and 72% reporting that conflict does not typically affect patient care, but almost 30% in this case did report that conflict does affect patient care.

The association between those experiencing conflicting goals and decision making capacity were calculated using Kendall's tau-c correlation statistics. A modest negative correlation was found between conflict with others in the practice and decision making capacity (τ= -.156, $p < 0.01$). In other words, as conflict experienced increases, decision making capacity decreases, albeit modestly.

Power (freedom) and Decision Making

A modest positive association was demonstrated between decision making freedom and decision making capacity (τ=.128, $p < 0.01$). A more moderate negative correlation was demonstrated between dental hygiene decision making capacity and settings where employers exerted dominance over decision making (τ = -.286, p = 0.00), meaning that the more dominating the employer, the less decision making capacity reported by the dental hygienists. Dental hygiene feelings of inferiority resulted in more modest negative associations with the outcome measure (τ = -.211, p =0.00). Interestingly, the perception of a practice hierarchy did not seem to be associated with decision making capacity (τ = .081, p =.219).

Knowledge production

Only a modest positive correlation was demonstrated between dental hygienists' decision making capacity and dental hygiene knowledge production (τ = .180, $p< 0.01$). While a negative correlation was more expected, a similarly weak positive correlation was also

shown between dental hygienists having a lack of necessary knowledge and decision making capacity ($\tau = .228$, $p < 0.01$).

Gender

There was a modest, negative association between decision making capacity and the negative influence of gender, meaning that as decision making capacity increases, reporting of a negative gender influence decreases. ($\tau = -.228$, $p < 0.01$).

Autonomy

For dental hygienists, control over time spent with clients may be interpreted as a proxy measure for autonomy, and this variable showed a positive association with decision making capacity approaching a moderate level ($\tau = .252$, $p=0.00$). A direct question about dental hygienists' perception of their own autonomy showed a similar association to decision making capacity ($\tau = .250$, $p=0.00$).

Sexuality

Perceived attitudes from others about one's sexuality did not appear to affect dental hygienist decision making capacity to a large extent; as decision making capacity increased, perceived negative attitudes surrounding sexuality decreased, but only negligibly.($\tau = -.061$, $p=.205$)

Personal Investment in Practice

One's self-reported personal investment in her/his practice was also shown to be marginally moderately associated with decision making capacity ($\tau = .248$, $p=0.00$).

Years Experience

Ranking years of experience and testing for an association between increased work experience and increased decision making capacity had negligible results. (τ = .071, p= .199).

Measurement Summary Scales

There were 7 measurement summary scales that were developed to test the themes from the hypothetical qualitative model (Box 4) that were comprised of several questionnaire items within the survey. As described previously, of these scales, 6 were reflective of organizational influences on decision making capacity and one surrounded individual characteristics—thus corresponding to structure and agency. For all 7 of these potential predictor variables, missing values were replaced by item means (mean imputation). This was considered appropriate because respondents with a missing value in any one or more of the individual items comprising a Summary Scale would be excluded entirely from the Scale calculation as is the default mechanism in PASW® Statistics Version 18. Thus, for all summary scores, there are no missing values, and all respondents are thereby included in the overall calculation.

Box 4: Data Dictionary

Scale/Variable-Label	Definition
DEMOGRAPHIC DATA	
DHProgram	Program type graduated from
EducLevel	Highest level of education
experience	Years of experience as DH
age	Age
sex	Sex
hours	Hours worked per week
practicetypeI	Practice type worked in (primary)
practicetypeII	Practice type worked in (secondary)
otherdescribe	Other type of practice worked in
Hierarchy: DMD, DH, DA,	Rank practice department hierarchy

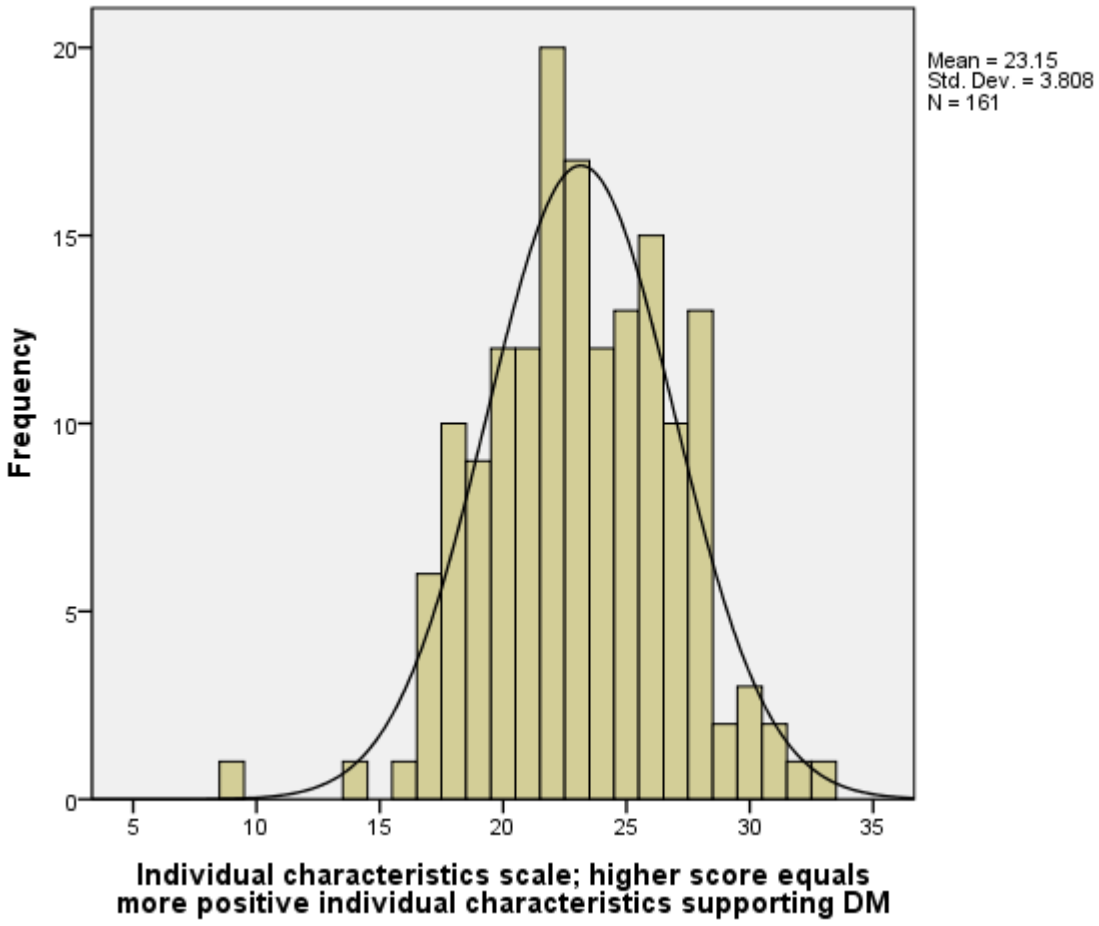
Admin, other **ifDependsexplain** **seniority_num** **relativework_num**	Other—explain Perceived level of seniority Work level compared to other DHs in practice
INDIVIDUAL CHARACTERISTICS **ApathyNoMiss_num** **LackConfNoMiss_num** **ChangeAgentNoMiss_num** **DMdiscomfortNoMiss_num** **LackAssertNoMiss_num** **NegDMAttitudeNoMiss_num** **PositiveAffilNoMiss_num** **DesireAuthorityNoMiss_num** **ChangeAvoidNoMiss_num** **LackEnergyNoMiss_num** **ProbOppsNoMiss_num**	 Level of apathy Lack of confidence in decision making DH acts as a change agent DH experiences discomfort when confronted with decision making DH lacks assertiveness in expressing views DH has attitude that does not support decision making DH affiliates with other providers in practice DH desires more decision making authority DH avoids changes to practice because may result in more work DH needs all her energy just to get through the day DH views practice problems as opportunities to learn
PRACTICE STRUCTURE **HierarchyNoMiss_num** **FlatOrgNoMiss_num** **FormOrgNoMiss_num** **CentralDMNoMiss_num**	 Perception of hierarchies between practice departments Perception that all workers have discretion and control over job Practice is formally organized Decision making is centrally organized
PRACTICE ATTRIBUTE **PhilAlignNoMiss_num** **AllegenceNoMiss_num** **DMcontribNoMiss_num** **EmployDMfacilNoMiss_num** **DMFreedomNoMiss_num** **DMschedContrNoMiss_num** **DMSupportNoMiss_num** **PractLeaderNoMiss_num** **PractReceptNoMiss_num** **WorkerXperNoMiss_num** **EffectLeaderNoMiss_num** **DMfreedomIINoMiss_num** **PositivDMcultNoMiss_num**	 Practitioners in practice have well aligned philosophies DH has allegiances with others in the practice DH is able to contribute to decision making in the practice Employer facilitates good decision making DH has decision making freedom DH has control over her client scheduling DH is supported to make good decisions Practice has good leadership Practice is receptive to positive change Practice views the worker as the expert of her domain

PractValChangNoMiss_num **TimeContNoMiss_num**	Practice has effective leadership DH has decision making freedom Practice has a culture encouraging DH decision making Practice values change over tradition DH has control over her time spent with clients
PRACTICE LIMITATION **BusEmphasNoMiss_num** **ConflictGoalNoMiss_num** **ConflictPtCarNoMiss_num** **DMundermineNoMiss_num** **EmployDMNoMiss_num** **EmployDomNoMiss_num** **Pract$MotivNoMiss_num** **PractValue$NoMiss_num** **GenderInflDMNoMiss_num** **InferiorityNoMiss_num** **LackDMfreeNoMiss_num** **SexualityNoMiss_num** **LackTimeNoMiss_num** **DMoverruleNoMiss_num** **NeedDMfacilNoMiss_num**	 Practice emphasizes business over health care DH experiences conflict in goals with others in the practice Conflicting goals between people in practice affects patient care DH decision making is frequently undermined by others Employer assumes decision making responsibility Employer exhibits dominance over practice decision making Practice is motivated by financial incentives Practice values reimbursable patient care over non-reimbursable care One's gender has had a negative influence over decision making DH feels inferior to others in the practice DH requires permission to make decisions DH has experienced attitudes from others based on sexuality DH is rushed to complete patient care DH has had others over-rule a decision made about patient care DH would be able to implement decisions with better facilitation
PRACTICE DISTILLERY **ComDMsuppNoMiss_num** **DMnegotiatNoMiss_num** **DHAutonomNoMiss_num** **FinanceInflNoMiss** **FormalDMNoMiss_num** **InvestPractNoMiss_num** **NegotiateDMNoMiss_num** **HierarchDMinflNoMiss_num** **SeniorDMinflNoMiss_num** **DHteamNoMiss_num** **TeamPractNoMiss_num** **TxGoalConflNoMiss_num**	 Practice has communication that supports decision making DH is able to participate in negotiation about decision making DH has decision making autonomy Decision making is complicated by financial pressures Practice has a formal approach to decision making DH feels personally invested in practice DH is able to negotiate with employer about decisions Practice hierarchy influences decision making

	Seniority influences who makes decisions DHs work as a team to achieve collective goals Practice operates as a team to achieve collective goals Treatments done in the practice conflict with DH's ideals
KNOWLEDGE INCORPORATION **ChallengStatQuoNoMiss_num** **EBDMNoMiss_num** **NewKnowIncorNoMiss_num** **DHNewKnowNoMiss_num** **DMDnewKnowNoMiss_num** **LackKnowInputNoMiss_num** **EBvalueDMNoMiss_num** **LackDMKnowNoMiss_num** **LackDMKnowIINoMiss_num** **GendInflNewKnowNoMiss_num**	DH is comfortable challenging the status quo Practice uses current evidence in decision making Practice actively incorporates new knowledge and technology DHs frequently bring new knowledge to the practice Dentists are typically responsible for bringing new knowledge to practice DH struggles to have her knowledge heard by others in practice Practice values using research to guide decision making DH lacks knowledge to make sound decisions DH is unable to discuss decisions because she lacks necessary knowledge Gender influences who brings knowledge to practice
DECISION CHARACTERISTICS **DecisionImpactNoMiss_num** **PtChoiceNoMiss_num** **TimingInfDMNoMiss_num** **DMdiscretionNoMiss_num**	Importance of decision influences DH desire to control decision making Practice encourages patient choice in decision making Timing can affect decision making DH has discretion over her clinical decisions
SUMMARY SCALES **IndivCharactNoMissScale** **PractLimitNoMissScale** **PractAttribNoMissScale** **PractStructNoMissScale** **PractDistilleryNoMissScale** **DHKnowledgeNoMissScale** **DecisionCharactNoMissScale**	Individual characteristics summary score Practice limitations summary score Practice attributes summary score Practice structure summary score Practice distillery summary score Knowledge incorporation summary score Decision characteristics summary score
OUTCOME VARIABLE **OUTCOMEMEASURE_num**	Level to which DH is able to make and carry out clinical decisions

As mentioned previously, the Individual Characteristics Scale was comprised of 11 questionnaire items with a maximum score of 33. It is estimated that the higher the score, the more positive the influence individual characteristics have on decision making capacity. Table 10 depicts the frequency distribution of the respondents, which is positively skewed to the right and has a mean score of 23 (standard deviation= 3.8).

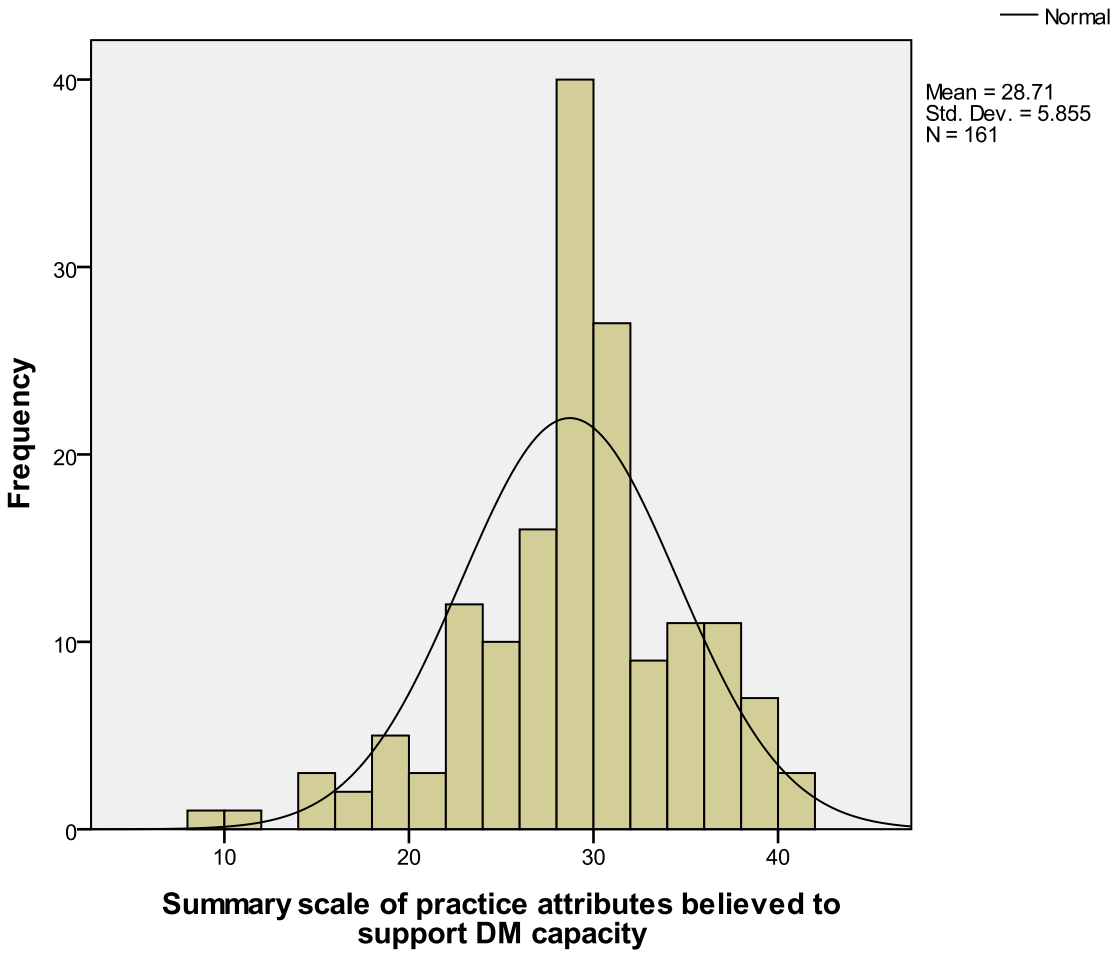
Table 10: Frequencies Individual Characteristics Summary Scale



The remaining 6 summary scales reflect the hypothesized structural influences on decision making capacity. The Practice Attributes Scale includes those questionnaire

items believed to exert a positive influence on decision making capacity. The scale included 15 items providing a maximum score of 45, and it is hypothesized that the higher the score, the more positive influence on decision making. Table 11 shows the slightly positively skewed curve of the frequency distribution of the respondents' summary scores with a mean of 29 (std. Deviation= 5.9).

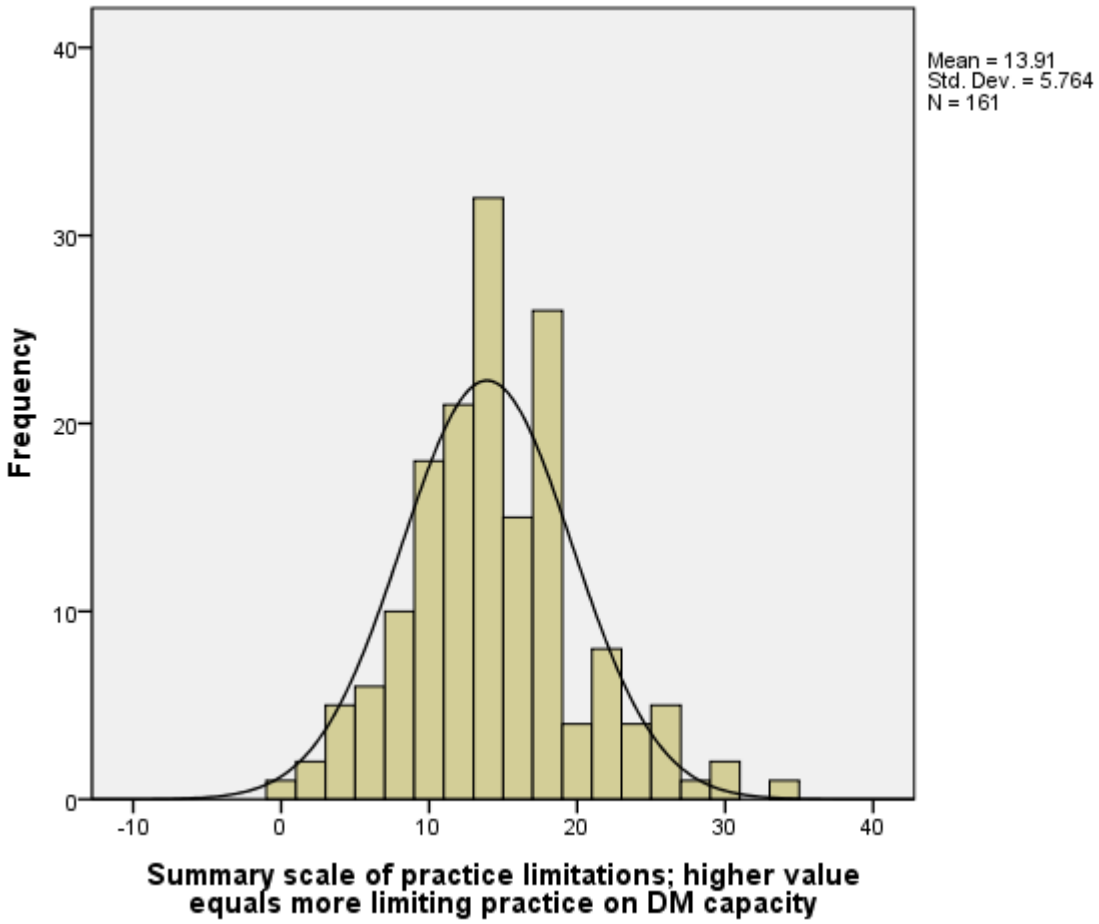
Table 11: Frequencies Practice Attributes Summary Scale



The Practice Limitations Scale reflected the opposite of the Attributes Scale in that it included 15 items that were believed to be unsupportive of decision making capacity of

dental hygienists and that higher values indicated a practice placing a negative influence on decision making capacity. The maximum score was again 45 and table 12 provides the frequency distribution, which is skewed to the left, and has a mean score of 14 (std. Deviation =5.8).

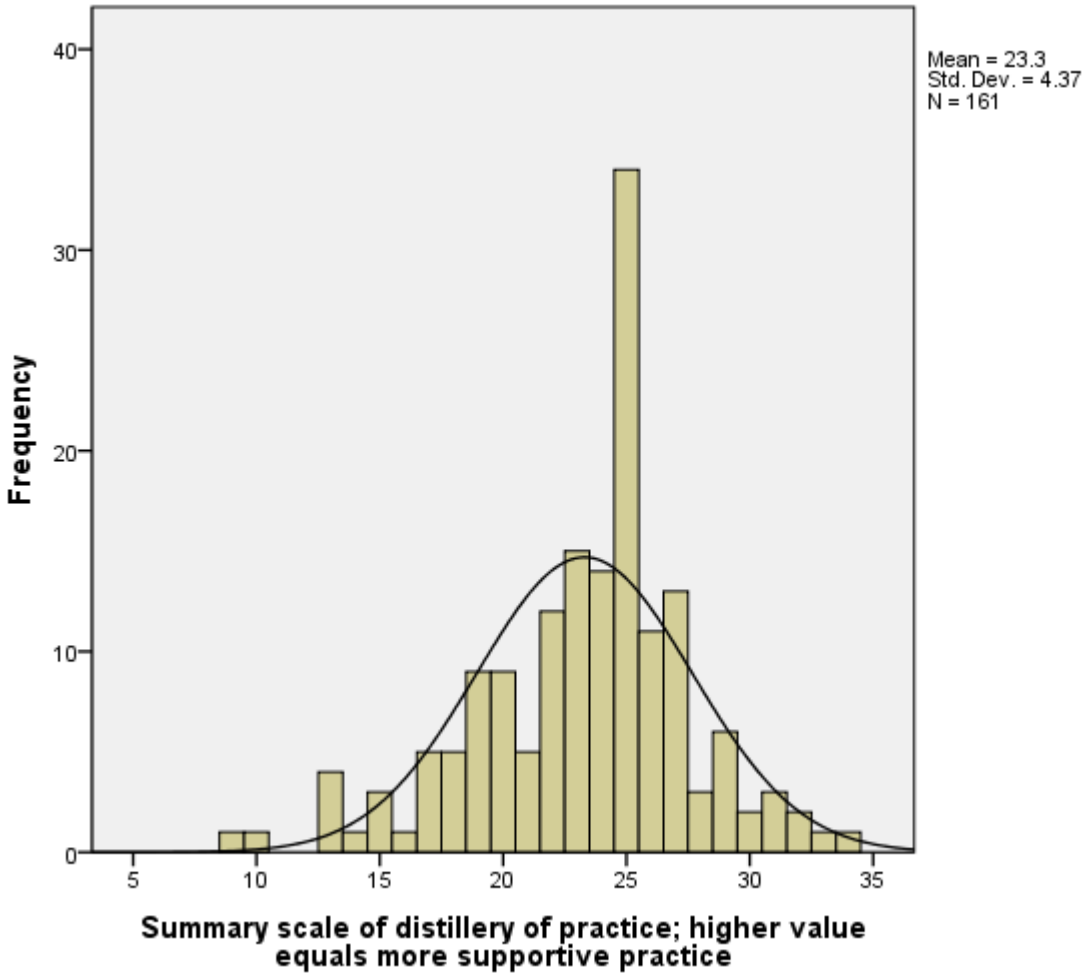
Table 12: Frequencies for Practice Limitations Scale



The Practice Distillery Summary Scale was comprised of 12 questionnaire items surrounding practice characteristics that were believed to be able to exert either a positive

or negative influence on dental hygiene decision making capacity. The maximum score was 36 with a higher score reflecting a more supportive practice influence on decision making capacity. Table 13 shows the frequency distribution, slightly skewed to the right, with a mean score of 23 (std. Deviation= 4.4).

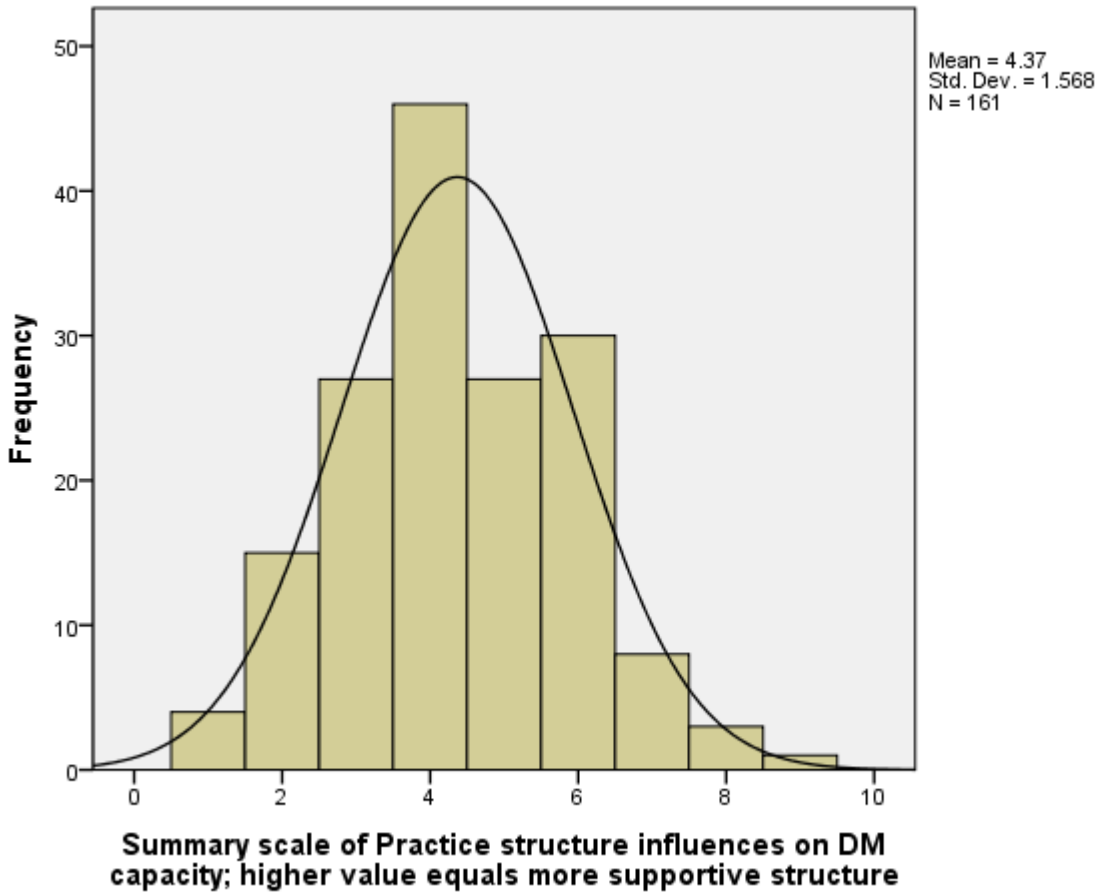
Table 13: Practice Distillery Scale



The Practice Structure Summary Scale had only 4 items, which were directed at assessing the structural organization of the respondents' practice. The maximum score was 10 with

higher scores being indicative of a less structured organization and therefore, theoretically, imposing less limits on dental hygiene decision making capacity. Table 14 depicts the slightly negatively frequency distribution having a mean score of 4.37 (std.deviation= 1.568).

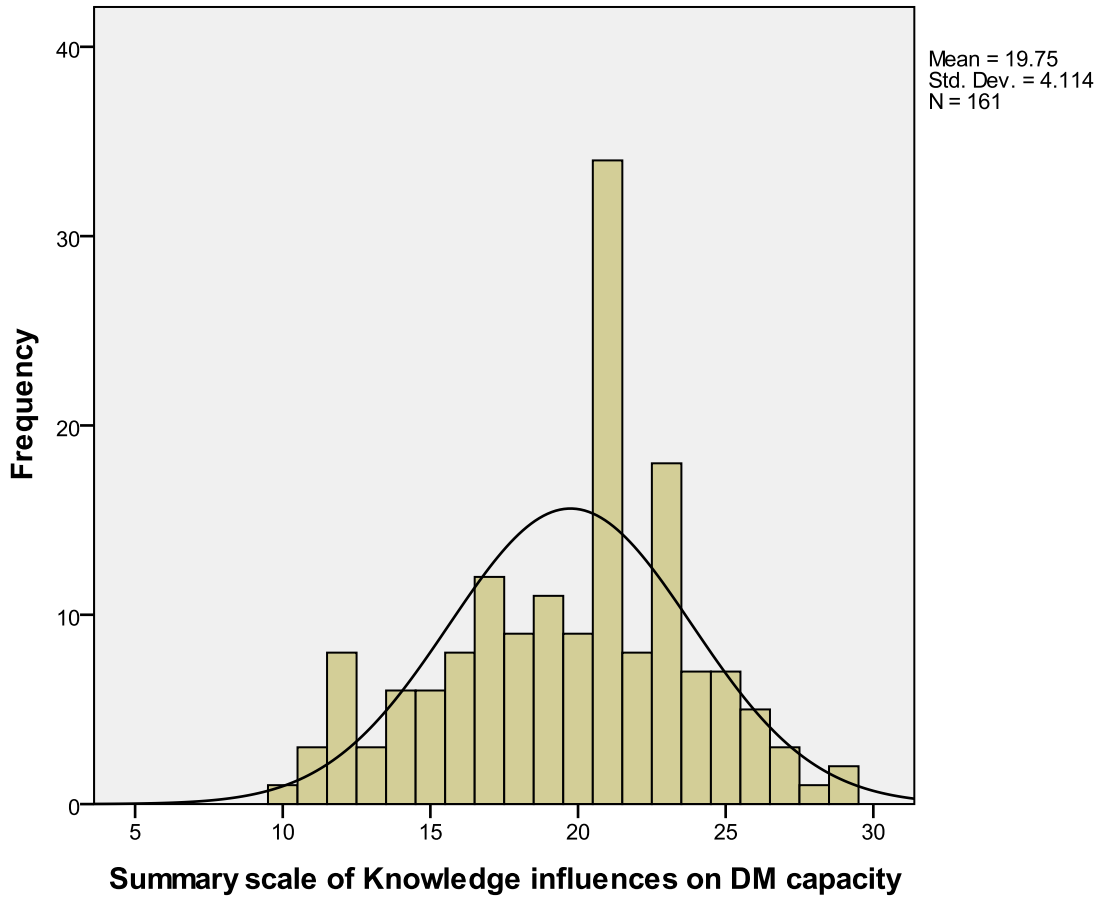
Table 14: Frequencies Practice Structure Summary Scale



The Knowledge Incorporation Summary Scale included 10 questionnaire items with a maximum of 30 with a higher score reflecting practices that support dental hygiene

knowledge incorporation and therefore, presumably, dental hygiene decision making capacity. Table 15 shows the frequency distribution being slightly skewed to the right with a mean score of 20 (std. Deviation= 4.1).

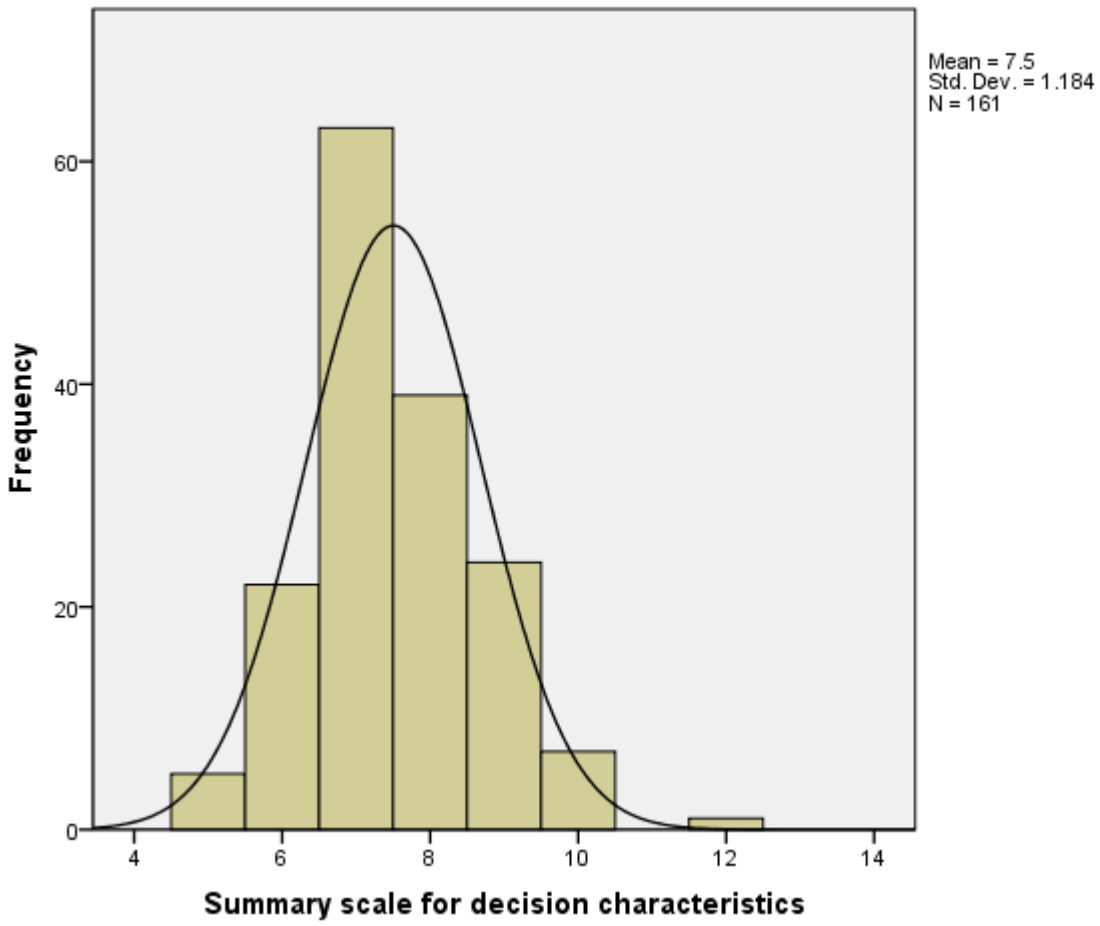
Table 15: Knowledge Incorporation Summary Scale



The final summary scale, Decision Characteristic Summary Scale, included 4 items focused on the qualities of decisions believed to influence decision making capacity. The maximum score was 12 with a higher score being indicative of better decision making

capacity. With a range of 5 to 12, the mean score was 7.5 (std. Deviation=1.184) and table 16 shows the frequency distribution, which is slightly skewed to the right.

Table 16: Frequencies Decision Characteristics Scale



All 7 of the summary scales were analysed for internal consistency reliability estimates using Cronbach Coefficient Alpha: Individual Factors Scale $\alpha = 0.737164$, Practice Attributes Scale $\alpha = 0.871166$, Practice Limitations Scale $\alpha = 0.831829$, Practice Structure Scale $\alpha = 0.399341$, Practice Distillery Scale $\alpha = 0.783752$, Knowledge Incorporation Scale $\alpha = 0.765285$ and the Decision Characteristics Scale $\alpha = 0.058656$.

All 7 of the summary scores were statistically tested for correlations with the outcome measure, decision making capacity, using Kendall's tau-c correlation coefficients to get a general sense of their relationship keeping in mind that such a calculation does not take the other, potentially intervening, scores into account. Individually, none of the 7 summary scores had more than a moderate association with the outcome measure (table 17).

Table 17: Frequencies Summary Scales and Outcome Measure Correlations

Scale	Kendall's tau-c	P value
Individual Characteristics	0.420	P=0.00
Practice Attributes	0.318	P=0.00
Knowledge Incorporation	0.318	P=0.00
Practice Distillery	0.290	P=0.00
Practice Limitations	-0.322	P=0.00
Decision Characteristics	0.221	P=0.00
Practice Structure	0.003	P=.953

The strongest correlation was demonstrated between the Individual Characteristics Summary Scale and the outcome measure, which had a moderate, positive correlation (τ = .420, p=0.00). This was followed by both the Practice Attributes Scale and the Knowledge Incorporation Scale and then the Practice Distillery Scale, which each had moderate to modest positive correlations (τ =0.318, p=0.00, τ =0.318, p=0.00 and τ

=0.290, p=0.00 respectively). The Practice Limitations Score had a similar moderate, albeit expectedly negative, correlation with the outcome measure (τ = -0.322, p=0.00). The Decision Characteristics Summary Scale had only a modest correlation with the outcome measure (τ = .221, p=0.00). The Practice Structure Scale had a negligible and insignificant correlation with the outcome score (τ = .003, p=.953).

Model test

An ordinal logistical regression analysis was performed for the single item, clinical decision making capacity, which served as the outcome measure. Ordinal logistic regression analysis was appropriately used because the outcome measure was reported as a five-level ordered variable and several scale variables were serving as potential predictor variables. The statistical significance level was 5%.

As an outcome of the focus group research, it was hypothesized through the conceptual model that having supportive organizational attributes (Practice Attributes Scale) and minimal organizational limitations (Practice Limitations Scale) would be predominant predictor variables for decision making capacity; in addition, one's individual characteristics (Individual Characteristics Scale), ability to incorporate dental hygiene knowledge (Knowledge Incorporation Scale), the characteristics of the decision itself (Decision Characteristics Scale) and how the practice operates in general (Practice Distillery Scale) may act as secondary intervening variables. This means that these latter variables were believed to provide a causal link between the various variables and are sometimes referred to as mediating variables. The practice structure was also included as

a component of the Phase II analysis although not part of the original model as it arose theoretically rather than empirically from the focus group data (Practice Structure Scale). Ordinal logistic regression models were calculated, first, with a full model including all potential predictor variables of interest and, second, a main model of interest that included only those variables with joint p-values that were less than 0.05, meaning that it removes all non-significant predictor variables. This final model indicated that only the Individual Characteristics Scale ($p<0.0001$) and graduation from the 3-year dental hygiene education program ($p=0.0078$) (table 18) were, in the presence of each other, significant. Thus, individual characteristics and the 3-year dental hygiene program of origin are together positively associated with enhanced decision making capacity. The Score Test for the Proportional Odds Assumption had a p-value=0.5647; we therefore do not reject the assumption of proportional odds and conclude that the odds ratios are constant across levels of the outcome.

Table 18: Final Model

Variable	Estimated Odds ratio	95% CI	*p*-value
Individual Characteristics Scale	**1.442**	**(1.276,1.630)**	**<0 .0001**
DH Program of Graduation **1- Yr diploma program** **2- Yr diploma program** **3- Yr diploma program**	 **1.537** **4.195** **9.515**	 **(0.245, 9.634)** **(0.990, 17.781)** **(2.072, 43.697)**	 **Not significant** **Not significant** **0.0078**

Phase II: Key Informant Interview Results

The key informant interviews were designed to investigate the overall environmental social influences on dental hygiene decision making capacity. These influences were hypothesized to exist, but they were not expected to, nor did they, emerge through the focus groups or the survey. This view was held because the study participants for both the focus groups and the survey study, with the exception of the pilot focus group, would be primarily comprised of "grass roots" clinicians. It is presumed that these practitioners do not typically have the range of experience that affords a comprehensive perspective of the dental hygiene profession. Key informants, on the other hand, are selected because of their unique expertise and broad insight surrounding a phenomenon.

For this study, five key informants were purposively selected to be interviewed based on the premise that those individuals in these key professional roles would have additional insight into the broad environmental conditions affecting dental hygiene decision making capacity. The individuals having (or who had) the following positions were selected to participate:

- The former Director of the School of Dental hygiene
- The former Registrar of the dental hygiene regulatory body (CDHM)
- The Past President of the provincial professional association (MDHA)
- The Past Chair of the CDHM Council and of the Dental Hygiene Legislation Committee of the MDHA,
- The current Chair of the Educators Advisory Committee (EAC) to the national professional association (CDHA).

As indicated above, in several cases the former holder of the position was solicited to participate in the study in order to capture the perspective of someone who has some

familiarity with the position and historical context rather than those currently holding the position that have just recently come into office.

The potential key informants were contacted via telephone to invite them to take part in the study. A description of the study was provided along with the role the key informant would be required to play, and the consent form was reviewed. It should be noted that the researcher has a professional and relatively friendly relationship with each of these key informants because of their professional backgrounds and histories. These associations were unavoidable, but the researcher believes that these relationships facilitated frank discussions, which resulted in rich data being provided for this part of the study. However, the researcher cannot overlook the potential that these relationships had on biasing the data.

Each individual approached agreed to participate in the study and was provided with a copy of the consent form via electronic mail for their further review and signature. An interview was scheduled with each participant. Three of the five participants were scheduled for face-to-face interviews and two out-of-province participants were scheduled for telephone interviews. The interviews took place over several weeks starting as the online survey closed: October 27, October 30, November 2, November 3, and November 9, 2010. Each interview was audio-taped and field notes were taken. Each interview followed similarly through the use of a common interview guide (appendix 2), which was designed to promote discussion surrounding key structural social aspects identified through the narrative literature review and other sources believed

to influence dental hygiene decision making in general. Interviews lasted between 45 minutes to one hour.

Subsequent to the completion of all five of the interviews, the researcher listened to the audio-tapes and developed detailed notes surrounding the emerging key ideas. Following this, the notes were reviewed and an iterative process of identifying codes and key themes ensued (table 19). The interview guide used by the interviewer/researcher provided both specific topic areas for discussion and also open ended questions prompting unique ideas to emerge from the key informants surrounding influences on decision making capacity. A question inquiring about the key informants' views on the appropriateness of dental hygiene practice expansion given their current capacity completed the interviews as this was believed to be the most contentious topic of discussion.

Most of the discussion that occurred surrounded what were seemingly negative influences of various environmental or social factors on dental hygiene decision making capacity although the discussion was not framed in this way. Key informants in this study had an extensive and considerably critical view of the environmental influences on dental hygiene decision making. Several distinct themes emerged surrounding these broad environmental social issues and will be discussed in turn. It should be recognized that these factors coexist and influence each other and will be further considered in the discussion section.

Themes from Key Informant Interviews

Education

Educational preparation was an overwhelmingly key theme identified by the key informants as an important but negative environmental influence on decision making capacity of dental hygienists. According to the key informants, the primary criticism about dental hygiene education is that it is too short and that it lacks a degree as an outcome. The length of the program was found to be 'relatively' too short when compared to others' education, such as dental students, because of the perceptions associated with shorter educational preparation and educational background and associated credentialing.

In addition, dental hygiene education was also reportedly 'absolutely' too short in that there was insufficient time to prepare students for the demands of the current practice environment. For example, the lack of educational preparation was deemed to contribute to several challenges dental hygienists face such as those associated with the changing dynamics of dental hygiene practice (i.e. more complicated patients), the lack of respect for dental hygienists as individuals and the failure of the profession itself to place dental hygiene at the health policy table with other more established professions.

Further, short educational programming for dental hygienists was reported to account for an applicant pool to dental hygiene school that is, in general, not seeking a professional career but rather a track for those seeking a short route to what is perceived as a relatively "good job". This was perceived to be an attitudinal influence of those attracted to and

entering the dental hygiene profession and is believed to be dissimilar to those attracted to other professions where educational preparation is more advanced.

Reportedly, the individuals attracted to the profession shape several other factors, such as one's investment in practice, the desire to challenge practice and one's knowledge use, that in turn limit dental hygiene decision making. In addition, due to the comparatively short educational background, the key informants believe that dental hygienists do not value knowledge use and are unskilled in acquiring knowledge. These issues are believed to factor into the lack of support of evidence-based decision making on behalf of the dental hygienists.

The key informants identified that recently dental hygiene education is becoming further eroded and inconsistent across the country. For example, there has been a movement in the last several years, particularly in Ontario, for private dental hygiene programs to open in 'career colleges' and offer dental hygiene programming in compressed models further appealing to non-degree oriented individuals. While several of these programs have failed to meet accreditation standards and have subsequently closed, the confusion and debate surrounding how dental hygiene education should be provided is undeniable.

Government has not supported an expansion of dental hygiene educational preparation for various reasons, but one must certainly include the point that the state has failed to appreciate a compelling need to do so. Accrediting bodies, such as the Commission on Dental Accreditation of Canada (CDAC), which is governed by dentistry overall, reportedly disappointed the dental hygiene profession when the opportunity arose several

years ago, CDAC failed to require higher standards for dental hygiene education and educators. This reportedly paved the way for private proprietary schools that are notorious for short programming, educators with limited credentialing and education and an overall lack of resources and infrastructure (i.e. libraries, researchers, etc.).

The key informants agreed that, together, these influences support the ongoing dominance of dentistry over dental hygiene practice by limiting dental hygiene confidence, knowledge and respectability. This dominance reportedly begins during dental hygiene educational training. Even when trained in Universities, dental hygiene students are undermined by dental students, who are trained over a longer period of time, receive a Doctor in Dentistry degree versus a diploma, and, up until very recently, witnessed dental instructors and even dental students having decision making control over dental hygiene instructors and students. Despite this, the key informants primarily supported dental hygiene education occurring in Universities, particularly along side of Dentistry, to provide a collaborative background and well-rounded educational preparation. On a positive note, it was reported that dental hygiene instructors and students are increasingly autonomous within the University setting and have a more collaborative versus hierarchal relationship in the school.

Additionally, the key informants reported that the lack of dental hygiene educational opportunities imposed limitations on dental hygiene graduate education and research development. With the diploma being entry to practice and few Bachelors trained dental hygienists, there are considerable limits for dental hygienists entering graduate school,

conduct research and expand the dental hygiene body of knowledge. Indeed, the applicant pool has a negative bearing on the demonstrated interest in advanced education.

Despite these aforementioned educational factors, the key informants made the point that dental hygiene practice is not aligned with the current educational preparation and that dental hygienists have the training to provide a broader scope of practice in many cases or to provide their current scope in broader contexts, but have been prevented in virtually all jurisdictions to do so.

Practice Barriers

A second major theme emerging from the key informant interviews believed to be an influence on dental hygiene decision making capacity was practice barriers, which were primarily recognized as being a negative influence. Of these barriers, the employment environment for dental hygienists was identified as a major limiting factor for dental hygiene practice and decision making capacity. Up until recently, Manitoban Dental hygienists had very few options regarding their work setting. Almost 95% of Canadian dental hygienists work in traditional private dental practices under the employment of dentists ,(156) . Thus, unlike other health professions who have various work options within both the private and public sector, the key informants criticized that dentistry largely controls dental hygiene employment options and as an outcome, the way dental hygienists are able to practice.

Further, dentistry operates as a privately funded and privately delivered system far removed from health care in general. Oral health care is provided on a fee-for-service

basis largely dependent on what is reimbursable through private insurance companies. Thus, the key informants identified that dentistry has an acutely business and entrepreneurial focus uncommon to other health care environments, and dental hygienists, by proximity, are subject to the conditions of this environment. Dentists were categorized by the key informants as business men (predominantly) primarily focused on providing billable services to the neglect of evidence-based decision making. According to the key informants, dental hygienists struggle within the organization to complete structured client care protocols, which was highlighted as limiting their ability to apply critical thinking, debate clinical protocol and possess decision making capacity in general.

Key informants further highlighted that because of the business focus of practice, dentistry is aggressively protective of their 'turf' and has actively resisted dental hygiene autonomy and independence from a political perspective. Organized dentistry has actively lobbied provincial governments across the country to maintain the status quo of these practice arrangements on the premise of maintaining patient safety and quality care, and only recently has the state begun to develop legislation to permit dental hygiene to provide care in alternate settings or within new delivery models in Manitoba. The key informants indicate dentistry has largely actively maintained its disconnection from the general health care field since the inception of Medicare until present.

The key informants strongly believe that should dental hygienists be able to go to salaried employment settings along side of other health care providers in public settings, it would be much more supportive to their developing decision making capacity subsequent to

graduation. Some examples of these work settings were identified as including personal care homes, community centre programs and hospitals. Such opportunities were believed to help solidify the link between dental hygiene's educational preparation and practice. Interestingly, some of the key informants reported that dental hygienists find their expertise to be more acknowledged from those in the broader health care context than from those within the oral health care sector.

Dental Hygiene as a Profession

The third theme identified from the key informant interviews was dental hygiene as a profession. The key informants reported that dental hygienists themselves largely do not view dental hygiene as a profession, but rather as a job, and have permitted their own subjugation. Several factors are believed to have contributed to this perspective, which surround both other environmental factors and individual influence.

Regarding the broad environmental features, the key informants identified the fact that dental hygienists do not typically work independently or autonomously and this has perpetuated their view that they do not belong to a profession of their own, but rather are an appendage of another. While dental hygiene was initiated by dentistry in a concerted effort to meet the increasing preventive oral health care needs of the public,(78) there has been a failure of other professions, the public and dentistry to appreciate dental hygiene's specific expertise surrounding periodontal therapy and their contributions to oral health care.

This lack of recognition is believed to have helped prevent dental hygiene from being distinguished as a unique profession. It was noted that many of the public have difficulty

distinguishing between dental hygienists and dental assistants for example. Further, key informants indicated that the lack of leaders and a strong professional association have contributed to the deficiency in professional recognition and legitimacy of dental hygiene in the policy arena.

On the more individual level, the key informants indicated that dental hygienists are reluctant to own their own practices or assume the responsibility of working independently even if opportunities were to exist. This may be an outcome of the 'type' of individuals attracted to dental hygiene education and the unavoidable factor that dental hygienists are primarily women, which, as discussed below, presents its own set of challenges to decision making capacity.

The State

Another theme emerging from the key informants was the negative influence of the state. The key informants were critical of the influence of the state, which has largely been an indirect, but instrumental, influence on the lack of dental hygiene decision making capacity. As identified by the key informants, the state has had a significant influence on dental hygiene through its restrictions on legislation surrounding dental hygiene practice. Across the country, various restrictive language exists in legislation preventing the public from directly accessing dental hygiene services, which has ensured dentistry's monopoly over oral health care and its gate keeping privileges to public access to dental hygiene services. Some examples include requiring dental hygienists to be directly supervised by a dentist, dental hygienists to be employed by a dentist and dental hygienists not being able to self-initiate dental hygiene care.

Several of the key informants were painfully aware that even as recently as 2008, when Manitoba's new Dental Hygiene Act was being written, the government did not permit dental hygiene to practice more independently despite several other provinces having already gone in this direction. Now, the new Regulated Health Professions Act umbrella legislation for all regulated health professions in Manitoba is being written and is expected to further expand dental hygiene scope and delivery of care.

The key informants also pointed out that the government has been responsible for preventing an expansion of dental hygiene education towards degree education while permitting the erosion of dental hygiene educational programming in some jurisdictions through questionable private programming. The key informants took major issue with these dental hygiene programs for both concrete reasons as described previously, but also based on more philosophical reasons. Specifically, this trend places dental hygiene education in technical institutes or career schools firmly entrenching dental hygiene at the technician level as opposed to being positioned as a higher learner along with other primary health care providers, health care professionals and decision makers. This movement was viewed as further eroding dental hygiene's access to gaining professional status or moving forward with the educational preparation that supports dental hygiene practice expansion.

The key informants witnessed this phenomenon as it was occurring and recognized it as a major negative influence and step backwards in the development of the dental hygiene profession. The full impact of this trend is not yet apparent, but because of the recent failures surrounding many of these institutions, in Ontario, a government mandate has

been imposed on these schools to meet accreditation standards or face closure. As an apparent response to the directive, several of these institutions suddenly closed their doors.(157) Interestingly, even when Universities and Colleges have formally supported expanding their own dental hygiene programming to offer dental hygiene degrees as opposed to or in addition to diplomas within their institutions, several key informants reported having personally experienced government intervening and prohibiting such advances to programming.

The key informants hypothesized about potential reasons for this obstruction to higher education including the avoidance of the "creeping credentialism" phenomenon, increased direct and indirect costs of expanding educational backgrounds, strong lobbying from organized dentistry and the state's own bias towards dental hygiene education. One key informant aptly expressed the view that government are people with their own bias too. This is an accurate statement as the state is is also gendered. The interweaving of these influences cannot be overlooked. For example, the creeping credentialism phenomenon has been occurring across the country in several health care fields where entry to practice requirements and, concomitantly, the educational programming was increased by a degree (i.e. Bachelors to Masters). The government began to aggressively ban this trend for various reasons, but the rationale largely surrounded the questionable benefits in relation to the increase in public costs to educating health care providers, limiting the availability of health care providers and potentially higher costs in accessing services. This being said, dental hygiene educators, and the key informants in this study, argue that, despite the costs associated with expanding educational requirements, dental hygiene education is in critical need of

change to develop curriculum that can support and address dental hygiene practice regarding the modern complexity of clients and the incremental expansion of dental hygiene scope and delivery models that is occurring.

Oral Health

Another major theme emerging from the key informant interviews was the influence of the dental hygiene profession operating within the oral health community as opposed to health care in general on their decision making capacity. While this factor was also briefly raised in the practice barriers section, according the key informants, this positioning in the private sector had at least two important negative influences on dental hygiene decision making capacity.

First, a general perception is that oral health care does not have parity with health care in general and, reportedly, this has limited oral health care providers, including dental hygienists', status from the perspective of various other groups including other health care providers, the state and the public. There is a persistent lack of recognition of the relationship between oral health and general health status. While the oral systemic link is increasingly being appreciated by the medical community, the importance of oral health to one's general health is only vaguely recognized. The key informants surmised that dentistry and dental hygiene alike are not considered to be 'life or death' health care professions and are therefore viewed to be less of a priority when considered in relation to heart disease, cancer and numerous other morbidities. This perceived lack of importance of oral health care to health has contributed to the lack of status of dental

hygienists and has helped perpetuate dental hygienists' lack of decision making confidence, autonomy and overall capacity.

The arrangement of oral health care existing outside of general health care has not been historically contested by dentistry despite limiting its perceived importance to overall health and well being. The key informants asserted that dentistry prefers its' segregated positioning because it maintains its autonomy from the state. The key informants postulated that dental hygienists may have benefited as far as their professional status, autonomy and decision making capacity is concerned, if they were assimilated with other health care providers in the general health care context.

According to the key informants, the second main influence of oral health care on dental hygiene decision making capacity is that dentistry and dental hygiene care is not part of the Medicare system and rather it operates as an entrepreneurial business versus like virtually all other health care professions. Most health care disciplines are primarily publicly funded and have some mix of private and public delivery and, while concerned about efficiency to some degree, are less motivated by profits. Dentistry was described by the key informants as the last of the cottage industries and is not mandated nor rewarded by providing care that is not reimbursed. The key informants were in agreement that as an outcome of this arrangement, dentistry is primarily concerned about its financial bottom line. Thus, dental hygiene, being positioned with dentistry, has been largely obliged to follow along with the dental profession's philosophies, which was strongly speculated here to limit dental hygiene decision making capacity.

Dental Hygienists as Followers

The key informants identified several factors that together emerged as the theme that dental hygienists generally tend to follow others rather than be leaders. The key informants noted that dental hygienists typically graduate from their training at a young age and are subsequently often employed by sometimes much older men. The key informants reported that the new dental hygiene graduates, being human, have an immediate desire to "fit in" and be liked and accepted in their new practice environment. The key informants described a situation where nascent dental hygienists lack the confidence, desire and maturity to challenge the status quo of the dental practice regardless of conflicts with their recent training and opt to defer decision making to others in the practice. Some of the key informants were quick to point out that educators prepare dental hygiene students for this transition to practice, but are frustrated by how ineffectual they have apparently been thus far.

The key informants report that a paternalistic relationship between the dental hygienist and her dentist employer ensues where the dental hygienist assumes her hierarchal position 'under' the dentist and is passively relieved of her rights and responsibilities. Despite the fact that dental hygienists have by far the most clinical and didactic training in their specialized field, they do not, as demonstrated in all phases of this study, perceive themselves as equivalent health care professional providers, and they fail to bring new knowledge to the practice. The key informants deduce that this is partly due to a combination of their inexperience in being autonomous, the dentist owning the practice and the failure of the profession overall to have strong representation and leadership.

Together, these factors are believed to act as a powerful negative influence on dental hygiene decision making capacity.

Female Dominated Profession

The key informants also reported on the influence of dental hygiene being a female dominated profession on decision making capacity. This influence was recognized as exerting itself on both an individual and more general level, and the impact was solely seen as being negative. The individual factors that were noted included that dental hygienists, being predominantly women, are the primary care givers in their families and their families are their principal concern. Thus, dental hygienists are less interested in owning and managing their own practice because of the associated responsibilities. Dental hygienists may be initially attracted to the profession based on its flexible work schedule, the well encapsulated work day and that, overall, allows for one to meet family obligations.

Further, the key informants hypothesized that women are socialized to be more subservient, less demonstrative of confidence and less willing to challenge of the status quo, thereby readily falling within the dental organization hierarchy. The key informants also pointed out that historically, and to a large extent continuing today, dentists, particularly the owner/operators, are male and the remaining staff, dental hygienists, dental assistants and receptionists, are female. The fact that dental hygienists being primarily women permits the profession to be readily consolidated together as part of "the girls" and presenting as an amorphous collective of auxiliaries—one indistinguishable from the other. This fusion of the women in the practice prevents other groups,

particularly the public, from differentiating the dental hygienists' role and responsibilities and distinguishing them as a unique profession.

From a more broad perspective, some key informants believed that dental hygienists lack strong leadership from within their ranks, which was also attributed to female dominance in the profession and contributing indirectly to the overall lack of decision making capacity. The key informants did not elaborate on how or why the profession lacks leadership. The key informants noted there were some dental hygiene leaders, but they were few in number and that it is necessary to help mitigate the subordination of the profession.

Economy

The next major theme that emerged from the key informant interviews was the influence of the economy on dental hygiene decision making capacity. Currently, the economy is believed to be exerting a negative influence. Specifically, the key informants indicated that a poor economy limits dental hygiene job opportunities, and therefore, dental hygienists are even less likely to be assertive in practice and challenge the status quo. In other words, the consequences of challenging the employers' practice philosophies and decisions are much more serious. Interestingly, none of the key informants made mention of whether this situation had been reversed when the economy was strong and dental hygiene positions were readily available.

All of the key informants indicated that work opportunities for dental hygienists are currently very constrained across Canada with some dental hygienists in some

jurisdictions not being able to secure dental hygiene employment. Clearly, if one has a position in this employment environment, one is careful to protect it and minimize risks to one's position. It can be rationalized that challenges to an employer or to employment philosophies can be delayed and can always occur in the future when employment options are less tenuous.

Views on Expansion of Practice

This was a potentially sensitive area of the key informant interviews and yet all interviewees were readily willing to share their strong but conflicting views on the subject. Two of the three key informants were supportive of the expansion of dental hygiene practice in having broader scopes and alternate practice settings, although one of these stipulated that dental hygienists need more experience working independently for this to occur effectively. Conversely, the remaining three felt strongly that dental hygienists, regardless of jurisdiction, require more educational training to support practice expansion.

While all key informants believed that having a Bachelor's degree was appropriate minimal entry to practice for expanded practice, these three felt expansion of dental hygiene practice should be conditional on expanding educational background. The feeling for these key informants was that the current educational background is insufficient to support dental hygienists working in alternate practice settings with the complexities of contemporary patients and providing the appropriate level of evidence-based care.

Table 19: Key Informant Interviews—Codes and Major Themes

Theme	KI	Specific influences (Notes and Emergent Codes)
Educational Preparation	1.;2; 3; 4; 5	Education too directive; too short; inconsistent, dh need higher education for respect; Dh not a respected profession DH not at table with others; Applicant pool attracts individuals that want quickie education; Dh lack education; Applicant pool attracts certain type; Dh don't value knowledge use; unskilled in knowledge acquisition; Education doesn't support ebdm; don't value ebdm; government has not permitted expansion of dh education; dh education is being eroded; accreditation body let education system down regarding private schools; current education model supports ongoing dominance of dentistry; Dh lack confidence; Lack of degree has negative influence; practice needs to be more linked to education; Dominance begins in school; don't believe in themselves; even between instructors; dental students given priority; dentists are there 4 years versus 2 years; dentists have decision making control in educational setting; Dh has been held back by the length of our program; lack of education determines lack post graduate work University programming more supportive of dh dm; well rounded educational model better than technical skills training; Training along side of dental students supports dh dm; Clinic is better now that instructors don't have to go to dentistry for every little thing
Practice Barriers	1; 2;3; 4; 5	Self regulation is a support, DH opinion is valued by health care workers versus by dentistry Dh don't work independently; government policy limits practice (state has biases too); Dentistry is primary employer; Dentistry controls dh lives; Dentistry concerned primarily about $$; Dentistry in private health care causes it to be a business; Dentist is business owner; the risk taker; Dentistry interested in turf protection; Organized dentistry supports current hierarchy; Dh rushing to get work done; Dentistry controls work opportunities; Employment environment limits; Work demands; dentist controls work environment; disconnect between education and practice; Practice is fee for service entrepreneurial environment; getting away from health care; doing what is "billable"; work around insurance codes; would be nice if they graduated and went into health care setting as opposed to the traditional setting; MDA is telling dentistry inaccurate info; still see dh in a certain way
Dental Hygiene as a Profession	1; 2; 3; 5	Dh don't work independently; Dh not a profession; its a job; Dh lacks leaders; Dh lack strong professional representation; Lack legitimacy in policy arena; Dh don't want extra responsibility of practice ownership; Lack of appreciation for dh perio skill and knowledge;; DHs have made themselves second class citizens;; they

		don[t see themselves as a fellow health care professional; dh do not go into environments that allow them to make decisions or have autonomy; they are expected to go into their 45 min appointment and accomplish a certain set of tasks; Prof association is a support; DH opinion is valued by health care workers versus by dentistry
The State	1; 3; 4; 5	government has not permitted expansion of dh education; dh education is being eroded; Government policy doesn't support dh dm; When DH was developing new legislation, their status was elevated; government runs the show; they did not see DH as being ready to be completely independent
Oral Health	1; 2; 3; 4, 5	Oral health not on par ; Dentistry concerned primarily about $$; Lack of connection to general health; Dentistry in private health care causes it to be a business; Dentistry is cottage industry; Dh work is not life and death; lacks importance; dentistry not connected to general health; dh not providing care along side of other health care providers; Dh is not part of public system; dh needs to interact with them
Dental Hygienists as Followers	1; 2; 3; 4, 5	dh are young; DH are subservient; Dh don't challenge status quo; Dh lack strong professional representation; Paternalistic relationship between dentist and dh; Dh lack confidence; Dh desire to fit in, be liked, be successful; Dh lack confidence and maturity; DHs have made themselves second class citizens; they defer; they don[t see themselves as a fellow health care professional; they see themselves under the dentist; but part of it is because they havn't been as autonomous; Takes a very strong 20 yr old to stand up to the entrepreneurial environment; they defer ; they see themselves under the dentist; Surprised that DH are not bringing in new knowledge to practice; because dh are the experts in their area of practice
Female Profession	1; 2; 3	work schedule; DH are subservient; Dh don't challenge status quo; Dh lack strong professional representation; DH are female and care primarily about their family; Dh don't want extra responsibility of practice ownership; Paternalistic relationship between dentist and dh; Dh lack confidence; Dh female profession has negative impact; "the girls" lumped in with other auxiliaries;
Economy	1; 2; 3; 4	Economic downturn decreases assertiveness; Dh don't challenge status quo; Poor economy doesn't support challenging status quo; lack of employment options; consequences to standing up to dentists' philosophy; Lack of jobs influences dh assertiveness
Other	3; 4	Individual characteristics; apathy (Dh enter with assumptions about dentists resistance to change; don't try)
Cross Influences	1; 2; 3; 4	DH not at table with others; Dh not a respected profession; Dh become followers; Dh are women; Dh don't work independently; Dh not a profession; its a job; DH are subservient; Dh don't challenge

		status quo; Dentistry concerned primarily about $$; Dh lack strong professional representation; Dentistry in private health care causes it to be a business; Lack legitimacy in policy arena; government has not permitted expansion of dh education; dh education is being eroded; accreditation body let education system down regarding private schools; Dh don't want extra responsibility of practice ownership; Paternalistic relationship between dentist and dh; Dh lack confidence
Supportive of Expansion??	**YES** 3: yes 5: yes; just need experience working autonomously	**NO** 1: requires better educational preparation 2: Does not support expansion in current educational model 3: requires better educational preparation

Chapter 7: Interpretation of Findings and Discussion

This study is unique in that the knowledge translation process, specifically dental hygiene clinical decision making, was examined within a relatively complex organizational and gendered theoretical framework and using a mixed methodological approach. It is important to recognize that applying this theoretical lens shapes the findings and the interpretation to a certain extent. In this way, the researcher has injected an inherent bias into her expectations surrounding the outcomes of the project. In its broadest sense, this study aimed to determine the influence of the organization on the decision making capacity of dental hygienists within a gendered perspective.

Thinking about the organization as being a key influence on knowledge uptake and decision making is relatively new in knowledge translational science, where the previous focus has been on individual clinician factors. In addition, the researcher applied a mixed methodology, which is also a departure from the positivist and rational thinking that has dominated knowledge translation research up until recently. Thus, this research reflects the paradigm shift that is occurring in knowledge translation research towards a more sociological examination of structure and agency. The researcher hypothesized, based on recent literature and previous failures to fully predict decision making in other health care contexts using traditional theoretical approaches, that organizational influences were key to not only understanding but ultimately promoting knowledge translation.

Making sense of research data is always a challenge for the investigator, but when conducting mixed methods research the complexity of meaning making is tremendous.

Fortunately, some guidelines for analysis and interpretation have been published, and, as discussed in detail in Chapter 4, these are dependent on the specific type of mixed methods the researcher has implemented. Because this study was, according to Creswell's typology,(124) an exploratory sequential design, the Phase I qualitative data set was analysed independently of and prior to Phase II. This allows for the Phase I data to be analysed and interpreted and then subsequently connected to the latter phase through the development of a dental hygiene decision making model, which provides the basis for the Phase II questionnaire survey. Thus, the first Phase is largely complete once it has been used to inform Phase II, while recognizing that previous knowledge cannot, nor is it desirable to, be ignored when interpreting Phase II data.

As discussed in the methods chapter, the Phase II survey questionnaire and key informant interviews were structured as somewhat of an independent embedded sequential mixed methods study of its own. These data sets were separately analysed and reported on above, but, conforming to true mixed methods design, interpretation of the qualitative and quantitative data sets should occur together while recognizing the major challenge this presents to the researcher.

As recommended by Creswell,(124) mixed methods interpretation requires the researcher to merge the data at some predetermined point. For this study the researcher opted not to 'transform' the data (i.e. qual into QUAN) but, rather, applied Creswell's alternate approach using the discussion section to present the findings from the primary data set (QUAN: survey questionnaire) and then use the secondary data set (qual: key informants)

to either support or refute the primary findings. The following provides the investigator's interpretation of the Phase II findings utilizing this framework.

The Phase II survey study was conducted with a 'census' of all registered practicing dental hygienists in Manitoba included on the regulatory body (CDHM) electronic list serve. The response rate, using the electronic list serve as the n, was considered to be adequate to good for conducting analysis given expectations surrounding survey research today. Because the study used a census rather than a random sample, testing for representativeness was not deemed necessary. However, the findings demonstrated that the sample was primarily homogenous with regard to demographic background. For example, the cohort demonstrated an expected curve in age distribution and had similar educational backgrounds, workloads, gender and practice settings. Given the sample was of registered practicing dental hygienists in Manitoba, their homogeneity regarding educational background was not surprising in that it was reflective of the Manitoba dental hygiene educational model.

This study aimed to explore the organizational influences on dental hygiene decision making, which, as previously discussed, is largely a cognitive component of the knowledge translation process. Understanding health care delivery variability to a large extent surrounds an assumption that the knowledge translation process has failed to be fully operationalized by practitioners. While some variability in health care practice is expected and appropriate, to a large extent it is attributed to overuse, underuse and mis-use of health care interventions and is a marker for suboptimal quality health care.(135;158)

It has been historically accepted within other health care contexts that the collapse in knowledge being translated into practice occurs early in the process as a failure in knowledge acquisition, meaning that clinicians lacked awareness of the evidence for various reasons, and were, therefore, not equipped to apply it to practice. More recently however, the literature is more clearly demonstrating that the failures in knowledge translation are not so much due to lack of knowledge, but rather in not applying it.(135;159)

As described previously, this part of the knowledge translation process has been referred to as the black box because it surrounds the poorly understood mental activities of deliberating, making decisions and, then, carrying those decisions out as intended. Knowledge translation research has primarily ascribed the failure to apply knowledge appropriately to practice based on individual factors. This study was unique in that the researcher believed that holding the individual responsible for failures in knowledge translation was too simplistic an explanation and, through this study, she aimed to determine the influence of the organization and gendering on knowledge translation failures.

Interestingly, it was found in Phase II of this study, most of the participants reportedly had high levels of decision making capacity with three quarters of the respondents indicating very high or high levels. The remaining 25% reported low degrees of decision making capacity. Thus, dental hygienists in this study by and large perceive having the capacity to make decisions regarding their clinical practice. While a proportion of 25%

having a lack of decision making capacity is disconcerting, the researcher anticipated that this figure would be higher given the focus group data, which showed the less experienced groups having far less decision making capacity than the more experienced group.

When tested with the larger cohort in the survey study, not only were the majority of participants found to have high levels of decision making capacity, interestingly, only a very modest positive correlation was shown between increasing experience and increased decision making capacity. While the key informants did not speculate on this point specifically, they did not demonstrate support for dental hygienists possessing the level of decision making capacity that was reported in the survey, and the key informants appeared to have a view that was more aligned with that of the focus group data.

The survey results may not be entirely surprising given the qualities inherent in self-reported data where respondents typically provide more socially acceptable responses.(160) In that the decision making capacity item in the survey instrument was a required field, participants may have also recognized the importance of the item and may have been more inclined to provide a positive response. Alternately, this may be a true reflection of these dental hygienists' perceptions surrounding their decision making capacity.

Considerable contemplation and discussion with the research committee surrounded an appropriate outcome measure for the survey, particularly in light of the lack of research that could be drawn upon. Consultation with statistical experts surrounding using

multiple items versus one singular item to measure the decision making construct also informed the decision to measure the outcome using one straightforward survey item.

In addition, previous knowledge translation work (i.e. PARIHS framework) has also used a single general conceptual construct to measure the outcome.(136) In that case, the researchers described their outcome measure as a general versus specific one and conceded that more specific measures are more concrete and measurable and therefore more interpretable.(136) However, they also note that these specific outcome measures are less available and that they found general measures to also show promising results in that they have been shown to capture variance and provide reasonably good predictions.(136)

Upon reflection, the researcher believes that these proportions are representative of this cohorts' perceived level of decision making capacity when measured as a global construct. Like in other fields, when one interprets one's competency, individuals tend to make overestimations in making global assessments about some kind of personal attribute, whereas more specific assessments seem to be more accurate.(161;162) Thus, the limitations of this measurement approach must be recognized when considering the findings.

Notably, there were no associations shown between decision making capacity and the demographic variables with the exception of gender, which approached significance. Males, while representing a small proportion of the overall sample, reported having higher levels of decision making capacity. This phenomenon has been reported on

previously in female dominated professions.(163) (For example, male nurses tend to have more perceived autonomy over their work than female nurses.(163)

Whether this is an outcome of the gendering of males in society in general or it is a manifestation of organizational influences of the dental practice is not known. However, the latter was not a supported explanation from the quantitative findings of this study in that gender influences were not strongly perceived with this cohort. However, as discussed earlier, 'silences' in qualitative data are of significant note to the researcher, and do not necessarily reflect a negative response.(150)

While there were definitive 'silences' from the clinical practitioners on the influence of gender, the key informants refuted this finding and reported on the significance of gendering in the practice in several ways. First, practice owners were identified as being predominantly men and older than the young, nascent dental hygienists initially coming into practice and being acculturated into the hierarchy. Dental hygienists age, sex and lack of educational preparation reportedly contribute to a lack of maturity and confidence and a paternalistic relationship ensues between the employing dentist and the dental hygienist, diminishing the latter's decision making capacity. Such a hierarchal relationship may not develop to the same extent with new male dental hygienists entering the workforce who may have a much different experience, which is hypothesized as having an influence on their ultimate decision making capacity.

A seemingly contradictory finding from the survey data surrounding decision making capacity was that 70% of the dental hygiene participants reported that decision making was centralized, meaning that decisions typically stem from a central administrative point rather than being in the hands of the worker. This seemed incongruent with the self-reported decision making capacity as described above and also with another finding that only a third of the participants detected a hierarchy in their practice organization.

The key informants appeared to agree more with the quantitative data regarding centralization believing that decision making is more likely to be emerging centrally. They provided several rationales for this that seemed to emanate either from the dental hygienists themselves or alternately were more structural. In the former case, the key informants rationalized dental hygienists as individuals lacking the confidence, education, interest in and knowledge rights to be key decision makers. On the other hand, from a structural perspective, centralization was believed to be a product of the employment structure, poor economy and legislative decisions, such as who can make a 'diagnosis' or prescribe radiographs or medications to name a few.

When organizational features were examined according to organizational theoretical constructs, the sample took on a normal frequency distribution. For example, a third of the respondents were reportedly situated in simple organizational structures whereas a third in complex structures with the remaining falling in between. As described previously, simple structural organizations are those having low levels of differentiation, meaning having few departments with little hierarchy between them, and low levels of formalization in the decision making processes. Hypothetically, these features support

decision making capacity of the workers, but, in this study, working in simply structured organizations was only very weakly associated with the outcome measure. Similar findings were found surrounding organic (simple, decentralized and informal) versus mechanistic (complex, centralized and formal) organizational structures. Thus, these theoretical constructs from organizational literature were not supported by the quantitative findings.

While not surprising, the key informants did not discuss the specific theoretical organizational arrangements in practice except highlighting dentistry's autocratic leadership style and, therefore, their ultimate control over decision making. This did align with organizational theory in that, of the levels of differentiation within the dental practice, there is a significant hierarchal difference between the top and the remaining departments. This finding is more supportive of organizational theory regarding the influence of structure on decision making capacity as opposed to the influence of the individual. It was interesting to the researcher that dental hygienists in the survey did not recognize the hierarchy, and rather typically viewed their practice as operating as a team.

Because of the theoretical associations, several specific items in the questionnaire were tested for correlations with outcome measure, but none of these showed a strong association. Strong employer dominance over one's decision making and having a high investment in one's own practice both showed moderate, negative and positive respectively, correlations. These examples both make intuitive sense, and the former was addressed indirectly by the key informants. They were in agreement with the finding in that they commented on the important influence of dentistry's control and dominance

over dental hygiene practice overall and their decision making capacity specifically. As discussed in the results, the key informants attributed this dominance to several factors operating together including the dental hygienists' educational background, practice barriers, legislation, gender issues and the nature of the dental hygiene profession itself.

The remaining specific items of interest from a theoretical perspective examined in the survey (i.e. conflicting goals, freedom, power, knowledge production, lacking knowledge, negative gender influences, autonomy, feeling inferior, practice hierarchy) demonstrated only modest to negligible associations with clinical decision making capacity. However, the influence of these factors seemed to be more obvious to the key informants. They spoke about virtually all of these issues in respect to their having a negative influence on decision making capacity of dental hygienists. For example, according to the key informants, those individuals attracted to the dental hygiene profession and the lack of educational background have together affected dental hygienists' knowledge rights and the value they place on the use of knowledge. In addition, dental hygienists coming to practice are relatively young and lack credentialing and enter practice without the maturity and confidence needed to place them on equal ground with the dentist employers thus limiting their decision making capacity.

While the preceding singular survey items provide some insight into specific influential features on decision making capacity, of particular interest to the research overall is the determination of associations of the summary scales in relation to the outcome measure. These summary scales were developed to determine if and to what extent the features of the conceptual model were influential on decision making capacity. Prior to testing the

overall model, each of the summary scales was tested individually for its association to decision making capacity to provide an overview of their influence as independent features.

As indicated in the results, the Individual Characteristics Scale had a mean score of 23 with a possible maximum of 33, and the frequency distribution was positively skewed to the right. The Individual Characteristics Scale had a moderate positive correlation with the outcome measure, meaning that as the Individual Characteristics Score increased, so did decision making capacity. What was particularly outstanding to the researcher was that this Scale exhibited the strongest association to the outcome measure when compared to all of the other summary scales.

This was particularly interesting in respect to the researcher's hypothesis where it was asserted that organizational factors would be stronger predictors of decision making capacity than individual characteristics. It was the researcher's contention that organizational factors would prevail in their importance over individual features such as personality and attitudes in regard to decision making capacity. The key informant interview data however sheds some light into this somewhat perplexing outcome in that, from the key informant perspective, many of the individual characteristics included in the survey are generally attributable to the broader environmental and social features.

For example, several individual items such as confidence, assertiveness and discomfort with decision making comprising the Individual Characteristics Scale may be outcomes of several of the environmental themes that emerged from the key informants including

educational preparation, practice barriers, the dental hygiene profession and dental hygienists being followers and primarily being female. As discussed previously, the lack of educational preparation for dental hygienists reportedly attracts a specific pool of applicants and then inadequately prepares dental hygiene graduates to be confidently positioned along side of dentists. Accordingly, they key informants explain that the lack of decision making capacity is indirectly attributable to the social influence of dental hygiene education, which operates through various individual personality characteristics.

In addition, other individual influences including apathy, acting as a change agent, attitude, affiliations and others would, according to the key informants, also be indirectly attributed to various environmental influences. For example, negative attitudes and apathy may be a long-term outcome of lacking the freedom to practice according to one's training and beliefs rather than possessing these as personality traits when first entering practice. Thus, from these findings, it can be summarized that rather than individual or direct organizational features being influential, it is the more broad social environmental influences that were shown to be important: who is attracted and recruited to the profession, how and to what level are they educated, what constraints do they later practice under and how oral health fits within overall health care are all important considerations in thinking about dental hygiene decision making capacity.

All of the remaining summary scales demonstrated expected positive associations, albeit these were only moderate to negligible correlations. Both the Practice Attributes Scale and Practice Limitations Scale had modest, positive and negative respectively, correlations to the outcome measure. Thus, as the practice became more or less

supportive of decision making, reported decision making capacity increased or decreased accordingly.

The key informants were largely in agreement with the survey findings regarding the Practice Limitations Scale. As the key informants primarily identified negative environmental influences on dental hygiene decision making capacity, they predominantly commented on practice limitations, as opposed to practice attributes. They asserted that the business emphasis on practice, the predominant focus on production and how these factors create conflicting goals between the employer and the dental hygienists were key issues imposing limitations on dental hygiene decision making capacity.

Specifically, the key informants were in agreement that the dentists as owner/operators of their practices were most concerned with profits and running a successful business over evidence-based decision making. While one may think that being both financially successful and patient centred can be congruent goals, the central focus of production was described as being an overwhelming preoccupation. The dental hygienists were believed to be more likely, as hourly wage earners, to be interested in making decisions based on patient need, and this created conflicts between the dentist and dental hygienist practice goals.

In addition, regarding the practice limitations on decision making capacity, the key informants were in agreement with the survey results in reporting on the employer 'taking' responsibility for and exerting dominance over decision making as the practice

owners have greater credentials, possess higher status and control the work environment overall. Further, the key informants highlighted the influences of gender, dental hygienists' perception of being inferior and their lack of decision making freedom. Thus, the key informants were well aligned with the negative influence of Practice Limitations Scale survey findings on decision making capacity.

The Knowledge Incorporation Scale also demonstrated a moderate positive correlation with the outcome measure indicating that as the score increased, so did the dental hygienists' decision making capacity. Some of the items comprising the Scale included the dental hygienists' comfort challenging the status quo, using current evidence in practice and who possesses and controls knowledge and it use in practice. The key informants concurred with the value of these influences in decision making capacity, and they were also cognizant of the limitations surrounding dental hygienists' knowledge use. They attributed these limitations in knowledge rights to some of the general environmental factors previously identified as being as being influential to other organizational scales. Some of these limitations include dental hygiene educational background, the practice barriers, the influence of the profession overall and dental hygienists taking the role as followers.

The Practice Distillery Scale also had a marginally moderate positive correlation with the outcome measure. The specific items comprising the Practice Distillery Scale were such that they could be facilitative or restrictive to decision making capacity depending on the particular practice. For example, some of these factors include communication, decision

making participation, autonomy, financial issues, practice hierarchy, seniority and teamwork.

Some of the items from the Practice Distillery Scale were indirectly supported by the key informants as being important in decision making capacity. For example, items such as communication and decision making participation, which could have been reported by individual participants within the survey as being supportive or restrictive to decision making capacity, were identified by the key informants as areas dental hygienists may lack confidence in and be potentially limiting to decision making. Additional survey items comprising this scale such as financial issues imposed by the practice environment, autonomy and the practice hierarchy were also highlighted by the key informants as practice barriers potentially limiting decision making capacity of dental hygienists. The remaining scale items, including seniority and teamwork, were neither supported nor refuted by the key informants.

The Decision Characteristics Summary Scale had a modest positive association with the outcome measure. This Scale was comprised of several potentially influential items surrounding decision making: patient influence, strength of the impact of the decision (i.e. how serious), decision discretion of the dental hygienist and timing of a decision. The former three of the four items were more obvious to the researcher regarding being supports to decision making capacity, while the latter item, timing of decision, may be more ambiguous as to whether it is supportive or obstructive to decision making. The scale was calculated in such a way that should the timing of the decision be perceived to have an impact, then it would be given a lower score; thus, a higher score reflects a more positive influence. This was determined because, during focus groups, it was clearly

identified that the resource demands of the organization at a given time did often affect the dental hygienists ability to make and carry out decisions. Thus, her/his control and autonomy over decision making was mitigated by timing in a negative way.

These influences did not emerge in the key informant interviews in a significant way and therefore, this scale was not well supported or refuted by the key informants. The only one of the four items indirectly addressed by the key informants was decision making discretion of dental hygienists where the key informants had significant discussion surrounding the structure of the dental practice being highly limiting to dental hygiene decision making capacity. Key informants were cognizant of the constraints dental hygienists face in their own practice decision making.

Interestingly, the Practice Structure Scale had a negligible correlation with decision making capacity. As discussed earlier, the items comprising this scale emerged from the organizational theoretical literature rather than inductively through the focus group interviews. According to the researcher, these items were deemed to be key theoretical components that needed to be tested in the survey. Items included the perceived hierarchy of the practice (differentiation) and the level of formalization and centralization within the organization. It was somewhat surprising that the summary scores from the survey were not found to be associated with the outcome measure. However, as discussed earlier, these factors did emerge from the key informants and thereby refuted the survey findings. More specifically, the key informants reported on the level of centralization, formalization and the practice hierarchy and their collective impact on decision making capacity, and they attributed these to broad social and more local organizational factors rather than to the individual characteristics of the dental hygienist.

Calculations of correlations between each individual Summary Scale and the outcome measure provide only a general sense of their relationship to the outcome measure and, as mentioned previously, these calculations do not take other variables into account. In order to get a sense of the overall picture, the major aim of the study was to develop and then test the strength of the proposed model of dental hygiene decision making. Through ordinal logistical regression analysis, determining the best predictors for the outcome measure can be determined.

Unexpected results were again found: the final model included the Individual Characteristics Scale and the 3-year dental hygiene program of graduation. This is surprising because, as discussed, individual factors were not hypothesized to contribute as a key influence on decision making capacity and, yet, this scale not only did appear in the final model, none of the other predictor scales from the hypothesized model emerged. Further, the dental hygiene program of graduation was also a surprise finding as it was not a predicted key variable in the decision making model.

Thus, in the presence of each other, the Individual Characteristics Scale and graduating from the three-year dental hygiene program were positively associated with increased decision making capacity. As discussed previously, the key informants were strongly supportive of the indirect influence of environmental and social features on dental hygienists' individual characteristics, which then in turn had an important impact on dental hygiene decision making capacity. The key informants asserted that the broad overarching social influence on who is being attracted to the profession of dental hygiene

in the first place, how these students are subsequently educated and then the environment that they practice within together contribute to their individual attitudes and behaviours.

It was particularly interesting that the three-year educational program was found to be a significant predictor of decision making capacity in the final model along with the Individual Characteristics Scale. As discussed previously, the key informants were most articulate about the influence of educational preparation on dental hygiene decision making capacity both directly and indirectly and had identified various negative impacts of dental hygiene education on their practices.

Longer educational programming is believed to be associated with better critical thinking and decision making skills,(164) and the key informants were in agreement with this. However, given that in Manitoba the three-year dental hygiene program replaced the two-year program in 1993, a change from 99 credit hours to 75 credit hours respectively, the researcher postulated that its' significance in the final model may be related to the 3-year program graduates being more recent and/or younger rather than educational preparation itself.

This possibility needed to be investigated. From the demographic data it was demonstrated that 35% of the sample graduated from the longer 3-year diploma program, while 52% graduated from a two-year diploma program. Analysis of associations between dental hygiene program type or the age of dental hygienist and the outcome measure failed to show any results beyond a negligible correlation meaning that neither was individually associated with the decision making capacity. Thus, findings

demonstrated in the final model may lend support for the importance of the longer educational program to decision making capacity when in the presence of the supportive individual characteristics. Such an overall conclusion would be supportable from the perspective of the key informants who believed strongly in the importance of longer educational preparation and the labyrinth of influence it generates including its impact on what are seemingly individual characteristics.

This is an interesting and central point. The key informants were particularly critical of the educational preparation of dental hygienists in that it influenced who was attracted to the program, how they were subsequently educated and, finally, how they integrated into the dental practice once graduated. These factors acted synergistically, albeit negatively, on dental hygienists' decision making capacity in practice in several ways. An important idea emerging from the key informants was that rather than dental hygienists individually possessing poor decision making personality characteristics or traits, the key informants believed that the broader social-environmental factors were indirectly responsible for these limitations. They strongly articulated that without significant changes to dental hygiene education, improvement in dental hygiene decision making capacity would not likely occur and would fail to support expanded practice.

Reflecting on the perspective from the key informants, the qualitative data largely supported the final model emerging from the quantitative data. It was extremely interesting to the researcher in that, initially, the model seemed somewhat erroneous. However, through the merging of the quantitative and qualitative data sets in the interpretation, the meaning making has been profoundly clarified. While the researcher's

hypothesis surrounding the influence of the organizational factors on dental hygiene decision making lacked support in this final model, based on the merged findings, one can appreciate that individual characteristics per se were only indirectly responsible for dental hygiene decision making capacity. Rather, the merged data interpretation demonstrated that broad environmental factors exerted a complex influence on individuals' decision making attitudes and behaviours and how individuals negotiated the practice barriers imposed on their decision making capacity.

Chapter 8: Limitations of the Study

With the potential policy applications of this research in mind, it is important to be critical of the limitations of the research and these should be recognized when considering the findings. Three major limitations surround this large mixed methods study: 1) the use of self-reported data; 2) the psychometric evaluation of the survey instrument particularly surrounding the outcome measure; and 3) the unknown sample size. All three of these factors have been discussed somewhat in the preceding chapters, but further discussion surrounding their implications is warranted.

First, the concerns surrounding the use of self-reported data have been well described in the literature.(160;165) While the advantages of using self-reports are clear and include lower costs of conducting research and the feasibility of carrying out research, the apprehensions about using self-reported data primarily surround issues of reliability particularly about absolute figures.(165) For example, if comparisons are being made, relative values are likely to be reasonably aligned, but the accuracy of absolute figures presents a greater challenge.

This study used self-reports in all phases. Focus groups and key informant interviews by nature utilize self-reported data and this is considered to be a strength of qualitative research. Questionnaire data on the other hand falls within the quantitative paradigm and therefore under the scrutiny of quantitative methods. The validity of this survey instrument was based on traditional and contemporary perspectives of validity, (134;145) developed through a recommended four-step approach,(134) appropriate scale of

measurement used, care in developing response format and item writing, use of multiple items for scales and ensuring uni-dimensionality of scales.

Despite this process, the primary concern in this research is of the validity of both the independent and dependent variables emerging from the survey data. Particular attention surrounds the participants' need to provide socially desirable responses, which would elevate a number of values within the data collected. It was noted by the researcher that some of the results did seem to be higher than expected, particularly the outcome measure. Social desirability bias occurs when an individual does not adhere to a social norm but reports doing so when questioned.(166) Such responses can be triggered by the scale's content, the context and the personality of the individuals being surveyed, and this can lead to artificially inflated scores.(134)

While the researcher concedes that some risk of such a bias exists, a reasonable level of confidence can be made when interpreting the findings for three main reasons. First, the study subjects were unaware of the centrality of the outcome measure survey item or the impact of any of the other items and there is no clear social norm regarding most of the measures in the questionnaire. In fact, the researcher's hypothesis and the organization of the survey items are largely veiled from the participants. Second, the survey items permitted participants to respond on a likert scale rather than as dichotomous responses therefore allowing for a more reflective and individualized response. Finally, ensuring the context permitted anonymity of respondents mitigates social desirability bias.(134)

The second main limitation of the study surrounds the psychometric evaluation of the ad hoc survey instrument. A main concern is the use of a single questionnaire item for the outcome measure rather than a scale comprised of several items. As previously discussed, this was a conscious decision based on input from the researcher's committee, statistician and the literature. In that decision making is a complex, cognitive activity, it is difficult to measure through observational measures or through a more specific and concrete measurement item. As previously stated, the use of single items to measure global constructs have been demonstrated to be reliable.(136)

However, using a single item to measure a particular construct contradicts the premise that longer scales with more items have been demonstrated to be more reliable.(134) Lengthening a scale can balance out artificially high and low responses.(134) In addition, the use of a single item negates the potential to statistically test for reliability of score through testing for inter-item correlations. Thus, further investigating the alignment of this single measure with a scale constructed of several items is worth pursuing.

An additional weakness in the psychometric quality of the survey instrument surrounds the values obtained for the Cronbach Coefficient for two of the scales: the Practice Structure Scale and the Decision Characteristics Scale. The Cronbach's Alpha is a measure of how well the individual items included in the summary scale correlates to the sum of the other items, or, in other words, the consistency among the items included in the scale.(167) Five of the seven scales had values greater than 0.7, which are considered to be acceptable, but these two scales had values of less than 0.3.(167) Interestingly, both of these were shorter scales comprised of 4 items compared to the

other 5 scales, which had 10 or more items. Longer scales typically result in higher Cronbach alpha values and very high values (> 0.9) are sometimes attributed to redundancy within the scale.(167)

It is unknown why these scales had such low values. Because the Practice Structure Scale emerged from the theoretical literature rather than empirically as an outcome of the focus groups, it may be hypothesized that the items were not reliable measures of the construct. The Decision Characteristics Scale was a finding from the focus groups, but, perhaps, requires more development to determine more and more reliable items to include in the scale. Regardless, this limitation should be evaluated when considering the findings overall. However, it should also be noted that neither of these constructs were found to be significant in the final model or in the final interpretation, and therefore, the lack of reliability may be of minor importance.

The third major limitation is the unknown sample size, which in retrospect, the researcher concedes could have been avoided. While the intention to reduce the bias that would have resulted by only including the list serve in the study was valid, it created an unknown sample size. It is believed that few participants entered the study from outside of the list serve, but this cannot be known with certainty. Therefore, the final response rate is an estimation. It is believed that this estimation is reasonable, likely conservative and that it permits the researcher to draw conclusions that are representative of the dental hygiene population in Manitoba given the use of a mixed methodological approach and the triangulation of methods, which provides additional confidence in the findings.

All research methods are fallible and each present unique limitations; specifically, qualitative methods (i.e. interview methods) and quantitative methods (i.e. survey methods) each have inherent disadvantages. Weaknesses can be diminished by applying appropriate rigor for that research paradigm, but imperfections persist. Using triangulation of methods has been advocated to help offset the limitations of any one research method when one is attempting to replicate findings.(168) However, in this research, triangulation was used in a mixed methods context, and therefore is aimed at providing depth and multiple understandings rather than simply providing corroborative evidence.(168)

Thus, one must expect that using mixed methods as a separate research paradigm will itself produce unique limitations beyond those presented by its component methods.(168) Bazeley describes several of these limitations including the philosophical issues of mixing separate research paradigms (or neglecting to report on this), failing to be explicit about the rationale to use a mixed methods approach, unsuccessfully truly integrating methods, confusing triangulation with mixing of methods, corrupting one or more methods used including sampling issues and analysis (i.e. coding, quantifying qualitative data) and, finally, the researcher's limitations.(168)

In this research, it is asserted that the use of mixed methods was appropriately applied given the clear purpose of the research, its philosophical and theoretical underpinning, the explicit reporting, systematic and methodological rigor. Bazeley states that "mixed methods are inherently neither more nor less valid that specific approaches to research."(168) Instead, the validity of this mixed methods research are based on its appropriateness, thoroughness and the effectiveness of its' application.(168)

Chapter 9: Policy Implications and Concluding Remarks

In order to mitigate oral health disparities observed in a substantial proportion of Canadians, and Manitobans specifically, government is seeking solutions for improving access to oral health care.(6) Potential solutions to policy problems are arrived at when policy is being developed, and this highly nuanced process is affected by various constraints.(67) Policy changes can take on varying levels in respect to the degree they depart from the status quo.(67) Furthermore, policy subsystems may vary in receptivity to new ideas and new policy actors, such as organized dental hygiene.(67)

While it is asserted that a radical reorientation to preventive care is required to make substantial improvements in access and oral health care disparities,(16) as discussed earlier, government is hesitant to make broad-stroke types of policy changes for several reasons. These include the political sensitivity of comprehensive changes and the difficulty quantifying and attributing the positive outcomes to the intervention.(16;67) Thus, policy actors need to be contented with approaching policy change in alignment with the more incremental nature of the policy process.

Government has many different tools at its' disposal for implementing policy change, and, for health care, a commonly used tool is regulation.(67) Decisions over tools is a policy choice,(33) and, therefore, interest groups often bring both the policy problem and recommendations regarding the tools forward to be used to achieve goals. In formulating its choice in policy tools, government will want to know the resource intensiveness, organizational capacity, the political risk and how sustainable the instrument is.(33)

Documentation from powerful groups, such as the IOM, is beginning to be published that supports changes to the way oral health care is delivered, which includes expanding allied health care providers' roles and delivery options.(7;18;169) As changes to policy are being considered and formulated, policy makers need more specific information as questions arise about the issue.(33) Questions will surround the nature of the policy issue, such as clear definitions, causes, effects and what has been done in the past, such as existing programming.(33) In addition, policy makers will be particularly interested in the benefit of the proposed policy, its costs, timeframes and political risk—information that is difficult to quantify and assimilate.(33) While surveillance of oral health measures is beginning to improve in Canada, many unknowns surrounding the impact that expanded dental hygiene interventions could make and the capacity of dental hygiene to take on a primary health care role specifically surrounding their ability to translate knowledge into practice and make sound clinical decisions.

Dynamic policy networks are comprised of members all with an interest in the proposed policy, but these interests or the tools recommended to address the problem are often not agreed upon.(67) For example, while dentistry and dental hygiene have both publicly denounced lack of access to oral health care and the resulting oral health disparities, their respective approaches to instrumentation have been largely in opposition and this has created conflict. Dental hygiene has anticipated changes to its scope of practice and delivery models for quite some time and is therefore highly motivated to see that practice expansion policy is implemented, but their efforts have been opposed by dentistry.(26)

This study has yielded interesting findings that will be helpful in informing dental hygiene and influencing the state as they make strides together in developing new policy. The most important finding from the study is that dental hygiene's educational programming is critical impediment to dental hygiene decision making capacity. In order for the broad policy change of practice expansion to be implemented, it is clear from this study that dental hygiene education requires serious attention at the state level.

While government may have had a rationale for limiting the expansion of educational preparation of various health professions in the past, it is asserted here that the pendulum may have swung too far in that direction and now requires a more moderated position to ensure that policy change can effectively and appropriately occur. Several shifts in entry to practice requirements for various health professions, like nursing and occupational therapy, had triggered a resistance from government to support escalating degree requirements. For example, occupational therapists have recently made a Professional Master's degree the entry to practice requirement.(170) While the suspension of expanding educational preparation for entry to practice may have eased somewhat, arguments still exist surrounding the associated increased costs, unjustifiable grounds and limiting the available workforce .(171)

It is concluded, based on the findings from Phase II of the study, that three key policy issues will need a collective reorientation to support an expansion of dental hygiene practice that is necessary for dental hygienists to make a significant contribution towards addressing unmet oral health care needs. These three aspects are the dental hygiene

educational preparation, the dental hygiene applicant pool, and dental hygiene practice structure, and all three are largely integrated.

Dental Hygiene Education

There is a current movement among Canadian dental hygiene educators to improve the alignment of dental hygiene education across the country.(171) For example, dental hygiene entry to practice in Canada is at the diploma level (and equivalent in the US), which is delivered in colleges and universities, but some jurisdictions offer dental hygiene education in private vocational settings or technical colleges, whereas in others, students graduate with Bachelor's degrees granted from university institutions.(60)

It was asserted by the key informants that the educational preparation of dental hygienists, with the exception of Bachelor's programs, does not support the complexities of current practice where patients are presenting with increased morbidity and the research in all areas of practice is expanding and the demands for implementing evidenced-based care are intensifying. The traditional 2-year diploma program was able to support graduates in their traditional technical role prior to the evidence-based era, but it is no longer viewed as being a viable model for preparing graduates for the critical thinking, knowledge use and decision making required for the contemporary dental hygienist. Thus, regardless of the shape practice expansion takes, more robust educational preparation was strongly found to be warranted.

Furthermore, improving dental hygiene educational preparation has the potential to alleviate some of the main practice issues that have limited dental hygiene decision making capacity within current practice structure. For example, an education that results

in credentialing for dental hygiene that is more on par with the dentistry is proposed to promote dental hygienists that demonstrate increased confidence and competence in knowledge use, acting as a change agent and challenging the status quo. Thus, both perceptual and substantive improvements in dental hygiene decision making capacity are possible outcomes for not only traditional practice, but also for an expanded environment.

Dental Hygiene Applicant Pool

Changes to dental hygiene educational preparation also has the potential to influence the applicant pool that is attracted to dental hygiene programming. Key informants identified the point that the current educational structure attracts predominantly young, females interested in securing flexible jobs in contrast to individuals aspiring towards higher levels of education that lead to professional careers. The latter is believed to be more supportive of attracting individuals that would be less agreeable to the current practice hierarchies and dentist patriarchy and dominance over practice. It was also noted that professional career education would also increasingly attract males.

The importance of gendering of the workplace cannot be ignored. While the survey respondents were somewhat silent on the issue, data did emerge demonstrating the small cohort of male dental hygienists have greater decision making capacity. The key informants strongly reported on the impact that a female dominated profession has on its power to act both individually in practice and collectively as a professional body. An applicant pool attracted to degree programming and professionalization would likely be less compliant to dentist/owner dominance and control over decision making and would assume greater responsibility for knowledge translation in general. Similarly, the

dentist/owner may be more amendable to negotiating with a higher calibre dental hygienist particularly when conflict surrounding patient–centred care arises.

Dental Hygiene Practice Structure

Broadening dental hygiene practice structure means expanding what dental hygienists do (scope of practice) and where they do it (alternate delivery models/practice settings). Expanding options for practice settings has the potential to make very important contributions to mitigating unmet oral health care needs, and, as a policy recommendation, it has been supported in numerous publications.(6;20;26;32;54) As mentioned earlier, dental hygienists have historically been required through restrictive legislation to provide their services under the supervision of a dentist.(26;32) There is a range of supervisory levels inherent with various legislative restrictions from direct supervision to general supervision, which permits a dental hygienist employee to provide services to the supervising dentists' pre-assessed patients while the dentist is physically absent.(60) This latter interpretation of supervision has done little to improve public access to care. However, there are other connotations of health care provider supervision that are observed in Canada and the US that are reflective of policy discourse and compromises between groups, and these variants have to varying degrees improved access of the underserved to oral health care.(28)

Relaxation or entirely removing these legislative restrictions would permit human resource substitution and is recognized as an effective means of shifting care to less expensive practitioners and providing more preventive interventions while containing costs.(22;26) However, in the case of oral health care, the greatest potential for this expansion would be that dental hygienists could provide their services in alternate

settings where dentists have historically failed to provide services thereby making preventive services accessible to the previously underserved.(20;26;28) The findings from this study support dental hygienists providing care in alternate settings, but with the caveat that educational preparation should be better aligned across the country and ideally expand to a degree level to support knowledge translation efforts and evidence-based sound clinical decision making.

There has been a history of mal-distribution of dental providers,(6) and the traditional dental office is described as a systematic barrier to oral health care.(20) The Federal Provincial and Territorial Dental Directors asserted that alternate delivery systems are needed and that inequities in care can only be mitigated if new delivery models are tailored to reaching the disadvantaged.(13) For example, long term care facilities, mobile vans for the homebound and established community care settings are prime examples where dental hygienists could be providing care but are currently prevented from doing so within current provincial legislation. Canadian dental hygiene students are, more and less, educated and trained to provide services in these settings with these populations. Dental hygiene services are more portable and relatively less expensive compared to dental services, and, further, while the dentist to population ratio is decreasing,(54) more dental hygienists are graduating each year.(60)

Dental hygiene employment options are significantly restricted under current provincial regulations as evidenced by the fact that over 95% of dental hygienists work in private dentist owned and operated offices.(60;156) The public has been largely satisfied with their oral health care in that middle and high socio-economic groups typically have

comprehensive dental insurance and are unaware of, and therefore silent about, oral health care disparities.(25;28) The marginalized sub-population groups who have the most to gain from the expansion of dental hygiene care are ill-equipped to launch or support policy campaigns.(25;26;28)

Broadening scopes of practice refers to expanding the list of procedures a health care profession does, (26;32) and such an expansion would be most beneficial if combined with an expansion of delivery models. Scopes of practice are part of virtually all health provider legislative regulations and are, therefore, difficult to change. Changes, in the form of expansions to scopes of practice, have been recommended in the literature for decreasing oral health disparities.(6;12)

Considerable conflict results from discussions about policy changes surrounding this type of expansion because, regardless of identified need, changes in scope typically involves one professional group encroaching on another, usually more elite, profession's turf. Canadian dental hygienists are experienced in this conflict as they have gained expansions in giving local anaesthetic and prescribing medications in some jurisdictions, which are traditionally within dentists' and physicians' scopes, and have had to justify these expansions in response to resistance from other groups.(60) Dental hygienists are seeking to have a more nationally uniform scope of practice and expand on their current scope of practice. Again, educational preparation will be key in ensuring that these expansions can occur.

Expanding scopes of practice can improve access to care and reduce health care disparities in various ways such as facilitating a profession in working

independently.(26;32;62) For example, regulation that permits taking radiographs allows a practitioner to conduct a comprehensive assessment. In addition, expanding scopes of practice may permit the provision of a specific high-need service. It can also simply permit the delivery of a service that a group of practitioners are already trained to do and in some cases are doing, but legislation has not kept pace with reality.(32) However, it is important to note that many health care procedures may be technically relatively simple but have complex theoretical underpinnings and be deceptively complicated in application, and therefore require careful consideration prior to including in an expanded scope.

Where government decides to implement new policy, they will be keenly interested in knowing how well the policy is achieving its goals.(67) Evaluation of policy is essential for ensuring accountability in using public resources and determining how to proceed long-term. Policy analysts are dedicated to evaluating policy outcomes using techniques designed to evaluate the cost to benefits and other performance measures.(67) In addition to government, any group interested in the policy development and implementation (supportive or otherwise), and potentially others including the public, will be interested in the outcomes.(67) Organized dental hygiene and public oral health organizations, such as the Federal Provincial and Territorial Dental Directors, have an expressed interest in mitigating oral health disparities and they will be keenly interested in outcomes evaluation. Organized dental hygiene on local, provincial and national levels should be involved in the ongoing monitoring of how these recommendations have been implemented and measuring success based on dental hygiene interventions provided and oral health status measures.

Policy researchers work with policy makers, and their staff, to create lasting relationships, generate understanding about issues and educate on new research and developments.(33) If new Statutes or Acts are necessary to implement policy, then both politicians and public servants will be required along with interest groups in providing support and research.(67) Where legislation exists and new regulations are the policy tool, interest groups work closely with government to write and consult on their development,(67) and it is not uncommon to have adversaries involved in this process to assist in developing a compromised and incremental final product.(67) It is hear that research is particularly important to refute erroneous challenges that these groups may present.

Future research will likely be needed surrounding measuring and evaluating the various outcomes of policy changes that have been advanced as part of this work. Primarily, public oral health and dental hygiene groups will be interested in measuring if access to care and oral health status of sub-population groups has improved. These are both complicated outcome measures and will require substantial timeframes to observe improvements. But, in addition to these measures, evaluating the outcomes of expansion to dental hygiene education will be warranted. It is important to state that the knowledge translation process, and decision making capacity specifically, demand further research in determining dental hygiene's progression particularly where educational preparation is expanded. Evidently, these are long-term policy changes with equally long-term timeframes for realizing and measuring their outcomes. Thus, it will be essential that policy interest groups and researchers identify short-term policy and measurement goals in order to maintain government support and momentum.

The investigator believes that this study has provided valuable insight into a complex phenomenon using a complex methodology. While the findings were somewhat unexpected and initially perplexing to the researcher, using the guidelines from mixed methodology, the researcher was able to interpret the complicated data sets and make meaning from the findings. The researcher was particularly stimulated by the outcomes afforded by using the mixed methodological approach. At the outset of the research, the investigator had only a rudimentary understanding surrounding mixed methods. The synergistic interpretative outcomes directly resulting from applying mixed methods in its strictest sense was as elating as the findings themselves to the investigator. This researcher sees a great value to utilizing mixed methods when studying complex phenomenon such as knowledge translation.

While broad dissemination of these findings through presentations and publications is planned, a targeted approach is also required so that key stakeholders are cognizant of the findings to guide future policy and research. Specifically, the Regulations for Dental Hygiene will be drafted in the next few years as part of the new Manitoba Health Act. Thus, consultation with the College of Dental Hygienists (CDHM) will be recommended to inform regulatory language. Second, the Education Advisory Committee (EAC) to the Canadian Dental Hygienists' Association (CDHA) will also be targeted for dissemination. This group is actively developing a strategic plan for improving the consistency of dental hygiene education across Canada with a particular view to increase the level of education dental hygienists receive. The findings from this study can be used to substantiate organized dental hygiene's largely anecdotal claims presented surrounding the inadequacy of dental hygiene education to the state. In this way the investigator

hopes to make at least a small contribution to improving dental hygiene decision making capacity and indirectly to improving access to preventive oral health care and mitigating oral health disparities.

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Appendix 1

Appendices

Focus Group Study Topics Guide

Section 1 ~ Micro-level differentiation (primarily through focus group and survey questionnaires):

I Practice Structure

- Number of different departments (horizontal differentiation)
- Levels of hierarchy (vertical differentiation)
  - Where is the dental hygienists situated
  - How is this negotiated; how is autonomy determined (i.e. positional, gendered)
  - Dental hygienists desire for greater/lesser autonomy
- Where are decisions typically made (centralization)
  - Does this vary
- Flexibility of relationships; informal (simple) versus formal (structured)
- Influence on dental hygienists' decision making and implementation
- Influence on patient care

Sample Questions:

1. Thinking about your clinical practice setting, comment on how your practice is organized and if you feel there is a hierarchy between the "departments". How did this evolve?

2. Given the hierarchy you've described, where does dental hygiene fit into this hierarchy?

3. Keeping these practice departments in mind, where does decision making typically occur? Is this a formal arrangement or does your practice operate more informally allowing flexibility in decision making?

4. Has the hierarchy you've described had an impact on your autonomy in practice? Does this level of autonomy affect your ability to make decisions or carry your decisions out? Do you desire more autonomy in your practice?

5. Does decision making responsibility vary depending on the nature of the decision?

6. Where your autonomy has influenced your ability to make and carry out clinical decisions, can you think of instances where patient/client care is has been impacted in a negative or a positive way? Do you think patient/client care would be improved by increasing your autonomy in decision making and carrying out your decisions?

I Organizational Leadership and Team

- Facilitative/distributive leadership
    - Culture of inclusion
- Decentralized decision making
- Collaboration and teamwork
- Organizational receptivity to change

Sample Questions:

1. Would you describe your organization as being receptive to new ideas and change? When you think about successful decision making and/or practice change, what has facilitated it the most?

2. What kinds of things have helped facilitate your decision making and implement decisions?

3. How is authority over decision making distributed?

- Prompt: Are workers viewed as understanding their work the best?
- Do your work colleagues work together to promote good decision making and practice change?

4. Has leadership been important in your ability to make good clinical decisions and carry them out? Where does the most facilitative leadership come from in your organization? Is leadership/management been consistently applied in your work setting?

III Multiple Interests and Relationships

- Organizational goals; production (traditional organizational motivation) vs. altruism (health care social contract)
- Individual goals; competing individual goals (self interests vs. altruism)
- Conflict arising from competing individual and organizational goals
- Methods to ensure compliance with organizational goals; incentives vs. punishments; concealed or overt
- Sub-structures or sub-cultures and goals
- Use of power to influence decision making and achieve goals
    - How is power applied and who applies it: overtly (hierarchy/authority of work position) or covertly (i.e. interference)
    - What stocks of capital are used to promote self-interests
    - How is power distributed

Sample Questions:

1. How would you describe the goals of the organization you practice in? Are there sub-cultures (i.e. dental hygiene) within your organization that has their own set of goals?

2. Keeping the organizational goals in mind, do they conflict with your professional goals or with your sub-culture goals? What about your own personal individual goals?

3. Have you experienced conflict arising from a misalignment between the organization's goals and your own?

4. Does your organization deliver incentives or disincentives/punishments to comply with the organizational goals? Can you provide examples?

5. How do you protect (stocks of capital) your own self/professional interests when attempts are being made to undermine your goals?

6. How is power used to influence your ability to achieve your goals, make decisions and influence your behaviours? How is power applied and who by? Is this distribution of power dependent on the situation?

Sample Questions:

1. Thinking about how your organization uses information, how does new knowledge and technology make its way into your practice? Who controls this process?

2. What are the expectations in your practice for you to use new knowledge and make decisions based on that knowledge? Do you experience difficulties in accessing relevant knowledge for practice?

3. Do you believe that you have the authority or autonomy to use knowledge in the way you want in your practice?

4. Does the type or qualities of knowledge influence how receptive your practice is to considering it?

- Prompt: For example, is your experiential knowledge valued in addition to formal, research knowledge?

5. Whose obligation is it to ensure dental hygienists in practice are aware of current knowledge?

V Gendered Substructure and Influences

- Domination:
    - Perceptions surrounding male dominance; overall ruling, subordination of others; maintenance of autonomy and advantage
    - Suppression of female views
        - Accepting oppression (i.e. acculturated in practice, academy, society), compliance
    - Prevention of change and maintenance of status quo
    - Feelings of oppression

        - Female vs male dental hygienists experiences
- Valuation:
    - Perceptions surrounding female opportunities; women's work (i.e. nurturing and emotional), value of women's work; decision making power; opportunities for advancement
    - How is dental hygiene work valued
        - By other workers, by leadership, by patients
    - What is accepted as knowledge
- Sexuality (part of the overall production of gender/sexually constructed roles):
    - Role of sexuality within the organization

Sample Questions:

1. When thinking about people that work in your organization, do you perceive a difference between men and women in their domination over the practice overall (control direction, discussions etc.)? In your experience, do you perceive a difference between the experiences of male versus female dental hygienists?

2. Do you feel subordination of women is present in your practice that diminishes their autonomy while maintains men's advantage?
3. Do you feel that women in your practice are oppressed (i.e. dental hygienists), and that systematically prevents positive decision making and improvements to patient/client care?

4. Do you feel that there are preconceptions held by others in (or out of) your organization about dental hygienists' work because it is a primarily female health profession?

- Prompt: For example, do you think your work is less valued because it is female dominated?

5. How did you first become aware that you/other women were dominated by men? (i.e. society, school, work)

6. Are you aware of a situation in your work where there was an expectation that women behave in a more emotional/less rational and more nurturing ways? Do you think patients hold the same preconceptions?

7. Do you believe your organization holds a different attitude towards knowledge and information produced or presented by women versus that of men? Have perceived differences affected the way this knowledge/information is used (i.e. information presented by women is discounted)?

8. When you think about the organization you work in, do you perceive that sexuality (social construction of gender roles) has had an influence in your autonomy, decision making and behavior in your role as a dental hygienist?

Focus Group Format

Logistical Issues to Resolve:

- Recording equipment
- Name tents
- Questionnaire
- Registration forms
- Refreshments
- Incentives
- Recruitment form: inclusion/exclusion criteria, follow up contact, reminder call, years in practice, program of DH graduation (degree or diploma), sex, practice hours/week, day/time available for interview
- Location, parking

Recruitment and Screen questions:

- How long have you been practicing
- What kind of DH educational program graduated from
- Highest educational level
- Sex
- Practice setting
- Hours per week practicing

Introduction to participants:

- Small talk and refreshments until everyone arrives; allow 5-10 minutes grace period for late arrivals; make participants at ease; washrooms; have participants fill out demographic forms
- Welcome
    - thank you for participating;
    - introduce oneself and overview of research topic => what we hope to learn about
        - gain insight into social-structural factors influencing the decision making capacity of dental hygienists
    - number of main questions (8-10)
- Moderator's role:
    - ask questions and prompt for additional information—won't be participating in discussion
    - ensure we hear <u>everyone's</u> views
    - ensure discussion stays on topic
    - interrupt when necessary to achieve goals
    - take field notes
    - summarize discussion at end for accuracy
    - contact participants later for clarification and provide summary report for participant review
- Ground rules:

- No wrong or right answers; need to hear everyone's views; want to hear differing views; no agreement is necessary or desirable
- One person speaks at a time; say your "name" before speaking; speak up
- If you want to make a comment, jump in; or raise your hand and moderator will indicate when it's your turn
- Maintain confidentiality
- Any questions before beginning

- Questions:
  - First one is easy and everyone should answer; 30 seconds each:
    - Your name, type of practice, how many people work in your practice and what are their professions/occupations

Appendix 2

Topics Guide – Key Informant Interviews (Phase II)

Introduction to topic and background information:

- Give information about the study; what has been done so far and what insight and information these interviews aim to achieve; for example:

  "Overall, this study aims to explore the decision making component of the knowledge translation process of dental hygienists (expand for specific informant); Previous research has focused on individuals and largely neglected the contextual features affecting knowledge translation and, furthermore, has not examined dental hygienists. In the first part of this study, focus groups were conducted and provided information about dental hygiene decision making capacity from a unit/organizational level or perspective; now, key informant interviews are being conducted with the aim of learning more about the broad, societal influences on dental hygiene decision making capacity.

- Background information about informant's expertise

Specific topics/questions for discussion:

- In general, what do you think have been major influences on dental hygienists' capacity to make and carry out their decisions in practice?
- How has the dominance of others affected dental hygiene decision making capacity (i.e. dentistry)?
- From focus group interviews, it seemed that dental hygienists predominantly relied upon others (i.e. dentist/employer) to bring new knowledge into the practice setting; why do you think that this may be?
- Do you think knowledge production and rights to its use affects dental hygiene decision making?
- Do you think that the profession of dental hygiene being primarily a female dominated profession has affected decision making capacity?
- Do you think the economy (strong or weak) affects dental hygiene decision making capacity?
- How has the state (government) affected dental hygiene decision making capacity in the past and present?
- Do you think dental hygiene education has influenced dental hygiene decision making?
- Do you have any other comments about how society overall affects dental hygiene decision making capacity?
- Do you feel comfortable with the expansion of dental hygiene's decision making capacity? Why or why not?
- What do you think needs to occur to expand dental hygiene's decision making capacity?

Survey Questionnaire

INFORMATION ABOUT THE STUDY:
You are being asked to participate in survey study for Manitoban dental hygienists. This survey questionnaire is part of a larger research project being conducted by the study investigator who is also a dental hygienist and is completing her PhD in the Department of Community Health Sciences, Faculty of Medicine, University of Manitoba. The purpose of the study is to find out more about what influences dental hygienists' ability to make and carry out their clinical decisions as intended.

The survey requires that you answer a series of primarily multiple choice and scale-type questions and should take you approximately 30 minutes. You may exit and re-enter the survey to complete at a later time if more convenient. There are no anticipated risks to participating in the study. While you will not be compensated for completing the survey, you will
be contributing to advancing the knowledge of dental hygiene practice and helping to inform future oral health care policy. To thank you for taking the time to participate, you will be asked at the end of the survey if you would like to be entered in two random draws for a gift certificate valued at $50.00!

Participation in this survey is completely voluntary and is NOT in any way associated with the College of Dental Hygienists of Manitoba (CDHM). The study investigator will not be aware of your e-mail address at any time. All information you provide as part of the survey will remain completely confidential and at no point will your individual responses be linked to you personally. Your completion of this survey will provide confirmation of your consent to participate in the study. You may exit the survey at any time, but you are encouraged to complete the questionnaire so that your information can be included in the analysis. You may call the study investigator for more information at: Joanna Asadoorian (204) 789-3574. Thank you for your consideration.

INSTRUCTIONS FOR STUDY PARTICIPANTS:

1. Attempt to answer all questions unless directed to do otherwise; Answers to questions with an asterisk* are required to complete the survey
2. Read each question carefully--there may be slight differences between some selectors
3. Answer each question to the best of your ability

DEFINITIONS:

1. "Dental hygiene practice" refers to where you work as a dental hygienist; think about the practice you work in most
2. "Clinical decision making" refers to any decisions you make as a dental hygienist at your work setting; may be directly or indirectly related to client care

∗1. I agree to participate in the survey study.

YES, proceed to survey

NO, thank you for your consideration.

Background Information

This section will provide background information about you and your attitudes towards your practice.

∗ 1. Are you currently a registered practicing dental hygienist in Manitoba?

- Yes
- No

2. What type of dental hygiene program did you first graduate from?

- 1-year diploma/certificate (includes 1 year Dental Assisting +1 year DH)
- less than 2 academic-year diploma or certificate
- 2 academic-year diploma, certificate or associate degree
- 3 academic-year diploma (including pre-professional year)
- 3 academic-year Bachelors degree
- 4 academic-year Bachelors degree
- other

Other (please specify)

3. What is the highest level of education you have completed? (select only one box)

	Check here if dental hygiene program	Check here if other program
Diploma		
Bachelor's degree		
Master's degree		
PhD degree		
other		

Other (please _____

4. How long have you been practicing as a dental hygienist?

- less than 1 year
- 1 year to 3 years
- more than 3 years to 5 years
- more than 5 years to 10 years
- more than 10 years
- have not graduated yet

5. What is your age?

- under 25
- 25 to 35
- > 35 to 45
- >45 to 50
- > 50

6. What is your gender?

- female
- male

7. How many days do you practice dental hygiene in a typical week? (If you work evenings, count these as half days)

- < 1 day
- 1 day
- > 1 day to 3 days
- > 3 to 5 days
- > 5 days

8. What type of dental hygiene practice do you work in? (If you work in more than one practice, respond for the two practices you work the most).

	Practice 1	Practice 2
general solo (1 dentist owner/operator/associate) general		
group (> 1 dentist owner/operator/associate) specialty		
solo (1 dentist owner/operator/associate) specialty		
group (> 1 dentist owner/operator/associate)		
independent solo (dental hygienist owner/operator)		
independent group (> 1 dental hygienist owner/operator/associate) institution (i.e. long term care facility, university)		
other		

For other please describe:

9. Of all the dental hygienists in your practice, which of the following best describes your level of seniority (meaning your status obtained as the result of your length of service, hours worked and/or other factors):

- least senior dental hygienist
- middle level of seniority
- most senior dental hygienist
- Not applicable in my practice

10. Which of the following best describes your work level relative to the other dental hygienists in your practice:

- I work the most hours
- I work more than most of the others
- I work about the same amount as the others
- I work less than most of the others
- I work the least hours

Dental Hygiene Decision Making

11. When thinking about your own attitude toward your dental hygiene practice, you would describe yourself as being apathetic and/or disinterested.

strongly agree agree disagree strongly disagree

Select one:

12. When thinking about your dental hygiene practice, you lack confidence in your decision making.

strongly agree agree disagree strongly disagree

Select one:

13. In your practice, it is typical for you to act as a change agent: meaning one who initiates and facilitates change.

always frequently sometimes rarely

Select one:

14. You experience discomfort when having to make clinical decisions.

alwa frequently sometimes rarel

Select one:

15. In your dental hygiene practice you lack assertiveness about expressing your professional views and values.

always frequently sometimes rarely

Select one:

16. As a dental hygienist, you have an attitude that does not support decision making.

strongly agree agree disagree strongly disagree

Select one:

17. In your dental hygiene practice, you affiliate with the other 'providers' (i.e. dentists) in the practice rather than the support staff (i.e. dental assistants, receptionists).

strongly agree agree disagree strongly disagree N/A

Select one:

18. In your dental hygiene practice, you desire more authority to make your own clinical decisions and carry those decisions out as intended.

strongly agree agree disagree strongly disagree

Select one:

19. You avoid changing your dental hygiene practice because of the additional work that may be involved for you.

always frequently sometimes rarely, never

Select one:

20. It takes all of your energy just to get through your day.

strongly agree agree disagree strongly disagree

Select one:

21. You view practice questions and/or problems as opportunities to learn new things.

strongly agree agree disagree strongly disagree

Select one:

∗ **22. In your dental hygiene practice, you are able to make and carry out clinical decisions.**

always mostly frequently sometimes rarely, never

Select one:

Dental Hygiene Decision Making

Practice Structure

This section asks about how your dental hygiene practice is structured.

1. Do you perceive a hierarchy or "levels" between departments (dentists, dental hygienists, dental assistants, administrative) within your dental hygiene practice?

- yes
- no (skip to question # 3)
- not sure (skip to question # 3)

2. Rank each of the departments within your practice from highest position (1) to lowest position (2)[where departments are equal, give the same number]:

	1	2	3	4	5
Dentists					
Dental Hygienists					
Dental Assistants					
Administrative (receptionist, manager)					
other					

Other (please specify)

3. In your practice, all workers have discretion and control over how to do their jobs.

strongly agree | agree | disagree | strongly disagree

Select one:

4. Your practice is formal in its organization and how it goes about its operations.

strongly agree | agree | disagree | strongly disagree

Select one:

5. In your practice, most of the decision making and control over the practice is centrally located coming from one individual or one group of individuals.

strongly agree | agree | disagree | strongly disagree

Select one:

Dental Hygiene Decision Making

Practice Features

The following questions surround characteristics of your practice that influence your decision making capacity.

1. The clinicians in your practice have well aligned oral health care philosophies; meaning "we all think alike".

strongly agree agree disagree strongly disagree

Select one:

2. You have developed allegences with others that work in your practice.

strongly agree agree disagree strongly disagree

Select one:

3. Your practice emphasizes business over health care.

strongly agree agree disagree strongly disagree

Select one:

4. You are able to contribute to the decision making in your practice.

strongly agree agree disagree strongly disagree

Select one:

5. You frequently experience conflicting goals with others in your practice.

strongly agree agree disagree strongly disagree

Select one:

6. Your employer/supervisor facilitates good decision making in your practice.

strongly agree agree disagree strongly disagree

Select one:

7. Conflicting goals between people in your office affects patient care.

never rarely sometimes frequently

Select one:

8. Your decision making is frequently undermined by others in your practice.

strongly agree agree disagree strongly disagree

Select one:

9. In your practice you have the freedom to make your own clinical decisions.

strongly agree agree disagree strongly disagree

Select one:

10. In your practice you typically have control over your own client scheduling.

strongly agree agree disagree strongly disagree

Select one:

ygiene Decision Making

11. In your practice you have the support you need to make good clinical decisions.

strongly agree agree disagree strongly disagree

Select one:

12. Your employer/supervisor assumes decision making responsibilities in your practice.

rarely sometimes frequently always

Select one:

13. Your employer/supervisor exhibits dominance over your practice decision making.

rarely sometimes frequently always

Select one:

14. You would describe your practice as having good leadership.

strongly agree agree disagree strongly disagree

Select one:

15. Your practice is receptive to positive change.

strongly agree agree disagree strongly disagree

Select one:

16. Your practice is motivated by financial incentives.

strongly agree agree disagree strongly disagree

Select one:

17. Your practice views the workers (receptionists, dental hygienists, dental assistants, dentists etc.) as the experts in their field.

strongly agree agree disagree strongly disagree

Select one:

18. Your practice values reimbursible (billable) patient care over non-reimbursible care.

strongly agree agree disagree strongly disagree

Select one:

19. Your gender has a negative influence in the control you have over your clincial decision making.

strongly agree agree disagree strongly disagree

Select one:

20. Your practice has effective leadership.

strongly agree agree disagree strongly disagree

Select one:

21. You feel inferior to the other people in your practice.

rarely sometimes frequently always

Select one:

22. You possess decision making freedom.

strongly agree agree disagree strongly disagree

Select one:

23. You require permission to make clinical decisions about your client care.

rarely sometimes frequently always depends on the decision

Select one:

if depends, please describe

24. Your practice culture encourages your decision making.

strongly agree agree disagree strongly disagree

Select one:

25. Your practice values change and innovation over routine and tradition.

strongly agree agree disagree strongly disagree

Select one:

26. You have experienced attitudes from an employer or co-worker(s) in your practice based on your sexuality.

never rarely sometimes frequently

Select one:

27. You have control over the time you spend with your clients.

strongly agree agree disagree strongly disagree

Select one:

28. You feel rushed to complete your patient care.

rarely sometimes frequently always

Select one:

29. You have had others (employer/co-worker) over-ride your decision about care that you have planned for a client without your agreement .

never rarely sometimes frequently

Select one:

30. You would be more likely to implement your practice decisions if you had someone to facilitate the process.

strongly agree agree disagree strongly disagree

Select one:

tillery of Practice

5. Practice Attributes

These items surround attributes of your practice that can be facilitative or stifling to your clinical decision making.

1. Your practice has communication systems that support your decision making.

strongly agree agree disagree strongly disagree

Select one:

2. You participate in negotiations surrounding your decision making.

strongly agree agree disagree strongly disagree

Select one:

3. You have decision making autonomy.

strongly agree agree disagree strongly disagree

Select one:

4. Your clinical decision making is complicated by imposed financial pressures such as practice production concerns.

rarely sometimes frequently always

Select one:

5. Your practice has a formal approach to decision making.

strongly agree agree disagree strongly disagree

Select one:

6. You feel personally invested in your practice.

strongly agree agree disagree strongly disagree

Select one:

7. You are able to negotiate with your employer/supervisor about decision making.

strongly agree agree disagree strongly disagree

Select one:

8. There is a practice hierarchy that influences decision making in your practice.

strongly agree agree disagree strongly disagree

Select one:

Select one:

9. Seniority is influential on who makes decisions in your practice.

strongly agree agree disagree strongly disagree

10. The dental hygienists in your practice work together as a team to achieve collective goals.

frequently sometimes rarely never

Select one:

11 Your practice operates as a team to achieve collective goals.

rarely sometimes frequently always

Select one:

12. Treatment that is done in your practice conflicts with with your own ideals.

strongly agree agree disagree strongly disagree

Select one:

Incorporating New Knowledge

These items surround the qualities of knowledge that clinical decisions in your practice are based on.

1. You feel comfortable challenging the practice "status quo" (traditional ways of doing things).

strongly agree agree disagree strongly disagree

Select one:

2. Your practice uses current evidence (scientific literature/research) to base its decision making.

always mostly sometimes rarely not sure

Select one:

3. Your practice actively incorporates new knowledge and technology into practice.

almost always, always frequently sometimes rarely

Select one:

4. You or other dental hygienists in the practice actively present or bring new knowledge/ideas into your practice.

always frequently sometimes rarely, never

Select one:

5. Your employer/supervisor or the dentists in the practice are responsible for presenting or bringing new knowledge to your practice.

strongly agree agree disagree strongly disagree

Select one:

6. Regarding gender, who is most responsible for bringing new knowledge to your practice?

males, regardless of position

females, regardless of position

males, because he owns the practice

females, because she owns the practice

no gender influence

7. You struggle to have your knowledge heard by others in the practice.

strongly agree agree disagree strongly disagree

Select one:

8. Your practice values using research to guide decision making.

strongly agree agree disagree strongly disagree

Select one:

9. You lack the necessary knowledge to make sound clinical decisions.

always frequently sometimes rarely

Select one:

10. You are unable to discuss and/or dispute clinical decisons with others because you lack the necessary knowledge or expertise.

always frequently sometimes rarely

Select one:

Decision Characteristics

This section asks about how the characteristics of a specific decision affect your decision making.

1. The importance or potential impact of a specific decision influences your desire to control that decision making situation.

strongly agree agree disagree strongly disagree

Select one:

2. Your practice emphasizes giving clients/patients choices or alternatives in decisions.

rarely sometimes frequently always

Select one:

3. Your clinical decision making is influenced by clients/patients characteristics.

rarely sometimes frequently always

Select one:

4. Timing can influence your decision making.

strongly agree agree disagree strongly disagree

Select one:

5. Clinical decisions about the care you provide to your clients are left to your discretion.

strongly agree agree disagree strongly disagree

Select one:

1. Please provide any additional comments about your experience as a dental hygienist in making and implementing decisions in your practice.

2. Thank you for completing this survey! If you would like to be entered in two random draws for a gift certificate for $50.00, please enter a mail, email or phone number where you can be contacted if you are drawn. This information will be separated from your completed survey immediately upon receipt and will not be linked to your survey responses at any time.