ORAL HEALTH FOR LONG-TERM CARE POPULATIONS: FROM PNEUMONIA PATHOGENESIS TO FRONT-LINE ORAL CARE PROVISION

by

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Oral health has dramatically improved in most industrialized countries over the latter half of the 20th century. However, profound oral health disparities still exist especially for those most at risk of developing oral diseases and associated systemic consequences such as populations residing in long-term care facilities. Despite the growing body of literature that supports the link between oral microflora and the importance of oral hygiene in limiting the risk of pneumonia development, there are still gaps in our knowledge to effectively manage this risk. The research included in this dissertation sought to further our understanding of oral health and oral care in the context of pneumonia pathogenesis (chapter 3) and, by exploring the perspective of various stakeholders in oral health, we sought to further understand the factors that influence care provision (chapter 5). Additionally, a novel knowledge translation approach was tested to challenge traditional oral care interventions in order to promote improvements in frontline oral care practices (chapter 6).
The relationship between oral microflora, oral care and pneumonia was found to be complex. It directs us to consider converging risk factors including a patient’s health status, health behaviours and access to oral care services.

Different professional groups were found to possess different definitions of oral health, which influenced both their motivation to provide care as well as their focus of care. Definitions of oral health could also potentially influence the saliency of different types of oral care information to different targeted groups; therefore, this should be considered in developing education and training initiatives aimed at improving the provision of oral care.

An appreciative knowledge translation approach was found to be effective in bridging the gap between oral care knowledge and the provision of care. Regardless of the type of intervention chosen, organizations were reported to play a crucial role in promoting oral health and supporting the successful implementation of oral care programs.
ACKNOWLEDGMENTS

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LIST OF ABBREVIATIONS

AGNB: Aerobic Gram Negative Bacterium
AGPB: Aerobic Gram Positive Bacterium
AI: Appreciative Inquiry
CAP: Community-Acquired Pneumonia
DHs: Dental Hygienists
DoNs: Directors of Nursing Care
HAP: Hospital-Acquired Pneumonia
HCAP: Health Care-Associated Pneumonia
KTA: Knowledge-to-Action
LTC: Long-Term Care
MDS: Minimum Data Set
MST: Modified Schirmer Test
NREM: Nursing Role Effectiveness Model
OTs: Occupational Therapists
PARiHS: Promoting Action on Research Implementation in Health Services
PSWs: Personal Support Workers
RNs: Registered Nurses
RNAO: Registered Nurses’ Association of Ontario
RPNs: Registered Practical Nurses
RPs: Respiratory Pathogens
SLPs: Speech-Language Pathologists
VAP: Ventilator-Acquired Pneumonia
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CHAPTER 1: INTRODUCTION AND THESIS OVERVIEW

Introduction

Research within the field of oral health has previously established connections between oral microbiology, oral hygiene and general health; however, it was the U.S. Surgeon General’s 2000 report on oral health (U.S. Department of Health and Human Services, 2000), which brought these relationships to the attention of the public, and fostered much-needed public awareness on the importance of oral health. This inaugural report included a national call-to-action to promote optimal oral care and to decrease disparities in oral health for vulnerable populations. In Canada, the Office of the Chief Dental Officer was established by Health Canada in 2004 (http://www.hc-sc.gc.ca/ahc-asc/branch-dirgen/fnihb-dgpsni/ocdo-bdc/index-eng.php) with a mandate to improve the oral health status of Canadians and to increase awareness about the prevention of oral diseases. The ideas and questions that are pursued in this dissertation arose within this context of increasing awareness and promotion of oral health as a priority, with the particular application of preventing pneumonia in long-term care residents as a focus.

The primary objective of this dissertation was to gain a better understanding of oral health, and factors influencing oral health, for residents in long-term care facilities. More specifically, three major questions were pursued:

1. What effect does standard oral care (including routine dental hygiene services) have on the oral microbiology and pathogenesis of pneumonia in long-term care populations over time?

2. What is the context of, and what are the enablers and barriers to oral care provision in long-term care?
3. How can front-line oral care provision be improved?

**Definitions**

For the purposes of this dissertation, we differentiate the term oral health, oral hygiene and oral care as follows:

- **Oral health**: the state of the mouth and functioning of the oral cavity without evidence of disease (RNAO, 2008);
- **Oral hygiene**: the practice of keeping the mouth (i.e., including the teeth, gums, tongue, mucosal surfaces and the hard and soft palate) clean and healthy by brushing and flossing to prevent tooth decay and gum disease (RNAO, 2008);
- **Oral care**: the process and actions involved in oral hygiene for optimal oral health.

The research for this dissertation was conducted primarily in long-term care facilities. For the purposes of this dissertation we define long-term care in a generic sense to encompass facilities or institutions that provide continuing care to both young and old over extended periods of time. This term extends to facilities that traditionally are referred to as nursing homes, but also to complex continuing care, which are hospitals for people who have long-term illnesses or disabilities and require medical care. Residential facilities such as retirement homes, where care is not provided, are not included. It should be noted that the facilities in our studies that were complex continuing care hospitals, provided a level of oral care above that which is typically seen in nursing homes. Specifically, the presence of dental hygienists on staff in the facilities included in our studies is not typical as dental hygienists would be seen on a referral basis only. Therefore, the general level of awareness regarding oral health in these facilities may have been greater than that seen in other long-term care settings.
Thesis Overview

This dissertation begins with a review of the links between oral health and pneumonia (chapter 2), which provides the background for our initial interest in this area and raises questions about whether oral care might be a mitigating factor in pneumonia development for individuals residing in long-term care facilities. Previous studies have reported that frequent professional dental services are effective in reducing the incidence of pneumonia and colonization of oral secretions with respiratory pathogens (Abe, Ishihara & Okuda, 2001; Adachi, Ishihara, Abe, Okuda & Ishikawa, 2002; Yoneyama et al., 2002); however, prior literature does not demonstrate whether the delivery of routine dental hygiene services and oral care impact colonization with pathogenic bacteria in the oropharyngeal secretions of residents in long-term care settings. The pilot study (chapter 3), set out to explore this relationship, and to determine the utility of bacterial analysis of oral specimens as an index of a patient’s risk for respiratory infection and of the effectiveness of oral care interventions in limiting that risk.

This study then segued to questions regarding oral care provision in long-term care facilities, which has been frequently reported to be inadequate, of low priority, and of poor quality (Chalmers, Levy, Buckwalter, Ettinger & Kambhu, 1996; MacEntee, Thorne & Kazanjian, 1999; Wardh, Hallberg, Berggren, Andersson & Sorensen, 2000; Weeks & Fiske, 1994). It became evident that there was a need to explore the factors influencing oral care delivery in long-term care. Specifically, we wanted to determine who the various stakeholder professionals were that were involved in oral care, what their roles and responsibilities were and what factors enabled or hindered their delivery of optimal oral care. Participants for this study were recruited from complex continuing care hospitals. In chapter 4, we discuss the
possible factors influencing oral care delivery and outline a framework for exploring such factors. For our study, we identified three professional groups (nursing, speech-language pathology and dental hygiene) who were considered to play crucial roles in maintaining oral health in long-term care and explored their perspectives regarding oral care, using a focus group methodology. This study (chapter 5), explores how different professional perspectives impact the activities and processes involved in the delivery of oral care. Participants for this study were recruited from a variety of institutional settings spanning both rehabilitation and complex continuing care hospitals.

The final study in this dissertation, (chapter 6), addresses the question of how to improve front-line oral care delivery. For this study, participants were drawn from a single complex continuing care hospital. From the literature surrounding nursing oral care interventions, we noted three major gaps in research that we wanted to address in our intervention design:

1. Previous intervention studies have typically adopted a problem-based approach and have employed didactic teaching methods. Such interventions are reported to have had limited success (Frenkel, Harvey & Newcombe, 2001; MacEntee, et al., 2007) and their focus on deficiencies rather than strengths in oral care practices narrows the window through which we may be able assess clinical effectiveness in oral care provision. Therefore, we wanted to veer away from traditional didactic educational approaches, which under-emphasized things that are being done correctly.

2. We wanted to conduct a knowledge-translation initiative that would support changes in practice that were grounded in good scientific evidence. In nursing, a large emphasis is placed on evidence-based practice, which sets standards of care based on
the best available evidence. As awareness of the importance of oral health has grown, the Registered Nurses Association of Ontario (RNAO) developed an oral hygiene best-practice guideline, which was incorporated into the design of our study.

3. Finally, the literature fails to document or explore the various strategies and decision-making processes that develop with clinical experience in oral care provision, and which may be critical to the knowledge-to-action process in knowledge translation. Therefore, we incorporated the use of an innovative approach known as Appreciative Inquiry (Cooperrider & Srivastva, 1987), chosen for its potential to elucidate the current strengths in clinical practice over deficiencies and for its potential to effectively bridge the knowledge-to-action gap that exists in oral care delivery.

Chapters 2, 3, 5 and 6 are verbatim excerpts from manuscripts either published, submitted or in press at the time of the dissertation submission. The reader is advised that these chapters may contain some redundant information. Finally, the dissertation closes with a chapter summarizing the major contributions from the studies contained within and considers implications for future research.
CHAPTER 2: THE ORAL CARE IMPERATIVE: THE LINK BETWEEN ORAL HYGIENE AND ASPIRATION PNEUMONIA

With kind permission of Lippincott Williams & Wilkins, this chapter was excerpted in its entirety from the following journal article: Yoon, M. N., & Steele, C. M. (2007). The oral care imperative: The link between oral hygiene and aspiration pneumonia. Topics in Geriatric Rehabilitation, 23(3), 280-288.

This article can be found on the publisher’s website at http://journals.lww.com/topicsingeriatricrehabilitation/Abstract/2007/07000/The_Oral_Care_Imperative__The_Link_Between_Oral.10.aspx. The journal’s homepage is located at http://journals.lww.com/topicsingeriatricrehabilitation/pages/default.aspx, and the publisher’s copyright information can be found at http://www.lww.com/webapp/wcs/stores/servlet/content_resources_permissions-journals_11851_-1_12551.

It should be noted that the section entitled Clinical Tips, found at the end of this chapter, was requested at the time of publication by the journal, but is essentially an appendix.

Introduction

The links between oral health, general health and systemic disease in institutionalized elderly populations have been established in the literature (Loesche & Lopatin, 1998; Shay, 2002). As a result, major health organizations, both within North America and worldwide, have increasingly mandated oral health as a priority (Health Canada. (2009); U.S. Department of Health and Human Services, 2000; World Health Organization. (n.d.)). Dramatic improvements in general dental health in the Western world during the latter half of
the 20th century mean that people are increasingly reaching old age with intact dentition (Gooch, Eke & Malvitz, 2004). Although this trend is indicative of improvements in the delivery of dental services, it brings with it an imperative to promote proper oral care delivery to seniors and the disabled in order to limit the oral-health related risk of systemic diseases such as pneumonia.

Pneumonia is the leading cause of acute care hospitalization and the primary cause of death in many diseases found amongst long-term care (LTC) residents (Muder, 1998). The reported incidence of pneumonia in LTC ranges from 0.1 to 2.4 per 1,000 patient days (Nicolle, 2001). Bacterial pneumonia (as opposed to viral pneumonia) is directly precipitated by aspiration (defined as the inhalation of oropharyngeal secretions into the larynx and down to the lower respiratory tract) (Marik, 2001). Aspiration is a common feature of dysphagia (swallowing difficulty), particularly in the elderly population (Feinberg, Knebl, Tully & Segall, 1990; Marik & Kaplan, 2003; Pikus et al., 2003). Poor oral hygiene has been linked with the elevated presence of respiratory pathogen (RPs) in oropharyngeal secretions (Mojon, Budtz-Jorgensen, Michel & Limeback, 1997; Scannapieco, 1999). When RPs are aspirated, they can overburden host defense mechanisms and lead to infection (Marik, 2001). For this reason, the promotion of high quality oral care should be a priority strategy for limiting the occurrence of bacterial pneumonia, particularly to individuals with an increased risk of aspiration secondary to dysphagia.

**Signs, Symptoms and Diagnosis of Pneumonia**

The typical signs and symptoms of bacterial pneumonia are cough, fever, tachypnea, chills and pleuritic chest pain (Marik, 2001; Marrie, 2000). A differential diagnosis of aspiration pneumonia is made if predisposing risk factors coexist with typical signs and
symptoms of bacterial pneumonia (Johnson & Hirsch, 2003); these predisposing risk factors include a history of aspiration (such as in the case of dysphagia), decreased level of consciousness or a primary diagnosis of neurologic disease. The diagnosis of aspiration pneumonia can be further inferred from characteristic chest radiographic abnormalities involving infiltrates in the superior segment of the lower lobes and the posterior segment of the upper lobes (Marik, 2001; Siegel, 2003).

The differential diagnosis of aspiration pneumonia in the elderly can be challenging. These patients may present with fewer and more subtle signs and symptoms, which frequently take the form of nonspecific deteriorations in general health (Bentley, 1984). Comorbidities such as congestive heart failure (CHF) and chronic obstructive pulmonary disease (COPD) may further confound the diagnosis by mimicking the classic symptoms of pneumonia (High, 2005). Furthermore, aspiration pneumonitis, (defined as an acute lung injury characterized by acute inflammation of lung airways and parenchyma after the inhalation of regurgitated gastric contents (Johnson & Hirsch, 2003; Marik, 2001), presents similar radiographic findings to those observed in aspiration pneumonia. As a result, the diagnostic label of aspiration pneumonia is likely to be over-applied, and estimates of the prevalence of aspiration pneumonia are unlikely to be accurately reflected in the literature.

**Bacteriology**

Bacteria are most commonly classified according to observable microscopic and physiologic characteristics. Gram-stain reaction (positive or negative) and dependency on oxygen for growth (aerobic vs. anaerobic) are the two primary characteristics used to describe bacteria. The structure of the cell wall, determined from the gram-stain reaction, plays a key role in the resistance of bacteria to various substances. Gram-negative bacteria
have cell walls that are more resistant to antibiotics, enzymes and detergents and are therefore more likely to be pathogenic (Tortora, Funke & Case, 1992).

**Bacterial Pneumonia**

Table 1

*Differentiating characteristics of bacterial pneumonia*

<table>
<thead>
<tr>
<th></th>
<th><strong>Community-Acquired Pneumonia (CAP)</strong></th>
<th><strong>Hospital-Acquired Pneumonia (HAP)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Timeline</strong></td>
<td>Outside hospital or after &lt;3 days of hospitalization</td>
<td>After 3 or more days of hospitalization</td>
</tr>
<tr>
<td><strong>Causative Agents</strong></td>
<td><em>Streptococcus pneumoniae</em></td>
<td><em>Staphylococcus aureus</em></td>
</tr>
<tr>
<td></td>
<td><em>Haemophilus influenzae</em></td>
<td>Aerobic gram-negative bacilli (AGNB)</td>
</tr>
<tr>
<td><strong>At Risk Population</strong></td>
<td>History of smoking, alcoholism, chronic pulmonary disease</td>
<td>Slightly older population with terminal disease; Weak, frail; Immunocompromised or depressed mental status</td>
</tr>
</tbody>
</table>

Bacterial pneumonia is traditionally divided into two etiologically distinct classifications: community-acquired pneumonia and hospital-acquired pneumonia, otherwise known as nosocomial pneumonia. These two varieties of bacterial pneumonia can be differentiated based on the usual location or timeline of their development, their bacteriology, and characteristics of the patient populations in which they most frequently occur (Table 1). Community-acquired pneumonia (CAP) is the diagnostic label applied to pneumonia that develops outside the institutional setting or in patients who have been hospitalized for less than 3 days (Siegel, 2003). The incidence of CAP is reported to be highest in patients with histories of smoking, alcoholism, chronic pulmonary disease and/or prior viral infections.
The main causative organisms of CAP are *Streptococcus pneumoniae* (an aerobic gram-positive bacterium, or AGPB) and *Haemophilus influenzae* (an aerobic gram-negative bacterium, or AGNB) (Bentley, 1984; Loesche & Lopatin, 1998; Marik, 2001; Mojon, 2002; Siegel, 2003).

Hospital-acquired pneumonia (HAP) contrasts with CAP in its timeline of occurrence, developing typically after stays of three days or longer in a medical facility (Siegel, 2003). The organisms that are most frequently implicated in HAP are *Staphylococcus aureus* (an AGPB) and AGNB including *Pseudomonas aeruginosa* (Bentley, 1984; Millns, Gosney, Jack, Martin & Wright, 2003; Mojon, 2002; Siegel, 2003). HAP is reported to occur preferentially in a slightly older population with terminal disease (Bentley, 1984), and in patients who are weak, frail, have compromised immunity, or have depressed mental status that increases their propensity to aspirate (Siegel, 2003).

**Risk Factors for Developing Pneumonia**

Functional dependency either for feeding or for oral care has been reported to be highly correlated with risk for developing pneumonia (Langmore, Skarupski, Park & Fries, 2002; Muder, 1998; Terpenning et al., 2001; Yoneyama et al., 2002). Patients who require feeding have reduced control over the manner in which food or liquid is administered; this is associated with an increased risk of aspiration, particularly in individuals with dysphagia (Langmore et al., 1998; Loesche & Lopatin, 1998; Terpenning et al., 2001). Individuals who are dependent for feeding are also likely to be unable to independently perform routine oral care (Langmore et al., 1998; Terpenning et al., 2001). Numerous articles speak to the inadequacies of oral care provided in nursing facilities (Chalmers et al., 1996; Fiske & Lloyd, 1992; Grap, Munro, Ashtiani & Bryant, 2003; Holmes, 1996; Paterson, 2000; Preston, 1992).
Punekar & Gosney, 2000), and these inadequacies are presumed to contribute to observed differences in oral health between institutionalized and community-dwelling seniors.

Research has documented elevated levels of both anaerobic and aerobic bacteria in the dental plaque and oral secretions of institutionalized seniors, compared to community-dwelling individuals who are more likely to be independent for oral hygiene (Terpenning et al., 1993). Similarly, populations known to have a high incidence of aspiration pneumonia (such as stroke patients) have been shown to have abnormally high levels of oral colonization with AGNB (Millns et al., 2003).

**Aspiration and Pneumonia**

Aspiration may occur during the swallowing of food and liquid (prandial) or with secretions at other times not associated with oral intake (nonprandial). The occult aspiration of microscopic volumes of saliva and oropharyngeal secretions during sleep is a common occurrence in approximately half of the healthy population (Gleeson, Eggli & Maxwell, 1997). When aspiration occurs, the risk of ensuing infection depends on: (1) the type, volume and bacterial load of the aspirated material; and (2) the host’s response to the aspirated material via defense mechanisms such as the cough reflex, mucociliary action of the respiratory epithelium, and cellular immune responses (Marik, 2001). Given these risks, strategies to limit the development of aspiration pneumonia should aim to a) reduce the occurrence of aspiration events; b) reduce the bacterial load and pathogenicity of oropharyngeal secretions that may be aspirated; and c) medically support and enhance host defenses in immuno-compromised patients. The delivery of quality oral care services addresses the second of these mandates.
Dental Plaque and Mechanisms of Respiratory Pathogen Colonization

Figure 1 illustrates two mechanisms by which poor oral hygiene is reported to lead to the colonization of oropharyngeal secretions by respiratory pathogens (Mojon & Bourbeau, 2003; Scannapieco, 1999). In Mechanism 1, the precipitating factor is a proliferation of dental plaque, a thick biofilm that plays host to many microorganisms implicated in periodontal disease (Loesche & Lopatin, 1998; Marsh, 1999; Mojon & Bourbeau, 2003). Poor oral hygiene facilitates the build-up of plaque, which grows more complex as it matures (Limeback, 1988; Mojon & Bourbeau, 2003; Scannapieco, 1999). This facilitates the growth of periodontal pathogens such as Porphyromonas gingivalis, a gram-negative anaerobic bacterium commonly found in diseased periodontal pockets and in the saliva of older patients with periodontal disease (Mombelli, 1998). In healthy subjects, fibronectin, (a fibrous glycoprotein), provides a protective coating that prevents the adherence of AGNB to oral epithelial cell surfaces (Gibbons & Etherden, 1986; Loesche & Lopatin, 1998). P. gingivalis produces and releases hydrolyzing enzymes into the saliva, leading to the degradation of fibronectin and other extracellular matrix components (Gibbons & Etherden, 1986). This
Process alters the surfaces of the oral mucosa, enabling the adherence of AGNB such as *Pseudomonas aeruginosa*, which, in turn, are shed into the saliva and aspirated to instigate infection (Gibbons & Etherden, 1986; Scannapieco, 1999; Scannapieco & Mylotte, 1996; Terpenning et al., 2001). In the second mechanism, poor oral hygiene disrupts the usual buffering and antimicrobial properties of saliva. This upsets the homeostasis of dental plaque, leading to conditions that favour the proliferation of aerobic bacteria (Marsh, 1999), which are then shed into the saliva. This situation has been observed in dental plaque samples taken from ICU patients (Fourrier et al., 1998); colonization is reported to increase with the passage of time spent in the ICU and is highly predictive of HAP (Fourrier et al., 1998).

**Influence of salivary flow.** Saliva provides a natural mechanism for ridding the body of pathogenic bacteria from the oral cavity. However, many elderly persons experience reduced salivary flow secondary to the use of common medications that have a side effect of xerostomia (dry-mouth). Xerostomia is reported to deepen the fissures of the tongue and contribute to the accumulation of bacteria in the oral cavity (Limeback, 1988). As the volume of saliva decreases, its washing, antimicrobial and buffering capacity diminishes, the oral pH decreases (Shay, 2000; Shay & Ship, 1995), and the bacterial (Loesche & Lopatin, 1998) and fungal (Narhi, Ainamo & Meurman, 1993) load increases. This raises the likelihood of infection following aspiration (Langmore et al., 1998; Loesche & Lopatin, 1998; Terpenning et al., 1993).

**Influence of antibiotic usage.** Another factor that contributes to the overgrowth of non-resident microorganisms in the oropharynx is the long-term use of broad-spectrum antibiotics (Marsh, 1999). Specifically, these medications are reported to lower the colonization resistance of dental plaque, facilitating the emergence of AGNB in the
oropharyngeal secretions (Loesche & Lopatin, 1998; Murder, 1998). Yeasts such as *Candida albicans* can become opportunistic and cause disease in the presence of repeated and prolonged antibiotic treatments and other predisposing factors such as poor oral hygiene, low salivary flow and ill-fitting dentures (Narhi et al., 1993; Shay & Ship, 1995).

**Influence of natural vs. prosthetic dentition.** An apparent paradox inherent to the strategy of promoting oral care as a means to limit the risk of pneumonia is the fact that the presence of teeth actually increases the risk of oral colonization by pathogenic bacteria (Scannapieco, 1999). Thus, while public health initiatives aimed at improving general dental health have succeeded in increasing the number of seniors who retain their natural teeth, this success brings with it an increased risk for pneumonia in these individuals. RPs have been shown to be more likely to colonize the oral cavities of patients with natural teeth or dentures than those of patients who have neither natural teeth nor dentures (Scannapieco, 1999; Scannapieco & Mylotte, 1996). In elderly people who retain their natural teeth, periodontal disease may directly contribute to greater shedding of anaerobic bacteria into the saliva (Loesche & Lopatin, 1998), thereby contributing to the risk of aspiration pneumonia as described in Mechanism 1 of Figure 1.

Plaque can, however, also accumulate on dentures and promote oropharyngeal colonization by respiratory pathogens (Sumi, Kagami, Ohtsuka, Kakinoki, Haruguchi & Miyamoto, 2003). Poor denture care is considered to be one of the mitigating factors for denture stomatitis (irritation of the oral mucosal surfaces that come into contact with the dentures), a condition that affects approximately two thirds of denture wearers, (Kulak-Ozkan, Kazazoglu, Arikan, 2002; Narhi et al., 1993; Webb, Thomas, Willcox, Harty & Knox, 1998). Denture stomatitis is reported to be a precipitating factor for the development
of oral yeast infections (*Candida*) (Budtz-Jorgensen, Stenderup & Grabowski, 1975).

Individuals with full dentures have been found to have significantly higher yeast counts than those with natural dentition (Marsh, Percival & Challacombe, 1992); this is thought to be due to the fact that full upper dentures act as a barrier to the natural surface-washing activity of saliva (Narhi et al., 1993).

Proper denture care entails regular removal of the dentures, brushing the dentures to remove plaque build-up, especially on the tissue fitting surfaces, and the cleaning of the oral cavity (Webb et al., 1998). However, these steps are often neglected and individuals have the predilection to simply remove and soak dentures without mechanical removal of plaque or cleaning of the oral cavity (Frenkel et al., 2001).

**The State Of Oral Care in Long-Term Care**

During the routine delivery of health care, a variety of different healthcare providers have abundant opportunities to visually inspect the oral cavities of the older patients in their care (Jones, 2005; Weeks & Fiske, 1994; Wener, Yakiwchuk & Brothwell, 2003). Those who are well-informed regarding the risks, signs and symptoms of poor oral hygiene are well positioned to monitor oral health, and to notice, interpret, and report oral health problems. Nursing staff monitor and care for patients on a daily basis; they frequently provide assistance with activities of daily living, including oral care, which they consider to be part of their routine responsibilities. Speech-language pathologists regularly inspect the motor and sensory function of the mouths of adult patients during their evaluations of speech and swallowing (American Speech-Language-Hearing Association [ASHA], 2002; Canadian Association of Speech-Language Pathologists and Audiologists [CASLPA], 2008). Other rehabilitation allied health professionals, physiotherapists and occupational therapists, may
also aid in a patient’s oral hygiene by enabling individuals to functionally perform their own oral care. Although speech-language pathologists, physiotherapists and occupational therapists may not directly provide oral care interventions, they may recognize oral health conditions that can be brought to the attention of a nurse or attending physician. In Canada, dental hygienists are the primary dental service providers in rehabilitation and long-term care facilities (dentists are only seen on a referral basis for conditions that require their attention). According to an e-mail conversation with M. Casper, MA, CCC-SLP, BRS-S (February, 2006), in the United States, dental services are more commonly provided by referral to dentists who hold external contracts for long-term care facilities. Therefore, differing professions are well suited to collaborate on interprofessional teams to promote the oral hygiene of older adults in institutional facilities.

Nurses are reported to consider oral care important, but further investigation reveals that their concern is primarily for their patients’ self-esteem and social acceptability, and does not stem from an appreciation of the relationship between oral care and general health (Fiske & Lloyd, 1992; Weeks & Fiske, 1994). Although nurses may perceive oral care to be routine and common sense, this task is not always carried out, or performed effectively (Pyle, Nelson & Sawyer, 1999; Weeks & Fiske, 1994). Many studies have attributed the poor level of dental and oral care knowledge among nursing staff to misguided information, and a lack of education and training (Chalmers et al., 1996; Pyle et al., 1999; Rak & Warren, 1990). Additionally, it has been noted that the primary responsibility for front-line oral care services is frequently delegated to untrained staff that are overwhelmed with other routine tasks; this often leads to the neglect of oral care.
Poor oral health knowledge in caregivers also raises the risk that signs of serious oral diseases (such as oral malignancies) will go unrecognized (McCann, Sweeney, Gibson & Bagg, 2005; Morgan, Tsang, Harrington & Fook, 2001). In a study that investigated the abilities of physicians to diagnose oral diseases such as oral cancer, physicians were found to be seriously deficient in diagnostic awareness. The authors suggested that training to familiarize physicians with the clinical features of a healthy mouth and to the more common and important oral diseases could improve their diagnostic abilities (McCann et al., 2005). This concept can also be applied to all the different healthcare providers who have the opportunity to participate in the delivery of oral care services.

**Future Directions**

Many interventions for dysphagia are designed to limit the occurrence of aspiration during swallowing (Huckabee & Pelletier, 1999). However, literature suggests that common strategies such as texture modification (to remove textures that are aspirated more easily such as thin liquids) may not be effective in preventing aspiration-related respiratory compromise (DePippo, Holas, Reding, Mandel & Lesser, 1994). These findings implicate aspiration at times other than meals (non-prandial) as a primary contributing factor to the development of pneumonia. Consequently, efforts to limit the load of pathogenic bacteria in the oropharyngeal secretions are logically supported as a key strategy in limiting the incidence of aspiration pneumonia. We propose that the improvement of oral health amongst seniors, both in the community and especially in residential health care facilities needs to become a public health priority. Interdisciplinary collaboration appears to be critical to the design and delivery of initiatives targeting improved oral health amongst seniors. If the eyes are the window to
the soul, then the mouth is a portal to the rest of you and we must all address the oral care imperative.

**Clinical Tips**

- Ensure patient has had a dental assessment
- Assess patient’s level of dependence for oral care. If patients are able to perform their own care:
  - Ask for occupational therapists’ recommendations to facilitate independent self oral care
  - Observe patients performing their own oral care to ensure they are cleaning all areas (e.g., right hemisphere stroke patients may neglect one side of the oral cavity and may need reminding to clean the neglected side)
- Ensure adequate and proper oral care materials and products are available for use
  - A soft toothbrush is the best tool
- Dentures should also be brushed accompanied with the cleansing of the oral cavity and tongue
- Suction toothbrushes may be used with G-tube or patients with dysphagia
  - Foam swabs or sponges are ineffective and should not be used
  - Mouthwashes containing alcohol are drying
- Mouthwashes should contain fluoride for dentate patients
- Chlorhexidine use should be monitored by a dental professional as there may be side effects to long term usage (Fourrier et al., 2005; Winkel, Roldan, Van Winkelhoff, Herrera & Sanz, 2003)
- Do not use a petroleum product (i.e., Vaseline) or lemon glycerin as moisturizing agents

Although there is no specific guideline to oral care provision in the literature, an excellent resource caregivers may want to review is a publication entitled Oral Hygiene Care for Functionally Dependent and Cognitively Impaired Older Adults (Johnson & Chalmers, 2002).
CHAPTER 3: LESSONS IN ORAL MICROBIAL COLONIZATION: UNFORESEEN COMPLEXITIES

Background

The relationship between poor oral health, the elevated presence of respiratory pathogens (RPs) in the mouth and in oral secretions, and the risk of developing bacterial pneumonia is well established (Marik, 2001; Mojon & Bourbeau, 2003; Russell, Boylan, Kaslick, Scannapieco & Katz, 1999; Scannapieco, 1999, 2006; Scannapieco, Bush & Paju, 2003; Scannapieco & Mylotte, 1996; Scannapieco, Stewart & Mylotte, 1992; Shay & Ship, 1995). The reported incidence of pneumonia in long-term care settings (LTC) is approximately 1.2 per 1,000 patient days (Loeb, McGeer, McArthur, Walter & Simor, 1999; Muder, 1998; Nicolle, 2001) and is the leading cause of transfer to acute care for LTC residents (Muder, 1998). More specifically, aspiration pneumonia constitutes 15.5% of all Medicare pneumonia admissions in the United States (Baine, Yu & Summe, 2001).

Traditionally, pneumonia is classified as either community-acquired (CAP) or nosocomial depending on the setting in which the infection developed. When pneumonia develops in a patient residing in a long-term care (LTC) facility, it is classified as nosocomial. Nosocomial pneumonia is further differentiated into ventilator-acquired pneumonia (VAP) if infection develops during the course of mechanical ventilation or hospital-acquired pneumonia (HAP) if infection is not due to mechanical ventilation. HAP is reported to occur preferentially in a slightly older population with terminal disease (Bentley, 1984), and in patients who are weak, frail, have compromised immunity, or have depressed mental status that increases their propensity to aspirate (Siegel, 2003). The term aspiration pneumonia, which resembles (and
may overlap with) HAP epidemiologically, is used to specifically categorize pneumonia in patients who are at increased risk of oropharyngeal aspiration (Marik, 2001). Populations known to have a high incidence of aspiration pneumonia (such as stroke patients) have been shown to have abnormally high oral colonization with aerobic gram negative bacilli (AGNB) (El-Solh et al., 2003; Millns et al., 2003).

Recently, the American Thoracic Society has recognized health care-associated pneumonia (HCAP) as a new category of nosocomial pneumonia to include patients who: a) are residents of long-term care facilities; b) have recently received antibiotic therapy; c) may be immunocompromised; d) require dialysis; or e) have recently been hospitalized (American Thoracic Society, 2005). Those with HCAP have been found to be most frequently infected by multi-drug resistant pathogens such as Staphylococcus aureus and AGNB including Pseudomonas aeruginosa (El-Solh et al., 2002; El-Solh, Sikka, Ramadan & Davies, 2001). The epidemiology of HCAP closely resembles that of nosocomial rather than community-acquired pneumonia and therefore is classified as such (Kollef et al., 2005).

Residents of LTC institutions who are functionally dependent for feeding and for oral care, and those who are at a high risk of aspiration, particularly in the case of swallowing impairment, are at increased risk for developing pneumonia (Langmore et al., 2002; Langmore et al., 1998; Loesche & Lopatin, 1998; Terpenning et al., 2001). When aspiration occurs, the risk of ensuing infection depends on: (1) the type, volume and bacterial load of the aspirated material; (2) how frequently material is aspirated; and (3) the host’s defense responses to the aspirated material (Marik, 2001). Speech-language pathologists, who bear a significant responsibility for the assessment and management of dysphagia, need to
understand the mechanisms involved in the pathogenesis of aspiration-related respiratory infection, including factors related to oral hygiene and microbial colonization.

There are two primary mechanisms by which RPs emerge in oropharyngeal secretions to cause aspiration-related pneumonia (see Figure 1 on page 10) (Mojon & Bourbeau, 2003; Scannapieco, 1999; Yoon & Steele, 2007). In Mechanism 1, poor oral hygiene facilitates the accumulation of dental plaque, a thick biofilm that plays host to a diverse community of microorganisms implicated in periodontal disease (Loesche & Lopatin, 1998; Marsh, 1999; Mojon & Bourbeau, 2003). As the plaque matures, it becomes more complex in composition (Limeback, 1988; Mojon & Bourbeau, 2003; Scannapieco, 1999) and fosters the growth of periodontal pathogens, exemplified by Porphyromonas gingivalis, a proteolytic gram-negative anaerobic bacterium commonly found in diseased periodontal pockets and in the saliva of older patients with periodontal disease (Mombelli, 1998). Microorganisms such as P. gingivalis release hydrolyzing enzymes into the saliva to degrade matrix proteins such as fibronectin, a fibrous glycoprotein, which normally provide a protective coating to oral epithelial cell surfaces in healthy subjects to guard against the adherence of AGNB such as Pseudomonas aeruginosa (Gibbons & Etherden, 1986; Loesche & Lopatin, 1998). In subjects with poor oral hygiene, degradation of fibronectin allows for an increase in AGNB adhesion, which ultimately leads to the shedding of epithelial cells bearing AGNB into the saliva, which can then be aspirated, leading to infection (Gibbons & Etherden, 1986; Scannapieco, 1999; Scannapieco & Mylotte, 1996; Terpenning et al., 2001). In Mechanism 2, poor oral hygiene combined with diminished salivary flow from the multiple medications prescribed to frail older adults decreases the natural buffering and antimicrobial capacity of saliva, which disrupts the homeostasis of dental plaque to create conditions that favour the
proliferation of aerobic pathogens (Marsh, 1999). These microorganisms are then shed into the saliva and may cause infection when aspirated.

Although there is good evidence that proper oral hygiene with frequent professional oral care is an effective strategy for reducing the occurrence of pneumonia (Azarpazhooh & Leake, 2006; Sjögren, Nilsson, Forsell, Johansson & Hoogstraate, 2008; Yoneyama et al., 2002), oral care is reported to be inadequate, frequently overlooked, and of low priority in LTC facilities (Chalmers et al., 1996; Fiske & Lloyd, 1992; Frenkel, Harvey & Newcombe, 2000; Grap et al., 2003; Holmes, 1996; MacEntee et al., 1999; Paterson, 2000; Preston et al., 2000; Wardh et al., 2000). The primary purpose of this study was to conduct a prospective longitudinal investigation in order to describe patterns of oral microbial colonization over time, and specifically to document the presence and quantitative load of RPs, AGNB and Candida in oral swabs collected from LTC residents. We were primarily interested in documenting the time course of oral colonization in the context of the standard oral care provided to residents in these LTC settings, namely quarterly visits to the dental hygienist for detailed cleaning, paired either with self-care or nursing care between dental hygiene appointments. To our knowledge, a longitudinal study of oral colonization related to standard oral care has not previously been conducted in the LTC population, and it remains unknown whether such standard oral care regimens are sufficient for managing and limiting oral colonization with bacteria known to be associated with the pathogenesis of pneumonia. Our specific hypotheses were that oral colonization with the pathogens of interest: 1) would peak just prior to the delivery of professional dental hygiene services; 2) would decline to a minimum at the first measurement following professional dental care; and 3) would
subsequently increase across measurements taken at successive intervals following the delivery of professional dental hygiene care.

Methods

Participants. A convenience sample of 11 participants was recruited from two complex continuing care/long-term care facilities in the Greater Metropolitan Toronto Area, Canada. After the initial recruitment and consent, one participant dropped out of the study because she was no longer interested in participating, leaving a total of 10 participants who were each followed for a three-month period. The units from which participants were recruited served residents with primary diagnoses of stroke and acquired brain injury. There was no exclusion of participants on the basis of age, gender, or ethnicity. Individuals with major cognitive impairments (based on a Cognitive Performance Score greater than 3 from the participant’s Minimum Data Set) were excluded due to concerns about their ability to provide informed consent, as well as the risk that they might inadvertently bite and/or swallow the materials that were used during data collection. The study received approval from the research ethics boards of the University of Toronto and from the participating hospitals.

Data Collection.

Oral swabs. Oral swabs were collected from participants at five time-points: a baseline analysis taken prior to their quarterly dental-hygiene appointment, and four follow-up analyses taken at 1, 5, 9 and 12 weeks following baseline. Specimens were collected just prior to lunch in order to reflect the lunchtime risk of aspirating pathogenic bacteria that might have accumulated over the course of the morning (i.e. in the time since the provision of routine morning oral care). Participants were evaluated under their normal eating
conditions (i.e. with or without dentures), and no special procedures were used to cleanse the mouth immediately before specimen collection.

Pathogenic bacteria are known to be readily detectable on the tongue (Van der Velden, Van Winklehoff, Abbas & De Graaff, 1986), which is prone to the accumulation of microorganisms due to its papillary structure and large surface area (Dahan, Timmerman, Van Winklehoff & Vander Velden, 2004). For the current investigation, oral specimens were collected from the dorsal surface of the tongue by sweeping the midline groove in a posterior to anterior direction three times with a sterile oral swab. The tongue swabbing method is considered preferable to swabbing the gingiva or tooth surfaces, as it is likely to gather equivalent data from both dentate and edentate participants. The chosen method is also considered safer than collecting an expectorated oral rinse because it avoids the risk of a rinse spilling into the airway in patients with dysphagia.

Upon removal of the swab from the participant’s mouth, it was immediately placed in a sterile specimen container (Amies-Gel with Charcoal Double Swab Kits) and transported to a microbiology lab to undergo standard microbiological analyses (Izenberg, 2003). The specimens were plated onto sheep blood agar, chocolate agar, and MacConkey agar and incubated at 35 °C for 48 hours. RPs (such as Streptococcus pneumoniae, Haemophilus influenzae, Staphylococcus aureus, and Pseudomonas aeruginosa), gram-negative bacilli and Candida albicans were identified to the species level using standard techniques. Reports produced a semiquantification (0 = absent, 1 = scant, 2 = light, 3 = moderate, 4 = heavy) of all isolated organisms based on smear plate method. The number of different bacterial species detected served as a crude index of complexity. Total burden was calculated as the number of bacterial species present, multiplied by their semiquantified levels.
**Salivary flow.** As the volume of saliva decreases, the fissures of the tongue may deepen (Limeback, 1988), the oral pH usually decreases (Shay, 2000; Shay & Ship, 1989), and the natural antimicrobial and buffering capacity of saliva reduces. This allows bacterial (Loesche & Lopatin, 1998) and fungal densities (Narhi et al., 1993), which can consequently be aspirated to cause pneumonia, to increase. In order to explore the influence of oral dryness on oral colonization, whole saliva measurements were obtained using a modified Schirmer test (MST) as described by Chen and colleagues (2005) immediately following the oral swab. This MST used filter paper test strips (Eagle Vision, Memphis, Tenn.), calibrated in 1mm intervals and impregnated with blue dye at the 0mm wick end, which were placed sublingually on the floor of the subject’s mouth. When exposed to moisture, the dye traveled up the length of the strip, which was read at our designated interval of one minute.

**Medical history/Chart reviews.** After collecting all our swab samples for the study, chart reviews were conducted for each participant in order to record health status factors that might influence the results and interpretation of the laboratory analyses. We gathered information on the participants’ state of dentition because the oral cavities of patients with natural teeth or dentures, both of which accumulate dental plaque, are more likely to be colonized with RPs than those patients who are completely edentulous (Scannapieco, 1999). Furthermore, elderly people who retain their natural teeth are at an elevated risk of aspiration pneumonia due to the combination of poor oral hygiene and the periodontal disease that contributes to greater shedding of RPs into the saliva (Loesche & Lopatin, 1998). We also documented medications (specifically the use of antibiotics) since the long-term use of broad-spectrum antibiotics is reported to lower the colonization resistance of dental plaque, facilitating the overgrowth of non-resident microorganisms (Marsh, 1999). Finally, we
gathered information on major medical diagnoses; dental care history; current oral care regimen; and, changes in medical status over time course of the study. The level of dependency for oral care was based on the dental hygienists’ evaluation of the patient.

**Data Analyses.** Analysis was conducted in SPSS 19.0 software. Chi-square tests were performed to identify differences in the semi-quantified colonization load at each time-point (baseline, 1, 5, 9 and 12 weeks post). In order to capture the group-wise relative load at each time-point, the frequencies of each load-coding across the sample of ten participants were multiplied by load-weightings (0 = absent, 1 = scant, 2 = light, 3 = moderate, 4 = heavy) to come up with weighted total scores for the sample at each swab measurement. The distribution of these weighted total scores was analyzed to determine the minimum (0), maximum (36), mean (8.2), and 95% confidence interval boundaries (5.79; 10.60). The weighted totals were colour-coded as none, under the lower 95% confidence interval boundary, within the 95% confidence interval and above the upper 95% confidence interval, representing absent, scant, light, moderate and heavy weighted scores (see Table 2). A mixed-model repeated measures analysis of variance was performed on the MST data with a repeated factor of time-point to identify differences in the oral dryness measures across swabs. Chi-square tests were also performed to identify differences in oral dryness measures in relation to different drug classes. For these chi-square tests, we used a binary classification of depressed (within 2 SD of mean) or not depressed (greater than one SD below the mean). Chi-squares were also performed to test differences in colonization severity in relation to the different drug classes.
Table 2

*Distribution of weighted colonization load scores*

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<td>None</td>
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<td>Light (below the 95% confidence interval lower boundary)</td>
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<td>Moderate (within the 95% confidence interval boundaries)</td>
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<td>Heavy (above the 95% confidence interval upper boundary)</td>
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<td><em>Staphylococcus aureus</em></td>
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<td>Aerobic Gram Negative Bacilli</td>
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<td>Yeasts (not <em>Candida albicans</em>)</td>
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<tr>
<td><em>Proteus</em> species</td>
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<td>Group B <em>Streptococcus</em></td>
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<td>Coagulase Neg. Staphylococci</td>
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<td><em>Stomatococcus</em> species</td>
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<td><em>Corynebacterium</em> species</td>
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<td>Non-Hemolytic Streptococci</td>
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<td><em>Neisseria</em> species</td>
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<td>Viridans Streptococci</td>
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<td>Viridans Streptococci</td>
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Results

The main characteristics of the study participants are summarized in Table 3.

Table 3

Demographics of participants

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<th>Gender</th>
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| Age: Range | 38-79; Mean: 50 |

| Major diagnoses | Stroke |
|                 | Brain Aneurysm |
|                 | Acquired brain injury |
|                 | Cerebral palsy |
|                 | Multiple sclerosis |

Table 2 shows the distributions of weighted colonization load-scores for the entire sample across the successive swabs. In our sample, oral colonization with respiratory pathogens was found to be rare; colonization with RPs did not decrease in response to dental hygiene interventions nor increase with the passage of time as initially hypothesized. In fact, there were no obvious trends in colonization patterns; none of the microorganisms identified in our samples appeared to be disturbed by the dental hygiene interventions. The most prevalent microorganisms were *Neisseria* spp. (not *meningitidis* or *gonorrhoeae*), viridans streptococci, and *Haemophilus parainfluenzae*, which consistently showed heavy colonization across all time-points. These strains are typically classified as commensal flora in the mouth.

In our sample, we encountered two cases of respiratory concern. One was in a patient who was medically diagnosed with pneumonia (via x-ray) and the other in a patient
suspected and treated as such with antibiotics. In the rare cases where RPs of interest were found (i.e., *Staphylococcus aureus* and AGNB) there was no significant association with episodes of respiratory concern amongst our participants. The only exception to this observation was with yeast (of types other than *Candida albicans*) \( P < 0.01 \), Fisher’s exact test). The participant who was diagnosed with pneumonia was the only individual in our sample who was colonized with yeast. One participant, who was the only individual on enteral feeding and the only one to have a white coating on his tongue and “heavy tenacious calculus” documented in his chart, was uniquely colonized with Group B *Streptococcus* and *Proteus* species. Notably, this participant exhibited an overall pattern of bacterial load that responded to the dental hygiene intervention according to the hypothesized pattern (i.e., lowest load post intervention, then gradually increasing with time).

With the exception of one participant, none of the participants showed conditions of oral dryness according to the MST (i.e., measures were greater than 5mm). There were no significant associations between oral dryness measures and any of the medications or medication classes prescribed for participants in our study. MST measures also did not fluctuate in any meaningful way across time (see Figure 2). The mean MST measure across all swabs was 14.6 mm (SD = 6.8), which is comparable to measures in normal healthy individuals (Chen et al., 2005). Oral dryness as a factor that may encourage proliferation of pathogens did not appear to be at play in our study. Medication use that might normally be considered to have xerostomia as a possible side effect did not affect the oral dryness measures taken in our participants.
Discussion

In the current study, the case for better oral care did not emerge from our data; there was no decrease and gradual proliferation of the bacterial pathogens of interest over time in individuals receiving routine oral care with regular dental hygiene interventions. We could naively interpret these data to show that routine oral care was effectively managing oral ecology in these patients. However, the complexity of the oral ecology observed gives us grounds to think otherwise. In order to position the current results (or lack thereof) in a proper context, one would need to fully understand the development/colonization process of dental plaque, the homeostatic mechanisms involved in maintaining oral ecology, and the bacterial/cellular interactions that occur and how these may place patients at risk for pneumonia. While these issues go beyond the scope of this paper, it is apparent to us that a
sample size of ten is inadequate for displaying the oral hygiene-bacterial interactions that are relevant to the pathogenesis of pneumonia. In fact, the biggest lesson we learned in pursuing this study was just how complex the relationship between oral microbial colonization and oral care actually is. We found that we were left with more questions than answers.

The majority of the bacterial strains identified in the samples collected were determined to be commensal (i.e., typical, non-pathogenic) microflora of the upper respiratory tract. The most predominant genera of the nasopharynx are *Neisseria*, *Streptococci*, and *Haemophilus*, which were the most prevalent microorganisms collected in our samples. These bacteria have also been shown to be the early colonizers in dental plaque development (Liljemark, Fenner & Bloomquist, 1986; Nyvad & Kilian, 1987), and therefore they are thought to play a key role in creating conditions that enable other more fastidious organisms to further colonize, leading to the bacterial and structural complexity of dental plaque (Marsh, 2005). Viridans streptococci are the most numerous bacteria, comprising approximately 40% of cultivable microflora in the oral cavity (Marsh, 2000, p.33).

Anecdotally, the dental hygienists working in the facilities where our study was performed reported that they considered oral health status to be relatively poor among the residents. This corroborates the literature showing poor oral health in LTC populations, even following interventions designed to improve the situation (Frenkel et al., 2001). However, the state of poor oral health was not sufficiently poor to allow for colonization with RPs. This raises questions about the types of physiological changes that would need to occur in order for an individual in LTC to become prone to colonization with respiratory pathogens. Do these changes involve disruption of the early colonizers seen in our data? Given that we did not
find RPs, does that mean that our sample was not at risk of developing pneumonia, given a longer timeframe of observation?

Speech-language pathologists, who perform assessments of oral motor and sensory function in adults during in their evaluations of speech and swallowing (CASLPA, 2008), are increasingly interested in patients’ oral health as a risk factor for developing pneumonia secondary to aspiration associated with dysphagia. They frequently report that oral health status affects their clinical recommendations for this patient population (Yoon & Steele, 2011) and it has become extremely common for SLPs to request greater vigilance in oral care for their patients. However, our data suggest that the combination of a diagnosis of dysphagia with clinical observations of poor oral health status does not add up to constitute a clear risk for developing respiratory infection. The overuse of recommendations for vigilant oral care as a mechanism for limiting pneumonia risk appears to reflect an oversimplified understanding of these risk factors.

**Limitations**

There are several limitations in this study that should be taken into consideration for future studies:

1. There was no tracking of the oral care provided by the nursing staff. The type of nursing oral care provided, products used, and the actual time of care delivery relative to the swab collection may be factors that could have influenced the results of the samples taken.

2. The hospitals in which data were collected for this study both have in-house dental services, which provided quarterly dental hygiene appointments to residents. This level of dental service provision is not common to most LTC facilities and, therefore,
the definition of routine oral care for this study may not be generalizable to other facilities where residents are more likely served by outpatient services.

3. Our sample size was primarily constrained due to budget. The high costs associated with the microbiological testing of oral swabs (i.e., $75.00/swab) render this method of monitoring oral colonization questionably feasible for screening for RPs in larger samples or over longer time frames. Even if we had found significant results, we question the merits of swabbing for oral bacteria as a method for tracking pneumonia risk. Clear demonstration of a much stronger relationship would be necessary before recommending more widespread use of this approach.

4. In the current study, we did not stratify our sample for level of dependence in oral care, or for the presence/absence of dysphagia. Both of these factors can impact the risk of developing aspiration-related pneumonia and should therefore be monitored as factors in future, larger studies. In addition, we did not capture a sufficient number of participants who experienced oral dryness to be able to discern the influence of salivary flow on colonization levels.

5. In an ideal world, we would have continued to add participants to our sample, and would have monitored enrolled participants until we had observed several episodes of pneumonia, consistent with reported pneumonia rates. The occurrence of only two candidate episodes in our sample suggests that our study was underpowered to reveal any meaningful relationship between the variables studied and the emergence of aspiration-related respiratory concerns.

6. The oral colonization of the one participant who was on enteral feeding was different from that observed in the rest of the sample. Greater vigilance is required for more
vulnerable and complex patients and, therefore, we should have better defined our exclusion criteria, or deliberately sampled a greater number of individuals on enteral feeding.

7. Oral ecology is an extremely complex phenomenon, which is sensitive to change, but the timing of our swab collections did not have sufficient resolution to capture rapid changes that might occur. Dental plaque starts to form immediately after being removed, when the early colonizers interact with the pellicle and begin to adhere to the enamel to begin the process; therefore, by the time we collected the first swab following a dental hygiene intervention, it is quite likely that bacteria had already reestablished themselves and the oral environment had already re-stabilized.

**Conclusion**

Our data did not show any changes in patterns of oral microbial colonization related to dental hygiene interventions over the time-course of our study. No clear relationships were found between oral microbial colonization and symptoms of upper respiratory infection in our pilot sample of LTC residents. We did not find any significant association between measures of oral dryness and the different classes of medications used by our participants, and we did not find that oral dryness measures affected oral bacterial colonization. From this study, we learned that the relationship between pneumonia, microflora, and oral care is not linear – that it is a very complex interaction. However, this does not take away from oral care as an important defensive strategy for managing the risk of developing pneumonia; yet, we should be aware that oral colonization is not as simple a mitigating factor for pneumonia pathogenesis as might be assumed. In conclusion, we recommend that speech-language pathologists should collaborate with their colleagues in dental hygiene and nursing to
promote good oral health for LTC patients, but they should be cautious about routinely requesting “more aggressive oral hygiene”. Given evidence that efforts to improve oral care provision in LTC facilities face challenges and show poor uptake, our data suggest that such requests should perhaps be reserved for situations in which there is clear evidence of multiple converging risk factors for pneumonia, including dysphagia, oral health and concerns about compromised immunity.
CHAPTER 4: FACTORS INFLUENCING ORAL CARE DELIVERY IN LONG-TERM CARE: APPLICATION OF THE NURSING ROLE EFFECTIVENESS MODEL (NREM) TO ORAL CARE

This chapter sets the background for the final two research studies of this dissertation, which sought to: a) explore perspectives regarding oral care held by nursing staff, speech-language pathologists (SLPs) and dental hygienists (DHs) in long-term care institutions and understand how these perspectives impact activities and processes involved in the delivery of oral care (chapter 5); and b) explore whether an appreciative knowledge translation approach to oral care practice might be successful in facilitating improvements in oral care service delivery (chapter 6). In this chapter, we use the Nursing Role Effectiveness Model (NREM) (Irvine, Sidani & McGillis-Hall, 1998) as a framework for identifying and understanding the different factors (e.g., professional group, organization, patient) that may impact the delivery of oral care in long-term care settings.

The Mouth as a Portal to the Body

In the past three decades, an increased focus on preventive dentistry in most industrialized countries has led to marked improvements in oral health (Petersen, 2003), and to a greater percentage of older individuals retaining their natural teeth (Lyons & McNally, 2004). This trend has left us with the challenge of providing appropriate interventions to ensure that these older adults, who are at high risk of developing oral diseases and associated systemic consequences, maintain their oral health. This challenge is especially true in long-term care (LTC) facilities where oral health is still described to be a relatively low priority (Chung et al., 2000; Pyle, Jasinevicius, Sawyer & Madsen, 2005; Wardh et al., 2000). This low priority status has been attributed to a number of factors, including a lack of oral care
related knowledge amongst caregivers (Chung et al., 2000; Weeks & Fiske, 1994); negative attitudes toward oral care expressed by both caregivers and residents (Fiske & Lloyd, 1992; Frenkel Harvey & Newcombe, 2002; Wardh, Andersson & Sorensen, 1997); the increasing workload of staff (Wardh et al., 2000); a lack of funding and support from the institutions themselves; and the limited financial support available for dental care from third party insurers (Cherry-Peppers & Schumaker Jr., 1993). Individuals who are dependent on nurses for oral care, who lack the cognitive capacity to request or cooperate in oral care, or who have complex comorbid conditions are particularly vulnerable.

The former U.S. Surgeon General, C. Everett Koop stated, “You are not healthy without good oral health” (U.S. Department of Health and Human Services, 2000). This statement is supported by growing evidence that poor oral health is linked to systemic diseases and vice versa. Poor oral health has been associated with cardiovascular disease, risk of ischemic stroke, peripheral vascular disease, poor nutrition and respiratory infection in compromised populations, such as those in LTC facilities (e.g., Joshipura, 2002; Meurman, Sanz & Janket, 2004; Mojon & Bourbeau, 2003; Mojon, Budtz-Jorgensen & Rapin, 1999; Scannapieco & Mylotte, 1996; Southerland, Taylor, Moss, Beck & Offenbacher, 2006; Teng et al., 2002). Common systemic diseases (e.g., diabetes, Alzheimer’s disease and depression), together with the side effects of medications used to treat these conditions, can also adversely affect oral health status (e.g., Friedlander, Friedlander, Gallas, & Velasco, 2003; Ghezzi & Ship, 2000; Kim & Amar, 2006; Mealey, 2006; Sandberg, Sundberg, Fjellstrom, & Wikblad, 2000; Ship & Puckett, 1994).

Consequently, it is imperative that oral health become a priority in LTC. In order to effectively incorporate oral health into long-term care, a comprehensive conceptual
framework is needed. One such framework is the Nursing Role Effectiveness Model (NREM) developed by Irvine, Sidani and McGillis-Hall (1998). Application of the NREM to the context of oral care aids in the identification of factors, and relationships between factors that may support or affect oral health outcomes (see Figure 3). The NREM has recently been used to guide the selection of structure, process and outcome indicators in a unit-based oral hygiene quality improvement initiative (Landesman, Murphy, Richards, Smyth, & Osakue, 2003), thus demonstrating the suitability of applying the NREM to the context of oral care.

In the remainder of this chapter, we will outline the various components of the NREM model that are relevant in considering its application to the context of oral care delivery in LTC.

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Figure 3. NREM adapted for oral care delivery in long-term care.

NREM Applied to Oral Care in Long-Term Care

The NREM outlines three major components in the analysis of care delivery variables in a context like oral care. First, structural components are recognized. In the context of oral care, these include nurse variables (e.g. knowledge and attitudes), organizational variables
(e.g. culture) and patient variables (e.g. patient status). Second, process components are identified relative to providers’ role functions and responsibilities. Processes relevant to oral care include the roles played independently by nurses, and the other roles played by members of the larger interprofessional team. Finally, outcomes are considered, which can be used to determine the effectiveness of oral care delivery at different levels. Each of these components is explored in detail, applied to the context of oral care in LTC settings.

**Structure Components.** The structure components of the NREM consist of nurse, organization and patient variables. Nurse variables of knowledge (both explicit and tacit) and attitudes can affect the quality of oral care provided. Organization variables are those that shape the culture that a LTC facility fosters, and the extent to which this culture supports and prioritizes the provision of oral care. Patient variables include the extent to which oral care is customized to the needs of the individual patient, including consideration of functional (in)dependence, cognition, medical and dental status.

**Nurse Variables.** In comparison to other healthcare-providers, nurses spend more time with patients, providing assistance with activities of daily living including oral care, which they consider to be part of their routine responsibilities (Miller & Rubinstein, 1987; Weeks & Fiske, 1994). Nurses are therefore in an excellent position to monitor and assist in the prevention of adverse oral health outcomes (Duffy, 2002), provided that oral health is recognized to be a priority. Although the primary responsibility for front-line oral care services frequently falls to nurses with minimal training (i.e., personal support workers or PSWs), one must consider the availability of resources in terms of the number and composition of available nursing staff, which may alter the quantity and quality of oral care provision. Depending on the funding formula for an organization, nursing skill mix may
differ across settings (for example, between LTC and Complex Continuing Care). PSWs who perform oral care services may lack the training necessary for recognizing oral health concerns and may frequently be overwhelmed by other routine tasks. Other patient concerns (such as skin care, continence or ambulation) may take precedence over oral care (MacEntee et al., 1999; Vargas, Kramarow & Yellowitz, 2001; Weeks & Fiske, 1994). The ineffective delivery of preventive oral care amongst nurses has been attributed to a lack of training and knowledge (Budtz-Jorgensen, Mojon, Rentsch & Deslauriers, 2000; Chalmers et al., 1996; Chung et al., 2000; Pyle et al., 1999; Weeks & Fiske, 1994). When oral health is a concern, acute conditions such as oral pain or emergency dental services may be viewed as more important than routine preventive care (Reznick & Matear, 2002). As a result, routine oral care is often neglected or performed inadequately. Poor oral health knowledge on the part of caregivers contributes to the risk that even signs of serious oral diseases (such as oral malignancies) will go unrecognized (McCann, et al., 2005; Morgan et al., 2001).

Knowledge. Knowledge is commonly categorized into explicit and tacit knowledge. *Explicit knowledge* can be consciously understood and articulated (i.e., know-what) (Landry, Amara, Pablos-Mendes, Shademani, & Gold, 2006). In the context of oral care provision, this includes awareness and understanding of: a) evidence/mechanisms that links oral health and general health; b) the risks surrounding poor oral health; c) treatments and medications impacting oral health; d) oral care products and their application; and e) how to identify oral abnormalities. Explicit knowledge is primarily obtained through the nurse’s education and training, usually didactic in approach.

*Tacit knowledge* is knowledge that the professional is not aware of (i.e., know-how) (Landry et al., 2006). In the context of oral care provision, this is knowledge about how to
deliver oral care, which is sometimes called skill. Skill is initially garnered through explicit knowledge but further develops through clinical experience and expertise, and is intimately related to action. Clinical experience and expertise are defined as the proficiencies and judgment that clinicians acquire through their own experiences and practices (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996), which become embedded in practice. It is this process of knowledge becoming practice that is fundamental in knowledge-to-action cycles of knowledge translation. In light of the increasing priority placed on evidence-based practices, it is paramount that we develop insight and understanding regarding the contributions that professional “know how” makes to front-line oral care provision in order to clearly elucidate gaps that may exist between knowledge and action.

The research literature has focused on inadequacies in oral care provision with little attention to the clinical expertise and experiences that underlie the oral care strategies and decision-making processes, which impact the care provided. This focus on deficiencies rather than strengths in oral care practices narrows the window through which we may be able to assess clinical effectiveness in oral care provision. Carter (2006) states that clinical practice improvements can be envisaged and facilitated through a process of acknowledging existing clinical strengths and effectiveness. A provocative transformational paradigm known as Appreciative Inquiry (AI) adopts a constructive approach to recognizing strengths in organizational structures, creating “a new lens for seeing old issues” and establishing a positive foundation upon which changes can be made (see chapter 6).

**Attitudes.** Attitudes can shape behavior and affect the implementation of desired behaviours (Conner & Armitage, 1998). Negative perceptions that have been voiced about oral care among nursing personnel include descriptions of fear, disgust, harm and aversion to
the activity (Eadie & Schou, 1992; Wardh et al., 1997). The perception that oral care as an unpleasant activity is one of the strongest barriers to the provision of quality care (Furr, Binkley, McCurren, & Carrico, 2004). Nurses may feel that oral care infringes on the patient’s personal space, requiring them to cross the boundary between the exterior and interior of the patient’s body (Frenkel et al., 2002). It has been shown that nurses have a preference for cleaning dentures rather than teeth in the patient’s mouth, perhaps because dentures can be removed from the patient’s mouth before cleaning (Fiske & Lloyd, 1992). Despite potential aversions to providing oral care, it has been shown that nurses believe that oral care is important for sociodental reasons (i.e., social impact of dental disease). Thus, empathy may serve as a motivating factor for nurses to ensure that patients have fresh-smelling mouths and mouths free of visible debris so that the patient can maintain a positive self-image and social acceptance (Fiske & Lloyd, 1992; Weeks & Fiske, 1994).

**Organization Variables.** Instrumental organizational variables affecting oral care delivery include the organization’s oral health program, support for educational initiatives, and the availability of resources to provide the care. Each of these factors is part of the organization’s commitment to oral health, which underscores the organization’s value for oral health. Oral health programs should address three pillars: (1) oral health assessments; (2) dental treatments; and (3) daily oral care (MacEntee et al., 1999). In a multiple case-study analysis, which contrasted different human resource and organizational strategies for managing the delivery of oral care to older residents, no single organizational strategy was found to be ideal (MacEntee et al., 1999). Rather, it was recommended that effective oral health programs be developed with consideration for each organization’s culture and values and with input from all healthcare disciplines, including nurses at all levels. Approaches such
as Appreciative Inquiry have been anecdotally reported to be very successful in changing organizational culture from the inside out (Carter, 2006). Concerted efforts towards fostering a caring patient-centered culture are required in order to establish a context in which staff members make appropriate decisions about their practice and promote oral health as a priority (Thorne, Kazanjian, & MacEntee, 2001).

Support for educational and training initiatives can demonstrate an organization’s commitment to oral health and promote better practice. However, studies of the effectiveness of oral health education have been inconclusive and there is little consensus on how such initiatives should be organized (Matear, 1999). Some initiatives have yielded oral health benefits for LTC populations (Frenkel et al., 2001; Isaksson, Paulsson, Fridlund, & Nederfors, 2000), others have enhanced the knowledge of nurses (Arvidson-Bufano, Blank & Yellowitz, 1996; Paulsson, Fridlund, Holmen, & Nederfors, 1998; Paulsson, Soderfeldt, Nederfors, & Fridlund, 2003), while still others have shown little impact (Schou, Wight, Clemson, Douglas, & Clark, 1989). More research explicitly describing educational methods is required, including consideration of organizational influences.

Sufficient availability of resources also promotes optimal oral care practices. Resources include time, accessible dental services and oral care products. Time constraints are often cited as a reason why oral care is not performed (Chalmers et al., 1996; Wardh, Berggren, Hallberg, Andersson, & Sorensen, 2002; Weeks & Fiske, 1994). Doran and colleagues (2002) found that sufficient time directly impacted nurses’ independent role of providing quality care. Similarly, Furr (2004) reports that perceived adequacy of time for performing care led to better oral care provision. Resources for oral care also encompass access to dental services. While having a full dental team available on-site allows for the
most comprehensive services, this is often not feasible (Pearson & Chalmers, 2004). Organizations therefore need to foster relationships with external clinics or contract mobile services to provide comprehensive dental treatments to patients.

The lack of available oral care tools and products has also been documented to be a frequent complaint among nurses (Frenkel et al., 2002). Thorne and colleagues (2001) suggest that providing patients with toothbrushes on admission and routinely thereafter may tangibly demonstrate an organization’s commitment to oral health and the degree to which staff are expected to take oral health seriously. Although straightforward oral care may simply require a toothbrush and toothpaste, various other products exist for the treatment of oral sequelae (e.g., oral rinses and oral moisturizers) and risk prevention (e.g., suction toothbrushes for patients with swallowing difficulties who are at risk of developing aspiration pneumonia). Organizations should consult members of the healthcare team to ensure that appropriate products are available. Budget constraints may act as a barrier to the availability of oral care products and tools. However, the costs of treating oral sequelae and other systemic conditions that potentially arise from poor oral health far outweigh the costs associated with providing these oral care supplies.

**Patient Variables.** Oral health programs are most successful when adapted to each individual patient (Chalmers, Johnson, Tang, & Titler, 2004; Fiske, Griffiths, Jamieson, & Manger, 2000). Individualized care plans improve the quality and consistency of oral care delivery (Altabet, Rogers, Imes, Boatman, & Moncier, 2003). Such plans incorporate patient characteristics such as health status, cognitive status, functional status and state of dentition. Each plan also notes patient preferences (e.g., positioning of the patient during care) and specific techniques to help care-providers in the delivery of oral care (e.g. techniques used to
assist with mouth opening in a patient with a bite reflex). Patients who experience cognitive and functional decline, such as those with Alzheimer’s Disease, may experience a loss in their ability to perform activities of daily living such as maintaining oral health. Cognitive status and baseline functional status have been found to be significantly related to nursing interventions targeting self-care (Doran, Sidani, Keatings & Doidge, 2006). Cognitive impairments may lead to communication difficulties (e.g., inability to express pain, discomfort or request for care) and behavioural challenges (e.g., resistive behaviours), which can ultimately serve as barriers to oral care provision (Pearson & Chalmers, 2004).

Functional impairments, such as losses in motor dexterity, may also contribute to poor oral health self-care if patients are unable to grasp tools or apply adequate pressure for proper cleaning. Reduced oral sensory perception can potentially exacerbate poor oral health secondary to the pocketing of food and debris and the neglect of certain areas within the mouth (as may occur in hemiplegic stroke patient). Another notable variable is the patient’s state of dentition. Although oral care encompasses the cleanliness of the teeth, failure to recognize the importance of other surfaces in the oral cavity can lead to unfavorable consequences. Ill-fitting and unclean dentures or failure to remove dentures overnight can predispose a patient to develop yeast infections and denture stomatitis (Narhi et al., 1993; Sweeney, Shaw, Yip, & Bagg, 1995). In addition, negative attitudes towards providing intraoral care may result in frequent oversight of the oral mucosal surfaces and tongue in denture-wearers and edentulous patients (Fiske & Lloyd, 1992). Irrespective of the use of dental prosthetics, tooth loss has been shown to have adverse psychological effects, causing individuals to feel less confident and more inhibited in performing everyday activities (Davis, Fiske, Scott, & Radford, 2000).
**Process Components.** Although oral care delivery in LTC settings in Canada is primarily delegated to nursing staff, it is a process that can be impacted by a number of other healthcare professions’ roles and functions and responsibilities. The report on oral health, published by the U.S. Surgeon General, argues that raising awareness is an important first step, but collaborative efforts across health professionals are then needed in order to promote optimal oral care and decrease disparities in oral health for vulnerable populations (U.S. Department of Health and Human Services, 2000). Interprofessional teams are well suited to fill this need. Interprofessional functions include communication, coordination of care, monitoring and reporting. A core interprofessional team for oral care could be comprised of nurses, dental professionals, physicians, speech-language pathologists and occupational therapists. While it is acknowledged that other healthcare professionals also play adjunct roles, the aforementioned professional groups have the greatest opportunity to impact oral health, to recognize oral ailments and to monitor changes in oral conditions. We explore the oral care perspectives of three of these professions in the study presented in chapter 5.

**Nurses’ Independent Roles.** Nurses’ independent roles are activities and functions for which only nurses are held accountable. Oral care is considered an activity of daily living and its provision is part of nursing scope of practice. Independent functions include initial and ongoing oral health assessment, the provision of oral care and follow-up care. These nursing functions are crucial to ensuring the success of any organization’s oral health program, irrespective of the availability of dental services. Effective oral care programs have been found to be contingent upon the regular implementation of oral health assessment and daily oral care functions (Thorne et al., 2001) (also see organization variables).
A patient-centered oral health assessment, which can be performed by suitably trained nursing staff, is recommended for all patients upon admission to LTC (Boyle, 1992; Chalmers & Pearson, 2005; Pearson, 2004). In Ontario, LTC facilities funded by the Ministry of Health for Long-Term Care require nurses and other healthcare practitioners to complete a comprehensive health assessment of patients upon admission using the Minimum Data Set (MDS). The oral health components of the MDS (section K and L) may be used to prioritize a patient’s oral health needs and may point to problems and “triggers” for oral care interventions, care-planning, and referral to a dentist (Coleman, 2005). However, the American Dental and Special Care in Dentistry Associations believe that the dental content of the MDS provides an incomplete appraisal of the oral health of individuals when used in LTC settings (Guay, 2005). Further, it is reported that the utility of the MDS to detect oral health concerns is limited, as nurses identify few oral health or hygiene problems via the MDS (Thai, Shuman, & Davidson, 1997). Other tools, such as the Brief Oral Health Status Examination (BOHSE) (Kayser-Jones, Bird, Paul, Long, & Schell, 1995) or its modified version, the Oral Health Assessment Tool (OHAT) (Chalmers, King, Spence, Wright & Carter, 2005), may supplement the MDS and provide a more comprehensive picture of a patient’s oral health status.

Daily oral care comprises the ongoing services associated with maintaining oral health in the LTC population. It involves front-line care-provider functions of promoting and delivering oral care interventions to maintain oral health and prevent acute dental crises in addition to treating existing oral ailments. For functionally or cognitively impaired patients who are unable to perform their own care, nurses are responsible for directly providing care while simultaneously providing education to informal caregivers. In patients who are
functionally capable, nurses may assist and monitor self-care, but again act as the primary promoters of oral health.

Nurses have been criticized for not playing a prominent role in oral health promotion and disease prevention (Coleman, 2005). Nursing behavior has been described as mechanical and their duties have been described as routine tasks performed in isolation rather than higher level skills requiring independent judgment and thinking (Shorr, 2000). This is unfortunate considering that nurses are the primary providers of bedside oral care, and are in the best position to continuously monitor oral health, and to notice, interpret, and report oral health concerns. Therefore, it is crucial to increase nurses’ knowledge, skills and commitment to oral health through more formal systematic interprofessional collaborations, especially with dental professionals (Coleman, 2005).

Nurses can play an essential interprofessional role in facilitating timely patient care by recording accurate and complete accounts of a patient’s existing and changing oral health status. Comprehensive documentation affords nurses and other members of the interprofessional team the opportunity to communicate, to engage in current and retrospective review (i.e., audit) and to reformulate techniques and strategies to improve care (i.e., feedback) (Coleman, 2005; Shorr, 2000). Nurses, who are the most intimately familiar with patients, serve as primary patient advocates by communicating patient preferences and needs, which should ultimately influence the team’s oral health goals and the coordination of care. Nurses in leadership positions must take active roles in communicating oral health as a priority to nursing staff, and in communicating the needs and accomplishments of the staff in improving oral health back to the organization (Coleman, 2005).
**Interprofessional Team Roles.** A sense of shared responsibility amongst care staff, visible administrative support, and shared awareness of the importance of oral health for general health, are integral to the effectiveness of an oral health program (Fiske, Griffiths, Jamieson & Manger, 2000; MacEntee et al., 1999). Health Canada states that teamwork is a method to address issues of social accountability amongst professions. Furthermore, the Institute of Medicine reports the necessity for interprofessional training among the health professions to address the changing demographics of our population, stating that all professions should be educated and trained as members of an interprofessional team (Greiner & Knebel, 2001). However, traditional professional training is usually done in isolation and regulatory bodies have a vested interest in protecting disciplinary boundaries and ‘expertise’ as defined by scopes of practice. With the increasing move toward specialization, students have even fewer opportunities to interact with other disciplines (Hall & Weaver, 2001).

Curricula must recognize that health professional students need to experience and be socialized with other professions in order to learn to work together in meaningful ways (Clark, 2002; Hall, 2005). Specifically, educational programs for dentistry, nursing and medicine (including all allied healthcare education programs) need to establish partnerships and encourage opportunities for interprofessional collaboration.

Although collaboration between policy-makers, educators, researchers and third party insurers in addition to healthcare providers is necessary for optimal oral health of LTC populations (Lyons & McNally, 2004), the current conceptualization of oral care using the NREM focuses on collaborative practice amongst the providers of oral care. In collaborative practice, collegial relationships that transcend the walls of professional silos need to be established with patient-centered care serving as the uniting element (Nowjack-Raymer,
Individual team members need to advocate within their respective professions, but unite to identify and analyze problems, define goals and assume joint responsibility for actions and interventions to accomplish these goals (Counsell, Kennedy, Szwabo, Wadsworth, & Wohlgemuth, 1999; Holtzman, Bomberg, Berkey, & Entwistle, 1988). The fundamental factors influencing team-function include accurate and adequate documentation as well as an ability to communicate without using discipline-specific jargon, thereby fostering open channels for monitoring patients and providing feedback (MacEntee et al., 1999; Nowjack-Raymer, 1995; Temkin-Greener, Gross, Kunitz, & Mukamel, 2004).

**Dental professionals.** In rehabilitation and LTC institutions in Ontario, dental hygienists are the primary providers of dental services that go above and beyond routine oral care (dentists are only seen on a referral basis). They are ideally positioned both to assess oral health and to recommend interventions (van Winkelhoff, van Steenbergen, & de Graaff, 1988). Although dental professionals play a key role in oral health, there is a short supply of dentists and hygienists who are trained to deal with medically complex populations such as those in LTC (Holtzman et al., 1988; Pickard & Ablah, 2005). Low reimbursement, inadequate treatment facilities and a general lack of interest in serving LTC populations have further discouraged dentists from providing services in these settings (Ellis, 1999). To compensate for this shortfall, Holtzman et al. (1988) suggest that it is essential to train non-dental professionals to supplement and support the activities of dental health professionals.

At the same time, to promote oral health as an integral part of the healthcare process, dentistry must take a visible and active role on healthcare teams (MacEntee et al., 1999; Pyle, 2002). Dental staff (or consultant) participation on interprofessional teams in coordinating standards and goals helps to promote oral health as a priority and facilitates communication
between professions (Fiske et al., 2000). The primary role of dental professionals is to provide education, expertise and to aid in formulating oral health goals by actively participating in the patient care-planning process (Coleman, 2005; MacEntee et al., 1999).

Physicians. Traditionally, physicians do not view the oral cavity as a high medical priority and often dissociate the body from the mouth, raising the risk that serious oral complications will go unnoticed (Chung et al., 2000). In a study that investigated the abilities of physicians to diagnose oral diseases such as oral cancer, physicians were found to be seriously deficient in diagnostic awareness (McCann et al., 2005). The authors suggested that training to familiarize physicians with the clinical features of a healthy mouth and of the more common and important oral diseases could improve their diagnostic abilities. Therefore, it is imperative for educational and LTC institutions to foster partnerships between the medical and dental faculties and communities. These partnerships will provide opportunities for knowledge exchange regarding relationships between poor oral health and systemic conditions. Physician training is often treatment-based with a focus on saving a patient’s life. Physicians are also trained to assume responsibility for decisions (Hall, 2005). Consequently, learning to share the leadership role in the context of an interprofessional oral health team may prove challenging (Hall, 2005). With a focus on prevention and maintenance rather than on reactive treatments for oral health, physicians will need to reconcile opposing values in order to avert communication barriers with the other professions on the interprofessional team (Hall, 2005). The primary role of physicians is to communicate to the team any risks of poor oral health arising from a patient’s condition, to be aware of any oral sequelae that may arise from treatments, and to provide medical attention to address any issues related to oral pain (e.g., prescribing analgesics).
Speech-language pathologists. Speech-language pathologists (SLPs) regularly inspect the motor and sensory function of the mouths of adult patients during their evaluations of speech and swallowing (Abt, 1999). Although SLPs may not directly provide oral care interventions, they are in a position to recognize oral ailments and bring these to the attention of a nurse or attending physician. Additionally, SLPs have a vested interest in limiting the risk of pneumonia secondary to aspiration (entry of material into the airway) associated with dysphagia (swallowing difficulties), and are therefore very concerned about the role that poor oral health may play in this context (Langmore et al., 1998; Yoneyama et al., 2002).

Occupational therapists. Many patients in LTC may have functional impairments such as facial weakness and paralysis of the upper extremities, which may impede them from performing activities of daily living, including oral hygiene. Occupational therapists (OTs) can assess and address sensory, posture and functional independence issues so that the team’s care plans can maximize the patient’s self-care activities (http://www.osot.on.ca/eng/aboutot/ot.asp). OTs’ roles may include the rehabilitation of upper extremity function or the modification of oral care instruments to facilitate a patient’s oral health self-care routine (Rose, Mealey, Minsk, & Cohen, 2002).

Outcome component. It is beyond the scope of this chapter to discuss all possible oral health outcome measures in detail, but the following brief discussion may guide the choice of oral health measure(s) for a LTC oral care program.

Traditionally, clinicians have perceived mortality, physiological and clinical measures to be the most relevant outcomes to their decision-making processes, as these measures are directly indicative of disease (Brenner, Curbow & Legro, 1995). More recently, patients and
clinicians are increasingly making decisions based on outcomes such as functional ability and perceived quality of life, which encompass patient experiences, preferences and values (Clancy & Eisenberg, 1998; Mitchell, Ferketich, & Jennings, 1998). This is in line with the World Health Organization’s definition of health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (http://www.who.int/suggestions/faq/en/index.html). Oral health is a multidimensional concern and can be associated with many different outcome measures, ranging from clinical measures of periodontal disease to oral-health-related quality of life measures (see Tables 4 and 5 for examples).

Table 4

*Clinical measures of the signs and symptoms of disease*

<table>
<thead>
<tr>
<th>Authors</th>
<th>Name of Measure</th>
<th>What is Measured</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quigley and Hein, 1962</td>
<td>Quigley Hein Index</td>
<td>Plaque Index</td>
</tr>
<tr>
<td>Loe &amp; Silness, 1963 &amp; Lobene et al., 1986</td>
<td>Gingival Index</td>
<td>Gingival Inflammation</td>
</tr>
<tr>
<td>Greene and Vermillion, 1964</td>
<td>Oral Hygiene Index</td>
<td>Debris &amp; Calculus Index</td>
</tr>
<tr>
<td>Silness &amp; Loe, 1964</td>
<td>Silness &amp; Loe Index</td>
<td>Plaque Index</td>
</tr>
<tr>
<td>Ramfjord, 1967</td>
<td>Periodontal Disease Index</td>
<td>Periodontal Status</td>
</tr>
<tr>
<td>Turesky et al., 1970</td>
<td>Turesky Index</td>
<td>Plaque Index</td>
</tr>
<tr>
<td>Elliott et al., 1972</td>
<td>Navy System</td>
<td>Plaque Index</td>
</tr>
<tr>
<td>Muhlemann, 1977 &amp; Caton and Polson, 1985</td>
<td>Papillary Bleeding Index</td>
<td>Gingival Inflammation</td>
</tr>
<tr>
<td>Budtz-Jorgensen, 1978</td>
<td>Denture-Induced Stomatitis</td>
<td>Fungal Infection for Denture Wearers</td>
</tr>
<tr>
<td>Ausberger and Elahi, 1982</td>
<td>Ausberger and Elahi Denture Index</td>
<td>Denture Plaque Index</td>
</tr>
<tr>
<td>Fischmann et al., 1987</td>
<td>Distal Mesial Proximal Index (DMPI)</td>
<td>Plaque Index</td>
</tr>
</tbody>
</table>

*Note.* Information for this table has been compiled from Fishman (1988) and Pretty and colleagues (2005).
Table 5

Well-being measures of oral health

<table>
<thead>
<tr>
<th>Authors</th>
<th>Name of Measure</th>
<th>What is Measured</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cushing et al., 1986</td>
<td>Social Impacts of Dental Disease</td>
<td>Impact of oral disorders</td>
</tr>
<tr>
<td>Atchison and Dolan, 1990</td>
<td>Geriatric Oral Health Assessment Index</td>
<td>Impact of oral disorders</td>
</tr>
<tr>
<td>Strauss and Hunt, 1993</td>
<td>Dental Impact Profile</td>
<td>Evaluate patients’ perceptions salience of events</td>
</tr>
<tr>
<td></td>
<td>Oral Health Impact Profile</td>
<td>Measure both the frequency and severity of oral problems on functional and psychosocial well being</td>
</tr>
<tr>
<td>Slade and Spencer, 1994</td>
<td>Subjective Oral Health Status Indicators</td>
<td>Impact of oral disorders</td>
</tr>
<tr>
<td>Locker and Miller, 1994</td>
<td>Subjective Oral Health Status Indicators</td>
<td>Measure both the frequency and severity of oral problems on functional and psychosocial well being</td>
</tr>
<tr>
<td>Leao and Sheiham, 1997</td>
<td>Dental Impact on Daily Living</td>
<td>Measure both the frequency and severity of oral problems on functional and psychosocial well being</td>
</tr>
<tr>
<td>Adulyanon and Sheiham, 1997</td>
<td>Oral Impacts on Daily Performances</td>
<td>Measure both the frequency and severity of oral problems on functional and psychosocial well being</td>
</tr>
<tr>
<td>McGrath and Bedi, 2000</td>
<td>OH-QoL UK</td>
<td>Measure both the frequency and severity of oral problems on functional and psychosocial well being</td>
</tr>
</tbody>
</table>

Note. Table is adapted from Allen (2003).

Outcomes may be discipline-specific, or reflect the care of all involved healthcare professions (i.e., interprofessional team-functioning) (Duffy, 2002). The choice of outcome measure is dependent on the organization’s specific oral health goals and objectives. Careful analysis of structure and process variables will highlight deficiencies in an oral health program that require intervention. This, in turn, will direct the choice of outcome measures.

Conclusion

In light of widespread inadequate oral health amongst vulnerable LTC populations, oral health must become a priority and care must be improved. However, this is challenging because oral health is complex and multifaceted. The NREM in the context of oral care provision serves as one possible framework for examining the various elements within LTC settings that contribute to oral health. The preceding conceptualization of oral care using the NREM highlights the importance of nurse variables and nursing roles in the promotion and maintenance of oral health by exploring the factors that influence nursing practices and
functions on interprofessional teams. Application of the NREM to oral care provision also illustrates how organizational cultures congruent with valuing oral health are crucial to fostering optimal oral care. Although an interprofessional approach to oral care provision is often recommended, the literature fails to explicate either the role of the team itself, or the contribution of different roles each profession plays. By encapsulating different professional roles in the NREM for oral care, the importance of an interprofessional approach to providing optimal oral care is elucidated.
CHAPTER 5: HEALTH-CARE PROFESSIONALS’ PERSPECTIVES ON ORAL CARE FOR LONG-TERM CARE RESIDENTS: NURSING STAFF, SPEECH-LANGUAGE PATHOLOGISTS AND DENTAL HYGIENISTS

With kind permission of Wiley-Blackwell publishing, this chapter was excerpted in its entirety from the following journal article: Yoon, M. N., & Steele, C. M. Health care professionals’ perspectives on oral care for long-term care residents: Nursing staff, speech-language pathologists and dental hygienists. Gerodontology, 2011. DOI: 10.111/j.1741-2358.2011.00513.x.

The journal’s homepage is located at http://www.wiley.com/bw/journal.asp?ref=0734-0664&site=1 and the publisher’s copyright information can be found at http://www.wiley.com/bw/permis.asp?ref=0734-0664&site=1.

Background

Oral care is an often-neglected part of the daily care regimen for residents in long-term care institutions. Despite the fact that it is often overlooked, poor oral health has been identified as a precipitating factor for many serious health conditions (e.g., aspiration pneumonia, malnutrition, heart disease etc.) (Mojon & Bourbeau, 2003; Mojon et al., 1999; Scannapieco, 1999; Southerland et al., 2006; Teng et al., 2002). It is therefore important that oral health be promoted and maintained in long-term care facilities; improvements in oral health within this population can ultimately result in improved health outcomes (Frenkel et al., 2001; Yoneyama et al., 2002) and cost savings to the health care system (Terpenning & Shay, 2002). In 1998, the annual inpatient hospitalization cost for aspiration pneumonia in the United States was estimated to be $1.3 billion (Coyle et al., 2009).
In long-term care institutions, the responsibility for oral care provision is usually assigned to frontline nursing staff. However, other professions share an interest in this area, and it is the premise of this article that a collaborative approach to oral health promotion may be more effective in achieving improved oral health outcomes. The three professions of nursing, dental hygiene and speech-language pathology are well suited to collaborate in the domain of oral care delivery; each of these professions has opportunity to monitor the oral cavity during the course of regular practice, and to flag the need for interventions when an oral care deficit is identified.

Nursing staff, including registered nurses (RNs), registered practical nurses (RPNs), and personal support workers (PSWs), monitor and care for patients on a daily basis in long-term care institutions; they frequently provide assistance with activities of daily living, including oral care, which they consider to be part of their routine responsibilities (Miller & Rubinstein, 1987; Weeks & Fiske, 1994). Previous studies have suggested that nursing staff are motivated to provide oral care by their desire to promote the patient’s self-esteem and social acceptability, and that their motivation is not grounded in a theoretical or evidence-based understanding of the implications of oral health for general health (Chung et al., 2000; Weeks & Fiske, 1994). Despite their good intentions, nurses are reported to frequently neglect oral care, or to give it a low priority amongst other nursing care duties; a lack of knowledge regarding the importance of oral care has been blamed for this failure to give a high priority to oral care (Pyle et al., 1999; Weeks & Fiske, 1994). This knowledge gap has been traced back to the limited attention given to this topic in nurse education and training curricula (Chalmers et al., 1996; Fiske & Lloyd, 1992; Pyle et al., 1999; Rak & Warren, 1990). Furthermore, while such gaps are recognized amongst registered nurses, the situation
is exacerbated by the fact that the primary responsibility for frontline oral care services is often delegated to PSWs. PSWs have no formal training regarding the importance of oral care and they are reported to be overwhelmed with other tasks. Moreover, the job description of PSWs involves no expectation of skills in assessing and evaluating the condition of the oral cavity; this means that problems or changes in a patient’s oral health status are likely to go unnoticed.

Over the past decade, interest in oral health has been growing amongst speech-language pathologists (SLPs), who regularly inspect the motor and sensory function of the mouths of adult patients during their evaluations of speech and swallowing (CASLPA, 2008). Although SLPs may not directly provide oral care, they are in a position to recognize oral ailments and to bring these to the attention of a nurse or attending physician (Yoon & Steele, 2007). SLPs have a particular interest in limiting the risk of pneumonia secondary to aspiration (entry of material into the airway) associated with dysphagia (swallowing difficulties) (Langmore et al., 1998). Colonization of the mouth and oral secretions with bacteria that are respiratory pathogens has been identified as a major vector for the development of aspiration pneumonia, particularly in patients with dysphagia; poor oral hygiene is a precipitating factor in this cycle (Langmore et al., 1998; Marik, 2001; Scannapieco, 1999; Tokuyasu et al., 2009). It has, therefore, become extremely common for SLPs to request greater vigilance in oral care for their patients.

Professional dental services are in short supply in rehabilitation and long-term care facilities in Canada (Pickard & Ablah, 2005). Nonetheless, dental hygienists (DHs) are the primary providers of such dental services while dentists are only seen on a referral basis for conditions that require their attention (Yoon & Steele, 2007). DHs are ideally positioned both
to assess oral hygiene and to recommend and provide interventions that will promote optimal oral health (Ontario Dental Hygiene Association).

The purpose of this study was to use focus groups to explore the different perspectives that nursing staff, SLPs and DHs have regarding oral care provision in long-term care settings and how these different professional perspectives might influence the activities and processes involved in the delivery of oral care. Our expectation was that we would uncover assumptions by each profession about the roles of the others, which might not agree with the perspectives of each profession about their own roles. Furthermore, we expected to encounter concern on the parts of all three professions regarding gaps in oral care delivery. Our hope is that identifying these issues will inform future interprofessional initiatives to design more effective and comprehensive oral care delivery to residents in long-term care facilities.

Methods

Participants. We initially convened 3 separate focus groups. A face-to-face session was held with nurses (RNs and RPNs). Profession-specific telephone focus groups were held with speech-language pathologists (SLPs) and dental hygienists (DHs). During advertising for the study, we became aware of interest from directors of nursing care (DoNs) from long-term care institutions, who also suggested that we include personal support workers (PSWs) in our study. Therefore, we convened two additional telephone focus groups with these individuals.

Six nurses (RNs or RPNs) were recruited through the distribution of information sheets describing the study at a major rehabilitation hospital in the Greater Metropolitan
Toronto Area (GTA). The targeted nursing units covered 224 complex continuing beds serving a mixed population of patients with primary diagnoses of stroke, head injury, dementia and other neuro-degenerative diseases. The staff reported a high prevalence of dependency for oral care, amongst other activities of daily living.

Six SLP participants were recruited through distribution of an e-mail advertisement circulated to a provincial swallowing interest group. Four DH participants were recruited similarly, using an email contact list for DHs working in long-term care settings provided by the College of Dental Hygienists of Ontario. To recruit DoNs, an email describing the study was sent to relevant members of the Registered Nurses Association of Ontario (RNAO) inviting participation. The directors of care who expressed interest in participating, were asked to recruit a PSW from their facility to partake in a separate focus group. Six directors of care and 6 PSWs from nursing homes throughout the GTA participated in the study.

**Focus Groups.** Prior to each focus group, written consent was obtained from all participants for audio recording, transcription and analysis of the discussion. The study received approval from the research ethics boards of the University of Toronto, and three major participating hospitals at which recruitment activities were planned.

With the exception of the RN/RPN focus group, which was held face-to-face, all focus groups were held via teleconference. All focus groups were digitally voice recorded. Focus groups were facilitated by the researcher using a nondirective interview technique with open-ended questions (see Table 1 for a list of the guiding questions). This process allowed the participants to share their views without the interviewer influencing the course of the discussion (Krueger & Casey, 2000). The guiding questions were designed to capture the participants’ descriptions of the oral health evaluation process, their experiences in oral care
provision, their perceptions regarding the roles that different professions play in oral care, and to understand the overall attitudes and commitment to oral care in their institutions.

Table 6

Focus group guiding questions

1) What prompts the various disciplines to evaluate the oral condition of the mouths of their clients?

2) What indicators trigger concern in a professional caregiver that a change in oral health status may have occurred?

3) How does each discipline understand the significance of oral health for overall health and wellness?

4) What is the experience of providing oral care to the various patient populations within the long-term care environment?

5) How does the experience of providing oral care to patients in long-term care impact on the staff relationships with clients, their families, co-workers and other disciplines?

6) What factors influence the delivery of oral care?

7) What is the perception of one discipline of the role that other disciplines have in the delivery of oral care?

Data Analysis. The focus group recordings were transcribed, anonymized and entered into QSR NVivo8 (QSR International Pty. Ltd., Doncaster, Victoria, Australia) for
analysis. Data analysis proceeded in two stages. First, three members of the research team met to review the focus group transcripts and established an initial set of thematic codes and their definitions to be used in coding (see Table 7). The first author coded the entire transcript according to these codes, during which a further set of free node codes emerged. The revised set of codes including free nodes was then used by the other two raters, who independently reviewed and coded the transcripts. Inter-rater agreement was calculated on 10% of the coding, yielding an inter-rater reliability Cohen’s kappa statistic of 0.744, showing strong agreement across coders (Landis & Koch, 1977).
Table 7

*Thematic codes and descriptions*

<table>
<thead>
<tr>
<th><strong>Variables</strong></th>
<th><strong>Description</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Barriers</strong></td>
<td>Statements that refer to factors that pose as barriers to oral care provision. Environmental, personal and patient characteristics included.</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td>Statements related to content and format of educational activities/initiatives</td>
</tr>
<tr>
<td><strong>Emotions</strong></td>
<td>Any expression of emotions toward oral care, other clinicians or even of own emotions</td>
</tr>
<tr>
<td><strong>Enabling Factors</strong></td>
<td>Factors that enhance oral care provision by the healthcare professional. Specifically, it should relate to factors in the environment such as the organization rather than the patient or emotions.</td>
</tr>
<tr>
<td><strong>Indicators of the State of Oral Care</strong></td>
<td>Indicators that professionals use to judge the status of a patient’s oral health status or the quality of care that has been delivered to the patient</td>
</tr>
<tr>
<td><strong>Knowledge</strong></td>
<td>Awareness of specific knowledge surrounding the risks associated with oral care and the preventative measures required to address them</td>
</tr>
<tr>
<td><strong>Motivating Factors</strong></td>
<td>Statements related expressing what motivates the healthcare professional and patients to deliver or partake in oral care. Specifically, it should relate to patient characteristics (e.g., patient expressed pain) or feelings (e.g., I felt satisfied to provide good care)</td>
</tr>
<tr>
<td><strong>Organizational Process</strong></td>
<td>Statements related to the policies, procedures or the process of care that the organization has a role in</td>
</tr>
<tr>
<td><strong>Patient Characteristics</strong></td>
<td>Anything related to patients such as their conditions, their willingness to partake in oral care, their values and perceptions</td>
</tr>
<tr>
<td><strong>Professional Roles</strong></td>
<td>Perceived or stated role of the healthcare professional</td>
</tr>
</tbody>
</table>

**Results**

The themes that emerged from the coding of focus group transcript fell into three main categories: 1) Roles and responsibilities in oral care provision; 2) Enablers of good oral care delivery; and 3) Barriers to good oral care delivery. We will present the results under each of these three headings.
Roles and responsibilities in oral care provision.

<table>
<thead>
<tr>
<th><strong>Nursing Staff</strong></th>
<th><strong>Speech-Language Pathologists</strong></th>
<th><strong>Dental Hygienists</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily care</td>
<td>Supplemental care</td>
<td>Thorough care</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Monitoring &amp; Assessment</td>
<td>Assessment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Education</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Advocacy</td>
</tr>
<tr>
<td></td>
<td>Assessment of dysphagia</td>
<td>associated risk factors</td>
</tr>
</tbody>
</table>

*Figure 4. Oral care roles or nurses, speech-language pathologists and dental hygienists.*

**Daily oral care is a nursing staff duty.** Figure 4 illustrates the perspectives of the three target professions who were interviewed regarding their roles in oral care delivery. The comments of all five focus groups reflected broad agreement that the provision of daily oral hygiene support was the responsibility of nursing staff and fell within their scope of practice. All nurse participants (RNs, RPNs, PSWs and DoNs) commented that oral care was a routine part of their duties, that it was “automatic”, “pretty basic” and “common sense”. Furthermore, they felt that no other discipline would be likely to take on the responsibility of providing oral care on a routine basis. DHs commented that the engagement of frontline nursing staff was the “number one factor that [can] influence oral care on a daily basis because they [are] right there”. Their comments reflected the view that nursing staff are a crucial resource for maintaining patient oral health as well as the primary source of dental
hygiene referrals. Although SLPs also expressed that frontline nursing staff were best suited to provide daily oral care, their comments reflected some concern that a patient’s oral health status had to be visibly poor in order for it to attract appropriate attention from nursing staff. “Unfortunately, you get to the point where there’s thrush on the tongue, it’s bleeding and that’s when [attention is paid] and things can actually be done…. it seems to go pretty far to the extreme to get some oral care being done regularly.”

**Speech-language pathologists and dental hygienists have supplementary oral care roles.** The roles of the SLPs and DHs were described as supplementing the daily oral care provided by the nursing staff. SLPs reported that they were concerned with oral health primarily because of its link to aspiration pneumonia, and because it affected their recommendations regarding oral intake, diet texture and the allowing of oral water intake for patients with dysphagia.

“My dysphagia recommendations are going to depend on the mouth getting cleaned up before [I] start to do things like allow water or even before liberalizing the diet – I’m going to want to make sure their mouth gets attended to.”

Nursing staff commented that SLPs played an important role in identifying patients with dysphagia who are unable to rinse with water or mouth-rinse, due to the risk of aspirating, to whom they felt uncomfortable providing oral care otherwise. Motivated by these concerns, SLPs perceived a disparity between the actual oral care being provided to their patients and the need for optimal oral health that would limit the risk of pneumonia. In the absence of other disciplines who are available and able to address this gap, some SLPs had taken on the role of actively participating in oral care provision by “[getting] in there and
[getting] the gunk out and [doing] it on a regular basis” whenever they considered it necessary.

However, the primary supplemental role of the SLPs was described as one of advocating for their patients and educating them, as well as other staff members, regarding the importance of oral care. SLPs expressed the opinion that they “really [had] a good handle on the research being published in the area [of oral hygiene]”. This was in spite of the SLPs’ self-awareness of their lack of training to recognize subtle changes in oral health status.

“I’m not confident that I would, as a speech pathologist, really catch the more subtle aspects of dental care, but the majority of people I see have more major issues [that] are more easily identified.”

DHs commented that SLPs were recognized as one group of professionals who displayed a willingness to learn about oral health and its risk factors, showed interest in providing oral care when necessary, and were already working in the mouth. Therefore, establishing a collaboration with SLPs was felt to be helpful for supplementing the daily oral care that was being provided by nursing staff. However, in nursing home facilities where SLPs are rarely available, dietitians were mentioned as playing a possible role in developing individual care plans (including oral care) for the residents.

DHs working in long-term care felt that they were the “knowledge experts in the mouth”, and that they held the primary responsibility for promoting health, both oral and general. They described themselves as the primary profession with awareness of the connection between oral health and general health. They expressed a wish to be recognized as experts in this domain and “not just simply there to pick teeth”. Oral care provision by DHs was reported to occur following initial assessments by dentists or physicians, or upon
referral from frontline nursing staff. The majority of comments by participants reflected the opinion that the DH’s role was to be “somebody that’s interested and knowledgeable and experienced in working in the mouth…[educating] other people to do the things that have to be done to keep people’s mouths healthy”. Education was reported to be provided by DHs in the form of in-services, training for individual patients to implement individual care plans, and communicating with other healthcare professionals, patients and patient families when there were perceived gaps in knowledge. Nursing staff commented that in-services were most helpful when they focused on teaching strategies for dealing with challenging patients, or on oral care provision for residents who were medically complex.

“A person that doesn’t eat that has only a tube in their stomach that is fed by a bag…what kind of care would you give that person?…We don’t know those things.”

In addition to the role of DHs in such education, nursing staff and SLPs expressed that DHs were valuable in supplementing daily oral care by actually providing thorough oral care for patients (sometimes at the bedside or with sedation) so that it “doesn’t go completely ignored”.

**Enablers of good oral care delivery.**

**Indicators and motivation for oral care.** The comments of all professions showed that they possessed some degree of knowledge regarding the links between poor oral health and negative health consequences, but the concerns of each discipline appeared to be based on different indicators of oral health status. They described different motivations for assisting or providing care to promote and maintain oral health (see Figure 5).
The concerns of the nursing staff regarding the need for oral care were based primarily on visible indicators such as remnants of food particles, dried lips, coated tongues, slimy mouths and blood in rinse water. The most common indicator and greatest motivation for providing oral care, however, was identified as malodor, which nursing staff felt affected the patient’s social acceptability and self-esteem. This was reflected in such comments as:

“When they are speaking to you, you don’t want any odor coming from them”; and

“She doesn’t smell good, nobody likes to talk to her and see her and she is complaining that she has nobody to talk to…nobody approaches her.”

Patient self-reports of oral pain or discomfort and the changes in behaviour that might arise as a consequence (e.g., refusal to eat, weight loss or behavioural outbursts) were mentioned by nursing staff, together with cases of ill-fitting dentures, as triggers that should flag a need for further investigation. These indicators motivated frontline nursing staff to
address concerns for the patient’s physical well-being and their ability to obtain adequate nutrition.

“[Good oral health is required] so they can have good digestion for their food…eat properly”; or

“If the patient is not eating very well, one of the reasons [could be that] their mouth is sore or their dentures could not be fitting very well.”

In addition to addressing patient concerns, nursing staff were also motivated by their own sense of pride in their job performance and concerns regarding liability:

“I don’t want someone to come and say ‘[Jane] you didn’t do it right’”; or

“The next person to care for them would definitely say something and you’re liable.”

Interestingly, nursing staff seemed primarily motivated to provide care because of their own personal hygiene values, which allowed them to empathize with patients.

“If we take care of our mouths we have a better instinct of how [residents] would feel if their mouths need looking after…we have to put them in our places and put us in their places. How would we like our mouths to not be smelling the best?”; or

“For my own personal hygiene, having your teeth is a very important part of my own self, so I think that that makes me more aware of dental hygiene.”

PSWs also felt strongly that poor oral hygiene in residents reflected badly on them and the quality of care that they provided.

“I think for myself, we should start off the day with cleaning our mouths, our bodies…we shouldn’t be up and about and not be tidy. This reflects [on] us, so if we don’t do it for ourselves, how can we show our residents or even try to talk to our residents about it? We should set examples in every way.”
SLPs regularly assess the oral condition of their patients during speech and
swallowing evaluations and follow-ups; as one stated “they go hand in hand”. Like nurses, SLPs also focus on visual indicators of oral hygiene such as “dirty dentures”, “dry and cracked” lips, buildup on the tongue or palate, “ropey” secretions, and obvious signs of infection such as thrush (i.e., oral candidiasis). However, SLPs also appear to consider other factors such as patient history (i.e., medications, nutritional status, and diet texture tolerance) in identifying oral health risks. They also scope the environment for clues to determine whether or not oral care is being performed (i.e., the presence of proper supplies at the bedside). For SLPs, the motivation regarding good oral health stems primarily from the awareness that the presence of pathogenic bacteria in oropharyngeal secretions is linked to the risk of aspiration pneumonia, especially in patients with dysphagia. SLPs also expressed compassion and empathized with patients’ discomfort when oral care appeared to be lacking; this motivated them to carry through with “getting the gunk off” despite their feelings of repulsion, including reports that the poor condition of a patient’s mouth would sometimes make them feel like “throwing up” and “gagging”.

The comments of the DHs showed that they are focused on oral disease processes and their impact on general health consequences. As trained oral health professionals, their focus is on plaque and calculus levels and how these impact gingival health and the risk for periodontal disease. Their comments reflect a preventative focus rather than a reactive or curative one. However, aside from initial assessments and referrals from dentists or physicians, DHs who work in long-term care facilities rely on frontline staff for referrals; these referral sources are not trained to notice subtle changes such as “[recognizing] that plaque is causing destruction to the tissue”, to determine when a particular patient might
require treatment. Rather, DHs report that the most common reasons for referral are broken or fractured teeth or dentures, obvious decay and oral pain:

“It doesn’t appear… that they [the nursing staff] are at the point where it triggers them to say something needs to be done when the gums are bleeding. It seems to be something that’s broken with the teeth or the denture.”

Organizations have a large role to play in promoting oral health. Throughout the focus group discussions, all three professions referred to the importance of organizational support in developing effective oral care programs. Participants acknowledged that organizational budgetary constraints could hinder the degree to which an oral care program could be made a priority. Organizational support through clear policies and procedures, standardized assessment tools and adequate oral care supplies/equipment was thought to be essential for ensuring reliable and consistent patient oral care in addition to having “people in administration that believe [oral health] is a good thing and it is for your overall health”.

Organizational support was thought to be crucial for establishing a culture in which nursing staff would show a strong commitment to oral-care. SLPs noted that nursing staff buy-in and the overall culture on each unit was important to their oral care approach.

“If it were the same patient but on a different unit that I work on, it would be a very different approach in terms of my interaction with the staff and how to tackle it,… on some units you have that much more buy-in because [nursing staff] get it more and they’re much more involved and see the importance of it and for some of the units not so much.”
Participants also commented that they viewed the organization as having an important role in “[facilitating] good oral care [by] having the discussion and having a plan that it’s not just assumed that good oral care is having a toothbrush - that there’s more to go into it”.

**Barriers to good oral care delivery.**

*Poor oral care is not a highly visible condition.* Interestingly, the DoNs suggested that one reason why oral care might often be left unaddressed by frontline nursing staff was because oral care concerns were not imminently visible.

“Oral care is not something that you can sort of walk down the hall and look at somebody and think ‘oh they don’t have their teeth brushed’ [whereas you can] walk down the hall and say ‘well she didn’t have her hair combed’ or ‘he is not shaved’; so, I think that oral care, generally is not as important to the [frontline nursing staff] providing care – it’s not that it’s not important, but it’s not noticeable.”

*Workload, time and resource constraints.* Despite the nursing staff accepting daily oral care provision as part of their responsibilities, workload constraints were described as a barrier that often relegated oral care to being a low priority.

“We know [oral care] is really important, but cleaning a diaper takes a little bit more priority than mouth care”

The recognition of time constraints as a barrier in oral care delivery was also reflected in the comments from the DHs and SLPs who sympathized with nursing staff and perceived them to be “overworked”, “understaffed” and “underpaid”. Additionally, nursing staff reported that they experienced a lack of access to supplies and equipment that they considered appropriate and useful, such as suction toothbrushes and toothpaste.
**Challenging behaviours.** Other barriers to the provision of oral care that were identified by the nursing staff in the study included challenging behaviours in patients. Interestingly, in some cases other existing organizational policies, such as an abuse policy, were identified as possible barriers to nursing staff promoting or encouraging oral care with noncompliant patients. DHs perceived that inadequate oral care could result from nursing staff not “[wanting] to appear as though they are abusing the patient because they don’t know how to brush properly”. This perception was in part confirmed by the PSWs.

> “Because of the [concerns about] abuse [in the healthcare] system, you don’t want anybody to be outside in the corridor [thinking] you are in there fighting with these people. Sometimes you just have to leave them to themselves and hope for the best. Maybe in an hour or so you can go back and maybe they’ll take [oral care] from you then.”;

> “For many staff here, sometimes when the residents refuse we try to leave them alone because of the abuse policy.”

When developing oral care policies and procedures, organizations should consider issues such as behaviourally challenging persons and the refusal of care.

**Discussion**

The purpose of this study was to explore and understand differences in perspectives regarding oral care between nursing staff, SLPs and DHs. The results of the focus groups conducted for this study confirm that nursing staff recognize the need for good oral hygiene in the older institutionalized population (Fiske & Lloyd, 1992; Miller & Rubinstein, 1987) and are motivated primarily to address social consequences of oral health. Comments regarding the nutritional consequences of poor oral health were not prominent in this study.
Oral care was recognized to be a task within the nursing scope of practice (Miller & Rubinstein, 1987; Pyle et al., 1999; Weeks & Fiske, 1994) although it receives low priority in comparison to other daily care-giving tasks (Wardh et al., 2000). Despite the reported barrier of workload, frontline nursing staff remain the ideal first-line of defense, if we wish to raise the priority of oral care in long-term care institutions.

Our study concurs with previous studies in showing that nursing staff perceive time constraints and challenging patient behaviours as barriers to oral care delivery (Sonde, Emami, Kiljunen & Nordenram, 2010). However, the comment from a DoN that a barrier to oral care provision may not lie in its perceived (un)importance but rather in its relative invisibility provides important additional insight. Indeed, noticeable signs such as visible debris and malodor are well recognized by nursing staff as flags indicating that oral care interventions are needed. These indicators are ones that frontline staff cannot avoid noticing, even without close inspection of the mouth, and they represent situations that are perceived to negatively impact a patient’s social acceptability and self-esteem. Upon closer inspection of the mouth and oral cavity, other obvious visual indicators such as ill-fitting dentures, dried lips, coated tongues, and signs of possible infection become noticeable. The motivation to alleviate these conditions then becomes one of relieving perceived patient discomfort.

However, it is reported that oral health has often deteriorated to the point where the resident’s health may already be compromised when such indicators are recognized. Care must then become curative and reactionary rather than preventative. Ideally, oral care would be provided with a preventative focus, as expressed in the motivation and vision of our DH participants. However, signs of gingival disease arising from plaque and calculus are not easily noticed by the untrained eye unless they have already reached a serious level;
consequently, it is unlikely that frontline staff would be able to incorporate the recognition of plaque and calculus levels into their scopes of practice.

The recognition of different motivations and concerns across professions suggests that oral health means different things to different disciplines, as a construct. This raises the question of how such constructs might be built-upon in collaborative initiatives to improve oral health for institutionalized populations. To frontline nursing staff, oral health appears to mean having “fresh smelling breath” so that patients have high self-esteem and are perceived to be socially acceptable, as well as being free from pain or discomfort that might impact on their physical well-being. To an SLP, oral health appears to mean both the absence of oral discomfort and the absence or control of risk factors for developing aspiration pneumonia. To a DH, oral health means the absence of risk factors for developing oral diseases and their sequelae. Although each definition differs, each is a crucial piece of the overall oral health picture.
Sheiham (2005) suggests that oral health be divided into three components with relation to oral health status: physical, psychological and social well-being (see Figure 6). Each component can constitute a group of motivating factors for achieving optimal oral health. Considering each discipline’s definition of oral health (see Figure 7), frontline nursing staff appear to use a comprehensive definition addressing all three components of Sheiham’s oral health model, while SLPs and DHs primarily define oral health in physical terms. The absence of any component in any profession’s concept of oral health does not signify a deficiency in their understanding of oral health; rather, the model serves to highlight what each profession is ultimately motivated to achieve, as reflected by the focus group comments in the current study. This model illustrates targeted areas of effort to consider when trying to increase motivation and make oral care a higher priority; when such efforts are directed towards nursing staff as the primary providers of oral care, training may have to address more than one component (or motivator).
Previous studies have reported a lack of knowledge, training, and skills to be barriers to oral care (Chalmers et al., 1996; Wardh et al., 2000; Weeks & Fiske, 1994). Unfortunately, education and training initiatives that have tried to address these deficits (Frenkel et al., 2000,
2001; Isaksson et al., 2000; MacEntee et al., 2007; Peltola, Vehkalahti & Simoila, 2007; Wardh et al., 2002) have reported unsatisfactory outcomes in terms of changing nursing practice, and results have been short-lived (Adams, 1996; Chung et al., 2000; Wardh et al., 1997; Wardh et al., 2000). Considering the three components of oral health from Sheiham’s model, perhaps the frontline nursing staff’s concept of oral health has not been sufficiently recognized in education and training initiatives, leading to poor results. Previous interventions targeting improvements in oral care have often focused on didactic teaching in the technicalities of care, neglecting social factors influencing oral health, which are shown to be primary motivators for nursing staff in the current study.

The content of previous oral care training interventions may also not have been sufficiently salient to the caregiver given that oral hygiene is perceived to be a very personal issue. The perceived intimacy of the oral care interaction can act as a barrier to good care; caregivers who are providing direct oral care assistance must cross the threshold dividing the exterior and interior of the patient’s body, and this is perceived as a potential violation of private personal space (Fiske & Lloyd, 1992; Frenkel et al., 2002). In addition, it has been reported that nurses who dislike oral care are likely to spend less time in oral care activities (Chalmers et al., 1996). Considering these factors, incorporation of personal oral hygiene values and experiences into educational content may be important for improving oral care delivery in long-term care settings. Educational interventions should consider highlighting the associations between the nurse’s own oral health maintenance and their self-perceived well-being, in the hope that these associations will prompt a greater vigilance and skill improvement when delivering oral care to patients. A healthcare professional is likely to be more motivated by conditions that resonate with personal experience; emphasizing such
connections in oral care quality improvement initiatives might facilitate better recognition of the more subtle signs of poor oral health.

At a personal level, statements in our focus group transcripts such as “we need to be praised” suggest that nursing staff perceive that their efforts in oral care provision need greater recognition and celebration. At an organizational level, clear and accessible policies can reflect the oral health values that an organization espouses and the goals it hopes to achieve (Brynne, 2008). This can serve to increase nurse buy-in and garner management support, which was mentioned to be important for promoting oral health. Organizations, in most cases, have policies and procedures surrounding other patient safety issues such as wound care and falls prevention. These programs are often given high priority. Consider the following:

“This patient whose wounds…whose skin wouldn’t heal and she finally, after trying to do everything, initiated a dental consult and once they got his teeth taken care of, low and behold – his wounds healed up.”

If organizations were to formally recognize oral health as a patient safety risk (acknowledging the links between poor oral health and poor health outcomes), and clearly support an oral hygiene program, perhaps oral care would receive equivalent priority to wound care and falls prevention.

Organizations can also play a large role in promoting effective communication amongst healthcare professionals on multidisciplinary teams. Recent trends in healthcare education promote interprofessional training for teams, which integrates the separate perspectives of different stakeholders in a process (professionals and perhaps patients) and promotes a holistic view of all aspects of the patient’s care and decision-making processes.
(Egan-Lee et al., 2008; Jessup, 2007; Reeves et al., 2007). Oral care is ideally suited to be addressed by teams who adopt such interprofessional perspectives because, in long-term care settings, it is a care process that requires the involvement of many different healthcare professionals and individualized care plans for specific patients. Even in settings where dental services are externally outsourced, organizations can collaborate with dental professionals to develop sound policies and procedures for the institution and to promote effective communication about each patient and their oral care needs.

In the current study, we explored the perspectives of nursing staff, SLPs and DHs. Oral care can, however, also involve other professionals, such as physicians, dentists, occupational therapists, physiotherapists, and dietitians, in various functional roles (Yoon & Steele, 2007). The results of the current study show that frontline nursing staff play a central and pivotal role in daily oral care maintenance and monitoring; they are the first-line of defense in oral health programs. SLPs and DHs play crucial supplementary roles, as illustrated in Figure 4. Our study did not, in fact, specifically ask participants about the degree to which they collaborate with others in oral care delivery. Another important perspective that is missing from our study is that of the patients themselves, and their relatives; gaining an understanding of these perspectives would be important to enable an interprofessional team to develop plans for the delivery of patient-centered care. The comments of the focus groups conducted for this study did, however, capture the opinion that the patient's family is a valuable resource that can alleviate some of the nursing staff’s workload burden by providing some of the oral care. Focus group comments spoke to the ability of families to act as an additional pair of eyes and bring a need for further dental intervention to the attention of the healthcare team. Future studies should consider exploring
the perspectives of patients and families, and the potential roles that they can play in the promotion and delivery of oral care.

**Limitations.** One limitation of our study is the fact that RNs and RPNs were interviewed face-to-face while other participants were interviewed over the phone. The telephone has a disadvantage of blinding participants to body language and may make it harder for people to break into the conversation. On the other hand, in our experience, there was less opportunity for tangential side conversations over the phone and participants stuck to the topic of discussion. Specific methods were followed to ensure that participants who wished to comment on any given topic had been given the opportunity to do so. At the beginning of each focus group, both face-to-face and telephone, participants were reminded that the conversation would be recorded in a non-identifying fashion and that they should feel free to share opinions and that these were to be kept in confidence by all participants. We used a process of reflecting back the main themes and messages that had been stated for each topic in order to verify transcript content with participants.

**Conclusion**

Daily oral health maintenance and monitoring in LTC institutions is primarily a frontline nursing task, but speech-language pathologists and dental hygienists can play important supplementary roles through assessment, advocacy, educational activities and providing oral care when necessary. Our focus groups highlighted the fact that oral health, as a construct, means different things to nursing staff, SLPs and DHs. The nursing staff interviewed in our study were primarily motivated by social factors related to oral health while SLPs and DHs were focused primarily on factors related to health, including oral health risks for aspiration pneumonia and other systemic diseases. These findings suggest
that education and training initiatives for nursing staff who provide oral care may be more
effective if they emphasize social factors related to oral health. Furthermore, our focus group
participants clearly expressed the view that interprofessional collaboration and organizational
support are important for raising the priority given to oral care in long-term care institutions.
CHAPTER 6: AN EXPLORATORY INVESTIGATION USING APPRECIATIVE INQUIRY TO PROMOTE NURSING ORAL CARE

With kind permission of Elsevier Inc., this chapter was excerpted in its entirety from the following journal article: Yoon, M. N., & Steele, C. M. An exploratory investigation using appreciative inquiry to promote nursing oral care. Geriatric Nursing (in press at time of thesis submission).

The journal’s homepage is located at http://www.gnjournal.com/ and the publisher’s copyright information can be found at http://www.elsevier.com/wps/find/authors.authors/non-elsevier_permissions

Background

Oral health is recognized as a serious issue for individuals residing in long-term care or complex-continuing care facilities (U.S. Department of Health and Human Services, 2000). This population is at risk for developing serious medical conditions due to poor oral health and inadequate oral care provision; pneumonia is a specific risk due to the aspiration of oral secretions colonized with pathogenic bacteria into the lungs (Abe et al., 2006; Adachi, Ishihara, Abe, & Okuda, 2006; Azarpazhooh & Leake, 2006; Haumchild & Haumchild, 2009; Mojon & Bourbeau, 2003; Scannapieco, 2006; Sjögren, Nilsson, Forsell, Johansson & Hoogstraate, 2008). Frailty, cognitive and functional impairments, and a high prevalence of complex medical conditions further increase the risks (Chalmers & Pearson 2005).

Oral care in long-term care has been described to be inadequate, and interventions aimed at improving oral care practices have typically taken a reactive and didactic approach to rectifying deficiencies in knowledge and/or skill. A randomized control trial by Frenkel and colleagues (2001) reported small but statistically significant improvements in patient oral
health outcome measures (e.g., denture and dental plaque, gingivitis, and denture-induced stomatitis) following a didactic educational intervention, with some practical demonstrations and hands-on practice for nursing staff responsible for oral care provision. Although encouraging, one may still question the clinical significance and durability of these changes since oral health was still found to be far from optimal. In a study by Yoneyama and colleagues (2002), indirect outcome measures such as rates of pneumonia, febrile days and deaths from pneumonia all decreased significantly for patients who were given hands-on oral care treatment after every meal as well as a full professional dental cleaning weekly. These two studies illustrate two very different approaches to addressing oral health concerns in long-term care populations. The approach described in the Yoneyama study, with provision of weekly dental cleaning, is not feasible under current funding mechanisms for dental care in North America and most of Europe. The Frenkel study raises questions about the effectiveness of nursing education interventions in terms of knowledge transfer, changes in practice, and associated clinical outcomes in the patients who depend on the oral care that is provided.

The purpose of this exploratory study was to determine whether an appreciative knowledge translation approach to oral care practice might be successful in facilitating improvements in oral care service delivery. We chose to use an approach called Appreciative Inquiry (AI), which is a provocative transformational paradigm in which strengths are recognized as a positive foundation upon which changes can be made. We were specifically interested in exploring whether the use of an AI approach in an oral care best practice workshop would: 1) lead to the identification of contextual factors that enable effective oral care delivery; 2) enable participants to generate personal action strategies and/or
organizational implementation strategies for oral care practice-improvement; and 3) effectively bridge the knowledge-to-action gap by motivating participants to successfully implement practice-improvement strategies over the course of a two month follow-up period.

**Appreciative Inquiry theoretical framework.** AI was initially developed as a theory of organizational development (Cooperider & Srivastva, 1987) and has been anecdotally reported to be successful in changing organizational culture from the inside out (Carter, 2006; Liebling, Elliott & Arnold, 2001). AI methodology has been gaining attention in a variety of healthcare situations (Havens, Wood & Leeman, 2006; Reed, Pearson, Douglas, Swinburne & Wilding, 2002; Richer, Ritchie & Marchionni, 2009; Wright & Baker, 2005) such as in optimizing the process of hospital discharge (Reed et al., 2002), and as a knowledge translation approach for nurse education in pain management (Kavanagh, Stevens, Seers, Sidani & Watt-Watson, 2008, 2010). In our study, we explored whether AI principles can be applied effectively on a smaller scale to address individual oral care practices by nurses.

Traditional problem-oriented approaches to health-care practice change begin with the identification of an ideal model to which current reality is compared, based on the assumption that a particular problem requires a solution. Cooperrider and Srivastva (1987) suggest that these traditional problem-focused interventions are themselves driving the direction of change to create (or magnify) the problems they are intending to solve. AI departs from the traditional problem-solving approach and assumes that there is always something that “works” in any organization (or in every clinician’s practice); these best practice examples are actively identified and problems are reframed as opportunities, or
sources of hope and inspiration (Carter, 2006). An underlying premise of the AI approach is that we learn best from what has worked well in the past (Yballe & O’Connor, 2004).

AI interventions typically use a guiding framework of inquiry known as the 4-D cycle: discover (identifying the best of what is or has been); dream (envisioning what might or could be), design (designing how to achieve an “ideal” beyond current limitations and maximizing past successes); and deliver (implementing proposed plans and strategies) (Cooperrider & Srivastva, 1987). Questions are used to launch the process of generating dialogue that is seen to hold potential for growth and transformation. The emphasis is on using positive imagery, recognizing the potential heliotropic effect of such imagery on behavior (Cooperrider & Srivastva, 1987). Positive images are generated through reflection about participants’ accumulated experiences of the “best of what is” and from an understanding of the factors that contribute to perceived strengths in a process. A specific activity within AI methodology involves the development of “provocative propositions” (i.e., statements of an ideal state that is worth striving for). Sentiments like hope, inspiration and camaraderie are thought to act as crucial elements for motivating behavioral change, and facilitating the realization of the ideals represented in the provocative propositions (Fredrickson, 2001). Two kinds of outcomes may be observed: 1) new knowledge; and 2) the generation of new models of ideal or best practice (Bushe, 1995). In the current study, we sought to foster the development of new knowledge about ‘best’ oral care practices, and we hoped that new ideas regarding oral care best practice implementation would evolve.

**Knowledge Translation and Appreciative Inquiry.** Two models of knowledge translation in health care services research resonate with the AI paradigm (Kavanagh et al., 2008): a) the Promoting Action on Research Implementation in Health Services (PARiHS)
Model (Kitson, Harvey & McCormack, 1998); and b) the Knowledge-to-Action (KTA) Model (Graham et al., 2006). According to the PARiHS Model, change in practice is a function of the interplay between evidence (i.e., research, clinical experience and patient choices), context (i.e., the environment in which change is implemented) and facilitation (i.e., support to enhance change in the way of thinking and participating) (Kitson et al., 1998). The KTA Model is similar, and comprises two major components: a) a knowledge creation funnel, (a reiterative cycle from knowledge inquiry, to knowledge synthesis, to the development of knowledge tools and products); and b) an action cycle, in which knowledge is applied in particular contexts, and supported through facilitation.

Figure 8. Target model of appreciative inquiry in knowledge translation.

Our study explores AI methodology as a vehicle for oral health related knowledge translation. Figure 8 illustrates how evidence can serve as the core upon which the four phases of the AI cycle (discover, dream, design and deliver) are built. This evidence core
corresponds to the knowledge creation funnel of the KTA Model. The deliver phase parallels
the action cycle of the KTA Model, with a change in emphasis from the identification of
problems and barriers to the appreciation of best practice ideals and enablers. The deliver
phase occurs against the background of the context in which change is to occur, as well as the
facilitation process that is inherent to AI itself.

Methods

Participants. This study was conducted in the 224-bed complex continuing care
program of an academic rehabilitation hospital in the Greater Metropolitan Toronto Area. In
this facility, frontline oral care delivery is primarily provided by Registered Practical Nurses
(RPNs) and Registered Nurses (RNs). A convenience sample of nine volunteer members of
the nursing staff (seven RPNs and two RNs) was recruited to participate. These staff came
from five complex-continuing care units, housing a mixed population of patients with
primary diagnoses of stroke, head injury, dementia and other neuro-degenerative diseases.
Staff reports confirmed a high prevalence of dependency for oral care, amongst other
activities of daily living. The study was approved by the Research Ethics Boards of the
University of Toronto and the participating hospital.

Intervention design. The intervention for this study involved two face-to-face
modules and a follow-up questionnaire. (see Figure 9). Module 1 (three hour session)
involved individual reflections on best oral care practice experiences, before and after a
didactic presentation summarizing the evidence-based oral care best practice
recommendations of the Registered Nurses’ Association of Ontario (RNAO, 2008). The next
day in Module 2 (full day, seven hour session), we further explored those best practice
examples that corresponded to the ideals put forth in the RNAO document using the 4-D
cycle of AI. See Appendix A for details of the AI intervention. This module was delivered by two facilitators who have previously held numerous AI sessions and were also trained by an experienced AI consultant.

Module 1: Presentation of the RNAO Oral Hygiene Best-Practice Guideline
- Think about what oral care best-practice is and how your own practices aligns with research evidence – reaffirming some current practices and identifying possible areas that require attention.
- Describe a scenario when you delivered good oral care.
- Presentation of the guideline practice recommendations.
- Reflect on each recommendation and how it impacts your practices.
- Elaborate on the described pre-evidence best oral care scenario in light of the evidence-based recommendations that were presented.
- Write a reflection guided by the following questions:
  1. What did you learn from this session of the workshop?
  2. How do you think what has been discussed related to your own oral care practices?
  3. How do you feel about this session of the workshop?

Module 2: AI Intervention
- See Appendix 1.

Evaluation & Feedback
- Forms were administered at the end of module 2, which informed the researchers as to whether AI, in the context of an oral care practice development activity, was an effective vehicle for facilitating knowledge-to-action.

Figure 9. Study intervention design.

Data Collection. The intervention was held over two consecutive days, with subsequent administration of a commitment to change follow-up questionnaire (Lowe, Herbert & Rappolt; Mazmanian, Daffron, Johnson, Davis & Katrowitz, 1998), two months after the face-to-face sessions. All data were qualitative and were collected in written format (i.e., worksheets), which were scanned at the end of each session and returned to the participant for their future reference. A research assistant attended each session and made
supplementary notes regarding the dialogue and other subtleties of the interactions that occurred, which might not have been captured in participants’ reflections.

**Data analysis.** Figure 10 illustrates the process of data analysis. All scanned documents and session notes were transcribed and anonymized. Transcripts were analyzed using content analysis. Two members of the research team separately reviewed the transcripts and identified major themes in the content. Discussions regarding the content and the relevant themes were held until consensus was reached. True to the generative nature of AI, the data analysis was not performed using line-by-line coding; rather we achieved consensus on interpretation and the themes emerging from the material.

![Figure 10. Process of data analysis.](image)

**Results**

**Module one.** The stories of good oral care described by nurse participants at the beginning of Module 1 (prior to the didactic presentation on oral care best practice recommendations) detailed scenarios of good oral care that were primarily motivated by a desire to eliminate or alleviate foul odor, mucous build-up, and/or oral dryness suffered by
the patient. At the end of Module 1, stories and guided reflections suggested that participants had become aware of the opportunity to incorporate more detailed oral health assessments into their practice as a means of identifying specific oral care issues in their patients, and for refining oral care delivery methods for those patients beyond the basic routine care that was currently being provided. For example, one participant stated “when doing an assessment on a client regarding oral care or giving oral care, I should also check the oral cavity for any abnormalities and report my findings…not just do the initial oral care.” This sentiment resonated with recommendations in the RNAO oral hygiene best practice guideline, that “nurses use a standardized, valid and reliable oral assessment tool to perform their initial and ongoing oral assessment” (RNAO, 2008).

Although the results from this first module indicated that participants possessed some insight of how they may improve upon their own oral care delivery methods, there was no proposal of how they may implement these changes nor were they inspired or committed to advocate for changes beyond their own practice. These latter insights were fostered in the second module.

**Module two.** Seven primary themes emerged from the discover and dream phases of the AI intervention: knowledge, consistency in care, facilitation, assessment tools, collaboration and emotions (see Table 8 for further detail). These themes were subsequently aligned into three categories of information, in order to answer key questions about the results of the AI experimental intervention (see Figure 11): what participants wanted more of, how they were going to obtain it and why they were motivated to do so. Emotional rewards emerged as a primary motivation, which drove nurses to strive for better oral care, and in turn
resulted in improved patient conditions, which then further validated nurses by giving them a sense of satisfaction in the care provided.
Table 8

*Themes identified from discover and dream phases*

<table>
<thead>
<tr>
<th>Theme</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Most nurses expressed that education was key to enhancing knowledge surrounding oral health risk factors and benefits of oral care in addition to knowing how to provide oral care. Knowledge enabled them to attain excellent care provision and promote a sense of confidence to provide the care. Hospital-wide (including patients’ and their families’) knowledge of oral health was felt to be important.</td>
</tr>
<tr>
<td>Consistency in Care</td>
<td>Nurses expressed the desire to provide regular and consistent oral care for every patient.</td>
</tr>
<tr>
<td>Facilitation</td>
<td>There was an expressed desire for a more facilitative interaction with an oral health champion or oral health expert, for example, to promote optimal oral care by increasing the oral health related knowledge being incorporated into a nurse’s practice.</td>
</tr>
<tr>
<td>Assessment</td>
<td>The regular use of an assessment tool and documenting patient characteristics and preferences in care plans could enable nurses to monitor the oral health status of patients and allow for consistent individualized care.</td>
</tr>
<tr>
<td>Collaboration</td>
<td>Collaboration within interprofessional teams, including patients and families, enabled patients to receive comprehensive individualized oral care.</td>
</tr>
<tr>
<td>Emotion</td>
<td>Most nurses commented that excellent oral care resulted in patients and families expressing gratitude, as well as improvements in patient conditions (e.g., being more comfortable, being able to breathe better, and being able to eat). These validated the oral care practices of the nurses resulting in a sense of satisfaction and to be proud that they had benefited their patient. Comments also highlighted that a nurse’s empathy and compassion motivated excellent care provision.</td>
</tr>
</tbody>
</table>
Table 9 lists the three provocative propositions that were developed by participants in the design phase of the AI intervention. The idea of promoting assessment and evaluation, which emerged in Module 1, was prominent again in proposition #1. This proposition also reflects an ideal vision of implementing evidence-based best practices, and being fully supported to achieve best practices through resources such as “the right tools”. Propositions #2 and 3 reflect a desire on the part of the participating nurses to be leading the way in the area of oral care practices, to be working in an organization committed to cutting-edge practice, and to facilitating widespread implementation of best practices through teaching. Proposition #2 reflects awareness that nurses will be best supported to implement and achieve oral care best practice in an environment where everyone shares and enforces the same goals. Finally, proposition #3 speaks to the value that these nurse participants place on research and innovation.
Table 9

_Provocative propositions developed_

1. Oral care practices at our hospital are fully consistent with best practices (e.g., RNAO oral hygiene best-practice guideline). This includes: assessment, monitoring, collaboration/communication and having the right tools.

2. All patients, families, staff and students at our hospital are knowledgeable about oral health. We are spreading our knowledge to the community and other healthcare organizations.

3. Our hospital is leading innovation in oral care through research, measuring/monitoring what we do and experimenting with new ways of delivering oral care.

In the deliver phase of the AI intervention, participants identified key stakeholders for the promotion of excellence in oral care. These stakeholders included the leadership team (managers, educators, medical director and advanced practice leaders); the dental team; other interprofessional team members (dieticians, physicians, speech-language pathologists, physiotherapists, occupational therapists and pharmacists); and other nurse colleagues. A prominent theme that repeatedly arose throughout the four AI phases was the idea that organizational support was an important factor, both in fostering an environment supportive of oral health (e.g., having the right tools and products, fostering channels of communications and promoting interprofessional teams), and in enabling changes in oral care delivery practices with support from the leadership team.

Elevator speeches are concise 30-second messages used to quickly and effectively communicate ideas, in this case on the topic of how to enable excellent oral care (see Appendix 1 for guided questions to develop messages). The group elevator speech developed by participants (which summarizes individual messages) speaks to the ambitious ideals espoused by participants with respect to the potential impact of improved oral care delivery...
on patient health outcomes (see Table 10). Key messages, which participants wished to disseminate about oral care, were: a) that oral health could be improved through the use of assessment tools and by enlisting the involvement of interprofessional teams (including the patient, families and friends); b) good oral health could increase patient satisfaction; c) that improved oral health outcomes could be achieved by increasing the oral health knowledge base of the different professions involved; d) that improved oral health could prevent general health sequelae, such as pneumonia; and, e) that a reduction in oral-health-related health sequelae (like pneumonia) could save costs by requiring fewer acute hospital transfers.
### Table 10

**Collective elevator speech**

| What are the compelling needs for change?                                                                 | • Improve patients’ quality of life & patient satisfaction ratings  
|                                                                                                           | • Less transfers out and visits to other hospitals                     
|                                                                                                           | • Decrease nursing workload and stress – quality of worklife when oral care is done consistently |  
|                                                                                                           | • Cost savings opportunities for the organization and the larger healthcare system |  
| What goals could be addressed by good oral care?                                                         | • Patients’ overall health (physical and emotional/psychological – self esteem) |  
|                                                                                                           | • Increased motivation by patient to do oral care not only in the hospital but when they are discharged – building independence, patient and family more satisfied and generate a positive outlook |  
|                                                                                                           | • Increased overall awareness/priority of all team members and potential collaboration |  
| What steps are needed to achieve change?                                                                 | • Education of patients who don’t know about why oral care is important |  
|                                                                                                           | • Interprofessional involvement - talk about what was done and to colleagues what learned |  
|                                                                                                           | • Include in goal setting putting it on the radars of all team members |  
|                                                                                                           | • Choose an assessment tool and work with a nurse educator/leader to implement |  
|                                                                                                           | • Ask colleagues what else can be done to improve oral care raising education as a priority |  
| What this means to the organization or the person you are speaking with?                                 | • Changes how I feel about delivering oral care |  
|                                                                                                           | • Cost effective for the organization |  

The personal action strategies from the commitments to change focused on practice changes related to increasing one’s sensitivity and awareness of patient characteristics (e.g., preferences, cultural influences, language) and incorporating these into individualized care plans; increasing the frequency of oral care provision in addition to providing consistent care; and finally, increasing the involvement of others (e.g., patient, family, staff).

Two-month post-intervention follow-up questionnaires were received from four of the nine participants (44%). These were designed to explore the success with which the action strategies articulated in the initial commitments to change had been implemented. One reason for the lower response rate may have been that the hospital was undergoing accreditation around the time of the follow-up inquiry. Review of the follow-up questionnaires revealed that a very high proportion (11/12 or 92%) of the commitments to change initially proposed by the four respondents had been fully or partially implemented. The 11 commitments to change covered a wide variety of themes including: (1) increasing the frequency in care; (2) enhancing the consistency in care; (3) increasing the awareness and participation of others in oral care; and (4) becoming sensitive to individual patient characteristics and incorporating these into care routines. All responding participants reported a strong commitment to the proposed practice changes. The highest impact change that was reported came from two participants who had presented a poster of the information arising from the AI intervention to their unit, resulting in a decision by the nursing program manager to incorporate oral care on the agenda for regular staff meeting discussions.

“We presented a poster and information to our unit – proposing a new project to our nurse manager for staff meetings regarding oral care… this is now incorporated in our rounds for each patient and each patient is assessed for any oral care issues.”
Discussion

Enablers of effective oral care delivery. Seven primary themes emerged in the analysis of the discover and dream phase transcripts from our AI intervention; these outline a context in which we can identify factors that nurses felt were important for enabling the delivery of excellent oral care to their patients. These themes also provide insight into factors that should be the focus of efforts to enhance oral care delivery within a long-term care organization.

A nurse’s oral care knowledge, or lack thereof, has been cited throughout the literature as a major barrier to the provision of effective oral care (Dharamsi, Jivani, Dean & Wyatt, 2009; Frenkel, et al., 2002; Preston, Kearns, Barber & Gosney, 2006; Wardh, Andersson & Sorensen, 1997). In the current study, nurses did indeed have some knowledge of oral health risk factors, the benefits of oral care and how to provide such care. Their comments further suggested that they viewed knowledge regarding research evidence and best practices as something empowering, which could instill a sense of confidence when providing care. This sense of confidence is closely tied to the primary motivation of emotional rewards that nurses reported for providing oral care (as per Figure 11 and Table 8), which also served to reinforce excellent and consistent oral care. Interestingly, there was no mention of dental outcome measures in the stories of successful oral care provision.

The results from the current study suggest that although the oral health knowledge that nurses possess is a large factor in determining the quality and consistency of oral care provided in an organization, without organization-wide awareness (including patients/families) and support of the importance of oral health, an oral health program can be difficult to sustain in the long-term. Although, organization-wide changes are necessary in
order to support the implementation of practice changes there were examples of changes in practice that were initiated by nurses and subsequently supported by leadership in this study, perhaps related to the use of AI as a KT intervention.

**Strategies to improve oral care.** The information that emerged in the transcripts and dream phase provocative propositions in this study suggests that participants valued the implementation of an assessment tool, greater organizational facilitation, and the promotion of interprofessional teamwork as strategies for improving patient oral care. The implementation of an assessment tool was felt to be necessary in order to provide consistent and thorough care. The Oral Health Assessment Tool (OHAT) is one example of a valid and reliable assessment tool (Chalmers et al., 2005), which has been adopted by the primary care sector in Australia (Chalmers et al., 2005) and long-term care sector in Ontario (van der Horst, Scott & Bowes, 2008), and is highlighted in the RNAO guideline section on standardized oral health assessment methods. It prompts the user to consider several different domains (i.e., lips, tongue, gums and tissues, saliva, natural or prosthetic teeth, oral cleanliness and dental pain) and provides descriptions of what to look for during assessment.

This study also revealed that nurses believed that organizational facilitation through the appointment of oral health champions or experts would improve oral care (see Table 1 under facilitation). Previous literature has suggested that such champions can foster improved awareness and promotion of oral health (Thorne et al., 2001); however, participants in our study specifically mentioned the hope that such champions would be directly involved in the process of incorporating knowledge into practice. In part, the champion would serve as an easily-accessible knowledge expert, when needed. An oral health champion would be an individual who is passionate and knowledgeable about oral
health and has a rapport with the group (i.e., nurses targeted for changes in practice). This individual can be a peer and not necessarily in a position of seniority. With customer-initiated, just-in-time access to a knowledge expert, nurses can better control the type, content, volume and flow of information they seek; this sense of ownership in the process can also influence their sense of confidence.

The transcripts generated in our AI intervention reflect a clear sense that oral health will not improve unless it is raised to a prominent level of awareness among stakeholders, including the wider interprofessional team, patients and families. Organizations require mechanisms through which oral care success stories can be shared, and, if appropriate, interprofessional collaboration, in achieving success can be promoted. However, it is also clear that organizational support from managers and administration is important for supporting changes in oral care practice. Frontline service providers (i.e., nurses) and users (i.e., patients) may not have strong-enough voices within an organization to implement ideas regarding change (Reed et al., 2002). It has been reported that managers can play a key role in supporting the implementation of ideas and sustaining the momentum generated by the appreciative inquiry process (Richer et al., 2009); the example of the nursing program manager who supported the incorporation of oral care into regular patient rounds discussions in our study illustrates this principle.

**Bridging the knowledge-to-action gap in oral care delivery.** The results of this study confirm that AI can be used as a technique for promoting healthcare practice transformation. In our case, the intervention increased awareness of opportunities for nurses to initiate change, or to raise awareness by being ambassadors and advocates for future change. In our experience, AI tapped into positive emotions and fostered an environment in
which nurses were able to adopt a positive attitude towards oral health. Participants spoke freely, and were able to articulate their awareness of a need for changes in practice. Such an openness to change is difficult to establish in traditional didactic approaches to practice change, which frequently encounter defensive responses and resistance (Coghlan, Preskill & Tzavaras, 2003). In the current study, the nurses themselves were the ones who identified the opportunities for change, which resulted in a high level of self-reported practice-change implementation and supports AI as a good method in bridging the gap between oral care knowledge and action. The AI intervention itself was successful in facilitating the process of designing action and implementation strategies to improve oral care practices. Momentum developed through the organic process of the AI cycle. The results of the study also support the idea that AI might not, in fact, differ substantially from the tailoring of knowledge translation initiatives to the context and experience of the learner; however, a major difference is in the emphasis that AI places on knowledge being generated by participants or the users of the knowledge rather than it being introduced by an external source.

**Challenges**

There is a mandate within healthcare to embrace valid, evidence-based practices developed through systematic methodology. This mandate has the potential to run counter to the spirit of AI, in which participants are supposed to freely generate constructs of ideal practice based on their own experiences. In the case where such ideals and experiences are not consistent with available evidence, there is the potential for the AI methodology to reinforce practices that may, in fact, be contraindicated. Kavanagh and colleagues (2008) suggest that an AI intervention can be designed to address a specific area of evidence-based practice (such as pain management); the challenge is to ensure, at the outset, that participants
are aware of the relevant best-practice evidence. In the case of oral care, the literature suggests that nurses lack the foundational knowledge and skills required for optimal oral care provision. Furthermore, organizations frequently lack clear policies and procedures regarding oral care that might guide nurses toward evidence-based practices. In this study, we felt it was crucial to manage the potential issue of reinforcing practices that lack empirical support by incorporating a review of evidence and the RNAO best-practice guideline into Module 1 of our intervention. We acknowledge that this is a departure from strict AI methodology, which does not usually allow for preconceived notions of “best” practice, or of graded evidence.

The commitments to change were included in the design of this study with the intention of measuring practice changes from the participant nurses perspectives (i.e., evaluating outcomes as part of the KTA action cycle). However, it is recognized that self-reports of changes in practice may have limited validity. The degree of long-term commitment to change implementation and impact beyond the two month follow-up was ultimately not captured. As a result, we are unable to report whether the momentum for change created by the intervention was sustained. This is a challenge in AI as it runs the risk of raising hopes that can then be shattered when organizational support for implementation is not in place (Carter, 2006; Liebling et al., 2001), hence implementation planning is critical. Having skilled facilitators with some expertise in the AI process is a critical component in planning in order to avoid such risks of raising hopes unrealistically or misusing the approach such that positive remarks only are heard (leading to unsafe environments, etc).

In our experience, some nursing units were more successful than others in implementing change strategies, and it was clear that other organizational initiatives might easily take
priority without a plan for sustained support. Nurse participants were not directly observed, so behavior changes could only be inferred from self-reports in this study. Patient oral health outcome measures were also not assessed in this study so the effectiveness of any reported behavior changes are unknown.

AI, in contrast to traditional, problem-focused methodologies for knowledge translation, offers the benefit of enhancing positive aspects of practice and allows participants to feel that their own perspectives and experiences are important; they should feel free to share their ideas without judgment. This latter goal may be difficult to achieve in situations where staff with different levels of responsibility participate together, due to issues of power and hierarchy.

**Conclusions**

In the current study, participants identified the implementation of a standardized assessment tool, the promotion of teamwork and increased organizational facilitation as key strategies for improving oral health within their organization. Implementation of such strategies largely depends on organizational support of oral health as a priority. Oral care programs in healthcare settings require an organizational-wide commitment and therefore, the interventions targeting change in practices would be most effective if staff from all levels of the organization participated.

Appreciative inquiry is a useful framework for generating dialogue regarding ways to improve healthcare practices such as oral care. It provides a positive momentum in pushing practice change and empowering participants to become ambassadors for change whereby effectively bridging the knowledge-to-action gap. Although AI is not a guaranteed solution
for improving oral care in long-term care institutions, it should be considered as one part of a multi-interventional strategy.
CHAPTER 7: SUMMARY OF CONTRIBUTIONS

This dissertation began with an interest in oral health and aspiration pneumonia and a question about whether oral care could be a mitigating factor in pneumonia development for individuals residing in long-term care facilities. Although connections between these three areas of interest had been drawn to some extent in prior literature, the links were still not clear, signaling a need for further investigation. Therefore, the research for this dissertation began with basic science questions about oral microbiology related to oral care and pneumonia. Although our own longitudinal investigation of oral microflora did not reveal any clear patterns of colonization growth related to pneumonia pathogenesis, the experience of collecting and analyzing these data revealed a complexity in oral microbiology that was previously underappreciated. Recognizing that the patients involved in the oral microbiology study had received a level of routine dental care that likely exceeds the norm for individuals in long-term care, we wanted to better understand the context of oral care delivery for long-term care populations, which is widely reported to be inadequate in the literature. As we scratched the surface of this topic, a need emerged to better understand the perspectives held by different professional groups with an interest in oral care, oral health and their sequelae. The focus group study presented in chapter 5 provided new insight into the roles and responsibilities held by three professional groups: nursing, speech-language pathology and dental hygiene. We did not probe further into the assumptions of one profession about the others’ roles and responsibilities because these were coherent with the professions’ descriptions of their own perceived roles. In the focus group study, the crucial perspective of both the patients and their families is missing and would have added value to the overall understanding of oral care delivery. Additionally, the focus groups revealed a variety of
enablers and barriers to oral care provision in LTC. Finally, motivated by the reported failure of traditional didactic approaches to changing nursing practices in oral care delivery, we decided to test the potential of an appreciative knowledge translation approach to engage nurses more positively in promoting improvements in oral care; this technique resulted in self-reported practice changes.

This concluding chapter presents a summary of the major contributions from these studies and considers implications for future research.

1. **Relationship between oral microflora, oral care and pneumonia is non-linear**

   The relationship between oral microflora and oral care is complex; oral care may not be a simple mitigating factor for pneumonia pathogenesis. This does not diminish the importance of optimal oral hygiene, but rather, directs us to consider the convergence of risk factors for the development of pneumonia, including the patient’s health status, health behaviours and access to oral care services.

2. **Definitions of oral health differ among different professions**

   The definition of oral health is constructed differently by different professions. Nursing staff possess a comprehensive construct of oral health, which is comprised of physical, psychological and social well-being factors while speech-language pathologists and dental hygienists primarily define oral health in physical terms.

3. **Saliency of information is an important consideration in education and training initiatives**

   Oral health care education and training initiatives may have better potential to succeed if they are developed with consideration to the type of information that is most salient to the target audience. By connecting a nurse’s personal oral hygiene
values with their patient’s oral health requirements, one can tap into the primary motivation reported by nurses for providing oral care – that of preserving and improving a patient’s social acceptability and self-esteem. This strategy may be more effective than traditional didactic approaches.

4. **Appreciative inquiry promotes change in practice**

An appreciative knowledge translation approach to oral care practice promoted evidence-based practice changes and was effective in bridging the gap between oral care knowledge and front-line care provision. The most pronounced effect of an appreciative inquiry approach was its ability to generate positive emotions and attitudes toward oral health. This fostered an environment where participants were engaged, participated openly and developed self-motivation to change their oral care practices.

5. **Organizations play a crucial role in promoting oral health**

Organizational support emerged as a pivotal factor in implementing and sustaining oral health care programs. Organizations have a dual role in promoting optimal oral health. First, they have an administrative role to ensure that there are clear oral health policies and procedures (including the implementation of a standard assessment tool) and to ensure that adequate equipment, supplies, and other resources are in place to provide necessary care. Second, they have a role in facilitating best oral care practices. Organizations can facilitate an overall culture that places a priority on oral health by promoting interprofessional collaboration, which can also serve as a platform to encourage front-line care staff to advocate effectively for the oral health needs of their patients.
Limitations and Future Research

Although the relationship between oral microbiology and pneumonia pathogenesis is not simple, oral care still remains an important component in limiting the risks associated with pneumonia development. Previous studies have reported that frequent professional dental service provision (approximately once per week) was effective in reducing the incidence of pneumonia, febrile days and the colonization of oral secretions with respiratory pathogens (Abe et al., 2001; Adachi et al., 2002; Yoneyama et al., 2002). Although such findings suggest oral hygiene to be an effective weapon against pneumonia, questions remain regarding the balance between respiratory pathogens and commensal microflora and regarding the balance between therapeutic and routine oral care. Furthermore, in countries where dental services are not federally funded, there are questions about the feasibility of increasing access to professional dental services for individuals in long-term care based on the associated costs. It is therefore important that future research explore the threshold of oral and dental care frequency that is required to maintain oral health at a level that effectively limits the oral health risk factors associated with developing pneumonia. Further investigation into the effectiveness of professional dental services in limiting the risks of pneumonia, and into determining the level of service provision that is required to be cost-effective could serve to inform policy makers in funding and budget decisions to support programs that can address the oral health disparities among the elderly and/or dependant populations.

Interprofessional collaboration emerged from both the focus group and appreciative inquiry studies, as something that is likely to be beneficial for promoting oral health. Although the literature review in chapter 1 suggested various roles in oral care delivery for
members of an interprofessional team, and different professional perspectives were explored in the focus group study, a functioning model of interprofessional collaboration was not encountered in the facilities where this research was conducted. A diffusion of evidence can occur within interprofessional collaborations provided there are opportunities for the different professions to create shared work experiences and to converge their different belief systems and values (Chalmers et al., 2005). Unfortunately, interventions to improve evidence-based practices usually exclusively target single professions, thus limiting the opportunity to effectively foster interprofessional collaboration. Interventions using an appreciative inquiry approach have the potential to incorporate multiple professions and foster interprofessional collaboration. The appreciative inquiry pilot study undertaken in this dissertation research did not exploit this potential, but began by targeting nursing staff exclusively.

Different professions (i.e., nursing staff, speech-language pathologists and dental hygienists) were found to have different constructs of oral health and motivations for providing oral care. Without the opportunity to converge these constructs and differing values, it is foreseeable that collaborative efforts may be hindered. In addition, the focus group study explored the perceived boundaries of practice for each individual profession rather than within the context of a team, which further segregates the professions. Further research is needed to explore models of interprofessional oral health collaboration. An appreciative inquiry intervention, with various stakeholders involved in oral care, would allow participants to share in success stories (sharing work experiences) and to converge their beliefs (by developing oral care strategies together). This intervention design could have broader implications for other evidence-based interventions beyond oral care.
A recurring finding emerging from this dissertation was the need to implement standardized oral health assessment tools in long-term care. Evidence-based practice guidelines also recommend the use of such tools (RNAO, 2008). Currently, the most commonly used tools are the Revised Oral Assessment Guide (Andersson et al., 2002), Brief Oral Health Status Examination (Kayser-Jones et al., 1995), and the Oral Health Assessment Tool (Chalmers et al., 2005). Each of these tools relies on the caregiver to visually assess various components within the oral cavity. This dissertation research demonstrated that nursing staff and speech-language pathologists are most likely to notice oral health conditions that are grossly out of control (e.g., fungal infections on tongue that leave a thick white coating) or that are obvious (e.g., a broken tooth) but may not be able to notice more subtle changes (e.g. inflamed gums). This finding calls into question whether or not subjective tools are sufficient to alert care providers to the need for professional services when required.

Although the above-mentioned oral health assessment tools have been tested for broad content validity and user reliability, there has been no study to date that has investigated the sensitivity or specificity of such tools for capturing a patient’s risk of developing oral diseases or oral-health related sequelae. Furthermore, there is still a need for careful validation of the content analysis of such tools, to identify key clinical signs that are relevant in this respect. An ideal screening tool should be both sensitive (correctly identifies proportion of people with the problem) and specific (correctly identifies the proportion of people who do not have the problem). Although each of the previously-mentioned tools attempts to describe the visual appearance of the different rating categories that are included, there are currently no gold standards available to validate these scales, or to clarify the
thresholds that meaningfully discriminate levels of impairment within these scales. Furthermore, our investigations into this area have failed to identify any clear consensus regarding care pathways for oral health assessment tool implementation, which delineate appropriate next steps for patients who demonstrate different degrees of oral health concern. Future research is needed to better identify the key parameters in oral health assessment tools that are predictive of different oral health outcomes. It is possible that such tools can be further developed to specifically flag concerns relative to specific subsets of the population, such as those at risk of developing aspiration pneumonia.

Conclusions

This dissertation has evolved from “bench to bed-side”, beginning with investigations of oral microflora and ending with investigations into front-line oral care. To say that vigilant oral care is the only modifiable factor for limiting pneumonia risk would clearly reflect an oversimplification of the risk factors involved. The research conducted for this dissertation has illustrated an ongoing need to identify strategies for improving oral care service provision and delivery, in order to minimize the disparity that exists within long-term care populations. This dissertation has established a need for future studies to further elucidate the role of organizations in initiating and sustaining effective oral care delivery programs; to develop models of interprofessional collaboration in oral health care delivery; to develop screening tools to accurately discriminate patients at risk of oral diseases and oral health-related sequelae using clinically meaningful signs; and to develop interventions that effectively incorporate the different beliefs and values of front-line personnel, when promoting practice change and improvement.
It is hoped that the results of this dissertation have contributed to the body of literature that will bring improved oral care to those who are the greatest risk of developing oral diseases and associated systemic consequences – answering the call to action.
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### APPENDICES

#### Appendix A

**Table of detailed AI intervention**

<table>
<thead>
<tr>
<th>Objective</th>
<th>Activity</th>
<th>Specific Inquiry Used</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Discover</strong></td>
<td>Discover the &quot;best of what is&quot; and the &quot;best of what has been&quot; to be appreciated and celebrated.</td>
<td>1. Think about a time when you felt you delivered the best oral care to a patient. Tell a story. Describe the patient and their preferences and how this care impacted the patient. Describe how you felt providing this care. 2. What factors do you think enabled you to deliver this care? 3. When you think about the future, imagine you have 3 wishes regarding oral care for your unit. What would you wish for and why? How could we achieve the most powerful results?</td>
</tr>
<tr>
<td><strong>Dream</strong></td>
<td>Dream of what might be or “what could be”, which can compel individuals to take action.</td>
<td>1. Write a letter that summarizes their vision of a successful oral care program achieved from their efforts 1 year later. The letter details achievements, their roles as a leader in oral care and what made the greatest difference.</td>
</tr>
<tr>
<td><strong>Design</strong></td>
<td>Design how to achieve the “ideal” beyond current limitations and maximizing past successes.</td>
<td>1. Formulate radical statements of intention by moving beyond restrictions of current practice constraints in order to articulate ideal states. These statements reflected the group’s vision for moving beyond restrictions of current practice constraints in order to achieve outstanding results in the oral care program and you are feeling extremely proud of your collective accomplishments. You have generated results that exceed anything you could have hoped for. Write a letter to yourself telling the story of what has been achieved and your role as a leader in oral care. What are you most proud of? What are patients, families, staff and your organization saying about oral care? What has made the greatest difference?</td>
</tr>
<tr>
<td><strong>Delivery</strong></td>
<td>Innovating what will be by developing sustainable action plans and implementation strategies that participants can commit to.</td>
<td>1. Think about a time when you felt you delivered the best oral care to a patient. Tell a story. Describe the patient and their preferences and how you felt providing this care. 2. What factors do you think enabled you to deliver this care? 3. When you think about the future, imagine you have 3 wishes regarding oral care for your unit. What would you wish for and why? How could we achieve the most powerful results?</td>
</tr>
<tr>
<td><strong>Personal Action Strategies</strong>:</td>
<td>Elevator speeches: Concise 120 second message used to effectively communicate ideas on how to enable excellent oral care.</td>
<td>Identify a compelling need for change. (e.g., Why does oral care need to be changed?) What goals could be achieved in oral care? (e.g., What could oral care achieve in your organization?) What steps or tasks need to be taken to make the changes? What does this mean to you personally? What might this mean to the organization or the person you may be speaking with?</td>
</tr>
<tr>
<td><strong>Organizational Implementation Strategies</strong>:</td>
<td>Moving from Themes to Actions: Reflect on the success of achieving one of the propositions generated and identify key stakeholders who play a key role in the successful implementation of the best oral care practices.</td>
<td>1. What does this success actually look like (in very concrete terms)? What were your measures of success this year (be specific)? 2. What were the initial, feasible steps you took that led to your success? 3. Who was involved (including partners and supports)? Who led your success? What type of administrative support did you receive? 4. How did you sustain your efforts throughout the year? (e.g., processes or practices, support etc.)</td>
</tr>
<tr>
<td><strong>Commitment to Change Questionnaires</strong>:</td>
<td>These questionnaires are shown to be a reliable self-assessment measures of practice change administered to evaluate participants’ implementation of learning in practice as well as assess the effectiveness of the intervention itself to promote change. Follow-up questionnaires were administered 2 months post-intervention.</td>
<td>See Appendix 2</td>
</tr>
<tr>
<td><strong>Knowledge Transfer Worksheet</strong>:</td>
<td>Using principles that guide effective knowledge transfer strategy development, a message tailored for each stakeholder group is developed, which is to be disseminated by sharing it with the relevant stakeholders in rounds and report time as well as placing a written copy in the communication books of each unit.</td>
<td>See Appendix 3</td>
</tr>
<tr>
<td><strong>Group Elevator Speech</strong>:</td>
<td>Summary of the overall message the participants want to deliver as a group compiled from both personal action and organizational implementation strategies.</td>
<td></td>
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</tbody>
</table>
Appendix B

Commitment to change questionnaire

Please identify 3 changes you intend to make to your oral care practices:

1. I intend to…. (Please describe in detail)

   How committed are you to implementing this change? (Please circle)
   (1 = Not really committed; 5 = Strongly committed)
   1 2 3 4 5

2. I intend to…. (Please describe in detail)

   How committed are you to implementing this change? (Please circle)
   (1 = Not really committed; 5 = Strongly committed)
   1 2 3 4 5

3. I intend to…. (Please describe in detail)

   How committed are you to implementing this change? (Please circle)
   (1 = Not really committed; 5 = Strongly committed)
   1 2 3 4 5

* Adapted from Mazmanian PE, Daffron SR, Johnson RE, Davis DA, Kantrowitz MP: Information about barriers to planned change: a randomized controlled trial involving continuing medical education lectures and commitment to change. Acad Med 1998, 73:882.
Appendix C
Commitment to change follow-up questionnaire

You identified that you would implement the following changes to your oral care practices:

1. XXX

   Have you implemented this change? (Please check one)
   (   ) Implemented change
   (   ) Partially implemented change
   (   ) Did not implement change

   If change was made, please describe any enablers that aided in your change process. If no change was made, please describe why.

2. XXX

   Have you implemented this change? (Please check one)
   (   ) Implemented change
   (   ) Partially implemented change
   (   ) Did not implement change

   If change was made, please describe any enablers that aided in your change process. If no change was made, please describe why.

3. XXX

   Have you implemented this change? (Please check one)
   (   ) Implemented change
   (   ) Partially implemented change
   (   ) Did not implement change

   If change was made, please describe any enablers that aided in your change process. If no change was made, please describe why.
Appendix D

Knowledge transfer worksheet

<table>
<thead>
<tr>
<th>WHAT</th>
<th></th>
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<tbody>
<tr>
<td>What is the message you would like to share regarding oral care?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TO WHOM</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Who do you want to share your message with?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BY WHOM</th>
<th></th>
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<td>Who would you like to present the message?</td>
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<th>HOW</th>
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<td>What is the method you would like to transfer your message?</td>
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<th>WITH WHAT EXPECTED IMPACT</th>
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<td>How would you like to evaluate the impact of your message?</td>
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* This chart is adapted from Reardon R, Lavis J, Gibson J: *From Research to Practice: A Knowledge Transfer Planning Guide* [http://www.iwh.on.ca/system/files/at-work/kte_planning_guide_2006b.pdf]
Appendix E
Research information sheets, consent forms and ethics approvals

**Participant Information Sheet and Consent Form**

**Title of research project:**
Study of oral colonization in long-term care residents

**Principal Investigator:**
Catriona M. Steele, Ph.D.
Research Scientist & Corporate Practice Leader for Speech-Language Pathology and Audiology, Toronto Rehabilitation Institute
550 University Avenue, Room 801,
Toronto, ON, M5G 2A2
Phone: 416-597-3422, extension 3895; Fax: 416-597-7131
E-mail: steele.catriona@torontorehab.on.ca

**Contact-person:**
Minn N. Yoon, B.Sc.
Graduate Research Student (Department of Speech-Language Pathology, University of Toronto)
Toronto Rehabilitation Institute
550 University Avenue, Room 805
Toronto, ON, M5G 2A2
Phone: 416-597-3422, extension 3851; Fax: 416-597-7131
E-mail: yoon.minn-nyoung@torontorehab.on.ca

**IMPORTANT:**
You are being invited to take part in a research study. Before you consent to participate, it is important that you read the information below about the study. It describes the purpose of the study, risks or benefits to yourself and your right to withdraw at any time during the study. Ask as many questions as necessary to be sure you understand what you will be asked to do. Make sure all your questions have been answered to your satisfaction before signing this document.

If you have any questions about your rights as a research participant, please call one of the co-chairs of the Bridgepoint Research Ethics Board: Carol Ringer (416) 461-8251, ext. 2972, OR Linda Yetman (416)461-8251, ext. 2274.
ORAL BACTERIA STUDY INFORMATION SHEET

Study Title: Study of oral colonization in long-term care residents

Your dental hygienist has referred you to our study investigating the bacteria in your mouth.

We would like to take a swab of the upper surface of your tongue at five different timepoints over the next 4 months. These swabs will then be sent to a microbiology lab for analysis to determine what kinds of bacteria are present in your mouth. This procedure will help us to understand health risks associated with bacteria that grow in the mouth.

After we have collected the swab we would also like to measure how much saliva you have in your mouth. To do this we will put a small marked filter paper strip under your tongue and ask you to hold it there for 1 minute.

None of the above procedures are harmful to you.

Finally, we would like permission to gather some information from your medical chart. This will include: your medical condition, any changes in your health; your medication; any dental and dental hygiene appointments; and the use of dental products during the 4 months of the study.

Thank you for your consideration.

If you have any questions, please contact:

Minn N. Yoon
Graduate Research Student
416-597-3422 X 3851

OR

Catriona M. Steele
Research Scientist
416-597-3422 X 3895

Title of research project:

Study of oral colonization in long-term care residents

If you have any questions or concerns about this study, please contact Catriona M. Steele, Ph.D. at 416-597-3422 ext.3895.

If you have any questions about your rights as a research participant, please call one of the co-chairs of the Bridgepoint Research Ethics Board: Carol Ringer (416) 461-8251, ext. 2972, OR Linda Yetman (416)461-8251, ext. 2274.

CONSENT FORM

I, _________________________, agree to participate in the Study of Oral Colonization in Long-term Care Residents, a project coordinated Catriona M. Steele, Ph.D., a Research Scientist at the Toronto Rehabilitation Institute.

The purpose, procedures and risks of the Study of Oral Colonization in Long-Term Care Residents have been fully explained and I understand them.

I have been given the opportunity to ask questions about the project, and all of my questions have been answered.
I understand that I am under no obligation to agree to participate in the study, and that I may request to have my data removed in the future without any consequences for my current and/or future access to or use of healthcare services.

I understand that the information I provide will be kept confidential. I understand that my name will not be identified in any of the electronic files.

I understand that I will not benefit directly from participating in the study, but that my participation will help in promoting the understanding of oral bacteria in long-term care residents and may guide future oral hygiene intervention studies.

I understand what participation in the oral colonization study involves.

I have been given a copy of this consent form.

<table>
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<tr>
<th>Participant Name (please print)</th>
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<th>Signature participant</th>
<th>Date</th>
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<table>
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<th>Signature of person obtaining consent</th>
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<tr>
<th>Signature principal investigator</th>
<th>Date</th>
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</table>
Title of research project:
Study of oral colonization in long-term care residents

If you have any questions or concerns about this study, please contact Catriona M. Steele, Ph.D. at 416-597-3422 ext.3895.

If you have any questions about your rights as a research participant, please call one of the co-chairs of the Bridgepoint Research Ethics Board: Carol Ringer (416) 461-8251, ext. 2972, OR Linda Yetman (416) 461-8251, ext. 2274.

SUBSTITUTE DECISION MAKER CONSENT FORM

I, _________________________, am acting in my capacity as a substitute decision maker for ____________________ (patient name) who has been referred for the study of oral colonization in long-term care residents, and is therefore being approached to participate in this project coordinated Catriona M. Steele, Ph.D., a Research Scientist and Corporate Practice Leader for Speech-Language Pathology and Audiology at the Toronto Rehabilitation Institute.

The purpose, procedures and risks of the study of oral colonization have been fully explained and I understand them.

I have been given the opportunity to ask questions about the project, and all of my questions have been answered.

I understand that an oral swab of _________________ ’s (patient name) will be obtained on five different occasions and will be sent to a microbiology lab for analysis. I also understand that test strips will be placed under the tongue to measure saliva. Finally, I understand that the investigators will review the patient’s medical chart to gather information relevant to this study.

I understand that ____________________ (patient name) is under no obligation to agree to participate in the oral colonization study, and that he/she/I may request to have the data removed in the future without any consequences for current and/or future access to or use of healthcare services.

I understand that the information provided will be kept confidential. I understand that the patient’s name will not be identified in any of the electronic files.

I understand that the patient will not benefit directly from participating in the study, but that participation will help in promoting the understanding of oral colonization of bacteria in long-term care residents and may guide future oral hygiene intervention studies.

I understand what participation in the oral colonization study involves, and I assent to allow ________________’s (patient name) to partake in the study.

I have been given a copy of this consent form.

________________________________________________________________________
Patient Name (please print) Date

________________________________________________________________________
Substitute Decision Maker Name (please print) Date

________________________________________________________________________
Signature Substitute Decision Maker Date

________________________________________________________________________
Signature of person obtaining consent Date

________________________________________________________________________
Signature principal investigator Date
August 18, 2005

Dr. Catriona Steele
Research,
Room 801, UC
Toronto Rehabilitation Institute

Dear Dr. Steele:

RE: TRI REB # 05-018
The Time Course of Oral Colonization by Respiratory Pathogens Related to Dental Hygiene Service Provision in Long-Term Care Residents.

The Toronto Rehabilitation Institute Research Ethics Board has reviewed the above-named submission. Any concerns and requested revisions have been addressed to the satisfaction of the REB. The protocol (dated August 04, 2005) and the participant and substitute decision maker consent forms (dated August 04, 2005) are approved for use for the next 12 months. If the study is expected to continue beyond the expiry date, you are responsible for ensuring the study receives re-approval. The REB must also be notified of the completion or termination of this study and a final report provided.

If, during the course of the research, there are any serious adverse events, changes in the approved protocol or consent form or any new information that must be considered with respect to the study, these should be brought to the immediate attention of the Board.

Best wishes for the successful completion of your project.

Yours sincerely,

Barbara Secker, PhD,
Vice-Chair, Research Ethics Board
Toronto Rehabilitation Institute

18 August, 2005
Date of Initial REB Approval

18 August, 2006
Expire Date of REB Approval
Dear Dr. Steele & Ms. Yoon:

Re: Your research protocol entitled, “The Time Course of Oral Colonization by Respiratory Pathogens Related to Dental Hygiene Service Provision in Long-Term Care Residents” by Dr. C. Steele (supervisor), Ms. M. N. Yoon (Master’s student)

ETHICS APPROVAL

We are writing to advise you that a member of the Health Sciences II Research Ethics Board has granted approval to the above-named research study, under the Board’s expedited review process, for a period of one year. Ongoing projects must be renewed prior to the expiry date. Your ethics protocol approval is valid for a period of 1 year. It is the responsibility of the investigator to maintain a valid approval throughout the duration of the research activity, and to report to the Ethics Review Office of its completion. Annual Renewal of Ethics Approval forms and Study Completion Report forms can be found at http://www.rir.utoronto.ca/ethics_hsmaterials.html. Consequences of expired ethics protocol approvals may include the freezing of funds and/or refusal to review new ethics protocol submissions.

The following documents (received August 25, 2005) have been approved for use in this study: Information Sheet and Consent Form, Substitute Decision Maker Consent Form, and Capacity Assessment Form. Participants should receive a copy of their consent form. Please provide a copy of the TRI REB approval letter, and of the Bridgepoint approval letter as soon as it becomes available.

During the course of the research, any significant deviations from the approved protocol (that is, any deviation which would lead to an increase in risk or a decrease in benefit to participants) and/or any unanticipated developments within the research should be brought to the attention of the Ethics Review Unit. Best wishes for the successful completion of your project.

Yours sincerely,

Marianna Richardson
Ethics Review Coordinator
UNIVERSITY OF TORONTO
Office of the Vice-President, Research and Associate Provost
Ethics Review Office

PROTOCOL REFERENCE #15301 now #18413

September 25, 2006

Dr. C. Steele
Dept. of Speech Language Pathology
Rehabilitation Science Bldg.
500 University Ave., Room 801
University of Toronto
Toronto M5G 1V7

Ms. M. N. Yoon
Dept. of Speech Language Pathology
Rehabilitation Science Bldg.
500 University Ave., Room 801
University of Toronto
Toronto M5G 1V7

Dear Dr. Steele & Ms. Yoon:

Re:  Your research protocol entitled, “The Time Course of Oral Colonization by Respiratory Pathogens Related to Dental Hygiene Service Provision in Long-Term Care Residents”

ETHICS APPROVAL

| Original Approval Date: September 27, 2005 |
| Next Expiry Date: September 26, 2007 |
| Renewal: 1 of 4 |

We are writing to advise you that the Health Sciences II Research Ethics Board has granted annual renewal of ethics approval to the above referenced research study through the REB’s expedited process. Ongoing projects must be renewed prior to the expiry date.

We understand that there have been no changes to the consent documents since the original approval date. Participants should receive a copy of their consent form.

During the course of the research, any significant deviations from the approved protocol (that is, any deviation which would lead to an increase in risk or a decrease in benefit to participants) and/or any unanticipated developments within the research should be brought to the attention of the Ethics Review Office.

Best wishes for the successful completion of your project.

Yours sincerely,

Jenny Peto
Ethics Review Coordinator
February 19, 2008

Dr. Catriona Steele
TRI - University Centre
550 University Avenue
Toronto, Ontario
M5G 2A2

Minn-Nyoung Yoon
TRI - University Centre
550 University Avenue
Toronto, Ontario
M5G 2A2

Dear Dr. Steele and Ms. Yoon:

RE: TRI REB # 05-018
The Time Course of Oral Colonization by Respiratory Pathogens Related to Dental Hygiene Service Provision in Long-Term Care Residents.

Short Title: Study of Oral Colonization in Long-Term Care Residents

The above-named study has received continued approval from the Toronto Rehab Research Ethics Board until the expiry date noted below. If the study is expected to continue beyond the expiry date, you are responsible for ensuring the study receives re-approval. The REB must also be notified of the completion or termination of this study and a final report provided.

If, during the course of the research, there are any serious adverse events, changes in the approved protocol or consent form or any new information that must be considered with respect to the study, these should be brought to the immediate attention of the Board.

Sincerely,

[ ] Gaétan Tardif MD FRCPC
Chair, Research Ethics Board
Toronto Rehabilitation Institute

[ ] Barbara Secker PhD
Vice Chair, Research Ethics Board
Toronto Rehabilitation Institute

August 18, 2005
Date of Initial REB Approval

August 18, 2007
Expiry Date of REB Approval

TRI REB conforms with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans and Ontario Privacy Legislation PHIPA
INTRODUCTION
Title of research project: Oral Care for Long-Term Care Residents: Understanding Perspectives

You are being asked to participate in a research study that is attempting to understand the differing professional perspectives surrounding oral care in long-term care institutions.

TIME COMMITMENT

You will be asked to participate in a discussion group with 7 other participants from various institutions regarding your perspectives surrounding oral care. The group discussion will be approximately 1 ½ hours long and will be held in a private location. A trained facilitator will guide the discussion. The discussion will be audiotaped, and the tapes will be transcribed. Individuals will not be identified by name. In order to examine the information, however, a research team member will record the order of the speakers by code number only and will keep back up notes. You will also be asked to complete a questionnaire requesting information on gender, number of years employed, job position, and previous oral care training.

As a follow up to the group discussion, we will also be sending out a survey to you, in a self addressed stamped envelope or via email, that will address any areas from the discussion that require clarification or expansion.

RIGHT TO REFUSE

You are under no obligation to participate in this study. During the group discussion you are free to not answer the questions or withdraw from the study at any time.

CONFIDENTIALITY

All focus group sessions will be recorded and transcribed, omitting any identifying information to ensure confidentiality. All personal information, recorded sessions, transcripts and computer data files will be stored on a secure server strictly accessible to the principal investigator and the staff of the Swallowing Rehabilitation Research Program.
Laboratory at Toronto Rehabilitation Institute. All paper and computer records as well as audio records will be destroyed after a period of ten years as per the documentation regulations of the College of Speech-Language Pathologists and Audiologists of Ontario, under the supervision of Dr. Catriona M. Steele.

RISK/BENEFIT

This study will not benefit you directly, but the researchers hope that the results of this study will advance the current understanding of the perspectives that different professional disciplines brings to the task of oral hygiene evaluation and intervention. These results will aid in establishing a context and recommendations for effective future interprofessional collaborations.

If you have any questions or are willing to participate, please email or phone the following contacts:

Principal Investigator:
Catriona M. Steele, Ph.D.
Research Scientist & Corporate Practice Leader for Speech-Language Pathology and Audiology, Toronto Rehabilitation Institute
550 University Avenue, Room 12030,
Toronto, ON, M5G 2A2
Phone: 416-597-3422, extension 7603; Fax: 416-597-7131
E-mail: steele.catriona@torontorehab.on.ca

Contact-person:
Minn N. Yoon, B.Sc.
Doctoral Student (Department of Speech-Language Pathology, University of Toronto)
Toronto Rehabilitation Institute
550 University Avenue, 12th Floor
Toronto, ON, M5G 2A2
Phone: 416-597-3422, extension 7812; Fax: 416-597-7131
E-mail: yoon.minn-nyoung@torontorehab.on.ca

If you have any questions about your rights as a research participant, please contact Jill Parsons, Health Science Research Ethics Officer at the University of Toronto, at jc.parsons@utoronto.ca or 416-946-5806.
Letter Confirming Participation

Dear ______________________________,

I would like to thank you for agreeing to participate in the upcoming focus group looking at understanding the different professional perspective of oral care in long-term care institutions.

The session will occur on (DATE to be determined) at (LOCATION and TIME to be determined). A light meal and refreshments will be served.

Your expenses related to travel (parking or public transportation) will be reimbursed to you and as a token of appreciation, we will be presenting a gift card to you at the end of the session.

Prior to beginning the focus group, you will be asked to read and then sign a consent form.

Following the group discussion we will be sending out a survey to you, in a self addressed stamped envelope or via email, that will address any areas from the discussion that require clarification or expansion that we kindly request you fill out and return.

If you have any questions prior to this time please feel free to contact Minn Yoon at (416) 597-3422 ext. 7603 or Dr. Catriona Steele at (416) 597-3422 ext. 7812.

Thank you,

Catriona M. Steele
Minn N. Yoon
Title of research project:

Oral Care for Long-Term Care Residents: Understanding Perspectives

If you have any questions or concerns about this study, please contact Minn N. Yoon (Doctoral Student) at 416-597-3422 ext. 7812 or the principal investigator, Catriona M. Steele, Ph.D. at 416-597-3422 ext.7603.

CONSENT FORM

I, ________________________, agree to participate in the Study of Oral Care for Long-Term Care Residents: Understanding Perspectives, a project coordinated Catriona M. Steele, Ph.D., a Research Scientist at the Toronto Rehabilitation Institute.

The purpose, procedures and risks of the Study of Oral Care for Long-Term Care Residents: Understanding Perspectives have been fully explained and I understand them. I understand that this study presents no risks. I understand that I will not benefit directly from participating in the study. My participation will help in advancing the current understanding of the perspectives that different professional disciplines brings to the task of oral hygiene evaluation and intervention. These results will aid in establishing a context and recommendations for effective future interprofessional collaborations or any publications.
I have been given the opportunity to ask questions about the project, and all of my questions have been answered.

I understand that I am being asked to participate in a group discussion that will be audiotaped and later transcribed for analysis.

I understand that I am under no obligation to participate in this study. I understand that I may withdraw at any time.

I understand that the information I provide will be kept confidential. I understand that my name will not be identified in any of the electronic files.

I understand what this study involves and I give my consent to participate.

Participant Name (please print)

Signature participant Date

Signature of person obtaining consent Date

Signature principal investigator Date
April 7, 2008

Dr. Catriona Steele
Toronto Rehabilitation Institute
TRI - University Centre
550 University Avenue
Toronto, Ontario
M5G 2A2

Dear Dr. Steele:

RE:  TRI REB # 07-019
Oral Care for Long-Term Care Residents: Understanding the Perspectives of Dental Hygienists, Nursing Staff and Speech Language Pathologists

The above-named study has received continued approval from the Toronto Rehab Research Ethics Board until the expiry date noted below. If the study is expected to continue beyond the expiry date, you are responsible for ensuring the study receives re-approval. The REB must also be notified of the completion or termination of this study and a final report provided.

If, during the course of the research, there are any serious adverse events, changes in the approved protocol or consent form or any new information that must be considered with respect to the study, these should be brought to the immediate attention of the Board.

Sincerely,

[ ] Gaétan Tardif MD FRCPC
Chair, Research Ethics Board
Toronto Rehabilitation Institute

[ ] Barbara Secker PhD
Vice Chair, Research Ethics Board
Toronto Rehabilitation Institute

April 18, 2007
Date of Initial REB Approval

April 18, 2009
Expiry Date of REB Approval

TRI REB conforms with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans and Ontario Privacy Legislation PHIPA
April 8, 2009

Dr. Catriona Steele
Toronto Rehabilitation Institute
TRI - University Centre
550 University Avenue
Toronto, ON M5G 2A2

Dear Dr. Steele:

RE: TRI REB # 07-019
Oral Care for Long-Term Care Residents: Understanding the Perspectives of Dental Hygienists, Nursing Staff and Speech Language Pathologists

The above-named study has received continued approval from the Toronto Rehab Research Ethics Board until the expiry date noted below. If the study is expected to continue beyond the expiry date, you are responsible for ensuring the study receives re-approval. The REB must also be notified of the completion or termination of this study and a final report provided.

If, during the course of the research, there are any serious adverse events, changes in the approved protocol or consent form or any new information that must be considered with respect to the study, these should be brought to the immediate attention of the Board.

Sincerely,

Gaétan Tardif MQ FRCP
Chair, Research Ethics Board
Toronto Rehabilitation Institute

April 18, 2007
Date of Initial REB Approval

April 18, 2010
Expiry Date of REB Approval

TRI REB conforms with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans and Ontario Privacy Legislation PHPA
June 13, 2008

Dr. Catriona Steele  
Toronto Rehabilitation Institute  
TRI - University Centre  
550 University Avenue  
Toronto, Ontario  
M5G 2A2

Dear Dr. Steele:

RE: TRI REB # 07-019  
Oral Care for Long-Term Care Residents: Understanding the  
Perspectives of Dental Hygienists, Nursing Staff and Speech Language  
Pathologists

This letter is to inform you that the amended recruitment strategy and change to  
the focus group implementation (as described in the e-mail from Minn-Nyong  
Yoon to Marleen Van Laethem, Research Ethicist, dated June 12, 2008) and the  
revised information and consent form (dated June 2008) have been approved for  
implementation by the Toronto Rehabilitation Institute Research Ethics Board.

Best wishes for the successful completion of your project.

Sincerely,

[签名]

[ ] Gaétan Tardif MD FRCPC  
Chair, Research Ethics Board  
Toronto Rehabilitation Institute

[ ] Barbara Secker PhD  
Vice Chair, Research Ethics Board  
Toronto Rehabilitation Institute
Participant Information Sheet

INTRODUCTION
Title of research project: A pilot intervention for nursing oral care practices.

You are being asked to participate in a research study, which will explore how a method called Appreciative Inquiry (AI) can change oral care practices.

TIME COMMITMENT

You will be asked to participate in all of the following:

- 1 half day session (3 Hours - PAID)
- 1 full day session (7 Hours - PAID)
- 1 group presentation (~5 Hours of personal time over 2-3 months)
- Follow-up survey (~30 Minutes)

Eleven other participants from various units of the Bickle Centre will be participating. All sessions will be guided by a trained facilitator and structured around Appreciative Inquiry with a focus on oral care.

Data will be recorded in a variety of ways throughout the sessions and later transcribed. Wherever possible, individuals will not be identified by name.

Following the sessions, you will be asked to participate in a group presentation focusing on your experiences in the sessions. We anticipate that this will require approximately 5 hours of your personal time. Preparations for the presentation will be supported by a facilitator.

At the end of the study, we will also be sending a follow-up questionnaire in a self addressed stamped envelope or via email for you to complete.

RIGHT TO REFUSE

You are under no obligation to participate in this study. Your decision regarding your participation will not affect your current work situation. During any session, you are free to not participate in any of the discussions or activities. You are also free to withdraw from the study at any time.

CONFIDENTIALITY

All information obtained during this study will be kept confidential and stored in a secure location. Once the research has been completed, all information will be destroyed.

RISK/BENEFIT

The researchers hope that the results of this study will improve our understanding of how evidence-based knowledge, delivered in workshops that adopt an AI paradigm, may change nursing oral care practice. This study will not benefit you directly but the results of this study may reveal self-reported improved clinical oral care practices secondary to the sessions. Further, the results from the study will support the design and evaluation of an organizational strategy for implementing changes in oral care knowledge, skills and practice.

If you are willing to participate or have any questions, please email or phone:

Contact
Minn N. Yoon, Ph.D. (C)
Department of Speech-Language Pathology, University of Toronto
Toronto Rehabilitation Institute
550 University Avenue, 12th Floor
Toronto, ON, M5G 2A2
Phone: 416-597-3422, Extension 7812; Fax: 416-597-7131
E-mail: yoon.minn-nyoung@torontorehab.on.ca

Thank you for your consideration.

Catriona M. Steele, Ph.D.
Research Scientist, Toronto Rehabilitation Institute
Associate Professor, Speech-Language Pathology, University of Toronto

Title of research project:

A Pilot Intervention for Nursing Oral Care Practices

If you have any questions or concerns about this study, please contact Minn Yoon (Doctoral Candidate) at 416-597-3422 ext. 7812 or the principal investigator, Catriona M. Steele, Ph.D. at 416-597-3422 ext. 7603

CONSENT FORM

I, ___________________________, agree to participate in A Pilot Intervention for Nursing Oral Care Practices, a project coordinated by Catriona M. Steele, Ph.D., a Research Scientist at the Toronto Rehabilitation Institute.

The purpose, procedures and risks of the Pilot Intervention for Nursing Oral Care Practices have been fully explained and I understand them. I understand that this study presents no risks. I understand that I will not benefit directly from participating in the study. My participation will help support the design and subsequent evaluation of an organizational strategy for implementing changes in oral care knowledge, skills and practice.

I have been given the opportunity to ask questions about the project, and all of my questions have been answered.

I understand that I am being asked to participate in an intervention study comprised of 2 sessions (1 half day and 1 full day) as well as participate in a group presentation and a follow-up survey.

I understand that data will be captured using a variety of possible media as suitable throughout the intervention and if video recording is used, I understand that there is no way to hide my identity but that measures will be taken to protect it.

I understand that data collected from the sessions will be recorded and later transcribed for analysis.

I understand that I am under no obligation to participate in this study. I understand that I may withdraw at any time.

I understand that the information I provide will be kept confidential. I understand that my name will not be identified in any of the electronic files.

I understand what this study involves and I give my consent to participate.

________________________________________________________
Participant Name (please print)

________________________________________________________
Signature participant Date

________________________________________________________
Signature of person obtaining consent Date

________________________________________________________
Signature principal investigator Date

September 30, 2009

Dr. Catriona Steele
Toronto Rehabilitation Institute
TRI - University Centre
550 University Avenue
Toronto, Ontario
M5G 2A2

Dear Dr. Steele:

**RE: TRI REB # 09-032**
A Pilot Knowledge Translation Intervention Using Appreciative Inquiry to Improve Nursing Oral Care Practices

The Toronto Rehabilitation Institute Research Ethics Board has reviewed the above-named submission. Neither you, nor collaborator Martha Budgell (both REB members), participated in the review nor the REB decision. Any concerns and requested revisions have been addressed to the satisfaction of the REB. The protocol (dated September 2009) and the Information Sheet and Consent Form (dated September 2009) are approved for use for the next 12 months. If the study is expected to continue beyond the expiry date, you are responsible for ensuring the study receives re-approval. The REB must also be notified of the completion or termination of this study and a final report provided.

If, during the course of the research, there are any serious adverse events, changes in the approved protocol or consent form or any new information that must be considered with respect to the study, these should be brought to the immediate attention of the Board.

Best wishes for the successful completion of your project.

Yours sincerely,

[ ] Gaétan Tardif MD FRCPC
Chair, Research Ethics Board
Toronto Rehabilitation Institute

[ ] Ann Heesters BEd, BA, MA, PhD(ABD)
Vice Chair, Research Ethics Board
Toronto Rehabilitation Institute

---

September 30, 2009
Date of Initial REB Approval

September 30, 2010
Expiry Date of REB Approval

TRI REB conforms with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans and Ontario Privacy Legislation PHIPA