8-25-2016

# Oral Care in New Mexico's Nursing Homes: A survey for the Directors of Nursing Homes

Nicole Gonzales

**Nicole C Gonzales**
*Candidate*

**Dental Hygiene**
*Department*

This thesis is approved, and it is acceptable in quality and form for publication:

*Approved by the Thesis Committee:*

Christine Nathe RDH, MS,Chairperson

Shelly Fritz, DDS

Charles Tatlock, DDS, MPH

# ORAL CARE IN NEW MEXICO'S LONG-TERM CARE FACILITIES: A SURVEY FOR THE DIRECTORS OF NURSING HOMES

By

**Nicole C Gonzales**

B.S., Dental Hygiene, University of New Mexico, 2009
B.A., Spanish, University of New Mexico, 2009

THESIS

Submitted in Partial Fulfillment of the
Requirements for the Degree of

**Master of Science**
**Dental Hygiene**

The University of New Mexico
Albuquerque, New Mexico

**July, 2016**

## Dedication

This thesis is dedicated to my family, my patients and to all the oral health care professionals who strive to improve the quality of life daily. **"To care for those who once cared for us is one of the highest honors…" Tia Walker**

To my parents Francisco and Nicolasa Chacon, thank you for always believing in me and encouraging my advancement in education. You both work hard daily to always make the nine of us feel loved, courageous and strong. Your example as community servants has inspired me to continue to serve others daily. To my siblings, Alfredo, Sylvia, Francisco Jr., Linda, Robbie, Raquel, Rafael and Pedro, you each have showed so much love and understanding throughout my lifetime. Thank you for being role models and my greatest fans. I love you all dearly.

I give my most sincere and loving appreciation to my husband Gabriel Antonio Gonzales. Thank you for loving me. Your love and support has been the most important to me throughout this journey. You continue to believe in me during my times of struggle and success. The hard work you put into being a father, husband and in your career as an educator inspire and encourage me daily. I am grateful for your support in my career decisions and advancement in my education.

Lastly, to my beautiful daughters, Minea, Camila and Natalia Gonzales, I pray that you will always find confidence in yourself and continue to challenge yourself. I hope that you will find happiness in your lives and careers. I hope that the completion of my thesis can be an example to you and inspire you to pursue what makes you happy. May you always believe in yourself and embrace life and continue to learn and serve others.

**Acknowledgements**

I gratefully acknowledge my Professor, advisor and chairperson Christine Nathe. Thank you for your encouragement and patience through my undergraduate and graduate studies. Your passion for education and community dental health is evident and heartwarming.

I would also like to acknowledge Cynthia Guillen for her work and efforts in advising me during my graduate studies. She also never failed in believing in me and placed continuous efforts in helping me meet many deadlines and providing information.

To Dr. Tatlock and Dr. Shelly Fritz, thank you for your time and for joining me during this journey. Your work in Dentistry is inspiring and appreciated. Thank you for your involvement and continued efforts in improving oral care for all New Mexicans.

I would also like to acknowledge Mary Rose Sena. Your friendship and willingness to provide feedback on the statistical analysis of my research will never be overlooked. Dr. Cara Scholl and Dr. Liang-tso Tung. Thank you for providing your time, knowledge and feedback for this research.

To the faculty and staff at the University of New Mexico- Division of Dental Hygiene. I continue to be proud of the education I have received at the division and know it would not have been possible without your hard work.

**ORAL CARE IN NEW MEXICO'S LONG-TERM CARE FACILITIES: A SURVEY FOR THE DIRECTORS OF NURSING HOMES**

By

**NICOLE C GONZALES**

B.S., Dental Hygiene, University of New Mexico, 2009
B.A., Spanish, University of New Mexico, 2009
M.S., Dental Hygiene, University of New Mexico, 2016

## ABSTRACT

*Purpose:* The aim of the study was to identify the Director of Nursing Homes' (DONs) perception of oral care in New Mexico's Medicaid/ Medicare certified facilities on training, assessment and utilization of a dental hygienists as an adjunct nursing home staff member. *Methods:* Via convenience sample,73 DONs were sent an e-mailed survey. *Results:* With a 23% return rate, statistical analysis indicates a mean of .063, confidence interval (CI) of -.164 to .257, with an average p-value of .32. These findings indicate an indifference of opinions towards or against specific dental care and fail to reject the null hypothesis. 88.24% of subjects believe that residents need dental care. The majority believe the Minimum Data Set (MDS) is useful in identifying residents' oral care needs. Subjects reported that yearly 82.35% of residents receive dental exams by a dentist and 70.59% receive dental cleanings. The majority explained they would not hire a dental hygienist as a staff member, unless funding was present to do so. Almost 67% indicated that improvement in daily oral health care for residents is needed along with staff training, restorative and preventative dental care for residents. *Conclusion:* The DONs in New Mexico perceive oral

care as an important health component for nursing residents. The MDS oral assessment is believed to be beneficial but a professional dental provider is preferred for assessment of oral needs. At this time funding does not allow for a staffed dental hygienists in all facilities.

## Table of Contents

## List of Figures

## List of Tables

## Chapter 1: Introduction

Between 2012 and 2050 the older population is expected to grow in the United States. The baby boomers, persons born between the years 1946-1964, post World War II, are primarily responsible for this increase and began turning 65 in 2011. By 2050 the surviving baby boomers will be over the age of 85 – referred to as the "oldest of the old."[1] The oldest of the old are projected to almost triple, from 6.3 million in 2015 to 17.9 million in 2050, accounting for 4.5% of the total population.[1,2] Recent projections estimate that over two-thirds of individuals who reach age 65 will need long-term care services during their lifetime.[3]

Long-term care services include support services provided to adults, primarily older adults who have a limited capacity of care due to chronic illness, injury, physical, cognitive or mental disability or other physical illnesses. Individuals may receive long-term care services in a variety of settings, which include: services at home from a home health agency or from family and friends, in the community from an adult day services center, in residential settings from assisted living communities or nursing homes.[3] The overall purpose of this study was to assess the dental hygiene services available to adults living in long-term care facilities that are Medicaid and Medicare qualified in the state of New Mexico.

This study investigates the access and assessment of oral health care in nursing residents by surveying the administrators of the facilities in New Mexico, known as the Directors of Nursing Homes (DONs). Their respected perception regarding oral care, access to oral care in their institutions, efficient and proper mandated assessments utilization by nursing staff, and utilization of dental hygienists as an effective staff member to provide preventive services and referral to a dentist to meet the overall needs of residents will be

evaluated. This study assessed the oral health care needs for current and future nursing home residents in New Mexico by identifying challenges perceived by the DONs, who primarily oversee all activity and programs in nursing homes.

**Statement of the Problem**

- Do the Directors of nursing homes (DONs) in New Mexico perceive that oral care in their facility is an issue that needs to be addressed?
- Are residents in nursing homes receiving the proper assessment and care to determine their oral health needs as perceived by the DONs in New Mexico?
- Do the DONs believe that a dental hygienist will be a useful and important team member to provide assessment and oral care needs for the residents?

**Hypothesis**

- Directors of nursing homes in New Mexico perceive oral hygiene as important and believe that training and assessment done by their staff members is not adequate with regards to oral care and specialized dental professionals such as dental hygienists will be a valuable adjunct towards meeting this need.

**Significance of the Problem**

There is no surprise that with the increase in knowledge and technological advances in health and dental care that people in the United States are living longer, including New Mexicans. In 2012, 43.1 million of the U.S. population were 65 years and older, an increase of 7.6 million or 21% since 2002.[4] With this significant increase in population, dental providers are faced with a patient population that has new complexities, which require specialized training and multi-dimensional treatment approaches to address the oral health and medical needs of the aging population.[5, 6] A collaboration of medical and dental

practitioners must develop solutions to these complex issues. Throughout the years many preventive programs, both medical and dental, in the United States have instructed people how to maintain a healthier lifestyle. As a result people are living longer, therefore it is important and logical that a collaborative team of healthcare providers continue to work to sustain and maintain life comfortably for all.

A vast amount of research has revealed that oral health is connected to overall health and directly affects individuals systemically. In 2003, the Surgeon General suggested that there are correlational relationships between oral infections and serious health problems such as diabetes, cardiovascular and lung disease.[2]

Many physiological changes and oral manifestations occur in the oral cavity of the elderly. These changes include, but are not limited to tooth loss, periodontitis, brittle teeth and tooth wear, caries, oral manifestations such as xerostomia, fungal infections, irritated tissue due to ill-fitting dentures, and oral cancers. With this vital research and information, it is essential to focus on improving the health of the overall body; including oral health.[7-9]

As people age it is a reality that many activities of daily living (ADLs) become difficult or sometimes impossible due to physical or mental incapacity. This reality results in the fact that many elderly patients are better off residing in long term care facilities where assistance can be provided and patients are monitored. A vast majority of nursing home patients rely on caregivers to assist in ADL's such as oral care. It is important for all staff members including the DONs to collaborate in obtaining and providing the most current knowledge and training to provide treatment, care and assistance to residents.

There are five main sectors of these services, which are Adult Day Service Centers, Home Health Agencies, Hospice, Nursing Homes, and Residential Care Communities. The

number of people utilizing these long-term care facilities is expected to rise due to the increase of older adults who need such services. The risk of needing these services increases with age. The number of people using nursing facilities, alternative residential care places, or home care services is projected to increase from 15 million in 2000 to 27 million in 2050.[3] Decreasing family size and increasing employment rates among women are expected to reduce the traditional pool of family caregivers, resulting in demand for paid long-term care services. It is projected that the number of older adults using paid, long-term care services will grow substantially. A substantial share of paid, long-term care services is publicly funded through programs such as Medicaid and Medicare. In order to improve care and access of these programs, gathering accurate timely statistical information can help guide these programs and inform relevant policy decisions.[3]

In 2013 it was reported that there are 15,700 Nursing Homes providing 26.8 % of long-term care services in the United States. The majority of these homes are Medicaid-Medicare certified homes. These nursing homes provided a total of 1,669,100 certified beds and ranged in capacity from 2 to 1,389 certified beds, with an average of 106 certified beds.[1, 3] Of these 15,700 homes, New Mexico currently has 73, a small percentage but just like the rest of the United States the amount of residents in nursing homes is expected to grow.[10]

Most nursing home residents have been admitted due to mental or physical illness or injury. Nursing home residents continue to face many struggles. The oldest of the old population tends to have the highest disability rate and need for long-term care services, and they also are more likely to be widowed and need assistances with ADLs.[3] The majority of this population are not able to do ADLs themselves, and a variety of services are reported to assist these residents. A report issued by the National Center of Statistics in 2013 show that

88.9% of nursing homes provide social work services, 86.6% provide mental health and counseling services, 99.3% provided therapeutic services, 100% provide skilled nursing or nursing services, 97.4% pharmacy and pharmacist services, and 78.6% Hospice. Interestingly, there were no reported provisions of separate dental services in this 2013 report given by the Center for Disease Control (CDC).[10]

Present research identifies problems that affect the goal of achieving minimal health and oral care for this population. Problems creating barriers for this population include but are not limited to, funding, transportation, provider's lack of training and negative attitudes in staff treating this particular population. A national nursing home survey conducted by the CDC in 2004 reported that 62.5% of residents had received dental care during their stay in their facility. This is a great improvement since 1999, but increasing that percentage still remains a goal.[11] Federal and state mandated laws and guidelines were developed to assist in increasing these numbers. Research questions continue to be reported on whether efficient training, documentation and assessment of oral needs are met with current nursing home staff; which generally excludes an onsite dental practitioner.[12-14]

In New Mexico data are collected on the aging population but there is a paucity of research documented focusing on the DONs. Initiatives in New Mexico are emerging, as providers are aware of the deficiencies in oral care for residents in nursing homes. Findings and recommendations must continue to establish new programs and ideas to overcome future challenges in providing, promoting and researching an overall standard of healthcare.

**Operational Definitions**

**Director of Nursing Homes (DON) –** A director of nursing (DON) is a registered nurse that supervises the care of all the patients in the facility. The DON has special training

beyond that of any clinical nurse for the position that pertains to health care management, and in some places a DON must hold a special license in order to be employed in that capacity.

**Nursing Homes –** private residential institutions for patients who require constant nursing care and have significant deficiencies of activities of daily living.

**Older Population –** A person 65 years of age and older.

**Geriatrics –** The specialty that focuses on care of the older population.

**Minimum Data Set (MDS) –** The resident assessment questionnaire used to assess the health of each nursing facility resident. The current requirements for oral health data are listed in OBRA in *MDS 3.0 (Section L) Oral Status and Disease Prevention*

**Activity of Daily Living (ADL) –** Routine everyday activities that people do unassisted to take care of themselves. These activities include bathing, eating, dressing, toileting, transferring and continence.

## Chapter 2: Review of Literature

Many aspects of dental care in long-term care facilities are lacking. Throughout the United States, longevity of life has increased. With the increase in age, chronic illness and oral illness increase. In order to sustain and maintain life, access to professional and preventative care in the medical and dental sector for institutionalized older adults is important. A vast body of research indicates that maintaining oral health can improve quality of life. Many older adults and their families resort to long-term care facilities for care. Research reveals that lack of access to oral care in these facilities exist due to lack of training for staff members and dental professionals involved. Access to oral care in nursing home residents is an important public health problem throughout the United States. The literature reviewed for this study discuss the demographics on aging population, reviews oral and systemic health, aging and dental manifestations, the federal and New Mexico state laws on oral care for nursing home residents and the dental hygiene profession.

### Demographics

According to the U.S. Census Bureau our nation is experiencing a dramatic increase in the aging population. By 2030 older adults will increase to over 70 million. Due to baby boomer generation aging, it is projected that 76 million people began reaching retirement by the year 2011.[1, 15] This rapid growth was noted all around the U.S., in rural and urban communities.[16]

The US Census Bureau reports that in 2014 15.3 percent of the population in New Mexico are 65 years and older.[17] NM data confirm the increase of population in person's age 60 and older with reported figures expecting to double from 2000 to 2030.[10] NM currently ranks 10th in the nation in percentage of population 65 years or older. The population will

rise by the year 2030, expecting NM to rank 4th in the nation in this age cohort. Person's aged 80 and older in NM will also triple by the year 2030 from 23,306 reported in 2000 to 75,629. This growing population will include the rise of baby boomers along with the continuation of migration of retirees and others to the western part of the U.S.[4] Since the year 2010 the overall NM population has increased by 1.3%.[17]

New Mexico data reports that in 2010, seniors living in rural communities had risen four percent in the past 20 years.[10] Many elderly require some kind of assistance for ADLs, and resort to living in a nursing home or community cottages. According to Spillman & Lubitz, studies indicate that approximately 43-50% of adults 65 or older will spend some time in a nursing home during the remainder of their life. [16]

The residents and families choose assisted living facilities primarily due to an individual's inability to physically, emotionally, and mentally perform ADL's. In many of these facilities the attention and priority placed on oral health care is limited.[16] With life expectancy increasing through the year 2030, dental practitioners can expect to see a doubling in the patient population of 65 years or above. With advances in oral disease prevention, millions of patients in the future are likely to maintain their natural dentition. Retention of healthy teeth must be maintained throughout a person's life. If retention of approximately 20 teeth of the 32 adult teeth is sustained in a person 65 years or older, they are likely to maintain sufficient function of mastication for nutritional intake.[8,18] In 2010, Berkey reported at the 2010 Institute for Oral Health conference that 50% of older adults suffered from deficiencies in protein, vitamins and minerals. Tooth loss and impaired function of mastication leads to malnutrition. In order to provide a healthy, appropriate standard of care and good patient rapport, an entire collaborative team is needed to address a

patient's overall health and dental needs in all facilities. This team once again includes all nursing facility administration and staff, dental and health care providers, patient and family collaboration.[18]

In 1957 over two-thirds (approximately 67%) of the U.S. population over the age of 75 were fully edentulous. By the year 1993 that number decreased to about 40% of the population and in 2015 it was down to 25.8%. In persons 65 and older the percentage drops to 13%.[19, 20] This remarkable decrease illustrates that health care providers have emphasized and educated patients on the importance of maintaining and retaining teeth. Therefore, it is no longer appropriate to equate geriatric dental care exclusively with denture care. Dental care now includes complex restorative procedures such as esthetic dentistry, periodontal surgery and implants. These procedures involve continual visits to a dentist and dental hygienist to maintain retained teeth.

**Oral Health and Systemic Health**

An essential component to keeping older adults healthy is preventing chronic diseases and reducing associated complications. Former Surgeon General C. Everett Koop explains, "You are not healthy without good oral health."[21] In 2014, the CDC conducted a study on the elderly (65 years and older) and found that 52% of men and 54% of women have hypertension and 37% of men have chronic heart disease. Reports indicate that 80% of older adults suffer from chronic illness and 50% suffer from at least two infectious diseases. Injuries also take an unbalanced toll on older adults resulting from osteoporosis, poor nutrition, head and neck cancers, cardiovascular disease, diabetes, mental incapability, decreased muscle mass, arthritis and other diseases and complications. Through observation of the oral cavity many diseases can be detected at early stages.[15,22] This is why the mouth is

considered to be a “mirror” in revealing many systemic conditions. The reality is that with age comes a higher susceptibility to chronic illness. Systemic changes predisposed other changes manifested in the oral cavity.

The New Mexico Department of Health reports that over one in four adults in NM ages 45 years and older has been diagnosed with two or more chronic diseases. Chronic disease is responsible for 60% of all deaths in the state and account for five of the leading six causes of death in NM. These five chronic diseases include cardiovascular disease, cancer, emphysema, stroke, and diabetes. Another common chronic disease, arthritis, is a leading cause of disability among adults. [21]

*Diabetes*

Diabetes is a chronic disease that many elderly acquire. Diabetes is a group of diseases associated with an increase in blood sugar (glucose) levels due to the body’s inability to produce the hormone insulin to maintain blood sugar levels. Diabetes is currently one of the fastest- growing epidemics in the world affecting over 24 million Americans. It is also considered one of the costliest conditions to treat. This chronic illness can lead to a series of health complications and even lead to death. Chronic inflammation seen in diabetic patients increases the risk of infection, especially in the oral tissues, that usually go untreated.[23]

The New Mexico Department of Health reports that diabetes prevalence increases with age and in New Mexico, older adults are eight times more likely to suffer from diabetes than younger adults. Diabetes incidence has increased in New Mexico. About 20.5% of New Mexicans over the age of 65 reported that they had been diagnosed with diabetes.[23]

Diabetes is a chronic inflammatory disease that is linked to periodontitis. Medical research addresses the link between acute infection and diabetes, particularly in the impact of the disease from inflammation. Inflammation is measured by the amount of C reactive protein (CRP) circulating in the blood to which insulin is sensitive. This CRP is a marker for the development of diabetes, making chronic inflammation such as periodontitis a risk factor for diabetes. Other oral health risks for diabetic patients are increased risk of caries, tooth abscesses, xerostomia, and burning sensation of tissues. With this knowledge it is important that dentists and dental hygienists play an important role in early detection and treatment. Along with scientific evidence reported, CDC data revealed in 2003-2004 through the National Examination and Nurtrition Survey (NHANES) that diabetic patients 50 years or older had higher numbers of missing teeth and were more than twice as likely to be edentulous.[24]

*Cardiovascular Disease*

Many older adults suffer not only from diabetes but also from heart disease. As the heart ages, physiological changes occur such as not pumping blood efficiently, less elasticity in blood vessels and less strength of heart muscle contraction during exercise. These diseases range from hypertension, congestive heart failure, myocardial infarctions, atrial fibrillation, and valvular heart disease. Risk factors of heart disease include smoking, diabetes, inflammation, age, increased lipid metabolism, lack of exercise, obesity and high blood pressure.[25]

Proposed mechanisms of actions suggest an association between oral micro flora and cardiovascular diseases, in particular bacteria associated with periodontitis. Platelet aggregation is induced from oral bacteria causing the formation of blood clots in blood

vessels inhibiting blood flow. Also, an exaggerated inflammatory host response can occur in the body when periodontitis is present in cardiovascular disease patients.[25] Gram-negative bacteria particularly associated with plaque and tartar formation that cause periodontal disease appears to be the main focus of research.

*Bacterial Pneumonia*

Pneumonia is a life threatening infection of the lungs caused by a variety of infectious agents such as bacteria. It is life-threatening especially in older immunocompromised patients. Aspiration pneumonia is a common type. It is a result of aspiration of oral-pharyngeal bacteria into the lower respiratory tract and the inability of the immune system to eliminate them resulting in a multiplication of oral flora leading to tissue damage.[25] Due to the mechanism of action of aspiration pneumonia, decreasing the amount of negative micro flora necessitates a high priority especially in the aging population. Frail older people living in residential care homes have a higher risk of developing aspiration pneumonia.[26]

Many risk factors for aspiration pneumonia are identified in frail older adults. These risk factors include age, male gender, lung disease, dysphagia, diabetes mellitus, severe dementia, Angiotensin-converting Enzyme with an alleles DD pattern (ACE DD) genotype, poor oral health and malnutrition.[25] Oral health care seems to play an important role in the prevention of aspiration pneumonia. Due to extensive research and findings, the CDC issued a general guideline for preventing health-care-associated pneumonia. The guideline recommends, “to develop and implement a comprehensive oral hygiene program,” without providing detailed information.[25] Recommendations by researchers to develop a program include frequent tooth brushing and pharmacological adjuncts to oral care such are Chlorhexidine Gluconate containing oral rinses. The population of institutionalized elderly

will need assistance in developing a comprehensive oral hygiene program and in most cases help with mechanical plaque removal and teeth brushing.

*Arthritis*

As mentioned before, the conditions listed above could have an obvious impact on overall health, but even the high incidence of arthritis provides reasons for concern for oral health. This condition affects patient's ability to maintain his or her own oral hygiene or even get to the dental office. As such, providers need to create more personalized dental care plans that factor in these medical concerns that make treatment more complex and time-consuming.[7] The CDC reports in 2011 that, "older adults who practice healthy behaviors, take advantage of clinical preventive services, and continue to engage with family and friends are more likely to remain healthy, live independently, and incur fewer health-related costs".

**Oral Manifestations**

Now that researchers and providers are becoming increasingly aware that oral health affects the overall health, evaluation of oral manifestations resulting from chronic and systemic diseases is apparent. Areas of concern seen frequently in the elderly include malnutrition, loss of appetite, denture pain, caries, periodontitis, oral cancers, oral lesions, difficulties swallowing and salivary dysfunction. Findings indicate that these conditions predispose an individual to the development of other systemic disorders.[15] According to the American Academy of Oral Medicine, due to susceptibility to systemic conditions as mentioned previously, older adults are predisposed to develop oral and maxillofacial disease that can "directly or indirectly lead to malnutrition, altered communication, increased susceptibility to infectious diseases, and diminished quality of life."[15]

*Xerostomia*

Many older adults complain of xerostomia. Saliva plays an important role in a person's immune system and the preservation of the oropharyngeal health. Additionally, saliva plays an important role in the digestive system as it assists with chewing, the breakdown of food through enzymes, and the action of swallowing. Therefore, the lack of saliva results in issues with food and beverage intake. Significant salivary dysfunctions can predispose the patient to permanent oral and pharyngeal disorders that can impair their quality of life. Dental caries, dry lips, dysgeusia (distortion of the sense of taste), dysphagia (swallowing problems), gingivitis and periodontitis, halitosis, mastication problems, mucositis, oropharyngeal candidiasis, ill-fitting dentures, sleeping difficulties, speech difficulties and traumatic oral lesions are reported side effects of oral and pharyngeal salivary hypo-dysfunction.[27]

Salivary disorders in the geriatric population are usually the result of systemic disorders and their treatments. With complex medical histories, medications are prescribed to treat chronic and systemic diseases, and along with other predispositions, the elderly are more vulnerable to salivary gland dysfunction. As with many medications, side effects occur, and a common side effect is xerostomia. About 80% of the most commonly prescribed medications cause xerostomia and about 400 medications associate salivary dysfunction as a side effect.[15, 27]

Along with the side effect of medication, radiation therapy is also associated with xerostomia. Head and neck cancers are usually treated through radiation treatments. The radiation external beam can cause severe salivary dysfunction. Within a week of the start of treatment, a patient's salivary function declines an immense 60 to 90%.[27]

Sjögren's syndrome is a chronic autoimmune connective tissue disorder. This autoimmune disorder affects the lacrimal and salivary glands causing a lack of secretions. It is the most common systemic condition associated with xerostomia and salivary dysfunction. About one million people in the U.S. are living with this disorder. It is generally diagnosed in patients 40 and older.[28]

Saliva deficiencies are reported to cause denture pain and ill-fitting dentures. Lubrication is important for dentures wearers. Denture sores can emerge along with lack of retention of the prosthesis due to lack of lubrication of the denture-mucosal interface. Reports of halitosis and burning sensation of the tongue are common in older adults with xerostomia, once again interfering with mastication, swallowing, and food intake. With change of the oral environment in conjunction with the systemic disease process usually seen in older adults, comes a change in the oral micro flora predisposing older patients to oral candidiasis which is seen and reported as a burning sensation of the tongue or other intraoral soft tissues.

*Dental Caries*

Salivary dysfunctions may subsequently result in a prevalence of dental caries. Along with the retention of natural adult teeth in the aging population, comes an increase in the prevalence of caries. In 2012, the CDC reports that 96.2% of older adults have experienced dental caries and18.9% of untreated dental caries in this population exists.[29] Deficiencies in salivary secretions enable microorganisms that cause caries to colonize. Tooth decay can cause mild to severe tooth pain. The inability to chew is often related to pain in the teeth. This can lead to change in diet and malnutrition in older adults.[30]

Through the years, geriatric investigations have been collected to detect caries in patients in hospitals and nursing homes. Primary studies recognized the high prevalence of caries in these facilities, whereas new research has branched out evaluating more in depth factors such as cognitive testing procedures to assess psychological factors, functional status, comorbid medical conditions, medications, and socioeconomics.[12,13, 31] This suggests that geriatric dentistry is in need of the best clinical, psychological, and social skills from practitioners and demands an integrated approach and advocacy.

*Periodontitis*

The American Academy of Periodontology reports that older adults have a higher prevalence of periodontal disease.[32] Periodontitis is known as loss of attachment of the periodontium. It is accompanied by inflammation of the gingiva and an increase in gram-negative bacteria that release toxins that cause destruction of the periodontium. This destruction is measured by the amount of bone attachment and categorized as initial, moderate, or severe periodontitis. Periodontitis is another significant problem in older adults.

The most recent 2010-2012 National Health and Nutrition Examination Survey (NHES) study found that in 70.1% of older adults (65 plus) have periodontal disease with the highest prevalence seen in Hispanic males.[8] Periodontitis is associated and connected to various systemic diseases such as diabetes, heart disease and autoimmune diseases all due to the inflammatory process. The American Diabetes Association lists periodontal disease as a complication of diabetes. When inflammation occurs, the body is working harder to fight off bacteria and other foreign debris or bodies. As mentioned previously factors that place patients at risk for periodontitis, place patients at risk for other systemic diseases. Research reveals that a relationship exists with diabetes and periodontal disease and that if oral

inflammation is kept under control, then glucose levels tend to be kept under control as well. Subgingival biofilms act as reservoirs for gram-negative bacteria sparking an inflammatory response. The periodontium also acts as a reservoir of inflammatory mediators, which can cause an increased incidence in blood clots.[25]

*Oral Cancers and Lesions*

In the United States, oral malignancies, candidiasis and inflammatory vesicular lesions are the three most common reasons for referrals by general dentists to specialists in older adults.[8, 33] The American Cancer Society reports that in 2015 it is expected that approximately 45,780 new cases of oral and pharyngeal cancers will occur along with 8,650 deaths.[24] Squamous cell carcinoma is the most common oral cancer (90%). A vast 90% of squamous cell carcinomas occur in persons aged 50 years and older.[19, 32] Thirty thousand Americans are diagnosed with oral pharyngeal cancers annually, the majority of cases occurring in the elderly. Silverman (2007) reports that 95% of oral and pharyngeal cancers occur after the age of 40, this continues to be true in 2010.[24] This high prevalence is the reason why an oral cancer screening (conducted by a dental professional) is recommended annually for all patients, especially as aging occurs. About 75% of oral cancers can be detected by clinical findings and palpations of the head, neck and oral cavity.[34] Immunosuppression in the elderly presents a risk for the development of genetic mutations and precancerous conditions. Another risk factor is smoking; early detection and diagnosis of oral cancers rely not only on the professional as well as by the patients. Appropriate yearly oral cancer screenings must be done on patients of all ages and demographics, especially as aging occurs. Dental professionals as part of the health care team play an important role in cancer control by conducting oral cancer screenings, biopsies and referrals

to assure oral and mucosal lesions are properly diagnosed and for identification of premalignant lesions and appropriate needed treatment.[33]

Along with malignancies in the oral cavity, fungal infections are common in many elderly patients. Candidiasis (thrush or moniliasis) is a white, red, or both, oral lesion that occurs when an overgrowth of the fungal oral flora occurs. Symptoms include discomfort at site, altered taste, halitosis, and a decrease in saliva. Review of health histories and clinical signs obtained from the professional are the common ways of preliminary diagnosis.[2]

**Compromised Quality of Life**

"Quality of life" can take on many different definitions depending on who one may be talking to. Providing everyone with a healthy "quality of life" including physiological and psychological are all goals for healthcare providers. In order to describe the direct impact of oral health on a patient's personal experiences, dental professionals have used the term "oral health-related quality of life." One study by Fiske and colleagues reports that denture wearers suffer from depression and social isolation due to tooth loss.[35] Older adults' well-being can be affected by poor oral health and dental pain. As emphasized by many studies and findings, wearing dentures directly affects a person's ability to eat, type of diet, weight changes, speech, hydration, behavioral problems, appearance and social interactions.[36] Oral impairment and disability are known as features of old age, but healthcare providers are working so that it is not necessarily a negative impact on the quality of life for the aging. Numerous questionnaires and interviews are available to document and measure the negative and positive attributes of oral health.[37] These studies and descriptive data have been dissected and reviewed in attempt to improve oral care for this population.

**Nursing Homes**

A nursing home, long term care facility (LTCF) or residential care facility, is a residential institution for patients who require constant nursing care and have significant deficiencies of ADL's. Residents include the elderly or younger adults with physical or mental disabilities. In 2012, 85.1% of nursing home residents were 65 years of age and older.[3] Approximately 5% of Americans over the age of 65, or 1.75 million people, are residents of long-term care facilities where they have problems receiving adequate dental care. In 2012, the CDC reports that there are 15,700 Nursing facilities in the United States with an average of 106 certified beds per facility.[3,10] The CDC reports that among the majority of nursing homes (61%) serves 26-100 residents on a daily basis. It is also reported that 32.8% of these facilities serve 100 or more residents. Nationally, 95% of nursing facilities are authorized or certified Medicaid facilities.[3] The Centers for Medicare and Medicaid Services (CMS) reports that the average nursing facility has an 83% occupancy rate in which Medicaid pays for 69% of nursing facility cost, while 23% is paid by private pay and Medicare pays 8%.

There are currently other options for elderly living as mentioned previously. Nursing homes are projected to increase in occupancy in the future. In 2008, 9 million Americans needed long- term care services. By 2020, the number will rise to 12 million and increase to as many as 24 million by 2060. There are 73 licensed nursing facilities in New Mexico. The average number of residents per facility is 81 with a total of 5,695 residents needing assistance with approximately 4.3 ADLs. Eighty-nine percent of nursing facility residents in New Mexico are 65 or older.[38]

Dolan & Atchison explain (1993) that there is scarce data defining the current utilization of dental services by long-term care facilities residents, and the data available indicates low utilization. A high prevalence of oral disease and the need for dental treatment are also evident.[13] Currently, this problem still exists. As more people retain natural teeth into old age and they become dependent on others for their overall care, there is an increasing need for dental services in this setting.[4–13] Unfortunately, there is not a 'gold standard' of oral health for residents that have solved the problems faced in residential care but federal and state attempts have been made.

*Federal Regulations: Omnibus Budget Reconciliation Act (OBRA)*

Medicare is the primary financial source for geriatric medical care in the United States.[12] Currently, Medicare does not provide reimbursement for dental care expenses. Primarily, dental care is limited to low-income older adults through the Medicaid program. Medicaid does not provide mandatory coverage of dental services for older adults in all states but mandates coverage for children and adolescents. However, it does provide coverage for many qualified adults in New Mexico. In 2003, the Oral Health America Grading Project states that, "twenty-seven states are failing to meet even the most minimal standard of care."[12] There are many gaps that still exist in providing oral care for all Americans, especially the elderly.

Federal regulations have been established for LTCFs to provide a clear guidance for resident assessment in order to ensure that residents receive appropriate dental care. It is noted that expert assessment is required to develop individualized care plans for residents prior to admission.[38] In one survey conducted in the state of Iowa, over 38% of assessments were done by only one person, usually a Certified Nursing Assistant (CNA).[13] Assessments

are also continued throughout the duration of the resident's stay at facilities. Federal regulations mandate that nurses and CNAs have the required knowledge and competencies to complete an accurate and comprehensive oral health assessment on all patients admitted to the care setting. Still, little time is taken to assure that the oral assessment is done and oral care is continued throughout the duration of the resident's stay. Research reveals there is not enough time spent on oral care for patients each day.[39-41]

In 1987, the Omnibus Budget Reconciliation Act (OBRA) and subsequent federal regulations established requirements for nursing facilities related to dental services and the periodic evaluation of health, including oral health for residents in nursing facilities. On October 4, 1990 the Omnibus Budget Reconciliation Act of 1987 became law.[41] The nursing facilities that receive funding from Medicare or Medicaid must periodically assess and document the health, including the oral health, of their residents utilizing a form known as the Minimum Data Set (MDS). [41]

The MDS is a confidential questionnaire used to assess the health of each resident of the nursing home conducted during admission, and periodically during the resident's stay in the nursing home. The data is part of the resident's medical record and is protected from improper disclosure by Medicare and Medicaid certified facilities. The primary use of this assessment is to aid "in the administration of the survey and certification of Medicare/ Medicaid … and to improve the effectiveness of quality of care given in the facilities."[42] Providers are required to transmit MDS data to a federal data repository the QIES Assessment Submission and Processing and the MDS database. Submission of this data is primarily to insure that the facility "meets quality standards and provides appropriate care to all residents."[42]

The MDS 3.0 assessment includes an oral health component that must be completed in the "7-day look-back period" or observation period seven days from admittance.[41] Ettinger and colleagues in 2000 indicated that even after the implementation of OBRA, many epidemiological prevalence studies indicated that nursing residents continue to receive poor oral care in facilities. Revisions of terminology and written language on the MDS sheets were suggested by the American Dental Association (ADA) prior to MDS 2.0. The ADA believed that the "dental content of the MDS proves to be an incomplete appraisal of the oral health of individuals when used by nursing staff," therefore revisions were made.[42] Many questions continue to arise about how effective MDSs really are. Several studies indicate that an MDS assessment does not necessarily lead to performance of the needed dental care.[41, 42]

*Regulations in New Mexico*

According to the New Mexico Health Care Association and the U.S. Medicaid website 73 certified nursing facilities are listed as Medicaid and or Medicare certified facilities in New Mexico. As in many facilities and organizations federal and state laws, regulations and guidelines are placed to ensure that services are ethical and beneficial. New Mexico has placed specific requirements and guidelines for nursing homes that are implemented and published by the New Mexico Department of Health. These laws specifically state in 7.9.2.60 A, of the New Mexico Administration Code (NMAC), that "each facility shall retain an advisory dentist to participate in the staff development program for nursing and other appropriate personnel to recommend oral hygiene policies and practices for the care of residents." By having a dentist recommend policies and practices staff can provide appropriate oral care measures to reduce oral infections and manifestations to

improve lifestyle and overall health. It is important to note that recommendations are only made and it is up to the staff and administration to ensure these policies are enforced.[42]

Along with having a dentist provide recommendations for policies and practices, New Mexico state regulations mandate that a dentist is made available for residents. Part B of 7.9.2.60 discusses that the facility make dental care arrangements for all residents when needed. This includes that the facility is responsible for making appointments and transportation arrangements "for residents who do not have a private dentist." This is to insure that the resident can attend appropriate dental appointments. Guidelines provided by Guidance to Surveyors in Long Term Care Facilities, state that the facility must "provide or obtain from an outside resource" routine dental services, emergency dental services, and refer residents with lost or damaged dentures to a dentist.[43] These guidelines are to be followed by all faculty and staff. For Medicaid residents no charges should be made for emergency dental services if covered under the state plan.[40]

These appointments are explained as routine dental services covered under the state plan and dental services. The staff must promptly refer residents with lost or damaged dentures to a dentist and make the appropriate dental appointments. Under the guidelines routine dental services are described as those services that provide "annual inspection of the oral cavity for signs of disease." These services include dental radiographs as needed, dental cleanings, fillings (new and repairs) minor dental plate adjustments, smoothing of broken teeth, and limited prosthodontics procedures.[43] Other guidelines provided are for emergency dental services and referrals. Referrals must be given when dentures are lost or damaged. A referral does not mean that the resident must see the dentist at that time, but an appointment must be made to follow up with appropriate examination and care.

*Nursing Staff and Training*

The key factor to maintaining good oral health is good daily oral hygiene. Almost all residents in nursing homes need assistance in achieving proper effective daily hygiene and removal of dentures. It is often difficult for nursing home residents to maintain a sufficient level of oral hygiene without assistance.[40,41] Until recently teaching and qualifying nursing staff in providing individual oral health care for all residents and improving attitudes in nursing staff to perform tasks was of low priority to managers and physicians.[42,45] Improved oral hygiene among older hospitalized people and nursing home residents reduces mortality associated aspiration pneumonia and other systemic diseases in healthcare settings, as explained before.

There are recommendations to have nursing staff partake comprehensive training in order to provide oral care in nursing homes. Problems emerge because staff reports that they do not have time, proper materials, or desire to conduct proper oral hygiene on residents. Oral healthcare attitudes and various educational programs in nursing homes have been investigated and there appears that gaps continue to remain between knowledge and the use of knowledge in clinical practice.[39,40] In 2009, Sjorgen and colleagues found that within one and a half years after dental hygiene training which consisted of three phases, verbal instruction, hands on instruction, and a theoretical lecture on plaque control, the oral hygiene level had not changed in residents after training. The conclusion of this study is that one training program every year and a half did not improve the oral status of residents.[44] Training has to be continual if these staff members are expected to meet a proscribed standard of care. A search conducted in the Cochran Review illustrates that the training intervention was not seen to have made a difference to the residents' intra-oral health (dental

plaque and gingivitis). Improvements outside of the mouth were increased such as denture cleaning.[45]

It is possible that regular short-term instruction and emphasis on knowledge could benefit and possibly improve the oral status in nursing home residents. Another study was done providing nursing staff with training after an initial dental exam was done by a qualified dental hygienist. Three weeks after initial training and examination, the oral hygiene of residents was assessed. During this time the staff had a registered dental hygienist available for reference every week personally or via phone.[39] It is already known that a relationship exists between poor oral hygiene and general health complications among older people and medically compromised individuals; therefore adequate training for all nursing staff members must be conducted for patient health.

One study assessed, through multiple dental examinations conducted by dental professionals at nursing homes, that 60% of residents with dementia report dental pain.[36] This illustrates that the current nursing staff are not trained to effectively detect and diagnose dental concerns of residents.

Attitudes in nursing staff vary.[46,47] Nursing staff report a high degree of frustration due to restricted training opportunities, access to equipment, assessment tools and professional dental support. Due to these frustrations, it is not surprising that many times oral care is not seen as a priority for nursing residents.[46,47] It is recommended that an on-site dental professional is present so that the dental team can integrate into the workplace and environment of the facility…assisting with difficult patients.[36]

The DONs are part of a team of administrators in these facilities that work to provide policies and attitudes to ensure that their facility is complying with federal and state laws to

provide exceptional care for all residents. It is evident that the quality of care is dependent on the perception and attitude of the DONs. If any changes need to be made and implemented it is the job of the director to ensure they are done. The director must be convinced that oral health is an integral and important part to maintain a healthy overall lifestyle. A dental professional hired to primarily maintain and assess dental care of all residents is greatly needed.

**Access to Care**

Access to oral health for residents in nursing homes presents challenges.[43] Delivery models in the U.S. do not effectively ensure access to dental care and numerous studies demonstrate there is limited access to dental care for older adults residing in nursing homes.[48] Older adults are maintaining their natural teeth into their later years, and epidemiologic trends suggest the increasing need for dental services by older adults. Yet dental utilization rates are lower for older adults than for younger age groups, and barriers to care include the cost of dental care, the lack of perceived need for care, transportation problems, and fear.[4,10] It is reported that only one in five nursing home residents had visited a dentist in the past year.[45] Since the residents are not receiving care, the care must be brought to them. Access to care through mobile care has facilitated more onsite care, but funding issues are still a problem. Another option for the resident is to visit a private practice dentist.

**Interprofessional Care**

As a member of the health care team and in collaboration with the dentist the dental hygienist performs necessary procedures for preventative oral care. A dental hygienist is a preventive oral health professional licensed to provide educational, clinical and therapeutic dental services to the public. Their job is to promote and maintain oral health in the

population. Dental hygienists can work in a variety of settings providing service. These services include dental prophylaxis, non-surgical periodontal therapy, dental radiographs, oral cancer screenings, oral health instruction/education, periodontal assessment and placement of sealants and topical fluoride. In some states the dental hygienist are licensed to perform local anesthesia and own their own collaborative practice. A variety of career options exist in this profession ranging from the clinical setting, education, sales, management, research and public health. It is the job of the dental hygienist to promote and maintain oral health.

There are many laws that define the scope of practice for dental hygienists. These laws vary from state to state. The ADHA (American Dental Hygiene Association) defines direct access as the "ability of a dental hygienist to initiate treatment based on their assessment of a patient's needs without the specific authorization of a dentist, treat the patient without the presence of a dentist, and maintain a provider-patient relationship.[48]

New Mexico law allows the dental hygienist to provide some preventative care outside the private/clinical setting such as in long-term care facilities. Below is a brief overview provided by the ADHA on laws in New Mexico.

> **New Mexico 1999/2011 Sec. 16.5.17** Collaborative Practice: Dental hygienist can practice in any setting with collaborative agreement and can own or manage a collaborative dental hygiene practice. Dental hygienist must enter into a written agreement with one or more collaborative dentist(s) which must contain protocols for care. Dental hygienist must refer patients for annual dental exam. Requirements: Dental hygienist must have 2,400 hours of active practice in preceding 18 months or

3,000 hours in 2 of the past 3 years. Dentists may not collaborate with more than 3 dental hygienists.

Provider Services: Collaborative practice dental hygienist can provide a dental hygiene assessment, radiographs, prophylaxis, fluoride treatments, assessment for and application of sealants, root planing, and may prescribe and administer and dispense topically applied fluoride and antimicrobials, depending on the specific services allowed in agreement with collaborating a dentist. (Direct Medicaid reimbursement allowed.)

**New Mexico 2007 Sec. 61-5A-C** No supervision required for any dental hygienist to apply topical fluorides and remineralization agents in public and community medical facilities, schools, hospitals, long-term care facilities and such other settings as the board may determine.[48]

The dental hygienist can be a helpful team member to the LTCF team. In one study participants suggested that "having a dental hygienist/educator on site on a daily basis as a resource person and establishing and enforceable protocol and standards for daily care was suggested by nursing staff."[33]

## Chapter 3: Methods and Materials

### Study Approval

This study was approved by the Human Research Review Committee at the University of New Mexico's Human Research Protection's Office on February 26, 2016. (HRRC #16-022). (See Appendix A). It was given exemption status. The requirements to obtain a signed consent form was waived from subject. Written statement provided to the subject about the research was required. All submitted forms were approved.

The purpose of the study is to evaluate the perception of the DONs that currently serve the listed 73 Medicare and Medicaid-certified nursing home facilities in New Mexico regarding oral care and oral health care assessment in their facilities.

- ***Hypothesis***: The current Directors of nursing homes in New Mexico's Medicaid/Medicare certified nursing facilities perceive oral hygiene as important and believe that training and assessment done by their staff members is not adequate with regards to oral care and specialized dental professionals such as dental hygienists can be a valuable adjunct towards meeting this need.

### The Study Population

All 73 nursing homes in the state of New Mexico reported from the Medicaid website (http://www.medicaid.gov) and the New Mexico Healthcare Association website were sent a questionnaire via email. Contact information was obtained by contacting each individual nursing home by telephone to confirm e-mail address of the DON. Information provided on the website list telephone number, address, bed capacity and Medicaid/ Medicare status. No vulnerable populations are surveyed. Subjects that qualified were ages 18 and above, both

male and female and that currently hold the position of Director of Nursing Home for the facility qualified to participate in the study.

**The Questionnaire and Subjects**

An anonymous eighteen-question survey was developed specifically for the DONs to answer. (See Appendix B). Questions regarding personal opinions on importance of oral healthcare needed in the facility, current oral health assessment tools used for residents, follow-up care, staff training and utilization of dental professionals were presented to the DONs. Subjects were selected by a convenience census.

The survey did not provide any identifying markers for subjects, unless the subject voluntarily provided their information to obtain further follow-up of the study and information on further research in future if done. Those who were interested and qualified to participate in the study were asked to complete a survey. Subjects were given two options to complete the survey, via Internet using the Internet service site survey monkey (sent via email and listed on paper) or by filling out the attached survey mailed if subject decided. By returning the anonymous survey in the envelope provided or by using survey monkey online, subjects can agree to participate in the study. All surveys were sent via e-mail since each facility had an e-mail listed via convenience sample or the DON directly requested it be sent to their e-mail address provided.

One week before all surveys were sent out, each facility received a call to inform the DON about the study, the process, confirm e-mail/mailing address and preference of administering survey, as well as to encourage the subject to participate in the study. All subjects were sent survey via e-mail due to confirmation and request via phone call from either the facility DON or via discussion with the facilities front desk. Almost half of the

subjects were directly contacted. Various telephone messages were left with front desk as well as on DONs answering machine. Subjects had three weeks to answer survey, after one week of administering the survey, a phone call was provided once again along with a reminder e-mail via survey monkey, to assure that the administrator has received the survey.

After surveys were returned the findings were analyzed. Analysis of data was based on questions answered by the DONs that responded and compared. Data were analyzed using two statistical programs (R program and survey monkey). A statistical analysis plan was developed before all the survey's were sent out (Appendix C).

## Chapter 4: Results, Conclusion & Recommendations

This study provided a brief examination of the perception of oral care in nursing homes of the New Mexico Nursing Home Directors. Information about oral care in the 73 nursing home facilities that are Medicaid/Medicare certified facilities, was collected via convenience census.

The study was organized in terms specific research questions listed below:

- Do the Directors of nursing homes (DONs) in New Mexico perceive that oral care in their facility is an issue that needs to be addressed?
- Are residents in nursing homes receiving the proper assessment and care to determine their oral health needs as perceived by the DONs in New Mexico?
- Do the DONs believe that a dental hygienist would be a useful and important team member to provide assessment and oral care needs for the residents?

### Assumptions

For the purpose of this study it is assumed that all participants are over the age of eighteen, currently serve as a Director of nursing home in New Mexico, utilize funding from Medicaid and/or Medicare and that all provided responses are accurate to the best of their knowledge. Also, assumed is that all articles utilized and cited in this research provide factual and ethical data findings to present developed ideas and further research.

### Statistical Analysis

Data were analyzed using the online statistical analysis program R and Survey Monkey. A power analysis was run prior to test to avoid a Type II statistical error. The power analysis determined that a 70% response rate was needed (n=53) to reach the desired effect. A 23% response rate was received (17 surveys). Since the survey response rate did

not reach the desired sample size of n = 53 a non-parametric bootstrapping resampling technique was applied to the data. A non-parametric bootstrapping is beneficial when working with a small sample size because the technique creates a large number of samples from which estimates and inferences are made. For our analysis, the bootstrapping technique resamples from the original sample 1,000 times. For each of the 1,000 new samples, a sample mean and t-test are calculated.[49]

The overall mean calculated from the bootstrapping technique is .063 with a confidence interval (CI) equal to (-.164 to .257). The average p-value for the t-test is .32. Since the p-value is greater than 0.05, we must fail to reject the null hypothesis, $H_o: \mu \leq 0$, of our experiment. This implies that the mean dental score for all DONs in New Mexico's Medicaid/Medicare certified facilities is less than or equal to zero. This indicates that directors have an indifferent opinion towards or against specific dental care in their facilities in general. Indicating that the DONs overall opinions towards dental care currently vary.

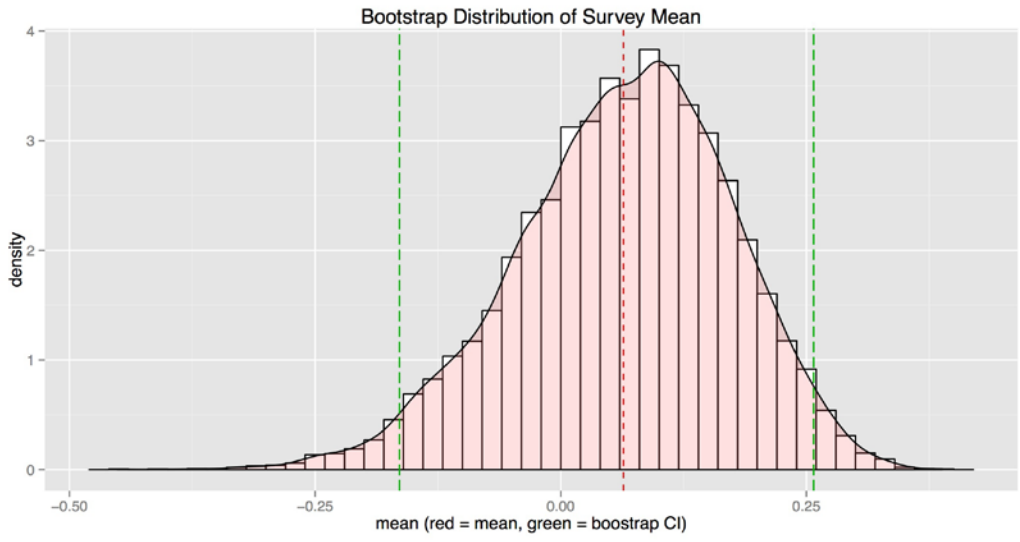


Figure 1: Distribution of Survey Mean.

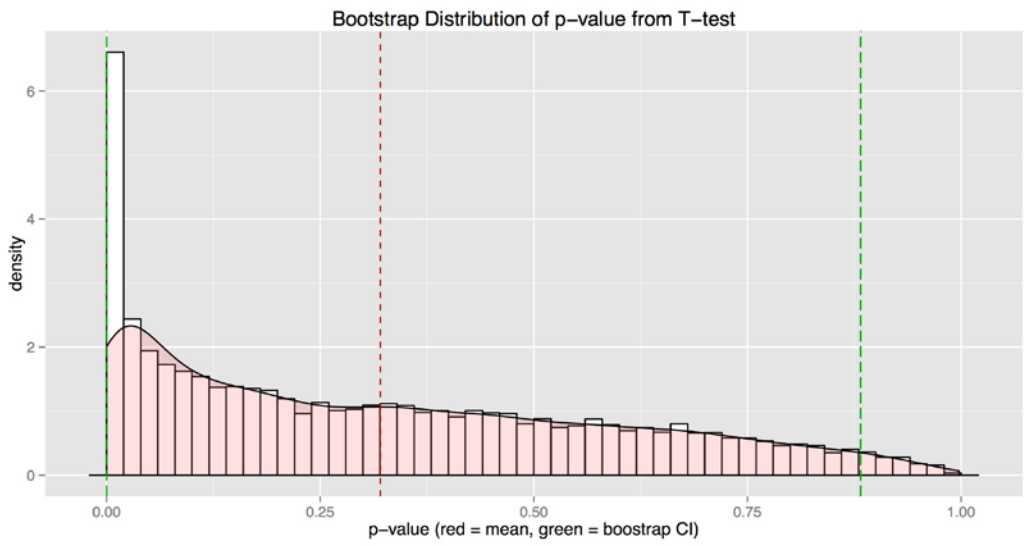


Figure 2: Bootstrap Distribution of p-value from T-test.

**Results**

The survey began with asking only one demographic question on experience of the DON. "How long have you held the position as director in your facility?" All subjects answered. The majority (41.18%) answered '0-2 years.' The graph below illustrates the remaining percentages.

**Table 1:**
**How long have you held your position as director in your facility?**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| 0-2 years | 41.2% | 7 |
| 3-5 years | 23.5% | 4 |
| 6-10 years | 17.6% | 3 |
| 10 + years | 17.6% | 3 |
| | ***answered question*** | **17** |
| | ***skipped question*** | **0** |

The need for dental care was illustrated by asking 'yes or no' questions of the DONs on denture care, primary or restorative dental care. All the subjects indicated that denture care is needed in their facilities, and 88.24% believed that their residents need restorative and/or primary dental care.

When addressing the care residents received by a dental professional survey response indicated that 82.35 % receive yearly dental exams by a dentist and 70.59% indicated that residents receive routine dental cleanings.

One question examined the amount of staff training received yearly on dental health care in their facility. Ten of the seventeen respondents indicated that the staff receive training on oral care once a year, three responded 0 times a year, one subject responded one to two times a year and another subject two to three times of training yearly.

'Daily oral hygiene for all residents' was indicated as the area of the resident's dental care that needs the most improvement in the facility. Three subjects responded that 'routine dental care' is the area that needs the most improvement and three others responded that 'Staff Training' is the area that needs the most improvement.

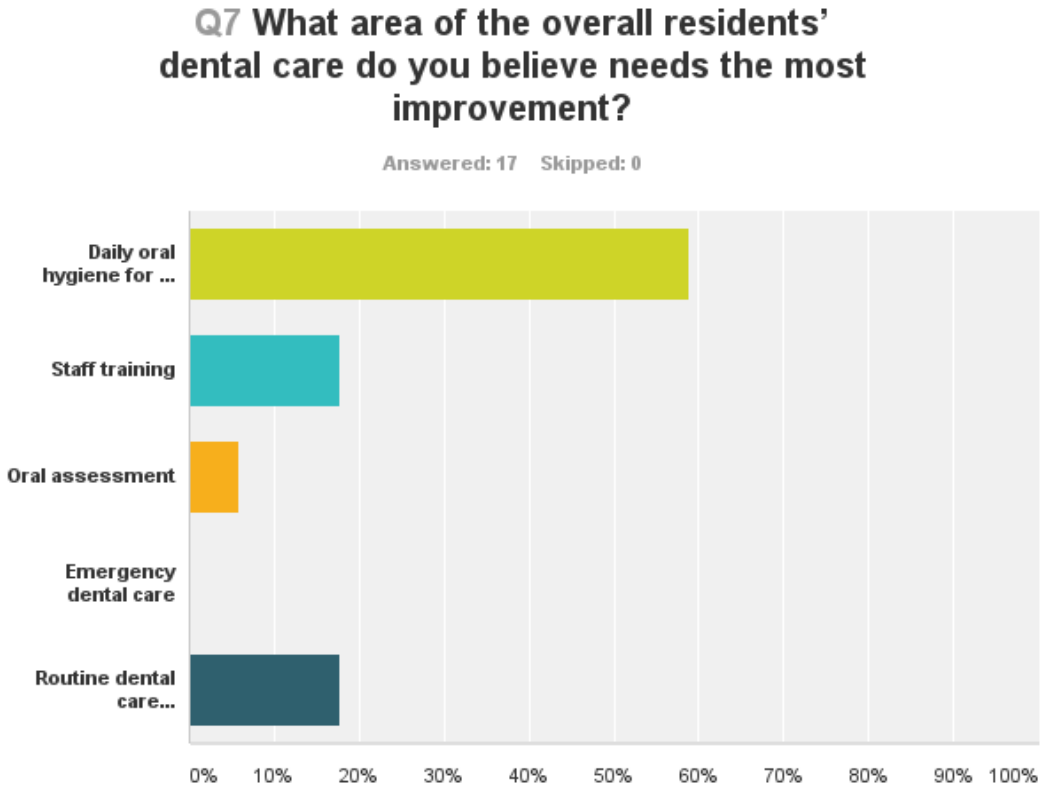


Figure 3: DON's perceived improvement of dental care in their facility.

The current dental assessment for residents was addressed throughout the survey. Sixteen of the seventeen subjects answered that dental assessment is part of the routine health assessment for residents and 88.24% of facilities have a registered nurse complete the assessment. The Minimum Data Set (MDS) is the federal assessment required by law for each resident of the facility yearly. All the subjects answered that the MDS assessment is useful in identifying oral needs for residents. A little over half believe that it is 'occasionally useful' (58.82%) and the remainder believe that it is 'very frequently useful' in identifying oral needs for residents. Subjects were asked to indicate if any other oral assessment tools were used to identify oral needs for residents. Six responded to this question with different

answers. One facility utilizes assessment given by family and the resident themselves. Another uses daily observation and assessment of the resident by staff or others and another an 'In-Home dental assessment tool' was used. Half of the six that answered indicated that their staff provide other assessments such as a weekly body assessment that is conducted by the staff in one facility, while a quarterly and annual nursing assessment was done in another. One facility utilizes a nurse admit assessment as well.

The study also focused on utilizing dental professionals to provide assessment and care for residents. Specifically a couple of questions were asked on whether a dental hygienist should join the nursing home healthcare team. The majority of DONs (87.5%) felt that a licensed dental provider such as a dentist or dental hygienist should conduct the oral assessment of residents. A little over half of respondents indicated that they currently have a contracted or staffed dentist and/or dental hygienist. One facility had only a dentist and the remainder indicated that they had neither, a dentist or dental hygienist contracted or staffed in their facility. When asked if a dental hygienist would be hired on staff eleven (64.71%) responded that they would not hire a staff dental hygienist for their facility and 23.53% answered that they would hire one. Two respondents indicated that they already have a dental hygienist contracted or on staff.


Figure 4: DON's response to hiring a staffed Dental Hygienist.

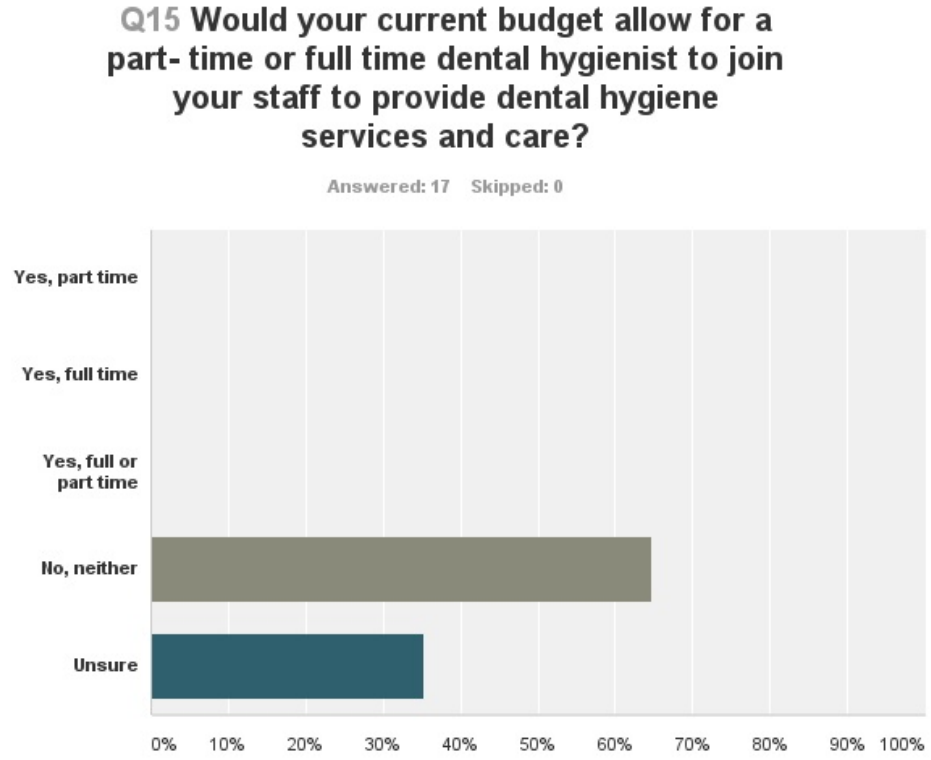


Figure 5: DON's current budget on hiring a Dental Hygienist.

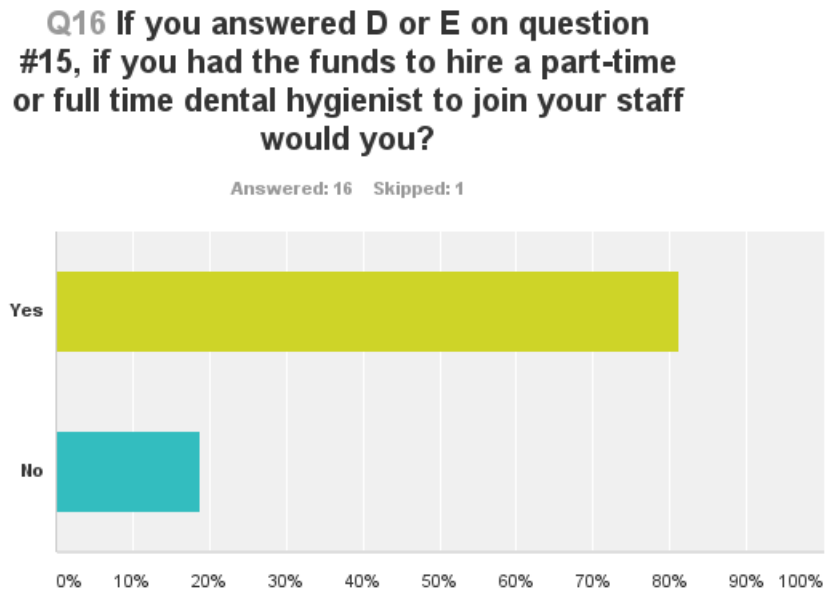


Figure 6: If funds were available to hire a Dental Hygienist.

Staffing a dental hygienist was further evaluated by briefly addressing funding of a staff hygienist. The DONs either felt like they 'could not' afford a staff part-time or full-time dental hygienist or were 'unsure' of the current budget to fund one. A later question asked the DONs, "if you had the funds to hire a part-time or full tine dental hygienist to join the staff would you?" The majority (13 subjects = 81. 25%) responded that they would hire a dental hygienist if they had the funds.

The end of the survey asked subjects to provide feedback on how oral care can be improved for all residents in the facility. Various answers were given as illustrated below:

**Table 2: DON's feedback on oral care for Nursing Home Residents.**

| |
|---|
| "Most of our residents have dentures and I do not believe that many of these questions apply." |
| "Every time we have someone set up to do this, we get forgotten or pushed aside. Hense, why I would be reluctant to do it again." |
| "Our residents are taken to the dentist yearly and as they need during the year. Daily oral hygiene could always be better for the residents, most of them cannot provide their own oral care. At time many of the residents refuse oral care." |
| "We currently have a dentist and hygienist who make monthly rounds to the facility. I am pleased to be able to offer this service to my residents" |
| "Residents have their own dentist" |
| "Education and prevention for staff" |

## Conclusion

This study was designed in an attempt to provide preliminary data on the opinions and the perceptions of the Director of Nursing Homes (DON) in New Mexico's nursing facilities on oral care. A survey was presented to 73 facilities throughout the state of New Mexico. The survey attempts to address these specific questions: Are residents in nursing homes receiving the proper assessment and care to determine their oral health needs as perceived by the DONs? Do the DONs believe that a dental hygienist will be a useful and important team member to provide assessment and oral care needs for the residents?

Almost all the DONs agreed that oral healthcare is needed in their facilities. The majority of facilities indicate that residents in their facility receive annual exams or cleanings routinely and yearly, but the question did not specify where the dental treatment is taking place.

When addressing assessment on oral needs, the majority of the DONs felt that the mandated MDS sheets were either 'occasionally helpful' or 'very frequently helpful' in identifying oral care needs for the resident in the past year. Previous studies illustrated that even after the utilization of the MDS sheets many residents of these facilities are still not receiving the appropriate dental care needed.[37, 38] As compared to a previous study noted, New Mexico nursing homes have their assessments done by a registered nurse (RN) rather than a certified nursing assistant (CNA).[36] This data can be encouraging, however, the DONs continue to believe that the oral assessment should be conducted by a dental professional, either a dentist or a dental hygienist, as confirmed by the answers to question twelve of the survey. The reports of this study, along with others previously noted, still do not address whether the dental treatment needed is being implemented nor received, it only addresses whether the assessment is being performed. It also does not discuss the findings after the dentists are performing the oral exams. One important finding was that it appears that the DONs are not concerned with emergency dental care but rather daily oral hygiene.

Improved oral care is beneficial to the resident of the nursing facility especially the aging population as reported by previous literature. This can improve their quality of life, which involves their physiological and emotional wellbeing of the resident in order to maintain life. It is apparent that the DONs are aware that oral care is important for residents. Research also suggests that the caregivers at these facilities present a poor attitude towards

providing daily oral care to residents as well as the residents are not cooperative when oral care is provided. The nursing home staff does not receive much training on oral care. The DONs in NM are also aware that staff training is lacking in this area. This study begins to provide evidence that the DONs of these facilities are aware of the limitations for residents on oral care in New Mexico's nursing facilities.

The overall study response was lower than expected. The overall results of the study indicate an indifference of opinions on dental care for the DONs and utilizing a dental hygienist to provide services to begin to address the oral needs of residents. After evaluating each survey it is apparent that the majority of the DONs believe that care provided by a dental professional is preferred. They seem to be open to addressing these issues if funding and training are present for their facility.

When addressing the perception of the DONs on hiring/contracting a dental hygienist for their staff the data reveals that the majority does not believe that they would hire a dental hygienist to join their staff. The study assumed that the DONs have an understanding of the job responsibilities and scope of practice of the registered dental hygienist in New Mexico. It is evident that the subjects believe that a staffed dental hygienist is beneficial to the facility but funding is an issue. If funding becomes available to provide these services then almost all the DONs would hire a staff dental hygienist. Perhaps addressing these issues with state, private and local entities funding can be investigated to develop programs to help in providing oral care for the residents in these facilities by utilizing trained and willing dental professionals to begin to address limitations to oral care in these facilities. The study did not address financial issues of the patient and whether private or state insurance coverage could assist in funding the utilization of a dental hygienist.

**Limitations**

- Despite the numerous amounts of research and data obtained nationally, currently data in New Mexico is scarce regarding oral care in nursing homes. There were no known reports on surveys addressing the Director of nursing homes in New Mexico on oral care.

**Recommendations**

This study only begins to investigate the opinions and perception of the DONs in the targeted 73 New Mexico Medicaid/Medicare certified nursing facilities and does not include alternative living situations for this population providing.

Collaboration with the overall administration of the nursing homes such as the executive directors, DONs and nursing home staff and the NM dental community is encouraged to develop programs, assessment tools, provide referrals and resources for the facilities in order to provide more access to oral care for residents. The DONs should be aware of how to utilize dental providers such as a dental hygienist to provide periodic preventive and even daily care for the residents. Current research already suggests that an inter professional perspective utilizing the dental hygienist and nursing team to develop care plans for nursing home residents is needed.[5, 51] Since the majority of the aging population suffer from at least one chronic illness in NM, addressing oral care as noted by literature can improve their quality of life. By providing evidence to the DONs on how a dental hygienist can be utilized to provide staff training, preventative oral treatment and assessment, assisting in developing programs for the residents the oral health needs of residents can begin to be addressed. Collaborative work to establish relationships with administration of the facilities

in order to provide more input from the directors on dental needs for this population is encouraged.

Access to oral care and funding are always an issue. It is proposed that the DONs and the dental community seek efficient cost effective ways to provide dental care. Since the majority of the DONs observe that direct daily oral care is needed to improve oral care for residents why not contract or staff trained comfortable providers to assist with this care. Previous studies indicate that providing oral care to dental residents is difficult and staff attitude towards it is poor. A call to action is needed to help improve the provided dental care to these residents.

In order to deliver overall health care to the individual, collaboration between oral health, general health, and social service professionals need to facilitate better patient centered care. Everyone must be on the 'same page' ranging from nursing home administration and staff, caregivers, dental providers, government officials and agencies in regards to developing systems that work to deliver oral care. This study only begins to investigate oral health care issues in nursing homes in New Mexico. Future studies should continue to provide data on oral care in New Mexico nursing homes.

Further research still needs to continue. Further studies should begin to focus on specific oral care needs in specific nursing homes. More specific questions to identify the needs of the nursing facilities in New Mexico are encouraged. Retrieving data and outcomes from current programs already utilized in some facilities, as indicated by at least one DON, would be beneficial in developing programs for the rest of the state of NM. Future studies in New Mexico should also attempt to obtain more information from the administrators of these

facilities as well as begin to address state legislation on funding to provide collaborative health and dental programs for the residents.

# Appendix A

## Human Research Review Committee (HRRC) Approval Letter

UNM HEALTH SCIENCES CENTER

*Human Research Review Committee*
*Human Research Protections Office*

February 29, 2016

Christine Nathe, RDH, MS
University of New Mexico
MSC09 5020
Albuquerque, NM 87131
(505) 272-8147
Fax: (505) 272-5584
CNathe@salud.unm.edu

Dear Christine Nathe:

On 2/26/2016, the HRRC reviewed the following submission:

| | |
|---|---|
| Type of Review: | Initial Study |
| Title of Study: | Oral Care in New Mexico's Long-Term Care Facilities: A Survey for the Directors of Nursing Homes |
| Investigator: | Christine Nathe, RDH, MS |
| Study ID: | 16-022 |
| Submission ID: | 16-022 |
| IND, IDE, or HDE: | None |
| Submission Summary: | Initial Study |
| Documents Approved: | • Consent Form Version 2-6-2016.pdf<br>• Attachment A<br>• Attachment B<br>• Telephone script- Attachment 3 Version 2-6-16.pdf<br>• HRRC 16-022 Protocol, 2-6-16.pdf |
| Review Category: | EXEMPTION: Categories (2) Tests, surveys, interviews, or observation. |
| Determinations/Waivers: | Waived the requirement to obtain a signed Consent form. Signature waived; requires written statement about research. HIPAA Authorization Addendum Not Applicable. |
| Submission Approval Date: | 2/26/2016 |
| Approval End Date: | None |
| Effective Date: | **2/26/2016** |

The HRRC approved the study from 2/26/2016 to inclusive. If modifications were required to secure approval, the effective date will be later than the approval date. The "Effective Date" 2/26/2016 is the date the HRRC approved your modifications and, in all cases, represents the date study activities may begin.

Because it has been granted exemption, this research is not subject to continuing review.

Please use the consent documents that were approved and stamped by the HRRC. The stamped and approved consents are available for your retrieval in the "Documents" tab of the parent study.

This determination applies only to the activities described in this submission and does not apply should you make any changes to these documents. If changes are being considered and there are questions about whether HRRC review is needed, please submit a study modification to the HRRC for a determination. A change in the research may disqualify this research from the current review category. You can create a modification by clicking Create Modification / CR within the study.

In conducting this study, you are required to follow the Investigator Manual dated April 1, 2015 (HRP-103), which can be found by navigating to the IRB Library.

Sincerely,

Thomas F. Byrd, MD
*HRRC Chair*

## Appendix B

### Survey

1. How long have you held your position as director in your facility? **NO NUMERICAL SCORE GIVEN**

   a. 0-2 Years
   b. 3- 5 years
   c. 6-10 years
   d. 10 + years

2. Do many of your residents need primary and/or restorative dental care (e. g. cleanings, extractions, fillings, crowns, root canals)?

   a. Yes (**-1)**
   b. No **(+1)**

3. Do many of your residents need denture care?

   a. Yes **(-1)**
   b. No **(+1)**

4. Do your residents receive yearly dental exams by a dentist?

   c. Yes **(+1)**
   **d.** No **(-1)**

5. Do your residents receive routine dental cleanings?

   a. Yes **(+1)**
   b. No **(-1)**

6. How many times a year does your staff complete education classes on dental health?

**If > 0 yearly = +1**

7. What area of the overall residents' dental care do you believe needs the most improvement? **NO NUMERICAL POINT GIVEN.**

   a. Daily oral hygiene for all residents
   b. Staff training
   c. Oral assessment
   d. Emergency dental care
   e. Routine dental care (preventative and restorative)

8. Is dental assessment part of routine health assessment for all residents in your facility?

    a. Yes **( +1)**
    b. No **(-1)**

9. Who completes this assessment?

    a. Registered nurse
    b. Nurse's aid
    **c.** Dentist (**+1)**
    d. Dental hygienist **(+1)**
    e. NA

10. How frequently in the past year has the Minimum Data Set (MDS) been useful in identifying residents' oral needs? **NO NUMERICAL POINT GIVEN.**

    c. Very frequently useful
    d. Occasionally useful
    e. It has never been useful
    f. NA

11. If there are any other assessment tools used besides the MDS to assess oral health for residents please list them below.
    **NO NUMERICAL POINT GIVEN.**

12. Do you feel that a licensed dental provider such as a Dentist or Dental Hygienist should conduct oral assessments in your facility for residents?

    a. Yes **(+1)**
    b. No **(-1)**

13. Do you currently have a dentist or dental hygienist contracted or employed to provide services in your facility?

    a. Yes, dentist & dental hygienist **(+1)**
    b. Yes only dentist **(+1)**
    c. Yes only dental hygienist **(+1)**
    d. No, neither **(-1)**

14. Would you hire a staff dental hygienist for your facility?

    a. Yes **(+1)**
    b. No **(-1)**
    c. Already have one on staff. **(+1)**

**15.** Would your current budget allow for a part- time or full time dental hygienist to join your staff to provide dental hygiene services and care? **NO NUMERICAL POINT GIVEN.**

a. Yes, part time
b. Yes, full time
c. Yes, full or part time
d. No, neither
e. Unsure

16. If you answered D or E on question #15, if you had the funds to hire a part-time or full time dental hygienist to join your staff would you?
    a. Yes **(+1)**
    b. No **(-1)**

17. Please rank the four according to your opinion on what you feel is the most important for residents to participate in (1 being the most important, 4 being the least)
    **NO NUMERICAL POINT GIVEN.**

    Effective daily oral care_____

    Participation of residents in education on oral care _____

    Emergency dental treatment _____

    Regular preventative oral examinations and treatments _____

18. Provide any comments or feedback on how you believe oral healthcare can be improved for all residents in your facility.

    **NO NUMERICAL POINT GIVEN.**

**TOTAL:_____ \ by 10 or 11 depending on if #16 was answered.**

## Appendix C

## Statistical Analysis Plan & Survey Score Sheet

Hypothesis Test (One Sample one tailed t-test)

Population= Directors of Nursing Homes in New Mexico's Medicaid/Medicare certified facilities (N=73).

Sample size: Subset of the population that will respond (n=?). We will run a Power Analysis to determine the minimum sample size to avoid a Type II Error.

Question: Do Directors of nursing homes in New Mexico's Medicare/Medicaid certified nursing homes perceive that improved oral care is needed in their facility and that a dental hygienist will be a beneficial adjunct to their team?

**1 Tailed t-test**

Each director in our sample will answer the questions from a survey. A numerical point system has been created from the survey in order to quantify a director's level of support for oral health care. A director's score is based on questions 2,3,4,5,6,8,9,12,13,14 and 16 (only if they need to answer question 16). For each question, a director will receive either a -1 or 1 based on their response. The sum of all the questions is then added up and divided by either 10 or 11, depending on if they had to answer question 16.

A director's score will be between (-1,1). A score < 0, indicates that the director is against dental health care in their facility. A score = 0 indicates that the director is indifferent. A score > 0 indicates that the direct is for dental health care in their facility.

The population statistic of interest for this analysis is:
$\mu =$ mean dental score of all Directors of Nursing Homes in New Mexico's Medicaid/Medicare certified facilities .

The following statistics are a calculated from the sample and are used to estimate $\mu$:
$\bar{x} =$ average of the directors' scores in your sample.
$s^2 =$ variance of the directors' scores in your sample.

**One Sample 1 Tailed t-test:**

**Null Hypothesis:**

$H_o: \mu \leq 0$, The mean dental score for all Directors in New Mexico Directors of Nursing Homes in New Mexico's Medicaid/Medicare certified facilities is less than or equal to zero.

This indicates that directors are either indifferent towards or against dental care in their facilities.

**Alternative Hypothesis:**

$H_a: \mu > 0$, The mean dental score for all Directors in New Mexico Directors of Nursing Homes in New Mexico's Medicaid/Medicare certified facilities is greater than 0. This indicates that directors are for dental care in their facility.

**T-Statistic:**

In testing the null hypothesis that the population mean is less than or equal to zero, the following t-statistic is used:

$$T = \frac{\bar{x} - 0}{\frac{s}{\sqrt{n}}}$$

**Decision Rule:**

With $\alpha = .05$ and $df = n - 1$ (degrees of freedom), compare the $T$ to the critical value $t_{\alpha,df}$ ($t_{\alpha,df}$ can be found by looking at a 1 tailed t chart).

If $T \leq t_{\alpha,df}$ , assume $H_o: \mu \leq 0$. This implies that Directors are indifferent towards or against dental care in their facilities.

If $T > t_{\alpha,df}$ , $H_a: \mu > 0$. This implies that Directors are for dental care in their facilities.

## References


1. Hogan H, Ortman JM, Velkoff VA. *An Aging Nation: The older population in the United States.* U.S. Census Bureau; 2014. Retrieved from: http://www.census.gov/prod/2014pubs/p25-1140.pdf

2. Tatlock C. Geriatrics. *Primary Preventative Dentistry.* 8th ed. Upper Saddle River, New Jersey: Pearson; 2014. P. 419-433.

3. Harris-Kojetin L, Sengupta M, Park-Lee E, et al. Long-term care providers and services users in the United States data from the National Study of Long-term Care Providers, 2013-2014. National health care statistics vital Health stat. 3(38). Hyattsville, MD: National Center for Health Statistics.

4. New Mexico Aging & Long-Term Services Department. New Mexico State Plan For Aging and Long-Term Care Services. October1, 2013- September 30, 2015 Retrieved from: http://www.nmaging.state.nm.us/uploads/FileLinks/868639a5dc0144c1b58a6f2f7ae1fdc6/2013_2017_State_Plan_1.pdf

5. Administration on aging. Administration for Community Living. U.S. Department of Health and Human Services. 2013. *A profile of older Americans: 2013.* http://www.aoa.acl.gov/Aging_Statistics/Profile/2013/docs/2013_Profile.pdf

6. Oral Health in Aging America. Improving Oral Health Through Innovation in Dental Education, Care and Access. Whitepaper. Institute for Oral Health 2008 National Conference. Sept 9-10, 2008. Chicago, IL.

7. Ettinger RL, et al. (2007). Oral health and the aging population. J Am Dent Assoc. 2007; 138:5S-6S.

8. Hally J, Clarson JE., Newton JP. Continuing dental care for Highlands elderly: current practice and attitudes of dental practitioners and home supervisors; 2003.

9. Simons D, Kidd EA, Beighton D. Oral health of elderly occupants in residential homes. Lancet. 1999; 353:1761.

10. Center of Disease Control. National Center of Health Statistics; 2015. Retrieved September 7, 2015 from: http://www.cdc.gov/nchs/fastats/nursing-home-care.htm.

11. Jones AL, Dwyer LL, Bercovitz AR, Strahan GW. The National Nursing Home Survey: 2004 overview. National Center for Health Statistics. Vital Health Stat. 2009; 13(167).

12. McEntee M. Quality of Life as an Indicator of Oral Health In Older People. J AM Dent Assoc. 2007; 138:47S-52C.

13. Dolan TA, Atchision K, Huynh TN. Access to dental care among older adults in the United States. Journal of Dental Education. 2005; 69(9):961-974.

14. Smith BJ, Ghezzi EM, Manz MC, Markova CP.(2010). Oral healthcare access and adequacy in alternative long-term care facilities. Special Care Dentist. 2010; 30(3):85-94.

15. Asa R. The Age of Dentistry: Oral-systemic health with emphasis on the geriatric population. AGD Impact. 30-34.

16. Shauman S. (Director). Riding the Age Wave: Changes & Challenges for Dental Professionals. *Improving Oral Health Through Innovation in Dental Education, Care and Access*. Lecture conducted from Institute for Oral Health in Aging America 2008 Conference; 2008 Sep 8; Chicago, IL.

17. United States Census Bureau. 2015. Retrieved May 24, 2016 from: http://quickfacts.census.gov/qfd/states/3500.html.

18. Berkey D. (Director). Enhancing Oral Health for Vulnerable Elderly Through Innovative Models of Care. *2010 Conference Oral Health in Healthcare Reform*. Lecture conducted from Institute for Oral Health; 2010 Oct 28; Scottsdale, AZ.

19. Shay K. (2000). Denture hygiene: A review and update. Journal of Contemporary Dental Practice. 2000 Winter; 1(2).

20. Dye BA, Thornton-Evans G, Li X, Iafolla TJ. Dental caries and tooth loss in adults in the United States, 2011–2012. NCHS data brief, no 197. Hyattsville, MD: National Center for Health Statistics. 2015.

21. Kramarow EA, Vargas CM, Yellowitz JA. The Oral Health of Older Americans. Aging Trends: No. 3. Hyattsville, Maryland: National Center for Health Statistics. 2001.

22. National Centers for Health Statistics Health, United States 2014. With Special Features on Adults Age 55-64. Hyattsville, MD; 2015.

23. New Mexico State of Health 2013 [Report]. New Mexico Department of Health.

24. Eke PI, Dye BA,Wei L, Slade GD, Thornton-Evans GO, Borgnakke WS, Taylor GW, Page RC, Beck JD, Genco RJ. Update on Prevalence of Periodontitis in Adults in the United States: NHANES 2009 to 2012.

25. Ryan ME. (Presenter). Special Considerations for Dental Professionals in Managing Patients with Diabetes. *2010 Conference Oral Health in Healthcare Reform*. Lecture conducted from Institute for Oral Health; 2010 Oct 28; Scottsdale, AZ.

26. Montoya A, Mody L. (2011). Common infections in nursing homes: a review of current issues and challenges. Aging Health. 2011; 7(6): 889–899. http://doi.org/10.2217/AHE.11.80

27. Bronkhorst EM, Maarel-Wierink CD, Vanobbergen JNO. Oral Systemic care and aspiration pneumonia in frail older people: a systematic literature review. Gerontology; 2012.

28. Turner MD, Ship JA. Dry mouth and its effects on the oral health of elderly people. JADA. 2007; 138:15S-20S.

29. Xiaojing L, Kristin M, Kolltveit LT, Olsen I. Systemic diseases caused by oral infection. Clinical Microbiology Reviews. 2000; 13(4):547-548.

30. Kullberg E, Forsell M, Wedel P. Dental hygiene education for nursing staff. Geriatric Nursing. 2009; 30(3):329-333.

31. Pearson A, Chalmers J. Oral hygiene care for adults with dementia in residential aged care facilities. JBI Reports. 2004; 2:65-113.

32. CDC: Half of American adults have periodontal disease. Academy of periodontology. Retrieved September 2015 from: https://www.perio.org/consumer/cdc-study.htm

33. Dharamsi S, Jivani K, Dean C, Wyatt C. Oral care for frail elders: Knowledge, attitudes, and practice of long-term care facilities. Journal of Dental Education. 2009; 73(5):581-588.

34. Lavigne SE. Treating the Aging Baby Boomer: Looking through the Crystal Ball. Crest dentalcare CE. Retrieved from www.dentalcare.com/

35. Katz RV, Smith BJ., Berkey DB, Guset A, O'Connor MP, . Defining Oral Neglect in Institutionalized Elderly: A consensus definition for vulnerable elderly people. J Am Dent Assoc. 2010; 141:433-44.

36. Silverman SJ. Mucosal lesions in older adults. JADA. 2007; 138(9):41S-46S.

37. Beltran-Aguilar ED, Barker LK, Canto MT, Dye B, Gooch,BF, Griffin SO, Hyman J, Jaramillo F, Kingman A, Nowjack-Raymer R, Selwitz RH, Wu T. Surveillance for Dental Caries, Dental Sealants, Tooth Retention, Edentualism and Enamel Fluorosis—United States, 1988—1994 and 1999—2002. CDC. MMWR Surveillance Summaries. August 26, 2005. 54(03: 1-44.

38. NMHCA http://www.nmhca.org/assisted-living.

39. Guay AH. The oral health status of nursing home residents: what do we need to know? Journal of Dental Education. 2005; 69(9):1015-7.

40. Guidance to surveyors-Long term care facilites. 1995; p.160-161. OBRA Manual.

41. Ettinger RL, O'Toole C, Warren J, Levy S, Hand JS. Nursing director's perception of the dental components of the Minimum Data Set (MDS) in nursing homes. Special Care in Dentistry. 2000; 20(1):23-27.

42. CMS's RAI Version 3.0 Manual. Chapter 5: Submission and Correction of the MDS Assessment. 2010.

43. New Mexico Department of Health. Requirements for Long Term Care Facilities 7.9.2 NMAC. 2000; p. 29.

44. Sjogren P, et al. Evaluation of dental hygiene education for nursing home staff. Journal of Advanced Nursing. 2010; 66(2):345-349.

45. Brady M, Fulantetto D, Hunter R, Lewis SC, Milne V. Staff Led interventions for improving oral hygiene in patients following stroke (Review). 2009; 48.

46. Kullberg E, et al. Dental hygiene education for nursing staff in a nursing home for older people. Journal of Advanced Nursing. 2010; 66(6):1273-1279.

47. Van der Putten G, et al. Supervised versus non-supervised implementation of an oral health care guideline in (residential) care homes: a cluster randomized controlled clinical trial.

48. Murray PE, Ede-Nichols D, Garcia-Godoy F. Oral health in Florida nursing homes. Int J Dent Hyg. 2006; 4:198-203.

49. American Dental Hygiene Association. Retrieved from: http://www.adha.org/resources-docs/7513_Direct_Access_to_Care_from_DH.pdf. Revised September 2015.

50. Burns Statistics. 2016. The Statistical bootstrap and other Resampling methods. Retrieved April 2, 2016 from: http://www.burns-stat.com/documents/tutorials/the-statistical-bootstrap-and-other-resampling-methods-2

51. Wintch PM, Johnson TJ, Gurenalian J, Neil K. (2014). Executive Directors' Perceptions of Oral Health Care of Aging Adults in Long-Term Care Settings. The Journal of Dental Hygiene. 2014 Oct; 88(4):302-308.