

**THE SMELL OF BAKING BREAD: AN INEXPENSIVE MEANS OF
IMPROVING THE QUALITY OF LIFE FOR LONG-TERM CARE
RESIDENTS?**

by

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Abstract

The provision of additional mealtime food aroma (baked bread) to long-term care residents was researched as a non-intrusive method of improving quality of life factors including weight, appetite, enjoyment of life, well-being and depression. A questionnaire was used to assess the effects of the intervention on personal appearance, appetite, overall health benefits and quality of life. The background for the study originated with Yeh et al. (2000) who used a pharmacological drug as an intervention to improve quality of life factors. Results included a statistically significant improvement in well-being factors potentially related to the improvement in the built environment for residents, employees, family members and volunteers.

Preface

The following research was approved by the UBC Behavioural Research Ethics Board with certificate number H10-01923. The research was also approved by the Northern Health Research Review Committee under application RRC-2010-0019. This research was conducted in its entirety by Jaret Clay with the assistance of a research assistant Nancy Clarke. The committee guiding the research for the Masters Thesis was from the School of Social Work at the University of British Columbia. This included the supervisor for the Masters research, Paule McNicoll, with committee member Sheila Marshall and external examiner Joanie Sims-Gould. Analysis of the data was performed by Terry Lee from the Centre for Health Evaluation and Outcome Sciences, St. John Hospital, Vancouver, British Columbia. All other portions of this research and thesis were performed in their entirety by Jaret Clay.

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Chapter 1: Introduction

Improving quality of life for individuals living in long-term care facilities is an important goal for healthcare in Canada. Long-term care facilities are defined in the Canadian health system as being complex care environments where those living in the facilities require medical and personal supervision on a 24 hour per day basis. Quality of life in these facilities is directly related to high staff-to-client ratios because human contact is a key contributor to quality of life. Unfortunately, the cost of staffing makes increases in staff-to-client ratios prohibitive because funding levels are difficult to change. Likewise, improvements to staff education that require large inputs of training resources are also problematic. Pervasive funding restrictions put pressure on facilities to develop inexpensive alternatives to increasing staff ratios or enhancing staff training (Ready & Ott, 2003).

My aim in researching in this area is to begin the process of discovering inexpensive improvements for quality of life in long-term care. The intent is that once identified, these alternatives can be evaluated for their potential to become standard practices for all long-term care facilities without greatly changing current budget requirements. To start however, I will present a description of long-term care, the population living in these long-term care facilities in Canada and of the quality of life issues they experience.

1.1 Long-Term Care Facilities

Long-term care facilities are a common model of choice for care and currently house approximately 280,000 Canadians as of 2008, with that number expected to increase to 690,000 by 2038 (CUPE, 2009; Alzheimer Society of Canada, 2010). Facilities often house between 20-100 people in a variety of arrangements. Rooms are commonly of a double or single room

capacity although in the recent past licensing requirements have focused on facilities becoming primarily single room dwellings.

The populations living in these long-term care facilities vary although the most prominent portion, approximately two thirds of the population, is experiencing some type of dementia (Singer, 2003; Rovner, Kafonek, & Filipp, 1986; Tariot, Living areagorski, Blazina, & Leibovici, 1993; Matthews & Dening, 2002). As of 2008, out of 4,850 residential care facilities in Canada, there were 270,000 beds of which 217,000 were identified for the aged, with 75 % of the institution population aged 65 years and older. Therefore, these facilities are often providing services to a broad array of individuals who require long-term care for reasons not always associated with aging or dementia. Younger people in long-term care are often physically disabled or affected mentally and/or emotionally by serious chronic disease or trauma. This younger population makes up almost 25% of the long-term care population so any sort of research into improving quality of life for people in care must be able to break down the long-term care population into more specific characteristics for investigation (Statistics Canada, 2008-2009; OECD, 2011).

1.2 Aging and Dementia

Dementia is a debilitating disease characterised by a progressive loss of brain function. Dementia begins by decreasing an individual's ability to remember clearly and progresses to affecting not only memory and intellect but also social abilities, eventually leading to behavioural problems and a list of other mental issues which result in behaviours such as wandering, disorientation, agitation and aggression. There are many diseases which cause dementia, with two types of dementia being the most common. Vascular dementia is the first of these two types and represents a group of diseases accounting for 20% of all dementias which are

caused by a lack of blood supply to the brain. Alzheimer's disease is the other main type of dementia, accounting for 63% of all dementia cases. Alzheimer's disease is a progressive and fatal disease that is not a normal part of aging, involving the degeneration of cells' communication in the brain leading to the death of those cells and eventually the death of the individual with the disease. Typically someone with Alzheimer's disease dies within 7-10 years after diagnosis. Alzheimer's disease is present in approximately one percent of all people over 65 and in one quarter of all those over 85 years of age (Cooke et al., 2010; Goodall & Eters, 2005; Canadian Study of Health and Aging, 1994; Ferri et al., 2005; Alzheimer Society of Canada, 2010).

In Canada the proportion of the Canadian population over the age of 65 will be 16% by 2016, increasing to 23% by 2041. There are currently 450,000 people with dementia in Canada with 60,150 new cases every year causing the number of people with dementia to double by 2024. In Canada, one in ten people will require long-term care by age 55, three in ten by age 65 and five in ten by age 75. By 2038, 1,125,200 people will have dementia in Canada and the demand for long-term care will have increased by 10 times. The number of new dementia cases per year will have multiplied by 2.5 times, from 103,728 in 2008 to 257,811 in 2038 with Alzheimer's disease prevalent in half of those new incidences. Over 24 million people worldwide are experiencing dementia and 4.6 million cases worldwide are diagnosed every year (Chertkow, 2008; Canadian study of Health and Aging, 2000; Canadian Study of Health and Aging, 1994; Alzheimer Society of Canada, 2010). As Canada's population ages and dementia becomes more prominent the discussion of care in long-term care facilities becomes increasingly important.

1.3 Philosophies of Care in Long-term Care

Many long-term care facilities used to operate on a philosophy consistent with the “medical model,” a non-specific term that is often used to refer to the relationship between physicians, medical staff and the patient, reducing care in long-term care facilities to a strictly biomedical phenomenon. This model is task-driven, relies on chemical and physical restraints, warehouses people and does not value the individuals in care (Marshall, 1998; Kane, 2001). The implication of this is that the primary focus of the medical model of care is only on the medical and biological functioning of the patient.

This focus places convenience for staff and the facility at the highest level of importance and focuses on diminishing behaviours that are inconvenient to those that manage the facility. Solutions such as pharmacology and physical restraints are common in this type of environment. However, these methods of controlling behaviour are often not ethical and do not necessarily achieve the desired effects in clients. Pharmacological drugs used in the treatment of dementia often result in side effects such as cognitive impairment, increased falls, constipation and urinary retention. Physical restraints have not only been shown to be unethical in their application but also dangerous to staff and residents alike (Robinson et al., 2007; Sink, Holden, & Yaffe, 2005; Hughes, 2002; Evans, Wood, & Lambert, 2003; Leibovici, 2009; Goodall & Eters, 2005; Cooke et al., 2010).

In the recent past, facilities operating under the medical model have been criticized for being too institutionalized and the quality of care provided in these institutions has begun to come under question. These facilities typically function in a hospital styled setting where residents’ desires place second to the set routines of the staff. Efficiency is understood to take a higher priority over quality of life factors such as privacy and self-determination in these

environments (Kane, 2003). Since the late 1980's the failure of traditional long-term care facilities to provide an acceptable quality of life for residents has resulted in new models of care to be sought for long-term care facilities.

Models such as Eden Care or Gentle-Touch gained popularity in the 1990's, having been introduced as a home-style approach to caregiving whereby individuals living in facilities got to experience care in a manner more typical to that of life when living in their home environment. These philosophies that are emerging focus more on the needs and desires of the client. The guiding theoretical framework for these models of care is person-centred care (PCC) which finds its roots in Kitwood's model of "Personhood". Person-centred care proposes that all people in care should be valued and receive respect; being allowed the freedom to live fulfilling lives. Person-centred care and other models critical of the medical model are concerned that quality of life in care should focus on security, comfort, meaningful activity, relationships, enjoyment, dignity, autonomy, privacy, individuality, spiritual well-being, functional competence, value-driven care, well-being, empowerment of individuals and families and enabling of the person in care to feel supported, valued and socially confident. These aspects of living have been marginalized by the medical model where these factors are only considered once health and safety issues are satisfied, if they are considered at all (Kitwood, 1997; Stoddart, 1998; Kane, 2001; Epp, 2003).

These new models of care focus on the desires of the individual, attempting to ensure that undesirable factors of care such as boredom and loneliness are reduced. Characteristics include the creation of a relaxing environment where people engage in activities on their own timeline as opposed to functioning within a provided schedule. It includes clients making many more choices around products and services received, allowing for changes to be made on an ongoing

basis for the utmost control possible in the residents' life. To facilitate the transformation to a home-like experience the physical institution is arranged into numerous small living areas and neighbourhoods, management hierarchies are diminished, and direct care staff become more empowered (Institute of Medicine, 1986; Kane, 2003; Thomas, 1999).

Residents living in facilities operated under the Eden principles seem to experience benefits. Following implementation, levels of distress related to boredom and helplessness in elderly long-term care residents have been reduced and significant improvements in family satisfaction have been noted (Thomas, 1996; Kane, 2003; Bergman-Evans, 2004; Rosher & Robinson, 2005).

Because it represents a significant paradigm shift, the implementation of the Eden Alternative or other similar approaches requires a significant investment in staff training in addition to infrastructure changes and expensive structural modifications to deinstitutionalize the existing buildings. Reducing the grouping size of the living areas, creating individual kitchens, laundry areas and small dining areas with more appealing surroundings all create better quality of life at higher monetary costs for the living environment. Individually focused recreation opportunities and family oriented visiting spaces all cost more money than a strictly institutional setting. Some areas of improvement however do not necessarily add physical cost but do increase administrative costs. Cross-training of staff to work in multiple areas, resident-focused meetings, family councils, community meetings and individual memorials all create higher internal costs. Some changes however are no higher in their cost and improve the functioning of staff. Empowerment of care staff to make decisions and changes are examples of this but even then there is an increase in the cost of training existing employees to follow a new model of employment (Kane, 2003).

The theory behind these changes is upbeat and encouraging, although the reality of life in institutions is unfortunately not so positive. Budgets in long-term care facilities are typically frugal and the fact that these practices cost more than the institutionalization and medical models often results in them not being initiated. This is especially the case in older facilities where the cost of physical changes can be inhibitive.

Understanding the costs of any suggested intervention for a long-term care facility is imperative to determining the intervention's potential for acceptance. To not consider these factors is to render any such suggestions ineffective. Most people understand that unlimited resources could solve many problems in healthcare and long-term care is no exception. Real help needs to come in the form of realistic low cost solutions for improving quality of life that every facility can immediately take action upon implementing without the worry of substantially increased cost. For example, many long-term care facilities lack the financial resources to train individuals in the manner required in order to achieve the level of quality of care that they may desire for their residents. Typically this has far more to do with the lack of overall staffing that is available in these institutions, creating systemic problems with lower quality of care.

Even in facilities where training is readily available it is difficult to achieve ideal models of care due to the limitations of physical infrastructure. Facilities have been built as institutions to keep the costs of care within a sustainable budget. Systems are in place such as central laundries and central kitchens in order to maintain lower costs. Housekeeping is done by housekeepers, maintenance by maintenance workers, and care by care aides or health care workers. This division of responsibility creates, as expected, a division of labour. This division of labour is exactly what makes it so hard for these facilities to create any sort of quality of life for their residents. As with any other business model, long-term care facilities use the least

number of staff positions possible to fulfill the duties of each job. Each job is broken down to a related number of job duties with a corresponding job description. This expectation of efficiency is what makes the institution not a home but rather a facility. For example, recreation staff are expected to provide quality of life for residents but are faced with the difficult task of using two to three recreation employees to provide activities for anywhere from 50-80 residents who live on the site full time. This equates to only a small number of hours per week that are available for any sort of time dedicated to quality of life activities.

Research focused on quality of life in facilities often suggests a different model of care that is more community-based with individuals receiving full time care while staying in their homes or living in group home styled settings. While a model of community living would likely be superior for the quality of life of residents, the reality is that these models are not in place due to the higher cost of staffing full time in a private setting.

North American society has become entrenched in a minimalist style of taxation model since the 1980's that does not lend itself to the creation of new models of care which are more expensive. Therefore, although the energy and the philosophy behind these changes are encouraging—indeed they promote best practices—large-scale implementation is improbable. While community living within group homes or semi-independent living sites may be desirable, Canada's current taxation philosophy cannot financially support this model. Long-term care budgets—both operating and capital—are very limited. Any increases in staffing costs or other expensive improvements are unlikely to materialize since they do not match the neo-conservative progressions of current government where tax bases are minimized and funding for improvement to care facilities is not a priority (O'Neill, Pederson, & Rootman, 2000). As the current

institutional model is therefore likely to remain the predominant form of care provision, at some point the challenge of improving quality of care in institutional settings must be addressed.

The resulting problem then becomes a search for inexpensive improvements that are available and could become best practices when looking to improve quality of life for those living in long-term care facilities. Research shows that certain activities such as music, for example, have been shown to improve feelings of belonging and depression as well as self-esteem (Cooke et al., 2010, Cohen-Mansfield & Werner, 1997). To help further investigate this question, quality of life indicators for those living in long-term care must be reviewed to identify different ideas which are easily and cost effectively implemented.

1.4 Defining Quality of Life Indicators in Long-term Care

Understanding what constitutes quality of life for those living in long-term care is a key factor in being able to measure and do research into improving quality of life in an institutional setting. Agreeing on what constitutes quality of life in long-term care facilities is however still an area of much debate in gerontology research. Each available measure of quality of life has its own focus and view point on how the issue of quality of life should be approached. These viewpoints exist because every person has a different view of what it means to have a high quality of life. Such values are influenced by our socialization and thus quality of life is different for every culture and up-bringing. These differences lead to value-based disagreements about well-being, with little ability to discern between right or wrong. There is support for using a variety of factors, data sources and measures when trying to assess quality of life. Some focus on functions of the body such as disease, nutrition or longevity while others focus on happiness levels or other subjective states. Still others focus on how much control people have over their own environment. Currently however there is no agreed-on best practice which acts as the sole

assessment of quality of life. However, measuring quality of life still depends on some level of agreement as to what specific areas would need to be measured to determine quality of life (Sloane et al., 2005; Brock, 1993; Fraser, 2008).

Research tends to support the breakdown of quality of life into the categories of physical functions, self-maintenance, partaking in usual activities, emotional states, cognitive functions, role performance, work productivity, sexual functioning, life satisfaction, behavioural competence, psychological well-being, distress, perception of quality of life, pain and discomfort, energy/fatigue, sleep, self-esteem, sense of mastery, perceived health, and life satisfaction (Kane, 2003; Ready & Ott, 2003; Lawton, 1994; Lawton, 1997; Stewart & King, 1994).

Determining the population for which quality of life is being measured is a priority in any research on this topic. Characteristics should be identified within the population which can help create categories of quality of life indicators for measurement. Measurable categories then become separated into those that are subjective versus those that are objective. However, defining quality of life in long-term care and determining how to measure it in these facilities is not straightforward and is still a topic of considerable debate. Two specific quality of life indicators which often occur in elderly long-term care clients, depression and weight loss, will be used as variables in this research.

1.5 Quality of Life Factor: Weight Loss in Long-term Care

Weight loss among elderly long-term care residents is a common and serious issue with up to 50% of residents having below normal weight. Weight loss is related to quality of life because it is indicative of a poor quality of life and possible depression. Therefore, weight gain is an important indicator in improved health and well-being for elderly populations. People who

are depressed or have a poor quality of life can tend to lose their will to live, and eating requires a desire to keep living (Yeh et al., 2000; Morley & Kraenzie, 1994; Wallace, Schwartz & Croix, 1995).

A challenge in maintaining weight for people in long-term care facilities is the poor quality of the food. Institutions typically do not create food nearly as appetizing as food created by individuals in their home. This is due to both nutrition requirements and mass production of food in institutions. Nutrition in long-term care facilities usually requires that food has strict restrictions around saturated fat, sugar, salt and spice all of which normally makes food taste better. Licensing requirements limit the amount of these ingredients for health reasons. These ingredients are also limited because when feeding masses of people, food is prepared to be average in taste so as not to offend anyone by being too spicy or salty, etc. Unfortunately, this often means that while everyone can eat the food, very few people truly enjoy the food. This is especially true in institutions that are linked to hospitals where food is not focused on taste but health instead. Mass production is another issue for food quality because food is created in such large quantities in these facilities that it tends to be made in poor quality; often over cooked and presented poorly. Food often has to be prepared in these facilities that can be pureed easily and is soft enough not to induce choking in residents or patients who are in danger of aspirating. This in turn often leads to everyone in the facility getting food that matches these priorities, which overall makes the food less appetizing.

These factors which result in poor food quality do not change the major issue for people living in the long-term care facilities. People need to maintain the desire to keep eating and that becomes much more difficult when food is not appetizing. Creating food in a manner that allows

it to be more appetizing is very important for maintaining the health and quality of life for people living in these institutions.

1.6 Quality of Life Factor: Depression in Long-term Care

Depression is also a fairly agreed upon quality of life factor in long-term care. Depression is common during dementia with reported prevalence of rates of up to 86% (Kliegel & Zimprich, 2005; Harwood et al., 2000; Migliorelli et al., 1995; Wragg & Jeste, 1989; Wright & Persad, 2007). Depression has been consistently shown to be related to quality of life whereas impaired cognition, pain, behavioural issues and reduced activities of daily living have been found by some to not necessarily be correlated with quality of life. Still, others have found that all these factors appear to be at least partially related (Nagamoto et al., 1997; CIPHER & Clifford, 2004; Clifford, CIPHER & Roper, 2003; Clifford, CIPHER & Roper, 2005).

Diagnosing depression in long-term care is difficult due to the overlap which occurs between people with depression and people with dementia. Dementia contains many elements which make it difficult to discern whether the level of depression is normal or not for this population, given factors such as loss of memory, health, and socialization. Evaluating depression in long-term care facilities then becomes important to quality of life measures as it is so intertwined with life in a long-term care facility. Attempting to separate what constitutes depression out of quality of life becomes a key challenge to measuring quality of life improvements in long-term care. There are many other aspects of life for long-term care residents beyond depression and weight which should also be considered when measuring quality of life, and many of these factors can be captured through the analysis of RAI-MDS data.

1.7 RAI-MDS Assessments

RAI-MDS (Resident Assessment Instrument – Minimum Data Set) assessment data that is collected in many Canadian long-term care facilities allows for each person within a long-term care facility to be described based on different aspects of their lives. This study will review the RAI-MDS data to help determine links between the measured factors within RAI-MDS and the intervention tested in this study. Identifying residents who share similar characteristics may help lead to the future development of interventions specific to people who share a given characteristic. This could eventually lead to best practices for specific populations of long-term care residents until each population had its own repertoire of potential quality of life improvements.

RAI-MDS data provides nine outcome measures which can be examined in comparison to the intervention. These include; activities of daily life, level of cognitive performance, level of aggressive behaviours, pain levels, level of social engagement, level of health and level of depression. Other classifications to be cross referenced with this data would also include divisions on gender, age and living environment, all of which can be easily separated.

Understanding that people in long-term care facilities have a broad range of characteristics is extremely important when attempting to determine inexpensive alternatives to increasing quality of life. Ideas that may work for some individuals will not necessarily work for others. By identifying trends in this research, future research may be able to use these characteristics to help determine how quality of life is defined differently for different sub-populations within long-term care. One such sub-population, those with dementia, is known to be prominent in long-term care, and thus requires specific examination for this research in terms of quality of life.

1.8 Measuring Quality of Life in People with Dementia

For general populations there is support for use of multiple quality of life measures. Some advocate the use of a wide spectrum of measures and sources, suggesting that each offers a different point of view (Sloane et al., 2005). Others are more definitive suggesting four dimensions, with psychological well-being, behavioural competence, objective environment and perceived quality of life as the main areas to be measured (Lawton, 1994; Ready & Ott, 2003). While these four dimensions must be examined, the current research must also be careful to use measures more specific to those affected by dementia.

Establishing quality of life dimensions within the field of dementia can be more taxing than in more general populations due to the cognitive and physical decline of those with dementia. If quality of life indicators are not corrected for these factors then quality of life measures will inevitably decline as these individuals progress in this disease (Ready & Ott, 2003; Rabins et al., 1999). To accommodate populations with dementia, quality of life measures should include additional factors such as independence, dignity, privacy, individuality, security, comfort, relationships, meaningful activity, enjoyment, functional competence and spiritual well-being (Kane, 2001).

1.9 Quality of Life Factors: Simple Improvements to the Built Environment

While quality of life indicators can include psycho-social factors for residents living in long-term care facilities, the indicators used are often based on a medical model. What these indicators miss is quality of life improvements which can occur on a much more instantaneous and psychological basis. Understanding that these factors exist requires no more than the simplistic awareness of pleasure received when we experience gratification in our own senses.

Providing positive stimuli to the five senses could potentially lead to a much higher quality of life for individuals living in long-term care. Such changes are the basis of improvements made to the built environment of any facility. The built environment refers to any number of a range of stimuli which include music, colours, structural changes, smells and other stimuli surrounding where people spend time. The built environment can also refer to features designed to help people, which in long-term care could refer to examples such as non-slip floors, natural lighting, assistive devices for lifting or preventing falls, single room beds, hand washing sinks, alcohol hand rubs, etc. (Reiling, Hughes, & Murphy, 2008). In long-term care facilities, residents have been found to look for a built environment that allows for a connection to caregivers, provides a sense of well-being, and maintains a connection to the outside world (Fowler et al., 1999). Examples of potential changes to the built environment for long-term care facilities include murals, camouflaging of exit doors, movement of nursing stations out of living areas and the creation of a more home-like kitchen and living area (Gnaedinger, Robinson, Sudbury, & Dutchak, 2007).

The provision of aroma to improve the built environment has great potential for improving quality of life in a long-term care setting. People with dementia in long-term care facilities could be greatly influenced by such a stimulus. Even though their short term memory is often negatively affected by the disease, people with dementia often share stories of their experiences from many years in the past. Linking of sensations to previous memories could therefore be very powerful via olfaction. Unfortunately, people with dementia have previously been thought to have lost their ability to smell and may need help in identifying smell stimuli. Therefore if something like a smell is used to access a memory, another corresponding sensation like sight might be necessary for the memory to be accessed. Using senses like smell and taste to

access positive feelings could be an inexpensive method of improving quality of life factors for people living in long-term care facilities.

In this manner, using aroma to improve quality of life for long-term care residents potentially incorporates a number of the different levels of quality of life improvement for these residents. By providing the smell of baking bread for example, the built environment of the facility changes with the kitchen perceived as coming closer to the residents' living area. By using bread-makers, this is achieved without the high level of cost usually associated with these Eden style improvements to the facility when attempting to move away from the medical model of care. The effect however is the same. This means that the level of care improves, as is the goal of the Eden alternative, towards creating a better living environment for the residents. Thus the best case scenario results where a positive quality of life improvement is created at very little cost to the long-term care facility.

1.10 Olfaction in People with Dementia

Reduced olfaction ability in those who have been identified with dementia has been well established in research. However, studies usually focus on the ability to discriminate smells and mistakenly carry forward their conclusions that a lack of ability to discriminate means that the individual cannot smell rather than simply not discriminate between smells (Ballard, O'Brien, Reichelt & Perry, 2002). One example of such research used a smell identification test to determine the individuals' ability to recognise odours using a scratch and smell technique with no other cues and four possibilities from which to choose the correct answer (Wilson et al., 2007). This study is typical in scoring an identification test to establish that dementia is present in the individual. However, as is typical in these tests for reduced olfaction function, the test focuses on the ability to identify smells; the test therefore demands that the dementia patient be

able to remember what a smell is; it does not test as to whether or not the dementia patient can smell the stimulus.

This type of scratch test is difficult because it demands that the smell be identified without any other external stimulus to assist the individual. This does not mean that there would be no ability to identify the smell if external cues were present. If this is true, than even an unknown pleasurable smell which could not be identified by a person with dementia should still be able to give them pleasure if they can sense the smell itself.

Studies have examined this differentiation by attempting to determine the difference between identifying smells and the sense of smell itself. The results show that as expected those with dementia cannot identify smells as readily as those without dementia and they also do experience some loss of intensity of smell (Royet et al., 2001). However, Royet et al. 2001 also found that populations with dementia had no lack of ability to determine whether or not a smell was pleasant or smelled like something that could be eaten regardless of the level of dementia. Therefore there was not an impairment in those with Alzheimer's disease in the ability to detect that a smell was present, just an inability to identify the smell. This is likely due to identification being a higher ordered process than mere detection which Alzheimer's disease does not appear to inhibit (Royet et al., 2001; Wilson et al., 2007; Piwnica-Worms, Omar, Hailstone & Warren, 2010; Serby, Larson & Kalkstein, 1991).

The position of the present research is that those with dementia can discern and experience pleasure from pleasant food smells, without necessarily the attached ability to identify the smell itself. Furthermore, the addition of the appropriate visual stimuli for the smell is expected to add to the positive feeling created by this stimulus. This should reduce confusion for these individuals by removing any barrier to the positive association with the food item. This

identification piece would be considered a higher cognitive function that has been reduced in ability in those with dementia but only in their ability to remember the smell, just like in other details of their life. Thus the loss of the sense of smell has not occurred near as much as the loss of memory association for these individuals.

1.11 Purpose of the Research

The goal then of this study is to explore the provision of additional mealtime food aroma (baking bread) as a non-intrusive method of improving weight, appetite, enjoyment of life, well-being and reducing depression in long-term care residents. A questionnaire was used to assess the effects of the intervention on personal appearance, appetite, overall health benefits and quality of life. The background for the study originated with Yeh et al. (2000) who used a pharmacological drug as an intervention to improve quality of life factors. The present study will use the aroma of baking bread as a simpler non-intrusive method to attempt to gain the same improvements.

Chapter 2: Method

A quasi-experiment was performed where the smell of baking bread was provided to residents of a long-term care facility in order to determine whether weight, appetite, enjoyment of life, well-being, depression and nine RAI-MDS outcome measures would be significantly affected after a 65 day exposure to the stimulus.

2.1 Intervention

Prior to each mealtime (three times daily) for three months, the smell of bread baking was manufactured in the living and dining areas of the long-term care facility. Bread was baked in a bread-maker that only required the staff to pour pre-portioned ingredients into the machine, allowing preparations to be created en masse by the kitchen staff with very little preparation time. The bread took approximately three hours to bake. Once completed, the baked loaf was set out on the counter and bread was made available to the residents for eating after it had cooled. Baking occurred on the main counter in each serving area to maximize aroma. Every resident who wanted to was able to eat a slice of the bread, although rather than forcing delayed gratification, previously baked loaves of bread were served during baking and cooling periods.

2.2 Sample

The Stuart Nechako Manor in Vanderhoof, British Columbia, is a long-term care facility operated by the Northern Health Authority which provides long-term care services to 50 residents. These residents were invited to participate in this study which took place from October, 2010 to March, 2011. Given the nature of the research all the residents at Stuart Nechako Manor received the intervention. There was no reasonable means by which to limit the exposure of the residents to the smell of baking bread, so an interrupted time series design was used so that the residents acted as their own control group. Thus, four measures were required,

with 65 days between wave 1 and wave 2 acting as the control period with no stimulus (no bread baking). Wave 3 data collection was completed approximately two weeks after wave 2 (to avoid being over the Christmas holidays). After wave 3, the stimulus was introduced for a period of 65 days. At the end of the intervention data were collected for the final time (wave 4).

2.3 Inclusion Criteria

As quality of life factors were a primary reason for the data collection in this study, all residents, regardless of recorded previous weight loss were invited to participate in the study unlike the inclusion criteria found in Yeh et al. (2000) which set out a “previous weight loss” criterion.

2.4 Exclusion Criteria

In order to be comparable to the Yeh et al. (2000) study, the exclusion criteria of uncontrolled hypertension, congestive heart failure, obstruction of the alimentary tract, untreated infections, serious chronic illness, weight loss directly related to hyperthyroidism, weight loss due to depression or life expectancies of less than six months were used in this study. Residents unable to communicate their response were included only if their wishes could be reliably gathered by a proxy of a family member or staff person who could reliably ascertain how the individual would answer the applicable questionnaire questions.

2.5 Randomization and Blinding

Due to the nature of the study randomization and blinding did not occur, as all subjects were subjected to the aroma of the baking bread and the research assistants (interviewers) understood that everyone was receiving the intervention.

Chapter 3: Measures

This research focused on assessing primary measures of weight, appetite, enjoyment of life, well-being and depression in long-term care residents while secondary measures were analyzed from the Resident Assessment Instrument – Minimum Data Set (RAI-MDS) data for each resident. Appendix #1 contains the research questionnaire which outlines the data gathering tool for the primary measures. All primary measures were administered four times. The secondary data, the RAI-MDS, were only collected twice. The first RAI-MDS measure was from the participants' latest evaluation of the RAI-MDS prior to the intervention occurring. The second RAI-MDS measure occurred after the 65 days of the intervention had ceased. The RAI-MDS was collected as per normal by nursing staff on a set schedule, occurring only once every three to six months, thus precluding the ability to do more measures for the secondary data. One interviewer collected all the self-report data for the primary measures by performing an interview using a set questionnaire with each participant. Questions for the primary measures were asked in the same order during each wave of data collection. The interviewer asked, in the following order, about appetite, well-being, enjoyment of life and depression. Participants' self-reported responses to the questionnaire were used when possible but proxies (staff or family members) were used when reliable responses were not available from the residents themselves.

A focus group was conducted at the end of the research with seven employees from the long-term care facility. Appendix #4 contains the questions asked in the focus group. Four participants followed up the focus group by submitting written answers to the focus group questions due to their desire to provide more input to the research.

3.1 Weight

Weights were recorded using a wheelchair weigh scale, with participants weighed in their personal wheelchair or in a standard wheelchair if the resident did not normally use a wheelchair. Weights were typically recorded after breakfast inside a four hour period of time between 8am and 12pm. Weights were taken 65 days after wave 1 and 65 days after wave 3 to get a “control” weight gain and an “intervention” weight gain respectively. Weights were recorded using the metric system in kilograms. Basic clothing was not removed for the weight measures, with residents wearing pants, shirts, socks, underwear and regular footwear such as slippers or shoes. Extraneous clothing such as hats, jackets, shawls and blankets were removed for the measures.

3.2 Appetite

Appetite was evaluated by asking participants to rate their current appetite. Using a question used in Yeh et al. 2000, participants were asked if their appetite was “very poor” (coded 1), “poor” (coded 2), “fair” (coded 3), “good” (coded 4), or “excellent” (coded 5).

3.3 Well-Being

Well-being was assessed with responses to four questions adapted from Yeh et al., 2000, to assess perceived change in aspects of the participants’ life. The questions were as follows: “Do you believe your health is better, or worse, or had no change in the last two months?”; “Do you believe your personal appearance has improved, or worsened, or had no change in the last two months?”; “Do you think your quality of life has changed in the last two months? Is it worse, better, or has there been no change?”; and “Do you think your appetite has changed over the last two months? Is it worse, better, or has there been no change?”

After responding to the questions, the interviewer would probe further. If the question was answered with “better” then the interviewer asked the resident whether it was “slightly

improved” (coded 1); “fairly improved” (coded 2); “somewhat improved” (coded 3); “quite improved” (coded 4); or “much improved” (coded 5). If the participant’s answer was “worse” the interviewer asked; “slightly worse” (coded -1); “fairly worse” (coded -2); “somewhat worse” (coded -3); “quite a bit worse” (coded -4), or “much worse” (coded -5). If the answer was “no change” then the interviewer was prompted to ask; “no change at all?” (coded 0); “slightly worse” (coded -1); or “slightly better” (coded 1). The coding generated an eleven-item linear analog scale ranging from -5 to +5, with higher scores indicating improved sense of well-being. For the outcome of well-being a simple sum of all the answers within the time measure of the wave was calculated.

3.4 Enjoyment of Life

Enjoyment of life questions required the resident to evaluate their existence with the evaluative questions of; “Do you think you normally have enough energy?”; “Do you often engage in your favourite activities?”; “Do you enjoy spending time watching television or reading books?”; and “Do you spend much time with family or friends?”. Despite the similarity of the questions, the overall evaluation component is more prevalent in the enjoyment of life questions than in the well-being questions. In the enjoyment of life questions, the answers are quantified into “not at all” (coded 1), “not very much” (coded 2), “quite a bit” (coded 3), or “a lot” (coded 4). Therefore, there is no assessment of self-reported improvement in these questions; only current evaluations. For the outcome measure of enjoyment of life a simple sum of all the answers assessed with a wave of data collection was calculated for comparison.

3.5 Depression

The Geriatric Depression Scale (Yesavage et al., 1983; Sheikh & Yesavage, 1986) was used to gather information on participants’ depression. Participants were asked to respond with

“yes” or “no” to 15 questions. The questions included; “Are you basically satisfied with your life?”; “Have you dropped many of your activities and interests?”; “Do you feel that your life is empty?”; “Do you often get bored?”; “Are you in good spirits most of the time?”; “Are you afraid that something bad is going to happen to you?”; “Do you feel happy most of the time?”; “Do you often feel helpless?”; “Do you prefer to stay at home, rather than going out and doing new things?”; “Do you feel you have more problems with memory than most?”; “Do you think it is wonderful to be alive now?”; “Do you feel pretty worthless the way you are now?”; “Do you feel full of energy?”; “Do you feel that your situation is hopeless?”; and “Do you think that most people are better off than you are?” The Geriatric Depression Scale tallies to a maximum total of 15 from the 15 questions asked in the GDS interview. Only the total score from these 15 questions was examined.

The Geriatric depression scale provides scores ranging from 0-15 with a higher score indicating a higher degree of depression. A score > 5 is suggestive of depression and a score of ≥ 10 is almost always indicative of depression. The GDS has been tested extensively and found to be valid, specific and sensitive when evaluated against diagnostic criteria for measuring depression (Kurlowicz, 1999; Sansoni et al., 2007).

3.6 RAI-MDS Data

As mentioned earlier, the functioning level of every resident in the long-term care facility is assessed every three months by nursing staff using the Resident Assessment Instrument – Minimum Data Set (RAI-MDS). Only two waves of RAI-MDS data could be included in this study as it is an assessment that occurs at set intervals in the long-term care facility. Pre-and post-RAI-MDS assessment data of study participants provided a secondary data source of outcome data (see Appendix #3 for full description). A baseline of every resident included in the

study was taken before the stimulus period of the study was conducted, providing a measure on each of the nine scales found in Appendix #3.

RAI-MDS data is gathered for every resident in long-term care in the Northern Health Authority in British Columbia. The purpose of including the analysis of the RAI-MDS Data is to determine whether any significant changes had occurred in pre- and post- measures which could be potentially linked back to the provision of the stimulus in the research.

The expectation for the study was that individuals would be different in their ability to identify smells and to register pleasure or hunger feelings based on the degree of their cognitive ability or severity of any existing dementia. The minimum data set (MDS) breaks down into nine measurable domains which then allow for these assessments to be compared to variables, allowing the assessments to help identify what interventions can cause improvements, allowing the MDS to act as an interactive assessment tool. The subscales of the MDS then allow for the status of the individual to be monitored along with outcome measures (Berg et al., 2002).

MDS data has proven to be reliable (Morris et al., 1990; Hawes et al., 1995; Morris et al., 1997; Berg et al., 2002) and valid in comparison to other instruments that measure the same categories (Morris et al., 1994; Hartmaier et al., 1994; Frederiksen, Tariot & De Jonghe, 1996; Fries et al., 2001; Berg et al., 2002). The diagnostic and functional outcome data in the MDS has also been shown to be valid (Gambassi et al., 1998; Bernabei & Gambassi, 1998; Bernabei et al., 1998; Landi et al., 1998; Berg et al., 2002).

3.7 Blinding of Interviewer

The researcher interviewed the individuals in a “blind” manner; not knowing how the individuals were actually assessed based on their MDS data. This did not necessarily eliminate the researcher’s knowledge of the person’s classification as the researcher’s education and

experience probably allowed for an educated guess as to the resident's classification. However, the quality of information gathered by the interviewer having a close relationship with the participants was expected to result in better information being gathered in the interviews. Thus, the knowledge of the participants outweighed any advantages expected to be gained by ensuring the interviewer maintained a higher level of "blindness" in the current research.

3.8 Interview Questions: Residents Input versus Proxy

Residents who could cognitively answer questions in their own right were interviewed notwithstanding issues such as dementia. Residents with more severe dementia or other disorders which rendered them unable to directly answer questions were not evaluated using their own responses. In these instances, caregivers or family members who were the most familiar with the specific resident were asked to participate on the resident's behalf or alongside the resident. These decisions often took place at the time of signing the consent to participate. However, in many instances, the interviewer had to determine the cognitive level of the individual in the moment, as this population has a tendency to experience good and bad days cognitively. This relied on the experience of the interviewer, who had a Masters degree in Social Work, to help determine if the responses from the interviewee were in keeping with the participant's cognitive ability to answer the questions.

The issue of whether to use the residents' versus proxy input (from staff, family or friends) is in determining as to whether the individuals with dementia are able to provide their own feedback on questions of quality of life. Lack of cognition, awareness and insight are the normal reasons why proxy data would be considered for those with dementia (Sevush & Leve, 1993; Ready & Ott, 2003; Lopez et al., 1994; Ott et al., 1996). Cognitive impairment increases in severity as dementia progresses, with affected individuals eventually losing the ability to

communicate effectively (DSM-IV TR, 1994). This means eventually for the person with dementia a proxy must be used to gather information if the resident is to be incorporated into research requiring cognitive participation (Green, Goldstein, Sirochman & Green, 1993; Ready & Ott, 2003).

Proxy reports have been shown to be a reliable manner in which to gain information from clients who may not be able to speak for themselves. Problems do exist with using proxies including; rating quality of life measures as worse than individuals usually rate themselves and allowing beliefs, expectations and relationships to affect their judgements. Self-reports, however, from people with mild and moderate dementia have been shown to report on quality of life and subjective states in a reliable and valid manner despite individuals potentially being unaware of their own level of dementia. Lack of awareness is not related to these individuals' ability to describe their own emotional states. Language skills, attention span, orientation, specifically designed assessments for the dementia population and establishing a good rapport, have all been identified as more important than cognitive impairment when determining as to whether or not an individual can self-report for research purposes on quality of life (Logsdon, Gibbons, McCurry & Teri, 2002; Logsdon, Gibbons, McCurry & Teri. 1999; Sainfort, Becker & Diamond, 1996; Bassett, Magaziner & Hebel, 1990; Brod, Stewart, Sands & Walton, 1999; Ready, Ott, Grace, Fernandez, 2002; Selai, Trimble, Rossor & Harvey, 2001; Ready & Ott, 2003; Mozley et al., 1999).

3.9 Ethical Limitations

Ethical limitations in the research were directly related to the interviews. The interview process, interview questions, and determining how and when to use proxies were key ethical topics. The interview process was demanding on participants who had to go through a twenty

minute questionnaire interview for each of the four waves of measures. Despite gaining consent from these individuals before every measure and at the beginning of the study, it is unclear as to whether the residents were prepared for the level of involvement required to complete the interview session. Many residents with dementia did not necessarily understand the process they were undertaking despite the researcher's explanation before every measure. While this is an ethical limitation of the research it had to be weighed off against an inability to include this population in research if they were to be excluded for their lack of comprehension. Therefore, so long as participants stated they were agreeable to be included in the interview process, they were allowed to participate.

The segment of the interview with the largest ethical limitations was that of the geriatric depression scale (GDS). Two other questions were seemingly difficult for participants who were struggling with depression. "Do you feel pretty worthless the way you are now?" and "Do you feel that your situation is hopeless?" were both questions that were identified by the research assistant as being problematic emotionally for particular participants who were already feeling depressed. However, the interviewer did take extra time in building a relationship with these participants at the beginning of each interview to ensure the participants felt at ease to answer these questions.

Also of ethical question was the use of proxy responses when it was determined that individual participants could not reliably speak for themselves. Judgements occasionally had to be made to use a proxy when it was felt by the interviewer that a participant's response was likely untrue. This occurred when it was determined that dementia or another mental disability had clouded the participant's judgement. The ethical dilemma here was in determining whether the participant's perception of a parameter was more important than what caregivers or family

had witnessed as being the participant's reality. For example, in one case a participant replied that their family and friends visited "not at all" in the enjoyment of life section. This did not fit with what the interviewer had witnessed so she in turn went and asked a staff member to act as a proxy to review the answers. The proxy indicated that indeed the answer was untrue and that the individual's family came to visit about every second day; the participant just could not remember. This however, did not end the ethical dilemma. The researcher and the interviewer had to determine what was more important; reality or the participant's perception of reality. In this case the research team determined that reality outweighed the participant's perception by assuming that the individual in this case would have wanted to share the correct information if they could have remembered what had actually occurred. Therefore, in this case, the proxy's information was used when it countered the participant's response. This does not mean that this was always the case. In order to best determine whose data was to be used, each individual, their circumstances, their proxy, their proxy's circumstances and the research question itself had to be examined. While this did not guarantee the information was correct, it did give the best chance for gaining meaningful data. These types of ethical dilemmas were rare in this study and participants were not included in the data set unless it was felt that reliable data was being gathered from either the proxy or the participant or the combination of both. At all times the goal of recording the most reliable data possible was upheld.

Chapter 4: Data Analysis

The statistical program “R” was used to manage data and to run the statistical analyses. The data was not normally distributed therefore non-parametric tests were used to analyze data. Statistical significance was accepted at $p < 0.05$ (two-tailed) and interesting findings were noted at $p < 0.10$.

The effect of the stimuli was compared on the various outcomes. For the primary outcomes, the non-parametric paired-sample Wilcoxon sign rank test was first used to examine the changes in the outcome over time. In particular, the potential for change from waves 3 to 4 and the average of scores from waves 1 and 3 were compared with scores from wave 4.

A linear mixed effects model was used to examine the treatment effect adjusted for gender and age. Also tested was whether any of the four separated living areas within the facility had different responses to the stimuli. One of the advantages of the linear mixed effects model analysis was that it took into account the variations which occurred in pre-treatment measurements (waves 1 to 3). Thus, it was a more appropriate method than the Wilcoxon sign rank test. However, the linear mixed effects model analysis assumed the data came from a normal distribution.

In the final section, the association was examined between the different outcomes using non-parametric Spearman correlation coefficients, non-parametric Kruskal-Wallis test and Fisher’s exact test. The Spearman correlation coefficients, Kruskal-Wallis test and Fisher’s exact test examined the relationship between pairs of variables. Spearman was used when both outcomes were continuous (or ordinal), Kruskal-Wallis was used when one of the outcomes was categorical and Fisher’s exact test was used when both outcomes were categorical.

4.1 Appetite

For the outcome variable “appetite”, many of the patients had the same score at wave 4 compared to wave 3 (18 of 33). This implied that the change score was “0” for these patients. With a large number of zero change scores, it would have been inappropriate to use the Wilcoxon sign rank test. This is because the Wilcoxon test would discard all the zero scores when testing. Thus, for example, if 10 subjects have a change score of “2” and one million subjects have a “0” change score, the Wilcoxon sign rank test would still have said that the treatment was effective in increasing the score, which was clearly not true. For this reason the linear mixed effects model was conducted for the outcome “appetite”. The linear mixed effects model was conducted on the appetite results due to the large number of same scores that occurred indicating no change. The linear mixed effects model (see Table 1) then resulted in a non-significant estimated treatment effect and no effect for living area.

4.2 Weight

Weight also did not improve as shown in the findings for the linear mixed effects model displayed in Table 1. Weight therefore did not improve significantly between wave 4 and wave 3 with $M = 0.02$, $SD = 1.7$ (see Table 2).

4.3 Well-Being

The linear mixed effects model produced the most significant finding for well-being. Well-being had an estimated treatment effect of 1.35 with a $p = .019$ (see Table 1) in the linear mixed effects model. The mean improvement score for Yeh et al. (2000) from baseline to 12 weeks was 7.76 ± 1.16 in the treatment group whereas it was 4.65 ± 0.73 in the placebo group,

which was statistically significant ($p = .045$). The equivalent result for this study was an improvement of well-being with mean improvement score of 1.61 ± 4.19 ($p = .05$; see Table 2).

Table 1

Linear Mixed Effects Model for Weight, Well-Being, Quality of Life, Depression and Appetite

	Estimated Treatment Effect	p^1	p^2
Weight	0.43	0.319	0.145
Well being	1.35	0.019	0.180
Quality of life	0.11	0.752	0.714
Depression	0.07	0.880	0.700
Appetite	-0.08	0.514	0.813

Note. p^1 for no treatment effect while assuming the 4 living areas have the same treatment effect, if any.

p^2 for the null hypothesis of same treatment effect at the 4 living areas.

Table 2

Wilcoxon Sign-Rank Test for Weight, Well-Being, Quality of Life and Depression

Variable	Wave #4 vs. Wave #3	<i>p</i>	Wave #4 vs. Average of #1-#3	<i>p</i>
Weight		0.565		0.488
Mean (SD)	0.02 (1.70)		0.43 (2.67)	
Median (Q1,Q3)	0.20 (-0.70,1.10)		0.03 (-1.20,1.53)	
Range (min,max)	(-3.90,2.60)		(-3.57,6.83)	
Well being		0.050		0.150
Mean (SD)	1.61 (4.19)		1.35 (4.09)	
Median (Q1,Q3)	0.00 (-1.00,4.00)		0.67 (-1.33,4.00)	
Range (min,max)	(-6.00,12.00)		(-5.33,12.33)	
Quality of life		0.782		0.989
Mean (SD)	0.21 (2.71)		0.11 (2.51)	
Median (Q1,Q3)	1.00 (-2.00,1.00)		-0.33 (-1.67,1.67)	
Range (min,max)	(-7.00,6.00)		(-5.33,5.33)	
Depression		0.975		0.844
Mean (SD)	0.15 (3.43)		0.07 (2.92)	

Median (Q1,Q3)	0.00 (-2.00,2.00)	0.00 (-1.67,1.33)
Range (min,max)	(-5.00,9.00)	(-5.67,7.33)

Note. Q1,Q3 represents inter-quartile range values of 25%, 75%

4.4 Enjoyment of Life

The enjoyment of life estimated treatment effect by the linear mixed effects model was insignificant, at 0.11 with a $p = .752$ (see Table 1). In the Wilcoxon sign-rank test for wave 4 versus 3, $M = 0.21$, $SD = 2.71$, $p = .72$ (see Table 2).

4.5 Geriatric Depression Scale

Depression was not significantly affected by the stimuli in this study. There was no significance between wave 4 and wave 3, with $M = 0.15$, $SD = 3.43$ and $p = .975$ while for wave 4 versus the average of waves 1-3, $M = 0.07$, $SD = 2.92$ and $p = .844$ (see Table 2). The linear mixed effects model resulted in an estimated treatment effect of 0.07 with a $p = .880$ overall and a $p = .70$ for the living areas (see Table 1).

Table 3

RAI-MDS Subjects: Worse/Stayed the Same/Improved after the Stimuli (n=33)

Variable	Improved	Same	Worse
RAI-MDS	6 (18%)	11 (33%)	16 (48%)
Cognitive performance scale	0 (0%)	29 (88%)	4 (12%)
Depression rating scale	2 (6%)	22 (67%)	9 (27%)
Activities of daily life (self)	1 (3%)	28 (85%)	4 (12%)
Activities of daily life (short)	3 (9%)	24 (73%)	6 (18%)
Activities of daily life (long)	3 (9%)	23 (70%)	7 (21%)
CHESS	3 (9%)	25 (76%)	5 (15%)
Aggression behaviour scale	1 (3%)	27 (82%)	5 (15%)
Index of social engagement	2 (6%)	24 (73%)	7 (21%)
The pain scale	1 (3%)	21 (64%)	11 (33%)

4.6 RAI-MDS

The majority of the subjects had change scores of zero for the RAI-MDS assessments. Therefore the change score was collapsed into three categories; worse, same and improved (see Table 3). The outcome “RAI-MDS” scores were the sum of all the nine components in the RAI-MDS survey (the index of social engagement was inverted before summing so that a larger score was considered worse as in all the other assessment areas).

Analysis of the RAI-MDS data showed no significant improvements in any of the categories. Every category had most people rated the same as the previous RAI-MDS assessment that would have occurred at least three months prior to the second assessment. For example, out of 33 residents the depression rating scale had 22 people stay the same in their

rating and 9 people worsened, while only 2 improved (see Table 3). Out of the nine total categories, the most improvement in any one category had only 3 people out of 33 improving. The assessment of “pain” had the largest number of individuals worsening, with 11 individuals out of 33 receiving a worse rating of pain, while only 1 experienced improvement. Overall in the RAI-MDS scales, 16 residents got worse in their ratings as opposed to only 6 who improved (see Table 3).

The Spearman correlation coefficients for the RAI-MDS social engagement scale and the well-being measure had almost no relationship in the pre-stimuli group with a correlation coefficient of $-.01$ and a $p = .953$ but changed after the intervention to a relationship of $.37$ spearman correlation coefficient with a $p = .036$. This change was examined by comparing the correlation coefficients using Fisher Z and found to be non-significant, where $Z = 1.54$.

The social engagement scale measure showed an expected difference in gender for its scores with male residents (pre-stimuli $M = 2.0$, $SD = 1.5$; post-stimuli $M = 1.6$, $SD = 1.5$) scoring significantly lower in social engagement than female residents (pre-stimuli $M = 3.1$, $SD = 0.9$; post-stimuli $M = 2.9$, $SD = 1.1$) to a $p = .010$ on pre-stimuli measures and $p = .007$ on post-stimuli measures for the Kruskal-Wallis, non-parametric, one way analysis of variance.

Aggression was measured on a scale of 0 to 12 with a higher score indicating greater aggressive behaviour. In the Kruskal-Wallis test, pre-stimuli had a $p = .025$ and post $p = .054$. Male residents became more aggressive rather than less aggressive between pre- and post-stimuli. The aggression behaviour scale went from a mean for male residents of $M = 1.6$ ($SD = 2.5$) pre-stimuli to $M = 2.2$ ($SD = 3.1$) post-stimuli. Female residents had a small increase in aggression, going from $M = 0.3$ ($SD = 0.8$) to $M = 0.4$ ($SD = 0.9$).

The Cognitive Performance Scale (CPS) of the RAI-MDS was significantly different for both the pre-stimuli and post-stimuli measures according to the age groups isolated, with those less than 70 years of age ($M = 5.0, SD = 0.8$, pre-stimuli; $M = 5.0, SD = 0.8$, post-stimuli), age 70-79 ($M = 1.2, SD = 1.2$ pre-stimuli; $M = 1.7, SD = 1.2$, post stimuli), and older than 80 ($M = 2.9, SD = 1.8$, pre-stimuli; $M = 3.1, SD = 1.8$, post-stimuli). Pre-stimuli measures had a $p = .008$ and post-stimuli measures had a $p = .013$.

Chapter 5: Discussion

The purpose of this study was to determine whether the simple intervention of baking bread in a long-term care facility could improve the lives of residents living in that facility. The effects of bread-baking in a long-term care facility were tested in a simple, inexpensive manner for their potential to improve the residents' living environment. The concept was borrowed from Yeh et al. (2000) who used a similar format to suggest that a pharmacological drug, megestrol acetate, resulted in significantly improved weight, well-being and enjoyment of life measures, although finding no improvement in geriatric depression scale scores. The present study then, was attempting to determine whether a non-pharmacological intervention which was inexpensive to implement could then improve the lives of those residing in a long-term care facility purely through an olfaction stimulus.

The intervention of the smell of baking bread was identified as being relatively inexpensive to implement yet potentially pleasurable for participants. The findings suggest that a significant change occurs in the participants' self-assessment of improvement of well-being after experiencing the smell of baking bread three times daily in association with their meal times. The significance of this finding is even more compelling when compared to the lack of significance in the other measures. Overall measures of enjoyment of life were not significantly altered, nor were weight or depression scores within the 65 day period.

These results indicate that perception of well-being was being influenced by a factor greater than the actual changes directly related to the stimulus. As well-being was the only factor that improved, and it improved drastically in comparison to the measure of weight, enjoyment of life and depression, some integral differences must define what was occurring

within this factor for the participants. Perception of improvement is the key to understanding this measured change.

The nature of the intervention was the smell of baking bread. Common sense would suggest that the smell of baked bread would not likely lead to watching a lot of television, having enough energy, often engaging in favourite activities or having friends and family visit more than they had previously, as was asked in the enjoyment of life questions. However, for the individuals who live in this environment the enjoyment of smelling the bread could have led to the outcome of sensing an improvement in lifestyle. Sensing an improvement of course does not reliably mean that a physical improvement had occurred but rather it means that a perceived difference had occurred, leading to a feeling of improvement.

The significant result for well-being in the present study implies that well-being can be improved without medications as used in Yeh et al. (2000). Perception of well-being in the present study was instead effected by a change in the physical environment found in the facility. Individuals, when asked whether they perceived a change in their well-being were very likely positively affected by a change that had occurred in their surroundings. The questions left to analyze are whether or not this measured effect was due to the smell of bread baking directly or had instead to do with some secondary effect of the bread baking. It is also possible that this effect was the result of a completely different factor not measured in the present study.

It seems unlikely that the smell of bread baking on its own directly resulted in the effect found in this research. The smell of bread baking three times a day is a very small component of the participants' day to day lives. Although enjoyable, it would be difficult to imagine this intervention alone being the sole reason why people would then note that their lives had improved.

Perhaps it is more likely that the intervention's effect was indirect, influencing everyone who was in the facility, not just the residents. Specifically, this effect would have occurred to the family, friends, and staff who would normally attend to the needs of those living in the long-term care facility. While every person in the study received this intervention, every other person who was close enough to smell likely was affected by the smell of baking bread. Multiple comments were made to the researcher by family members of clients and staff in the care facility that it was very enjoyable to come into the building and instead of smelling urine and industrial cleaners, to smell the bread baking in the living areas.

If people visiting or working in the facilities found the smell enjoyable it may have improved their mood which in turn could have made them more socially enjoyable to be around. Perhaps a shift in attitude occurred for staff and visitors who may have smiled or laughed a little bit more when working around the residents. This would create a strong link to the concepts of person-centred care and Eden style philosophy of care whereby a more home-like improvement would have occurred in the facility. Not only was the smell more home-like but also the attitude of the caregivers may have become more like that of a family member and less like that of an unattached professional. These kinds of changes could have affected the residents who also were enjoying the smell of the bread, although perhaps at a diminished capacity as their dementia may have reduced their ability to smell physiologically or to identify the smell. This indirect effect could then have resulted in the resident perceiving life more positively. In turn this could have resulted in the increased improvement in the scores of well-being on questions surrounding changes in the residents' health, personal appearance, quality of life, and appetite.

A third possibility however, is that the smell of bread baking had nothing to do with the improvement in well-being. Statistically it is possible that the results were found by chance,

although the likelihood of this is low. If the result was not due to the intervention, it is more likely that a third variable was present that was not measured. One such variable would be the relationship with the interviewer.

The statistically positive result in well-being depends on the results of the last wave of measures where the improvement in scores was recorded for well-being. As the interviewer knew that higher scores would lead to a significant result, she may have influenced the results in this direction either knowingly or unknowingly. This would be simple enough to do if she influenced participants by putting a more positive slant or emphasis on answering for improvement, rather than worsening, in the change of well-being questions. However, this scenario is unlikely because this positive result did not show up in the other measures of the fourth wave.

Another possibility is that the interviewer could have built a strong enough relationship with the participants over the course of the four waves for the participants to want to impress upon her that they were improving. However, if this were true, here again, the results would be expected to be more positive in every category, not just in well-being. Well-being however, was the only area that asked for improvement scores to be evaluated by the participant. A bias towards wanting to show improvement could have resulted in an outcome of improvement where in actual fact none was actually perceived by the participant.

It is more likely that a shift in these perceptions of change in well-being was the result of a change in the day to day experiences of the participants. The social interaction of all the people in the facility (residents, staff, family, friends and volunteers) was the most likely cause of the perceived improvement. However, this does not reduce the effectiveness of the intervention on improving life for the residents. Therefore it was unlikely that the significant

improvement found in the fourth measure of well-being occurred independently of the intervention. If it was an independent effect it would have likely shown up as an effect in the first three control measures of well-being and it did not.

Further indication that the finding of statistical significance in the improvement of well-being measures was not an artefact of the study comes from the fact that none of the other tests of measures were close to statistical significance. Therefore there was no improvement for enjoyment of life measures in how the residents evaluated the amount of energy they had, favourite activities they engaged in, time they spent watching TV or reading books, or time they spent with family or friends. The intervention then did not change the participants evaluation of what was actually occurring in their lives.

This difference between evaluation and perception is a key one in the findings of this study. A perception change was experienced without a change in the corresponding realities of life in the areas questioned. Therefore, other factors that were not specifically measured by the questionnaire questions may have been responsible.

This observation fits the measures of depression that were gathered through the geriatric depression scale (GDS). The GDS had no significant decrease due to the smell of baking bread. Such a decrease would seem unlikely if the limited scope of the stimulus was taken into account. The smell of baking bread was unlikely to have had enough effect to change highly evaluative questions with only a yes or a no answer. The GDS had only specific questions surrounding depression and none of the questions asked for any type of perception in improvement.

To gain insights into what else could have caused the shifts in perception in the well-being measures, the data from the secondary measures of the RAI-MDS were reviewed. The RAI-MDS data measured before and after the treatment period provided an evaluative report

from staff observations on quantitative factors in the resident's life. These measures gave values on cognition, depression, activities of daily life, aggression, social interaction and pain.

There was an expected difference in social engagement scores by gender with male clients scoring significantly lower in social engagement than female clients. What was not expected was that social engagement scores diminished rather than increased after the stimuli. Male clients had a larger reduction in social engagement than female clients after the smell of baked bread was initiated. However, these differences were small and not statistically significant. Despite not being significant this is an interesting trend. It is possible that the stimuli could have caused an improvement in the satisfaction of relationships between staff and residents, causing the residents to be more satisfied with their day to day interaction, thus lowering their desire to seek out further social interaction. However, it is probably more likely that this was due strictly to chance and had no relationship to the stimuli.

Aggression was significantly different between male and female clients as was expected. Male clients were measured as being more aggressive than female clients. Both male and female clients however, got more aggressive over the course of the intervention, although neither changed in a manner which was statistically significant. The expected outcome, if the stimulus was improving the lives of residents, would be that a higher satisfaction would lead to reduced frustration and in turn reduce aggressive episodes. A trend of increasing aggression likely represents the presence of an artefact. The individuals who demonstrated increased aggression may have been progressing in their dementia to a stage where they were becoming more aggressive with their caregivers. This change could be coincidental to the timeline of the research and is not expected to be related to the intervention. Further stimuli and a longer

timeline would likely be required to create enough lifestyle improvements to significantly alter outcomes in aggression.

Higher cognitive performance scores indicated lower cognitive function, meaning overall the trend towards worsening cognition was not reversed by the study. An anomaly of this measure is that the youngest individuals living in long-term care at the facility had the highest scores and thus the lowest cognitive function. This is consistent with the fact that these individuals were in the long-term care facility due to brain injuries or other disorders which significantly impaired their cognitive function. These are expected results as older individuals demonstrate lower cognitive performance over time.

The cognitive performance scale (CPS) was also significantly differentiated across the different living areas of the long-term care facility. The four different living areas were represented as expected in their scores. The first living area had the highest cognitive performance while the fourth living area had the worst cognitive performance. This fits with the fact that the highest functioning individuals typically lived in the first living area while the lowest cognitive functioning individuals lived in the fourth living area. Living area two and living area three were intermediate in their scores as expected with those areas being designated for intermediate functioning individuals.

The costs of the bread baking program were important if the intervention was to be implemented into other long-term care facilities. The full cost of producing a loaf of bread was determined in order that the study could examine as to whether or not the production of bread was a cost effective method through which to attempt to improve the lives of residents.

Total ingredients for a loaf of bread were \$1.16 per loaf, and included flour, oil sugar, yeast, salt, cinnamon and the bread bags. Labour cost for the production of the bread was

determined to be \$4.51 per loaf after determining that it took a total of one hour and 45 minutes per day to produce nine loafs of bread (three living areas three times per day). Labour activities included portioning ingredients, preparing the bread-makers (putting them together after they had been washed each day), slicing, bagging and cleaning up after the bread was prepared. Once per day each bread-maker needed to have its components washed, dried and reset. The total cost then worked out to \$5.67 per loaf of bread or \$51.03 per day, \$18,625.95 per year in total labour cost and ingredients. This does not incorporate the cost of the bread-makers that were readily available from \$60 - \$100 each but which also needed to be replaced after three months of straight bread baking three times per day.

The cost of the bread baking program was not entirely inexpensive; however, the actual cost of the program is somewhat deceiving. This program was put in place at this facility without adding any more staffing to accomplish the task. Therefore the actual experienced increase in costs to the program was far less than the \$5.67 per loaf, as workers just added the task to their regular duties. As the budget for staffing did not increase, expenses only increased a minimal amount resulting in the extra labour for the production of the bread resulting in an added cost estimated at approximately \$1.50 per loaf, with a total cost of \$13.50 per day, and \$4,927.50 per year.

Despite the real time being spent of one hour and 45mins per day, the fact that this amount of time is spread across seven employees per day reduces the time spent by any one employee down to about 15 minutes. Thus it potentially becomes an activity that reduces slack in a given timetable as opposed to simply adding more staffing time. Other issues than cost were apparent for those responsible for the creation of the bread when focus group discussions determined what the staffing members experienced with the bread making program.

A focus group was held with the kitchen staff members who were responsible for making the bread in the bread-makers. These staff members identified certain problematic features of this research which needed to be corrected in order for the greatest benefit possible to be experienced by those living in the long-term care facility. The focus group noted that the bread-makers did not create as much aroma for the living areas as other methods which could have been implemented. After the research was completed, the kitchen staff began baking diced onions at meal times wrapped in tinfoil in the residential ovens which created a much more aromatic smell. The onions were then served with breakfast, lunch and dinner meals. Different recipes were also tried to produce more aroma. However, even when certain recipes were more successful at creating a more pungent smell from the bread-maker, the bread-makers themselves did have limitations.

The bread-makers used in this research were standard household bread-makers that created an average sized loaf of bread. The constant use of these bread-makers, three times a day for 65 days, led to them beginning to break down by the time the research was nearing completion. It was quite obvious that the bread-makers themselves were never intended to be used so much, so a higher quality industrial version of a bread-maker would need to be acquired. This would drastically increase the cost of the equipment from a household bread-maker currently costing anywhere from \$60 - \$150.

The participants in the focus group thought a better solution needed to be determined to ensure that such a program was sustainable. The onions baking in the oven was a potential solution as onions can be ordered pre-diced or diced in large quantities by kitchen staff using industrial machines that greatly speed up production time. The tinfoil the onions are baked in creates a complete container which does not require any attention from staff during baking time.

This procedure was thought by the focus group to reduce the time spent by almost two thirds, resulting in a much more manageable 35 minutes per day.

The cost of the bread itself versus onions would be very comparable as both items cost less than \$1 per meal, or \$27 per week, which should not be considered inhibitive. The reality for long-term care facilities is that food is in constant creation so food items that fit into the normal realm of production do not create hardship. The change however of creating food where the residents are living does bring up a number of other factors for which careful planning must occur.

Food creation in any sort of oven obviously means a hot stove is present which creates a certain level of danger for residents. A constant worry is that a resident would attempt to open an oven door and remove the items baking without remembering to put on protective gloves. The potential for this type of accident leads to the need to identify barriers which would stop a resident from accessing the hot stove when there was no one available to supervise the kitchen. The nature of care in these long-term care facilities is that it is impossible to guarantee that someone will be available for supervision of a kitchen 100% of the time unless they are assigned to only that task. None of the outlined programs for creating aroma would be cost effective if a staff always had to stay with the food being created. This is why the bread-makers were chosen in the first place. A bread-maker does not get hot enough on its outside to burn the residents and the bread-makers purchased for this study all locked while they were creating the bread. The residents also were not familiar with bread-makers and did not appear interested in disturbing them. The onions therefore do have the downside of being in a hot oven. This is generally solvable as these kitchens are created with this population in mind and can usually restrict access to ensure safety when residents cannot be supervised.

Other items such as muffins were identified which could be baked in these areas and made available for eating. Staffing is what makes these items more problematic for creation but this is not to say these programs cannot be created. Making muffins in the morning in each living area and allowing them to be eaten is a great idea. How often this could occur would depend on the program's freedom financially to ensure that staff were able to do this in a safe and enjoyable manner.

Other issues with the bread creation were identified by the kitchen staff. The quality of the bread itself was an issue due to the nature of using bread-makers. The quality of the bread depended on variations in how the bread was made, which sometimes resulted in the bread being too crisp or crumbly for the residents to be able to eat comfortably. The onions in the oven would be more straightforward in this manner, with fewer issues around quality control. The bread when created often had to sit too long before residents could eat it so typically the previously baked bread was sliced for the residents to eat at a meal until after the new bread had cooled the required length of time. This led to further quality issues when residents had trouble eating a toasted version of the previously made bread, with some of them unable to chew the crusts.

Many of the focus group's comments were on the lack of smell from the bread-maker. It was felt that alternative bread recipes would be more effective at creating aroma. Cinnamon was used in the bread recipe to increase this level of aroma which was considered more effective by the kitchen staff but still not as aromatic as the onions. Additional ideas from the focus group included the creation of soups in crock-pots and barbeques whenever burgers were on the menu.

The focus group with the kitchen staff did bring up one other major point; the fact that the staff at the facility seemed to enjoy the bread being baked more than anyone else.

Technically the bread was supposed to be for the residents but this is a part of the reality of working in a long-term care facility. The bread making program seemed to be viewed as a perk by the staff who enjoyed its smell and taste.

Olfaction therefore appears to be established as a method by which improvement to quality of life factors can occur for long-term care residents. Concerns exist that a loss of olfactory function would not allow those with dementia living in long-term care facilities to experience an improvement in their perceived well-being due to a potential inability to smell the stimulus. Instead, as postulated, it appears that smell still improves well-being factors regardless of whether the smell could be identified. Regardless of the pathway, the improvement occurred, even if it was due to the attitude and behaviour shift in other people such as family and caregivers and not due to any ability of the participants to smell the stimulus.

A challenge for future research then is to use the knowledge gained in experiments such as this and add in future research which can determine other inexpensive sensory stimuli that can further improve the life of residents. These proven improvements can then be applied in facilities simultaneously, leading to a cumulative effect where lifestyle will be improved in a manner that is far more significant than any one improvement on its own.

5.1 Study Limitations

The study had a number of limitations which may have reduced the accurateness of the results. Weight, appetite, enjoyment of life and well-being indicators used in the study were all limited in their scope based on the techniques by which they were evaluated.

Weight was potentially confounded by not demanding that residents be weighed at the exact same time in the morning without any clothing. Realistically this could not be achieved based on the limited number of researchers available to record the weights. Ethically, it could

not be justified to get the participants to remove all their clothing prior to being weighed, nor could the time required to achieve this be supported. Both of these limitations led to results that were not as accurate as they could have been otherwise.

Appetite was evaluated by only one question which may have oversimplified the evaluation of this parameter. Expecting the participants to be able to judge their appetite was dependent on their memory. The participants' ability to recall their appetite level then varied in terms of the level of dementia present in that individual. Memory was then a factor in each of the questions asked in the study.

The enjoyment of life questions were very limited in the scope they evaluated for this parameter. It is unrealistic to expect that any set of four questions, with one on energy levels, one on favourite activities, one on how much family and friends visit and one on how much television is watched or books are read, could fully evaluate the enjoyment that a person has in their life.

A similar limitation is present in the well-being questions which are expected to evaluate this parameter with four questions on improvement in health, personal appearance, quality of life and appetite. The well-being measures may also have been affected due to their reliance on memory. The questions evaluating well-being required the participants to remember whether an improvement had occurred. This resulted in the well-being measures being more reliant on memory than any of the other measured factors. Given that a large portion of the participants had dementia, asking them to remember such an improvement in well-being represented a potential threat to the internal validity of the study. However, four measures of well-being were recorded, with each evaluated in the exact same manner. Only the fourth measure resulted in a significant change in well-being, occurring after the intervention occurred. Despite memory

being a threat to the internal validity, memory cannot explain the change found during just the fourth measure of well-being.

Only the geriatric depression scale and the RAI-MDS data used to evaluate participants had been fully vetted in their reliability and validity through repeated academic studies. Therefore it cannot be assumed that the measures of appetite, enjoyment of life and well-being accurately portrayed these parameters.

The validity of the geriatric depression scale (GDS) was questionable due to the use of questions not designed specifically for a long-term care population. The question “Do you feel you have more problems with memory than most?” should have been removed from the GDS as the comparison group for people in long-term care is skewed to a large percentage of individuals who have memory problems, reducing the validity of the question. The question “Do you prefer to stay at home, rather than going out and doing new things?” was also problematic as many individuals in the long-term care facility were not thinking of the facility as their home. These questions likely should have been discarded from the interview despite the effect that would have had on the ability to compare the GDS as a whole to previous research.

Despite the potential ability for the RAI-MDS data to be used in future research to allow for the further discrimination into sub-populations within facilities, the relatively small sample size, $n=33$, in this study meant an inability existed for sub-populations to be measured in this study in a meaningful manner. Trends indicated that indeed sub-populations contained different characteristics and it is expected that in future research the ability to follow larger populations would allow for some much more interesting patterns to emerge in how the different sub-populations responded to stimuli changes such as the smell of baking bread. Remembering to not group these sub-populations together as one large population called “long-term care

residents” is a key to achieving successful interventions that will be more effective in improving the lives of residents living in these facilities.

Another limitation of the study was that it did not isolate whether or not the smell was perceived by the residents. This was not measured as it was deemed too difficult to be able to interview each resident at exactly the mealtime when the smell would be present at its fullest effect. This however did leave a gap in the research. The study cannot say for certain as to whether or not the improvement found in the residents can be linked to the perception of the smell or is more likely due to the change in the attitude and behaviour of the surrounding staff and family members. Taking this measure would have also provided the opportunity to test more closely as to whether or not the residents could perceive smell while at the same time whether or not they could identify the smell. Without this data there is no clear means by which to determine the origin of the improvement in well-being scores.

5.2 Practice and Policy Implications

The first implication for this study is that it may be possible to increase the well-being of residents in long-term care facilities and to get staff to enthusiastically participate in the process. Simple improvements which have a large impact on well-being for residents have a higher likelihood of being supported by staff, especially if staff members also experience an improvement in their work environment.

Other positive implications have to do with the concept of sustainability for long-term care. Demand for long-term care will have increased 10-fold by 2038 with an expected economic burden of \$153 billion per year in comparison to the \$15 billion spent in 2008 (Alzheimer Society of Canada, 2011). Increasing the cost of long-term care in any manner may be difficult to justify from the point of view of sustainability when it is questionable already how

society will sustain long-term care as it already exists. However, with simple and low cost improvements as outlined in this research, it may still be possible to improve well-being without substantially increasing the costs of providing care.

The political power of the baby boomers could result in trends towards improvement in long-term care. As this population of baby boomers begins to live in long-term care, they and their caregivers will become attractive in terms of voting power. This invariably will mean political platforms will be built which increase services and improve the lifestyle for this population, regardless of what that will mean to increased costs for society as a whole. Quality of life will therefore be at the forefront of research into the future of long-term care as program dollars will start to be spent on programs that provide the largest improvements for the least amount of dollars.

Difficult questions will need to be asked as to what programs are sustainable in order for people to continue to live affordably in long-term care environments. Continuing to allow for lifestyle improvements will mean research ideas focused on the five senses will be popular due to the relative lack of expense in implementing ideas that involve smell, sight, touch, feeling and sound. The key to these research pieces will be the ability to incorporate changes that do not count on large increases in staff time as employees are the most expensive component of long-term care. The contribution of this exploratory study shall have been in exploring this topic and in providing preliminary data.

5.3 Conclusion

Considering the outcome of this study, the last observation by the focus group becomes very important. If the bread baking program positively affected the staff, then it would potentially explain the perceived improvement in well-being by the residents. Most of the

interaction that the residents get on a day-in day-out basis is with the staff who provide their care. Any improvement in the happiness of these employees is likely to carry over and affect the residents' mood day to day. Residents of long-term care facilities are not any different than anyone else in society in that they react to how they are treated. Day-to-day care for these individuals is a very difficult job, where it is especially hard to treat each interaction with a resident as though it is a unique experience. The reality for the caregiver is that it is not a unique experience; they are repeating this process for dozens of people on a continual basis. The experience for the resident, however, is unique. Residents typically look forward to their interaction time with the staff because it is one of the few positive inputs of interaction that they experience on any given day. Each interaction is thus mentally evaluated by the resident as to how it rates, positively or negatively. Staff can forget this fact and get to thinking too much about the list of jobs they have to complete. Residents then, react poorly to the staffs' lack of engagement, often resulting in the resident becoming ill-mannered.

Getting away from this type of interaction is helped by the smell of bread baking which results in a more home-like experience for both the resident and the staff member. It helps the staff feel better and remember that this is the residents' home. This small shift in attitude and perception can have large ramifications for the residents' interaction with staff and thus their perception of well-being.

Therefore, it is posited that food aroma may be able to enhance feelings of well-being for those living in a long-term care facility by enhancing their food-eating experience and positively influencing the interactions experienced in their relationships with staff. Since this intervention could be implemented simply and economically in long-term care facilities, it is worthy of examination. However, very little is known about the role of olfaction, food aromas in

particular, as it relates to improving the lives of long-term care residents. Using the senses to create inexpensive quality improvements therefore is worthy of future research which hopefully can one day culminate into a simple list of lifestyle improvements to be affordably initiated at all long-term care facilities.

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Appendix 1

Questionnaire

Resident Name:

Date:

Assisting with answer:

Resident ID:

Weight

- To be measured in the morning either pre or post breakfast for consistency

Weight (in lbs) _____ Date: _____ Pre – or Post –: _____

Appetite

Would you describe your appetite as being: (1) very poor, (2) poor, (3) fair, (4) good, or (5) excellent?

Appetite Measure _____

Well Being

- After Question if answer is; Better than ask “slightly improved (1); fairly improved (2); Somewhat improved (3); Quite improved (4); Much improved (5)
- If answer is “Worse” then ask; slightly worse (-1); fairly worse (-2); somewhat worse (-3); Quite a bit worse (-4), or Much worse (-5)
- If answer is “No Change” ask; no change at all? (0); slightly worse (-1) or slightly better (1)
- Do you believe your health is better or worse or had no change in the last 2 months?

-5 -4 -3 -2 -1 0 1 2 3 4 5

Much Worse Than

No Change

Much Improved

- Do you believe your personal appearance has improved or worsened or had no change in the last 2 months?

-5 -4 -3 -2 -1 0 1 2 3 4 5

Much Worse Than No Change Much Improved

- Do you think your Quality of Life has changed in the last two months? Is it worse, better or has there been no change?

-5 -4 -3 -2 -1 0 1 2 3 4 5

Much Worse Than No Change Much Improved

- Do you think your appetite has changed over the last two months? Is it worse, better, or has there been no change?

-5 -4 -3 -2 -1 0 1 2 3 4 5

Much Worse Than No Change Much Improved

Quality of Life

- **If answer is “No”; ask not nearly enough (1) or just not very much (2); if “Yes” then ask “by quite a bit” (3) or by a lot (4) (Follow like prompts under numbers)**

1. Do you think you normally have enough energy?

1 2 3 4

Not nearly enough Not very much by Quite a bit by a lot

2. Do you often engage in your favourite activities?

1 2 3 4

Not at all Not very much Quite a bit Very Much

3. Do you enjoy spending time watching television or reading books?

1	2	3	4
Not at all	Not very much	Quite a bit	Very Much

4. Do you spend much time with family or friends?

1	2	3	4
Not at all	Not very much	Quite a bit	A lot

Appendix 2

Geriatric Depression Scale – Short Form

Choose the best answer for how you have felt over the past week:

1. Are you basically satisfied with your life? YES / **NO**
2. Have you dropped many of your activities and interests? **YES** / NO
3. Do you feel that your life is empty? **YES** / NO
4. Do you often get bored? **YES** / NO
5. Are you in good spirits most of the time? YES / **NO**
6. Are you afraid that something bad is going to happen to you? **YES** / NO
7. Do you feel happy most of the time? YES / **NO**
8. Do you often feel helpless? **YES** / NO
9. Do you prefer to stay at home, rather than going out and doing new things? **YES** / NO
10. Do you feel you have more problems with memory than most? **YES** / NO
11. Do you think it is wonderful to be alive now? YES / **NO**
12. Do you feel pretty worthless the way you are now? **YES** / NO
13. Do you feel full of energy? YES / **NO**
14. Do you feel that your situation is hopeless? **YES** / NO
15. Do you think that most people are better off than you are? **YES** / NO

Answers in **bold** indicate depression. Although differing sensitivities and specificities have been obtained across studies, for clinical purposes a score > 5 points is suggestive of depression and should warrant a follow-up interview. Scores > 10 are almost always depression.

Appendix 3

RAI-MDS Data Collection Sheet

Residents Code:

RAI-MDS assessments resulting in nine outcome measures for each resident.

These outcome measures are defined as; (Northern Health Authority, 2010)

1. Cognitive Performance Scale (CPS)

- CPS categories (0 (Intact) to 6 (Very Severe Impairment)) are highly related to resident's average scores on the Folstein Mini-Mental Status Exam (MMSE, which as a score of 0 to 30)

Measure #1 (Pre-Control) _____

Measure #2 (Post Experiment) _____

2. Depression Rating Scale

- Scale is 0 to 14
- Scores of three or greater indicate major or minor depression disorders

Measure #1 (Pre-Control) _____

Measure #2 (Post Experiment) _____

3. Activities of Daily Life Self-Performance Hierarchy Scale

- Scale of 0-8 where “0” is independent and “4” is total dependence

Measure #1 (Pre-Control) _____

Measure #2 (Post Experiment) _____

4. Activities of Daily Life Short Form Scale

- Score is 0 to 4 where “0” is independent and “4” is total dependence

Measure #1 (Pre-Control) _____

Measure #2 (Post Experiment) _____

5. Activities of Daily Life Long Form Scale

- Score is 0 to 28
- Higher score indicates decreased function
- Score is calculated by adding up the scores (0 independent to 4 total dependence) on seven ADL items:
 - i. Bed mobility
 - ii. Transfers

- iii. Locomotion on Unit
- iv. Dressing
- v. Eating
- vi. Toilet Use
- vii. Personal hygiene

Measure #1 (Pre-Control) _____

Measure #2 (Post Experiment) _____

6. Changes in Health, End-Stage Disease and Signs and Symptoms (CHESS Scale)

- Score is 0 to 5
- Higher Score indicates increased chance of mortality
- The CHESS scale is a strong predictor of mortality and is a measure for detecting frailty and instability in health

Measure #1 (Pre-Control) _____

Measure #2 (Post Experiment) _____

7. Aggression Behaviour Scale (ABS)

- Scores range from 0 (no aggressive behaviour) to 12 (daily aggressive behaviour of all types)
- Based on summary score of
 - i. Verbal Abuse
 - ii. Physical Abuse
 - iii. Socially inappropriate behaviour
 - iv. Resisting Care

Measure #1 (Pre-Control) _____

Measure #2 (Post Experiment) _____

8. Index of Social Engagement

- Score is 0 to 6
- A higher score indicates greater social engagement
 - i. At ease interacting with others
 - ii. At ease doing planned or structured activities
 - iii. At ease doing self-initiated activities
 - iv. Establishes own goals
 - v. Pursues involvement in the life of the facility
 - vi. Accepts invitations into most group activities

Measure #1 (Pre-Control) _____

Measure #2 (Post Experiment) _____

9. The Pain Scale

- Score is 0 to 3 (0 is No pain; 3 is Severe daily pain)
- A higher score indicates prevalence in pain

Measure #1 (Pre-Control) _____

Measure #2 (Post Experiment) _____

Appendix 4

Focus Group Questions

Post-Trial Focus Group with Staff

Introductory Question: Tell us your name, your occupation and how long you have worked at Stuart Nechako Manor and one thing you enjoy doing (hobby, activity, etc.)

1. Describe the Quality of Life level you believe people at Stuart Nechako Manor have.
2. What changes have you witnessed in residents since the bread baking program began?
3. What changes have you witnessed in staff related to the bread baking program began?
4. What are your opinions on how food affects Quality of Life for Residents living at Stuart Nechako Manor?
5. What do you believe would improve the eating experience of people living at the Manor?
6. What aspects of food preparation could be improved at Stuart Nechako Manor?
7. What changes to the eating experience could make residents at the Manor happier?
8. Let's summarize the key points of our discussion.
9. Have we missed anything?
10. Is there any further comments any of you have?