Relationships between Quality of Life and Selected Resident and Facility Characteristics in Long Term Care Facilities in Canada

by

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AUTHOR'S DECLARATION

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

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

ABSTRACT

Background: Quality of life (QoL) of long term care facility (LTC) residents is being recognized as an important outcome of care by LTC providers, researchers, and policy makers. For residents, measurement of QoL is a valued opportunity to express their perception of the quality of their daily life in the LTC facility. For clinicians, self-reported QoL provides useful information in planning and implementing resident-centred care.

Purpose: The purposes of this study were: (1) to examine the distributional and psychometric properties of the *interRAI Self-Report Nursing Home Quality of Life Survey (interRAI_QoL Survey)*; and (2) to explore the relationship of selected socio-demographic and clinical characteristics of residents and LTC facility attributes with residents' self-reported QoL.

Methodology: This was a cross-sectional observational study. A convenience sample of 48 volunteer LTC facilities from six Canadian provinces was involved in this study. Nine hundred and twenty eight (928) residents agreed to participate in this study. Resident inclusion required an interRAI Cognitive Performance Scale score of 0 (intact) to 3 (moderate impairment). Residents' self-reported QoL was measured by trained surveyors using the *interRAI_QoL Survey* instrument. Residents' socio-demographic and clinical characteristics were obtained from the most recentResident Assessment Instrument –Minimum Data Set 2.0 prior to the QoL interviews. LTC facility attributes were measured by a survey form specifically designed for this purpose. Descriptive statistics were used to describe the participating LTC facilities, the sample of residents, and residents' self-reported QoL. Psychometric tests for reliability (test-retest and internal consistency) and validity (content and convergent) were conducted. Bivariate analyses were conducted to examine the relatioships between QoL and resident and facility charateristics.

Multivariate linear and logistic regression analyses were conducted to identify predictors of residents' QoL.

Results: The study confirmed the feasibility of assessing LTC facility residents' self-reported QoL. The findings showed positive ratings of some aspects of residents' daily lives while negative ratings in other aspects. Psychometric tests showed that the *interRAI_QoL Survey* instrument had test-retest reliability, internal consistency, content validity and construct (convergent) validity. Several resident and facility characteristics were associated with self-reported QoL. Religiosity and highest education level attained were significantly and positively associated with QoL. Other resident characteristics such as age, gender and marital status were not. Mild cognitive impairment, depression, aggressive behaviour, hearing impairment, bowel and bladder incontinence, and extensive assistance in activities of daily living were significantly but negatively associated with QoL. LTC facility ownership showed significant association with QoL. Residents in municipal LTC facilities followed by private LTC facilities reported higer QoL in contrast to charitable LTC facilities. Profit status, accreditation and leadership stability were not associated with QoL. Residents in rural settings reported significantly higher QoL than those in urban settings. Facility size (measured in number of beds), registered nurse hours of care, nursing staff turnover, and ratios of registered to non-registered nursing staff did not have a significant association with QoL. However, higher management hours and total hours of care had significant and positive associations with residents' overall QoL. Multiple linear regression showed that residents' religiosity, degree of social engagement, post secondary education, dependence in activities of daily living, and positive global disposition, and LTC facilities situated in rural settings and ownership type together accounted for 24% (adjusted R^2=0.24) of the variance in overall QoL (the dependent variable). In logistic regression, low QoL was used as the binary dependent variable. Residents who were religious, were socially engaged and had a positive global disposition were less likely to report low QoL. In contrast, residents with dependence in activities of daily living and post secondary education were more likely to report low QoL. Residents in LTC facilities located in rural settings and operated by municipal or private operators were less likely to report low QoL compared to charitable facilities.

Strengths and Limitations: This study had several strengths, including a sample of 928 residents who self-reported on their QoL and the use of RAI-MDS 2.0 for objective, external indicators of QoL. This study had several limitations, including response bias due to method of sample selection, inability to draw causal inferences due to study design; limited generalizability due to use of a convenience sample, lack of monitoring of surveyors for the integrity of resident interviews, and exclusion of residents with cognitive performance scale scores of more than three or inability to communicate in English. Future research should address these limitations. As well, future research should conduct more stringent psychometric analyses such as factor analysis and use multi-level modeling procedures.

Implications: The findings of this study have implications for improving residents' QoL, LTC facility programming, future research, and social policy development.

Conclusion: QoL can be measured from resident self-reports in LTC facilities. Self-reports from residents may be used by clinicians to plan and implement resident-centred care. There are significant associations of residents' QoL with select resident socio-demographic and clinical characteristics and facility attributes. Some of these resident characteristics and facility attributes may serve as predictors of QoL.

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DEDICATION

To my wife, Knar Kehyayan, I dedicate this doctoral dissertation to you for your love, encouragement, understanding, support, and patience. Your unwavering sacrifice for the past four years made my lifelong dream come true. Thank you for believing in me.

I also dedicate this work to the memory of my mother, Makrouhi Kehyayan, who instilled in me from an early age a passion for learning, perseverance, and an appreciation of learning as a lifelong occupation for exploring and discovering new horizons. I also dedicate this dissertation to my father, Avedis Kehyayan, from whom I learned about responsibility and strong work-ethic.

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LIST OF ABBREVIATIONS

ABS	Aggression Rating Scale
ADL	Activities of Daily Living
ADLH	Activities of Daily Living Hierarchy Scale
AIC	Akaike Information Criterion
CCRS	Continuing Care Reporting System
CHESS	Changes in Health, End-stage Disease and Signs and Symptoms
CI	Confidence interval
CIHI	Canadian Institute for Health Information
CPS	Cognitive Performance Scale
DRS	Depression Rating Scale
DW	Durbin Watson test for autocorrelation
FTE	Full time equivalents
ICC	Intraclass correlation
interRAI	Group of International researchers (www.interrai.org)
interRAI_QoL Survey	interRAI Nursing Home Quality of Life Self-Report Survey
ISE	Index of Social Engagement
LOS	Length of Stay
LPN	Licensed Practical Nurse
LTC	Long term care
OHA	Ontario Hospital Association
OR	Odds ratio
Proc Reg	Linear regression procedure in SAS

Proc Logistic	Logistic regression procedure in SAS
PSW	Personal Support Worker
Q	Quartile
QoL	Quality of life
RAI_MDS	Resident Assessment Instrument _ Minimum Data Set 2.0
REG	Regression
RN	Registered Nurse
RPN	Registered Practical Nurse
SAS	Statistical Analysis Software (SAS® 9.2)
SC	Schwartz Criterion
SD	Standard Deviation
SPEC	Test for heteroskedasticity (not identical distribution of error terms) and test for dependence of error terms
TOL	Tolerance
VIF	Variance Inflation Factor
WHO	World Health Organization
WHOQOL	World Health Organization Quality of Life Group

1.0 Introduction

There has been a notable increase in recognition by clinicians, policy makers, and researchers of quality of life (QoL) as an important health outcome (Bowling, 1996; Ferrans, 1996; Kane, 2001). A search of titles in Medline and PsycINFO databases using the search string "quality of life" from 1990 to 1995 yielded 830 hits, from 1996 to 2000 yielded 4,204 hits, and from 2001 to 2010 yielded 22,907 hits. Such results attest to the increasing importance of QoL in health sciences research. In contrast, while quality of life has also assumed great relevance in long-term care (LTC), the number of articles published in the literature is relatively scant. A search of titles in these two databases for the same periods using the search strings "quality of life" AND (nursing home* OR long term care) yielded the following counts of publications: 1990 – 1995 = 12; 1996 – 2000 = 24; and 2001- 2010 (February) = 142.

The issue of QoL in older adults has taken on greater importance because of an aging population that will place a greater demand for LTC services, including admission into LTC facilities. The population world-wide is aging largely because of declining fertility and mortality rates, increasing life expectancy, and advanced medical technology (Fried, 2000; Palacios, 2002). However, the greatest contribution to increased life expectancy over the past century is attributable to advances in public health such as improvements in motor-vehicle safety, safer workplaces, control of infectious diseases, safer and healthier foods, and recognition of tobacco as a health hazard (Bunker, 1994; Centers for Disease Control and Prevention, 1999). In the next decade, most of elderly Canadians will be from the baby boomer generation: people born between 1946 and 1965 (Steel & Gray, 2009). While this segment of the population will more likely to wish to remain in the community (Knickman & Snell, 2002; Quine & Carter, 2006), they may require admission into LTC facilities over the next two decades. This group of residents, who are described as wealthier and better educated than generations before them (Knickman & Snell, 2002; Quine & Carter, 2006), is expected to be very vocal about expressing their views and preferences about all aspects of their care, treatment and life in LTC facilities. The baby boomer generation can be expected to transform LTC (Blanchette & Valcour, 1998). They are also expected to want to maintain in the LTC facility the level of QoL they have become accustomed to in the community. Thus, the expectations of the baby boomer generation will serve as a driving force in shaping the content (what is provided), process (how it is provided) and outcomes of care, including QoL. They will be the catalysts for changing the culture of care in LTC facilities. They will be demanding more home-like environments where institutional care is replaced by person-centred care, and where personal autonomy and decision-making will drive the transformation of care from a medical to a consumer-directed model (Robinson & Reinhard, 2009). Thus, LTC facilities must adopt measures of QoL, including assessments of residents' comfort; respect, autonomy, and engagement in decision-making, meaningful activities and relationships.

While QoL is a shared concern in both community and institutional settings, it is particularly important in LTC facilities. One reason for this may be because of the limited choices and control residents have within LTC facility settings. Another reason may be the permanency of residents' situation (Holtkamp, Kerkstra, Ribbe, Van Campen, & Ooms, 2000) compared to other health care settings (Kane et al., 2004). For the majority of LTC facility residents, the facility becomes their permanent residence for the balance of their remaining life. According to The Council on Aging of Ottawa, the average length of stay in a LTC facility is three to four years (The Council on Aging of Ottawa, 2008). For the majority of these residents, the presence of chronic and co-morbid illnesses, which require close medical and nursing supervision, compromises their ability to continue living independently in the community necessitating their admission into a LTC facility (Druss, Bradford, Rosenheck, Radford, & Krumholz, 2001; Marsh, 1997). Increased impairment in cognitive functioning, activities of daily living (ADL; e.g., bathing, dressing, eating), and instrumental activities of daily living (IADL; e.g., grocery shopping, meal preparation, housekeeping), and the need for nursing and/or personal care 24-hours a day may also be determining factors for their admission (Alberta Seniors and Community Supports, Government of Alberta, 2008; Ontario Seniors' Secretariat, Government of Ontario, 2007). While LTC facilities occupy an important position in health care, they are total institutions from a sociological perspective.

Goffman (1961) defined a total institution as “a place of residence and work where a large number of like-situated individuals, cut off from the wider society for an appreciable period of time, together lead an enclosed, formally administered round of life” (p. xiii). While Goffman’s definition is about mental health asylums, its principles apply to any institution where a group of unrelated individuals reside. Whereas LTC facilities are designed to care for persons who require care, the deleterious effect of institutionalization has been well documented (Goffman, 1961; Kane, 1991). Admission to a LTC facility may signify major changes in the lives of older adults, including changing relationships with family and friends, forming new relationships with facility staff and other residents, and experiencing substantial compromise in their independence, autonomy and self-control (Guse & Masesar, 1999; Kane, 1991). Further, admission to an institutional setting may expose older adults to circumstances that are disempowering, such as dependence on facility staff for all aspects of their care, (Gibson, 1991; Tu, Wang, & Yeh, 2006). While most LTC facilities have adopted philosophies of care and have instituted measures in their physical design and programming to create “home-like” environments (Schroll, Jonsson, Mor, Berg, & Sherwood, 1997), they resort to instituting efficiency driven routines such as requiring choice of meals; scheduling meal or visitation times; or making available preferred leisure activities. Such routines may appear to be mundane, but they take great importance in the day-to-day life of LTC facility residents (Caplan, 1990). Thus, the basic content of residents' lives in LTC facilities, including their ability to make decisions about their care and to make choices; to exercise their rights as citizens; to have enjoy autonomy, privacy and dignity; and to maintain personal relationships with their families or significant others takes on great importance in shaping their QoL. While life expectancy in LTC facilities is relatively short, a great deal could be done to improve residents' QoL (Kane, 2000). An examination of the factors that contribute to their QoL may be of substantial benefit to these residents.

1.1 Search Strategy

Several searches of the peer-reviewed literature were conducted to retrieve articles relevant to the purposes of this study. An initial electronic search of the MeSH database (through MEDLINE PubMed) was conducted using the following combination of MeSH terms: "Quality of Life" AND "Aged") AND "Aged, 80 and over") AND "Residential Facilities". Further manual searches were conducted from related citations.

The following multiple databases in Scholars Portal CSA Illumina were also searched: Abstracts in Social Gerontology; E-Journals @ Scholars Portal; Expanded Academic ASAP @ Scholars Portal; Health Sciences: A SAGE Full-text collection; and PsycINFO. These searches were restricted to publications in the English language between 1985 and 2010. The following combination of keywords were used: (quality of life OR QOL) AND "definition OR model OR older age); (quality OR quality of life) AND (nursing home* OR facility* OR older adult*); (quality of life) AND (nursing home* OR nursing facilities OR long term care); (quality OR quality of life) AND (resident assessment instrument OR minimum data set OR MDS); (quality of life) AND (ageing OR older people OR elderly). These terms were used interchangeably and in combination with one another to increase search results. Additional articles were identified through “snowballing” or cross-checking citations in the listed references of the retrieved articles.

As well, specific searches were conducted to identify descriptive or inferential research studies on the association of quality of life and resident characteristics and quality of life and LTC facility attributes. The following terms were used: ("quality of life" AND "nursing homes") OR "homes for the aged") AND ("epidemiologic studies" OR "cross-sectional studies"). Other specific searches were also conducted to identify published articles on “generalized estimating equations”, “management of missing data”, and “reliability and validity of scales”.

In addition to searches by keywords, author searches were also conducted, including Bowling, Anne; Castle, Nicholas; Ferrans, Carol; Ferrell, Betty; Kane, Rosalie; Lawton, Powell; Hirdes, John; Morris, John, and the World Health Organization.

All in all, over 600 references were retrieved and, of these, over 250 citations were used.

1.2 Purpose of Study and Research Questions

The purpose of this study is twofold: to gain an understanding of LTC facility residents’ QoL, and to contribute to interRAI’s continuous efforts in developing QoL assessment instruments.

Consistent with this purpose and the proposed research methodology, the following two sets of variables, as possible correlates of residents’ QoL in LTC facilities, will be evaluated: (1) residents’ socio-demographic (e.g., age, gender, marital status, education) and clinical characteristics (e.g., health status, functioning, and cognitive performance), and (2) LTC facility attributes (e.g., ownership, size, geographic location, and hours of care). Accordingly, the following three research questions are posed for this study:

1) What are the distributional and psychometric properties of the *interRAI Self-Report Nursing Home Quality of Life Survey*?
2) To what extent are QoL ratings associated with residents' socio-demographic and clinical characteristics?
3) To what extent are QoL ratings associated with LTC facility attributes?

1.3 Potential Benefits of Study

There are several benefits to this proposed study. From a global perspective, this study contributes to a greater understanding of the concept of QoL, and specifically those resident and facility factors that may potentially enhance or impede residents' QoL. From residents' perspective, knowledge of what constitutes QoL in LTC facilities is a necessary prerequisite for developing and introducing effective interventions. For LTC facility staff, such knowledge may contribute to customizing residents' plans of care in a manner that is meaningful to residents. Such knowledge may also contribute to evaluating interventions that aim to enhance or maintain residents' QoL (Gerritsen, Steverink, Ooms, & Ribbe, 2004).

Further, this study contributes to a multi-country research initiative by interRAI to design and implement QoL instruments for use in multiple health care sectors. Specifically, this study evaluates the performance of the *interRAI Self-Report Nursing Home Quality of Life Survey (interRAI_QoL Survey)* as a measure of residents' QoL in Canadian LTC facilities. It also evaluates the instrument's psychometric properties, such as its internal consistency and validity.

As well, the outcomes of this study may also benefit society, and particularly residents' families, as they will have an increased knowledge and appreciation of their loved ones' day-to-day life in the LTC facility and intervene accordingly.

Finally, this study provides directions for future research in the examination of QoL predictors in LTC facility residents, policy development, and clinical practice in LTC facilities.

1.4 Overview of Study Proposal

Section one introduces the importance of the concept of QoL in LTC facilities. It also described the importance, overall purpose, and specific research questions of the study. A review of the relevant literature is described in section two, including the concept of QoL, conceptual issues related to its definition and measurement, and a proposed conceptual framework that forms the basis for this study and its methodology.

The research methods for this study are presented in detail in section three. Specifically, the following aspects are discussed: selection criteria for LTC facilities and residents; measurement of the dependent variable and the sources for the independent variables, both resident and facility; measures to ensure protection of resident identity and personal health information; research ethics clearance; data collection procedures and data management, and the statistical analyses that will be applied. Section four presents the results of the study specific to the research questions. Finally, section five is devoted to a discussion of the study and its findings, its strengths and limitations, and its implications for clinical practice, public policy, and future research.

2.0 Concept of Quality of Life

The recognition of QoL as an important health outcome in older adults living in LTC facilities has attracted many researchers internationally to explore its definition, construct, and measurement. The discussion in this chapter attests to its complex, dynamic and multidimensional nature, particularly as it pertains to LTC facility residents.

2.1 Defining Quality of Life

A wide variety of definitions of QoL have been offered in the literature. However, despite the abundance of the literature on this subject, there is no consensus about a definition of the concept, especially its dimensions and measurement (Richard, Laforest, Dufresne, & Sapinski, 2005). It is a complex concept because at least some aspects of QoL are subjective and value-based with different people valuing different aspects of their lives (Farquhar, 1995).

Many authors do not define or clearly adopt an existing definition in their research projects. In a systematic review of the literature of 68 health-related QoL models, Taillefer et al. (2003) reported that one-quarter of the authors did not define QoL, or that they cited several definitions from the literature without indicating their preference to guide their own research. Defining or adopting a definition of QoL is essential in guiding the development of a conceptual framework, which in turn will shape the design of an instrument to measure it (Taillefer et al., 2003).

Dictionary definitions of the term “quality” may serve as a starting point towards understanding this very elusive and complex concept. The Canadian Oxford Dictionary defines quality as “the standard of something when compared to other things like it, [such as] quality of life” (Canadian Oxford Dictionary, 2004). This definition infers an introspective examination and evaluation of what constitutes quality from an individual’s perspective. The Roget’s Thesaurus (1995) defines it as a characteristic, feature, value and status, and offers synonyms such as affection, attribute, condition, constitution, essence, and individuality; it also attributes positive and negative features to it (Roget's II, 1995). Thus, these definitions give quality both a subjective dimension as well as an evaluative, cognitive dimension.

In the 1970s, social science researchers Campbell, Converse, & Rodgers (1976) and Andrews and Withey (1976) conducted pioneering work in the field of QoL research. Campbell et al. (1976) defined QoL from the perspective of life satisfaction, happiness and a sense of well-being. According to these researchers, QoL is concerned with both positive and negative experiences. Andrews and Withey (1976) described QoL from a global well-being perspective, which is built upon people’s feelings about life concerns. They concluded in their pioneering research that affective evaluation played a major role in influencing people’s perception of their life experiences. Kozma, Stones & McNeil (1991) examined QoL in later life from the perspective of psychological well-being. Their construct of QoL included happiness, life satisfaction and morale. These constructs of social well-being are commonly incorporated in QoL definitions (Andrews, 1986; Andrews & Withey, 1978; Ferrans & Powers, 1992). These concepts are regarded as attributes of, rather than independent and distinct measures of QoL. Other researchers, as well, made a distinction between life satisfaction, QoL, and personal well-being (Smith, Kistler, Williams, Edmiston, & Baker, 2004). They conceptualized life satisfaction as one dimension of QoL, which, in their view encompasses the whole person and which in turn is a measure of an individual’s personal well-being.

Other researchers have used definitions of happiness and satisfaction to measure QoL. For instance, the Index of Well-Being developed by Campbell, Converse, & Rodgers (1976) measures happiness and satisfaction as a measure of QoL. However, while happiness and life satisfaction are used interchangeably, they are not synonymous (Andrews, 1986; Andrews & Withey, 1978). Kozma, Stones & McNeil (1991) defined happiness "as a transitory mood brought about by the relative weights of positive and negative feelings" (p. 22). Happiness is viewed as the net experience of positive and negative affects (Campbell, 1976; Zhan, 1992). Happiness is a reflection of one's current state of well-being. Life satisfaction, on the other hand, refers to contentment, gratification, fulfillment and pleasure (Rodale, 1978). It also refers to overall satisfaction over the life course and implies an evaluative dimension where one compares their aspirations to actual achievements in life (Campbell, 1981; Kozma et al., 1991). Life satisfaction is also stable over the life span and across age groups (Diener, Suh, Lucas, & Smith, 1999). This may be due to people readjusting their goals as they age (Campbell et al., 1976). Thus, life satisfaction has a past-present orientation and has a cognitive evaluative component; however, happiness is transitory and has an affective component (Zhan, 1992).

In contrast to the work of researchers in the social sciences, those in the health sciences define QoL from a health perspective. These researchers rely upon the World Health Organization's (WHO) definition of health. According to the WHO, health is a "state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" (World Health Organization, 1946). The WHO definition broadens the concept of health by introducing a social dimension. The inference is that there is a social context to an individual's state of well-being. As well, this definition establishes a link between health and well-being, and by extension to QoL. Thus, a state of good health is viewed as an essential condition of QoL. Built on this definition of health, the WHO's QoL Work Group broadly defined QoL as "individuals' perception of their position in life in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards, and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationships and their relationship to their environment" (World Health Organization Quality of Life Group, 1998, p. 552). The WHO Workgroup's definition of QoL clearly links individuals' health status to their perception of their QoL. As well, this definition, which has guided the development of a wide variety of QoL measures, adds a contextual dimension to its meaning. It suggests that individuals evaluate their QoL from their positional perspective in life, society and culture, and that their personal values and goals serve as a benchmark for evaluation and judgment.

Ferrans and Powers (1992) added the dimension of importance to their definition of QoL. They contended that while individuals may be equally satisfied with their lives, they may differ in the importance they give to aspects of their lives. They defined QoL as "a person's sense of well-being that stems from satisfaction or dissatisfaction with areas of life that are important to him/her" (Ferrans & Powers, 1992, p. 29). For example, in a LTC setting, a resident is asked "How satisfied are you with the care you are receiving"? They are also asked "How important to you is the health care you are receiving"? Thus, residents' satisfaction responses are weighted by their corresponding importance ratings. Such weighting individualizes individuals' QoL assessments, and their ratings or responses are valued according to these weights (Carr & Higginson, 2003). Several researchers have used the Ferrans and Powers (1992) model for evaluating QoL in their studies (e.g., Tseng & Wang, 2001; Tu et al., 2006). Lawton (1991) defined QoL of frail older adults as "the multidimensional evaluation, by both intrapersonal and social-normative criteria, of the person-environment system of an individual in time past, current, and anticipated" (Lawton, 1991, p. 6). This definition adds the concepts of objective and subjective measures to QoL, as well as a temporal dimension where one reflects on his/her life from the perspectives of past, present, and future. Lawton (1991) conceptualized QoL through four overlapping sectors or components, including behavioural competence, objective environment, perceived QoL, and psychological well-being. Behavioural competence referred to the "social-normative evaluation" of the person's functioning in health, cognition, time use (e.g., recreation), and social behaviour (e.g., intimacy). These categories of behavioural competence are all externally observable and objectively measurable by third parties (e.g., clinicians). Perceived QoL referred to the individual's subjective evaluation of his/her performance in the behavioural competence categories. These two components were central to Lawton's model. The third component was the objective environment, which represented factors that are external to the individual. Finally, the fourth component, psychological well-being, was "the ultimate outcome in a causal model of the open type" (Lawton, 1991, p. 11). Lawton characterized psychological well-being as the cognitive evaluation of overall life satisfaction, and having positive and negative emotions. Lawton's model introduced the element of loose causality between its components. It suggested that the objective (external) environment influenced the person's functioning in areas defined by behavioural competence, which in turn influenced perceived QoL, and which ultimately led to the individual's psychological well-being (Lawton, 1991).

In summary, QoL is a multifaceted, complex, and elusive concept. Despite the intense interest in this subject since the seventies, there is still no consensus regarding its definition, its components, or assessment. The literature outlines two broad frameworks for defining QoL: health-related and generic. The health-related QoL is favoured by clinicians and researchers in the health sciences. Supporters of this model view health status measures as QoL measures.

Measures of health status are a reflection of an individual’s QoL. In contrast, the generic construct is based on psychological research, has a subjective view of QoL, and relates to aspects of peoples’ lives that are not specifically connected to health but are influenced by personal values and life experiences. In this model, health status may be a predictive factor but is not considered a measure of an individual’s QoL. One distinction between the two models is whether health status is a component or dimension of or predictor of QoL. One advantage of generic instruments is that they may apply to broad range of situations. While disease-specific health-related instruments are more sensitive, they are restricted to measuring QoL from the perspective of the specific disease they were developed for.

While some researchers have opted for defining QoL conceptually, others have defined it operationally by using domains or describing facets of QoL (Taillefer, Dupuis, Roberge, & Le May, 2003).

2.2 Domains of Quality of Life

A variety of QoL models are described in the published literature. In this section, a few of these models are described to underline the multidimensionality of this complex concept.

The World Health Organization’s *Quality of Life – BREF (WHOQOL-BREF)* instrument is the shorter version of the WHOQOL-100 and has four domains including physical health, psychological, social relationships, and environment (World Health Organization Quality of Life Group, 1998). These four domains incorporate 24 aspects of QoL. The WHOQOL instrument has been shown to be effective in measuring QoL across a wide range of cultures (Saxena, Carlson, Billington, & Orley, 2001; Saxena, O'Connell, & Underwood, 2002).

The *Medical Outcomes Study Short Form-20 (MOS - SF-20)* is a 20-item multi-dimensional instrument, which is designed to measure health-related QoL in a wide range of populations with chronic illness. The MOS-SF-20 has six domains: physical functioning, role functioning, social functioning, mental health, general health perceptions, and bodily pain (Carver, Chapman, & Thomas, 1999; Cuijpers, van Lammeren, & Duzijn, 1999). Each of the six domains is equally weighted with a scale from 0 to 100; higher scores indicating better status.

Another example of a multi-dimensional health-related instrument is the *Ferrans and Powers Quality of Life Index* with 22 elements of QoL based on their research with dialysis patients. The authors used factor analysis to cluster these elements under four domains: health and functioning; psychological/spiritual; social and economic; and family (Ferrans, 1996). The health and functioning domain includes elements of QoL, such as physical independence, ability to meet family responsibilities, pain, and health care. The psychological/spiritual domain includes elements of QoL such as satisfaction with life, satisfaction with self, happiness in general, achievement of personal goals, and faith in God. The social and economic domain includes elements such as financial independence, home, friends, emotional support from others, and education. Finally, the family domain includes elements of family happiness, children, relationship with spouse, and family health. Hacker's (2003) three QoL domains, which are based on research with cancer patients, parallel these domains and include physical, psychological and social (Hacker, 2003). Similarly, the health-related QoL measure developed by Ferrell et al. (1998), which is also based on their research on pain in cancer patients, includes physical (e.g., functional ability, strength, fatigue, overall physical health, pain), social (e.g., roles and relationships, affection, finances, employment, isolation), psychological (e.g., control, pain distress, cognition, distress of diagnosis and treatment), and spiritual (meaning of illness, hope, positive changes) well-being (Ferrell, Dow, & Grant, 1995; Ferrell, Grant, Funk, Otis-Green, & Garcia, 1998).

Wilson and Cleary’s (1995) health-related model distinguishes health status from QoL, but recognizes that they are related. Their model linked overall QoL to clinical factors such as biological and physiological factors (objective indicators), physical, cognitive and emotional symptoms experienced by the patient (subjective indicators), functional status, including psychological, social, and physical functioning, and general perception of health. In this model, overall QoL referred to patients’ self-appraisal of their QoL such as how happy or satisfied they were with life as a whole. The clinical factors outlined have several other mediating factors such as psychological, social and economic supports, and individual and environmental characteristics. The authors recognized that there were other non-medical factors that may also influence the person’s overall QoL.

Sarvimaki and Stenbock-Hult (2000), in their formulation of a conceptual model for the elderly proposed three aspects of QoL: a sense of well-being, of meaning, and of value. Further, these investigators proposed that these aspects of QoL are influenced by two factors: (1) external conditions such as the biophysical (e.g., living area; housing) and the socio-cultural environment (e.g., social network); and (2) intra-individual conditions such as objective health (e.g., absence of disease), subjective health (e.g., psychosomatic symptoms) and functional capacity (e.g., activities of daily living; sensory-motor system), coping mechanism, and personality. Similar to Lawton’s model (Lawton, 1991), these investigators hypothesized a loose causal relationship between these conditions such that the external conditions influence the intra-individual conditions leading to an ultimate QoL.

Specific to residents’ QoL in LTC facilities, Kane’s *Quality of Life Index* included 47 items grouped under 10 domains for measuring QoL, including comfort, security, meaningful activity, relationships, functional competence, enjoyment, privacy, dignity, autonomy, and spiritual well-being (Kane, 2003). Stewart and King (1994) also offered a broad definition of QoL for older adults through the use of domains. These domains included subjective rating of life satisfaction; psychological well-being; pain and discomfort; energy and fatigue; self-esteem; sense of mastery/control; ability to function cognitively, physically, socially and sexually; ability to perform usual activities of daily living, including self-care and self-maintenance activities; and perceived health. In addition, these authors suggested that the dimensions or content of each domain should be specified. For example, the dimensions of the physical function domain may include ability in walking, climbing stairs, or getting out of a chair. Content specification contributes to clarification of the QoL conceptual model.

The newly developed *interRAI Self-Report Nursing Home Quality of Life Survey* (*interRAI_QoL Survey*), which is used in this study to evaluate LTC facility residents' QoL, consists of 50 items grouped under 10 domains (Morris et al., 2009). These domains include privacy, food/meal, safety/security, comfort, making daily decisions (autonomy), respect, responsive staff, staff-resident bonding, activity option, and personal relationships (presence of friends). For example, one item that taps the "privacy" domain states: "I can be alone when I wish". The *interRAI_QoL Survey* is discussed in greater detail in sub-section 2.5.4.

In sum, while there is some degree of variation in the QoL models proposed by various researchers, there seems to be a fair degree of overlap in their domains. Nevertheless, there are variations within domains in terms of the specific dimensions or items used to operationally qualify or define them. QoL models often include physical, psychological, and social dimensions. The physical dimension, which allows for objective evaluation by third parties such as clinicians, includes physical health and functioning; the psychological dimension includes emotional well-being, spirituality and satisfaction; and finally, the social dimension includes relationships, supports, and assumption of social roles. The *interRAI_QoL Survey* (Morris et al., 2009), however, primarily focuses on subjective evaluation of aspects of residents' day-to-day lives The evaluation of physical health and functional status is addressed mainly through interRAI's comprehensive clinical assessment instruments (Bernabei et al., 2009), which include but are not limited to subjective appraisals of different aspects of health.

The following section builds on the above discussion of domains, and examines in greater detail the determinants of QoL and further elucidates the multidimensional nature of this construct.

2.3 Determinants of Quality of Life

The preceding section defined the construct of QoL by using domains with specific content areas to define them further. As QoL is acknowledged to be an abstract concept, researchers and clinicians have made a distinction between aspects, constituents or components of QoL and predictors or determinants of QoL (Sarvimaki & Stenbock-Hult, 2000; Stewart & King, 1994). These determinants further contribute to the multidimensionality of the QoL construct.

There is general consensus that QoL is a multidimensional construct (Birren & Dieckman, 1991; Bowling, Banister, Sutton, Evans, & Windsor, 2002; Ferrans, 2005; Kane et al., 2003; Lawton, 1991; World Health Organization Quality of Life Group, 1998). There are several reasons for attributing a multidimensional construct to QoL. For one, both "quality" and "life" are value-based and shaped by individuals' perspectives. As older adults in LTC facilities are a heterogeneous group, they have varied interests, and cultural and educational backgrounds (Kane, 1990). They also have multiple and complex health conditions, which are compounded by their functional limitations and dependence on staff for most of their needs. As such, QoL may have a different meaning to individual residents. Moreover, residents' perception of QoL is influenced by their day-to-day experience in the facility, their relationships with other residents and staff, and the overall physical and organizational characteristics of the LTC facility within which they may have to live for the balance of their lives.

Research findings have supported the multidimensional aspect of QoL by demonstrating associations between QoL and a variety of determinants, that is, factors that potentially influence an individual's QoL. Table 1 provides a summary of QoL determinants identified by researchers. These determinants help to define QoL more inclusively. Determinants that have been identified through QoL research may generally be grouped under four core categories: socio-demographic; health; functioning; and psychosocial factors.

2.3.1 Socio-Demographic Determinants

Quality of life is associated with socio-demographic characteristics in older persons. For example, age has a positive relationship with QoL (Hinds, 1990; Jakobsson, Klevsgård, Westergren, & Hallberg, 2003; Tseng & Wang, 2001; Zhan, 1992). It has been shown that residents 95 years of age and older reported higher health-related QoL than younger residents for general health, role limitation and mental health (Drageset et al., 2009b). It may be that the perception of well-being improves with age. Another explanation is offered by Spranger and Schwartz (2000) who suggest that significant life changes prompt behavioural, affective and cognitive processes, which potentially create a shift in an individual's perception of what is important in achieving QoL.

Table 1: Determinants of Quality of Life

Domains	Specific Determinants	References
Socio-demographic	Age	Hinds, 1990; Jakobsson, Klevsgård, Westergren, & Hallberg, 2003; Tseng & Wang, 2001; Zhan, 1992
	Marital status	Huang, 1992; Tu, Wang, & Yeh, 2006
	Education	Campbell, Converse, & Rodgers, 1976; J. Drageset et al., 2009b; Saxena, O'Connell, & Underwood, 2002
Clinical	Health conditions, diseases	Ferrans, 2005; Ferrell, Grant, Funk, OtisGreen, & Garcia, 1997; Ferrell, Grant, Funk, Otis-Green, & Garcia, 1998
	Comorbidity	Cuijpers, van Lammeren, & Duzijn, 1999; Drageset et al., 2009b
Service Utilization	Length of stay	Moyle, Mcallister, Venturato, & Adams, 2007
Physical	Physical exercise	Hassmén, Koivula, & Uutela, 2000; Luleci et al., 2008; Ruuskanen & Ruopilla, 1995; Schechtman & Ory, 2001
Culture	Culture	Kagawa-Singer, Padilla, & Ashing-Giwa, 2010
	Social-cultural factors	Saxena, Carlson, Billington, & Orley, 2001
	One's beliefs, values, thoughts and attitudes	Collinge, Rüdell, & Bhui, 2002; Warner, 1999
	Religion, religiosity, spirituality	Efficace & Marrone, 2002; Ferrell, Grant, Padilla, & Vemuri, 1991; Katsuno, 2003; Kirby, Coleman, & Daley, 2004; Koenig, Kvale, & Ferrel, 1988; Low & Molzahn, 2007; Oleson, Heading, McGlynn, & Bistodeau, 1994; Tarakeshwar et al., 2006; World Health Organization Quality of Life Group, 2006
Psychosocial	Interpersonal relationships	Moyle et al., 2007
	Self-esteem	Kuehner & Buerger, 2005; Moyle et al., 2007
	Depressive symptoms	Dragomirecká et al., 2008.
	Social support	Kuehner & Buerger, 2005
	Chronic pain	Degenholtz, Rosen, Castle, Mittal, & Liu, 2008; Jakobsson et al., 2003; Zanocchi et al., 2008

Domains	Specific Determinants	References
	Functional disability e.g., decline in ADL	Bowling, Banister, Sutton, Evans, & Windsor, 2002; Bowling, Seetai, Morris, & Ebrahim, 2007; Luleci, Hey, & Subasi, 2008; Ozcan, Donat, Gelecek, Ozdirenc, & Karadibak, 2005; Tseng & Wang, 2001; Tu et al., 2006
	Physical function	Degenholtz, Kane, Kane, Bershadsky, & Kling, 2006
	Visual acuity/impairment	Degenholtz et al., 2006; DuBeau, Simon, & Morris, 2006; Elliott, McGwin, & Owsley, 2009
	Continence	Degenholtz et al., 2006; DuBeau et al., 2006
	Functional status	Patrick, Kinne, Engelberg, & Pearlman, 2000
	Cognitive impairment	Elliott et al., 2009
	Pressure ulcers	Gorecki et al., 2009
	Fear of falling	Ozcan et al., 2005; Suzuki, Ohyama, Yamada, & Kanamori, 2002
	Conflict in relationships	Degenholtz et al., 2006
	Social engagement	Degenholtz et al., 2006
	Emotional support	Berkman, Glass, Brissette, & Seeman, 2000; Kleinpell & Ferrans, 2002; Tang, Aaronson, & Forbes, 2004; Tseng & Wang, 2001
	Family involvement, social support, receiving affection	Duncan-Myers & Huebner, 2000
	A sense of meaning and purpose in life	Richard, Laforest, Dufresne, & Sapinski, 2005,
	Having a sense of control over daily activities	Abeles, 1991; Bowling et al., 2007; Duncan-Myers & Huebner, 2000; Rodin, 1986
	Personal autonomy	Abeles, 1991; Kane, 1991
	A sense of coherence	Drageset et al., 2009a
	Social support from staff and family	Tseng & Wang, 2001
	Involvement in educational activities	Duncan-Myers & Huebner, 2000
	Empowerment	Faulkner, 2001; Gibson, 1991; Tu et al., 2006

Some socio-demographic characteristics have been shown to have protective or mediational roles in the experience of QoL. For instance, several researchers have shown that marital status was positively associated with QoL (Huang, 1992; Tu et al., 2006). Drageset et al. (2009b) in a study of nursing home residents 65 years of age and older showed that those with higher education reported higher health-related QoL. As well, a study conducted by the World

Health Organization Quality of Life Group (WHOQOL) showed that persons over the age of 65 with lower education had significantly poorer QoL in all facets of QoL except in health, social care and self-esteem (Saxena et al., 2002). Similarly, Campbell, Converse and Rodgers (1976) in their classic study of QoL in American people found that higher levels of education resulted in greater overall life satisfaction (Campbell et al., 1976). However, in evaluating a particular facet of QoL such as housing, these investigators reported that people with less education had higher satisfaction with their lives from the perspective of their current housing situation compared to their preferred or expected housing. The corollary was also true that those with higher education had lower life satisfaction. This may be attributed to the discrepancy between an individual's higher expectations that result from the education process and the reality of their actual housing situation. Thus, in the appraisal of QoL, there seems to be an element of relativity; that is, an individual evaluates his or her expectations and their actual achievement or status in a particular facet of life. Additionally, it appears that education serves as a buffer in the achievement of QoL. Culture and religion are also important determinants of QoL and are discussed in greater detail in section 2.3.4.

Service utilization as measured by length of stay has also been associated with QoL, but with conflicting results. For instance, one study showed a longer length of stay to be associated with lower health-related QoL (Tseng & Wang, 2001), while another study showed the opposite (Noro & Aro, 1996). Another study also showed a significant relationship between longer length of stay and lower health-related QoL (Drageset et al., 2009b). These investigators explain that over time residents become socially withdrawn and they may rate lower QoL in that social context.

2.3.2 Health and Functioning Determinants

Other researchers have examined QoL from the perspective of specific disease conditions and have reported various degrees of associations between health conditions and QoL. For instance, in her extensive research with cancer patients, Ferrans (2005) reported an association between QoL and all domains of her conceptual model, including health and functioning, psychological and spiritual, social and economic, and family. Similarly, Ferrell et al. (1997), in their study of patients with breast cancer, reported that cancer was an influencing factor in all four domains of their conceptual model, including physical, psychological, social, and spiritual well-being. Cuijpers et al. (1999) reported a negative association between comorbidity of chronic illnesses in the elderly and health-related QoL. This finding was supported by Drageset et al. (2009b) in their study of nursing home residents in Norway where they reported that residents with no comorbid illness scored highest on all health-related QoL measures. In persons with depression, Dragomirecká et al. (2008) reported that higher scores in depressive symptoms were associated with lower QoL. Such an association between depressive symptoms and poor QoL scores is further illustrated by Kuehner & Buerger (2005) who showed that in depressed patients, interventions to help improve their self-esteem and response styles to depressed moods, and social support improved their subjective QoL. However, disease-specific QoL measures are not appropriate in LTC settings because of the common presence of residents' chronic and comorbid illnesses.

Some researchers have focused on specific symptoms arising from health conditions. For example, chronic pain has been shown to be negatively associated with QoL (Degenholtz, Rosen, Castle, Mittal, & Liu, 2008; Jakobsson et al., 2003; Zanocchi et al., 2008). Functional disability, such as decline in activities of daily living, has been negatively associated with QoL (Bowling et al., 2002; Bowling, Seetai, Morris, & Ebrahim, 2007; Luleci, Hey, & Subasi, 2008; Ozcan, Donat, Gelecek, Ozdirenc, & Karadibak, 2005; Tseng & Wang, 2001; Tu et al., 2006). In a longitudinal study of residents in nursing homes using a multidimensional measure of QoL, Degenholtz et al. (2006) found a negative association between QoL and physical function, visual acuity, and continence. Similarly, Dubeau, Simon, and Morris (2006) showed a reduction in their health-related QoL in residents with urinary incontinence and visual impairment. Incontinence, particularly fecal incontinence, is a very embarrassing and humiliating experience and can cause older persons to severely limit their social engagement, and hence their enjoyment of QoL. In evaluating the association between self-reported functional status and QoL in older adults with or without chronic conditions, better functional status was significantly associated with higher QoL (Patrick, Kinne, Engelberg, & Pearlman, 2000). A negative association between health-related QoL and visual and cognitive impairment among nursing home residents has also been reported (Elliott, McGwin, & Owsley, 2009). In a systematic review and synthesis of primary research reporting the effect of pressure ulcers on QoL in older patients, evidence suggested a significant negative association between pressure ulcers and QoL (Gorecki et al., 2009).

In the realm of physical correlates of QoL, some researchers have shown an association between physical exercise and QoL (Hassmén, Koivula, & Uutela, 2000; Luleci et al., 2008; Ruuskanen & Ruopilla, 1995; Schechtman & Ory, 2001). Exercise has been shown to improve functional performance (Bastone & Jacob, 2004) and to have physiological benefits (Hassmén et al., 2000) that have been associated with QoL (Tseng & Wang, 2001). Physical activity has a protective effect on depression in older adults (Strawbridge, Deleger, Roberts, & Kaplan, 2002), which as noted above is negatively associated with QoL. Physical exercise also reduces the risk of falls (Carter, Kannus, & Khan, 2001), the fear of which has been shown to be negatively associated with QoL (Ozcan et al., 2005).

2.3.3 Psychosocial Determinants

In the realm of psychosocial correlates, psychological conditions such as fear of falling have been negatively associated with QoL (Ozcan et al., 2005; Suzuki, Ohyama, Yamada, & Kanamori, 2002). In a study of a large sample of older adults in nursing homes, QoL was reported as negatively associated with conflict in relationships and positively associated with social engagement (Degenholtz et al., 2006). Several researchers concur on the positive association between QoL and emotional support (Berkman, Glass, Brissette, & Seeman, 2000; Kleinpell & Ferrans, 2002; Tang, Aaronson, & Forbes, 2004; Tseng & Wang, 2001), and family involvement, social support and receiving affection (Duncan-Myers & Huebner, 2000). In a study of QoL in individuals with dementia, Moyle et al. (2007) reported significant differences in QoL scores between the quality of interpersonal relationships and self-esteem. These findings highlight the contextual social-emotional environment of residents' life in LTC facilities where relationships, social/emotional support, and family involvement take on a greater importance.

In other facets of the psychosocial dimension, other researchers have shown that having a sense of meaning and purpose in life (Richard et al., 2005), having a sense of control over daily activities (Abeles, 1991; Bowling et al., 2007; Rodin, 1986), personal autonomy (Abeles, 1991; Kane, 1991), a sense of coherence (Drageset et al., 2009a), social support from staff and family (Tseng & Wang, 2001), involvement in educational activities (Duncan-Myers & Huebner, 2000) and empowerment (Faulkner, 2001; Gibson, 1991; Tu et al., 2006) are also associated with older adults' QoL in LTC facilities. These factors are critically important to older adults who feel a sense of loss and disempowerment following admission into a LTC facility and leaving behind lifelong personal possessions, their sense of control and autonomy in directing every aspect of their lives. LTC facility residents' ability to exercise personal autonomy, to make choices, and to make decisions are compromised. The importance of these factors is acknowledged by their inclusion in many QoL measurement instruments such as Kane's *Quality of Life Index* (Kane, 2003) and the *interRAI Self-Report Nursing Home Quality of Life Survey* (Morris et al., 2009). Such psychosocial factors arise because of the precipitous nature of older adults' admission into a LTC facility, the significant change in their social status from independence to total dependence in all aspects of their life, and the sense of social isolation despite the communal living conditions. Such negative feelings are compounded by the intrusive nature of life and care in institutional settings leading to their sense of disempowerment and negative perception of their QoL.

These reported determinants of QoL help to define QoL more inclusively. They also help clinicians and service providers to plan and deliver care and interventions to residents. Another purpose that QoL determinants may serve is in establishing the efficacy of therapeutic interventions. For instance, Owsley and colleagues (2007) showed that following cataract surgery, nursing home residents experienced significant improvement in their vision-targeted health-related QoL. In patients with bipolar disorder, researchers showed that group psycho-education was associated with improved QoL (Michalak, Yatham, Wan, & Lam, 2005). Based on a systematic review, it was shown that interventions to treat pressure ulcers in older patients had a significant effect on health-related QoL (Gorecki et al., 2009).

In summary, QoL is a multidimensional concept as evidenced by the multiplicity of determinants that are reported by researchers to be associated with it. Determinants may generally be grouped under three broad categories: (1) intra-person factors such as health status and functional performance; personality and demographic characteristics; (2) person-environment factors such as social environment (e.g., living arrangement; privacy; social networks; safety) and health care (e.g., services; medications; treatment interventions; attitude of care provider); and (3) extraneous factors such as physical environment (e.g., dwelling or residence); recreational opportunities (e.g., participation in meaningful activities); socioeconomic factors (e.g., income); lifestyle (e.g., spiritual practices).

Given the subjective nature of QoL and the contextual basis for one's perception of QoL, two other determinants require special consideration: culture and religion. These two determinants are discussed in detail in the following section.

2.3.4 Culture and Quality of Life

Aside from demographic, clinical characteristics and functional limitations, less tangible factors such as cultural heritage need to be considered as influencing perceptions of QoL. Culture "prescribes the ways of life of a group of people to ensure their survival and well-being, and it provides the beliefs and values that give life meaning and purpose" (Kagawa-Singer, Padilla, & Ashing-Giwa, 2010, p. 60). As culture is fundamental to human life, it is a major contextual determinant of QoL (Kagawa-Singer et al., 2010). Social-cultural factors influence perceived satisfaction of care and QoL (Saxena et al., 2001). Similarly, one's beliefs, values, thoughts and attitudes also influence QoL (Collinge, Rüdell, & Bhui, 2002; Warner, 1999). People in different cultures place different values to various aspects of their lives (Saxena et al., 2001).

Researchers have begun recognizing that QoL measures developed in western cultures may not be appropriate for use in non-western cultures (Collinge et al., 2002; Saxena et al., 2001; Scott et al., 2008; Xiang, Chiu, & Ungvari, 2010). Instruments that are standardized in English-speaking western cultures are not designed to measure the cultural differences in the conceptualization and meaning of QoL (Kagawa-Singer et al., 2010). For instance, when the Ferrans and Powers Quality of Life Index (Ferrans & Powers, 1992), which has been shown to be reliable and valid across a number of patient groups, was applied to African and Mexican Americans two of its elements were not relevant to them. As well, 11 other elements had interpretive problems requiring rewording. For example, “leisure time activities” was reworded to “things you do for fun”, and “physical independence” was reworded to “ability to take care of yourself without help” (Ferrans, 1996). In another study, older adults from ethnic minorities such as Blacks, Bengalis and Somalis were reported to have lower levels of QoL compared to Caucasians (Delahanty et al., 2001; Silveira & Ebrahim, 1995). However, such findings may be attributed to cultural bias in the conceptual design of instruments rather than actual reflection of the subjects’ QoL (Collinge et al., 2002). Thus, clinicians and researchers must be sensitive to the cultural limitations of QoL instruments, which have been developed in white European or North American cultures, when applied to non-western cultures. Such instruments must be validated against other segments of the population (Collinge et al., 2002). When interpreting QoL ratings, it is necessary for clinicians to consider what QoL means to the individual or cultural group in question, and not to assume universality of what it means to have good QoL (Kleinman, 2004; Kleinman & Benson, 2006).

The necessity for culturally sensitive QoL measurements has become important because of its increasing use as an outcome measure in evaluating the efficacy of therapeutic regimens or interventions (Bankole et al., 2007; Ferrans, Zerwic, Wilbur, & Larson, 2005). In a large scale, multi-cultural study Scott et al. (2008) reported that different cultural groups may emphasize different aspects of their QoL (Scott et al., 2008). For example, fatigue reduction resulting from a particular treatment intervention reflected a change in overall QoL in one culture but had no effect in another culture. The authors offer that such findings may be attributed to how individuals in different cultures interpret expressions such as “overall QoL” and “overall health”. Where one group may relate such expressions to physical health, others may relate it to mental health (Scott et al., 2008). A World Health Organization conference on QoL held in Tokyo struggled with a definition for it as there was no appropriate translation into Japanese (Kagawa-Singer et al., 2010). People’s view of QoL is shaped by their own cultural background. For example, in a study of cancer patients, Japanese-American patients considered treatment side effects as an outcome that had to be endured to maintain “family harmony”, while “Anglo-Americans” considered them as unwelcome outcomes that had to be countered (Kagawa-Singer, 1993). Xiang, Chiu and Ungvani (2010) recommend that culture-sensitive QoL measures are needed for Chinese patients. For example, Chinese patients express depression more as a physical experience rather than psychological symptoms (Kleinman, 2004). Jackson-Triche (2000) also reported that not only the expression of depression differed among whites, Hispanics and African Americans, but the latter group also reported the poorest QoL. A comparison of QoL variables in two large data sets of people with severe mental illness in the United Kingdom (UK) and Germany showed that those in the UK had significantly lower subjective well-being in almost all life domains (Evans, Huxley, & Priebe, 2000). Based on several types of survey data, including election surveys, Gallup polls, and official surveys by Statistics Canada, life satisfaction among Quebec Francophones has generally been lower than among Anglophones outside Quebec (Goyder & McCutcheon, 1995).

Culturally sensitive QoL instruments have been developed. The WHO’s Quality of Life instrument, both the generic 100-item and its 26-item short version, are such examples. The development of the WHOQOL was a 15-country, cross-cultural collaborative in devising an international instrument (Saxena et al., 2002; World Health Organization Quality of Life Group, 1998). A rigorous field trial was conducted in countries such as Australia, Croatia, France, India, Israel, United Kingdom and the USA using a questionnaire that was translated into 12 languages (Saxena et al., 2002). A dynamic and iterative input of multi-national QoL researchers and field testing of translations ensured the instrument's conceptual, semantic, and technical equivalence (Sartorius & Kuyken, 1994). Both 100-item and 26-item instruments were designed for cross-cultural use, and are now translated into more than 40 languages (Saxena et al., 2002). Similarly, the *interRAI_QoL Survey* received input such as definition of QoL dimensions and country-sensitive issues from researchers representing 30 countries (Morris et al., 2009). Concurrent to this study, the instrument is being tested internationally, including Japan, North America, and the South Pacific (Morris, 2010).

Another dimension of constructing cross-culturally valid and sensitive QoL assessment instruments is the choice of response scales (Hui & Trandis, 1989; Lee, Jones, Mineyan & Zhang, 2002; Szabo, Orley & Saxena on behalf of WHOQOL, 1997). Four response type scales were used by the World Health Organization's QOL Work Group: intensity, capacity, frequency, and evaluation scales. The intensity response scale measures the degree or extent of a feeling such as pain. The capacity scale measures the capacity for a feeling or behaviour. The frequency scale measures the rate of behaviours or activities. Lastly, the evaluation response scale appraises or evaluates a state or behaviour (Szabo, 1997). Researchers have suggested that anchor points in Likert scales such as "least" to "most" or "never" to "always" are relatively universal and easily translatable across cultures (Sartorius & Kuyken, 1994). However, researchers have demonstrated that in some cultures such as Asians it is less likely for extreme responses to be chosen (Hui & Trandis, 1989; Lee et al., 2002). These researchers demonstrated that cultures affect response patterns with Americans favouring four-point Likert scales while Japanese favouring seven as it gave them more options. Other researchers demonstrated that Japanese respondents tended to choose midpoint scores compared to American or British respondents (Stening & Everett, 1984). Thus, in the design of measurement scales consideration should be given to cross-cultural sensitivities and their potential influence on the quality and range of responses.

Another facet of culture is religion, which also encompasses religiosity and spirituality. Religion has been described as “an organized system of beliefs and worship often associated with social rituals related to the specific culture” (Efficace & Marrone, 2002). Religiosity refers to organized religious activities such as attending church, performing ritual activities related to a specific culture, praying, or reading of devotional literature (Efficace & Marrone, 2002; Koenig, Kvale, & Ferrel, 1988). Spirituality involves the search for meaning and purpose in life (Ferrell et al., 1998; O’Neill & Kenny, 1998; Sulmasy, 1999). Religion, and particularly spirituality, takes on greater importance in the later years of older adults than they might have in their younger years (Ferrell, Grant, Padilla, & Vemuri, 1991; Low & Molzahn, 2007; Oleson, Heading, McGlynn, & Bistodeau, 1994). Religion has been associated with QoL.

Several research studies have established an association between religion and QoL. In a study of adults between the ages of 16 and 90 years in 18 countries, the World Health Organization’s Quality of Life Working Group reported that there was a significant and positive correlation between spirituality, religion, and personal beliefs (SRPB) and the QoL domains, including psychological, general QoL, social support, environment, and physical (World Health Organization Quality of Life Group, 2006). Most studies on religiousness and spirituality and their possible association with QoL have been conducted in terminal cancer patients. For instance, Tarakeshwar et al. (2006) reported in a study of 170 patients with advanced cancer that greater use of positive religious coping was associated with better overall QoL. In a study of persons with early-stage dementia (MMSE scores of 18 or more), Katsumo (2003) reported an association between spirituality and perceived QoL. In a survey of 836 elderly members of churches and retired nuns who were outpatients of a university geriatric clinic, Koenig, Kvale and Ferrel (1988) reported that religious attitudes and activities influenced morale and well-being in later life. Similarly, other researchers in their study of religion and QoL in the last year of life reported a positive relationship. Such findings suggest that religiosity remains quite stable until the very end of life (Diehr et al., 2007; Idler, McLaughlin, & Kasl, 2009). Finally, in a study of 233 British residents of a housing complex, Kirby, Coleman and Daley (2004) reported that spirituality was a significant predictor of psychological well-being and moderated the negative effects of frailty on psychological well-being. Thus, the authors suggest that spirituality is a resource in maintaining psychological well-being. Efficace and Marrone (2002) concur that spirituality plays a role in mediating the psychological adjustment process to one’s illness and hence its relationship to QoL.

In summary, socio-cultural factors influence QoL measurements. Quality of life measurements developed exclusively from the perspective of one cultural group of a population may not be fully applicable to other groups without appropriate modifications. People from different social-cultural groups assign values to aspects of life that differ from those belonging to other social-cultural groups. What may be important for one group may not be relevant to another. The development of QoL measurements should take such social-cultural sensitivities into consideration. Clinicians as well should be aware of such sensitivities when assessing their patients' QoL, and particularly when it is used as an outcome measure in determining the efficacy of a particular therapeutic intervention. Recognition of cultural factors and their influence on QoL is particularly critical in LTC facilities where culturally diverse groups of residents are congregated. Because of such diversity, appropriate and culturally sensitive measures should be applied.

In addition to the endogenous factors (e.g., residents' socio-demographic and clinical characteristics) that influence QoL, there are also exogenous factors (e.g., the quality of care provided to residents and LTC facility attributes) that may influence QoL. These factors are discussed in greater detail in sub-sections 2.4 and 2.6.2.

2.4 Quality of Life and Quality of Care

Assessing the quality of care (QoC) in LTC facilities has received increased importance (Jones et al., 2010; Kane, 1995; Mor, 2005). Many stakeholders, including current residents of LTC facilities and their families, potential residents, advocacy groups, regulators, accreditation agencies, policy makers, funding sources, and LTC facility operators are all interested in QoC and associated data. Such data are commonly in the form of report cards, which are publicly disseminated through quality report cards (Austin, Alter, Anderson, & Tu, 2004; Castle & Lowe, 2005; Epstein, 1998; Harrington, Meara, Kitchener, Simon, & Schnelle, 2003; Li, Cai, Glance, Spector, & Mukamel, 2009; Mukamel & Spector, 2003). Such data may be used for multiple purposes, including empowering consumers to make informed choices of LTC facilities for admission based on QoC information; accreditation surveyors evaluating for level of accreditation; provincial surveyors determining compliance with regulatory requirements; and LTC facilities identifying targets for quality care improvement.

While there is no universally accepted definition of QoC, there are several approaches for its measurement (Spector & Mukamel, 1998). A widely used framework for assessing QoC is Donabedian's model of structures, processes, and/or outcomes (Donabedian, 1988). Structure measures characterize the context in which care is provided (Krumholz et al., 2006), or a LTC facility's capacity to provide QoC such as its physical plant, size, ownership, staff qualifications and skill mix, staffing ratios, and programming (Castle, 2008; Jones, Morris, Morris, & Fishman, 2003; Spector & Takada, 1991). Structure measures also include resident characteristics such as age, gender, health and functional status that may affect the delivery and outcomes of care, including QoL as previously discussed.

Process measures, on the other hand, refer to the actual delivery of care to residents (Krumholz et al., 2006), including the manner in which care is provided, and what is done to or for the patient, such as care of pressure ulcers, administration of medications, and incontinence care (Castle, 2008). Finally, outcome measures are aggregate markers of QoC (Jones et al., 2010; Krumholz et al., 2006). Outcomes may be positive or negative events (Kane, 1998), such as functional or physiological improvement, symptom relief or control, satisfaction with care, QoL, and incidence of pressure ulcers. They may also be end results or indicators of QoC or inadequacies in care provision that need to be explored (Kane, 1998).

According to Donabedian's model (1988), there is an implied, conceptual linear relationship between structure, process, and outcome measures (Kane, 1998); that is, process and structure measures are considered inputs for the observed or achieved outcomes. In other words, the presence of better structures and appropriate processes are expected to result in better outcomes (Kane, 1998). However, structure and process measures are considered only necessary but not sufficient conditions for the achievement of QoC (Mukamel, 1997). Some researchers have suggested weak relationships between structure measures and outcomes (Hillmer, Wodchis, Gill, Anderson, & Rochon, 2005) and process measures and outcomes (Krumholz et al., 2006). Nevertheless, process measures are widely used as quality indicators in LTC facilities (Jones et al., 2010; Mor, 2003; Zimmerman, Karon, Arling, Clark, & et al, 1995; Zimmerman, 2003).

Although the assessment of QoC in LTC facilities has historically focused on structure and process measures (Spector & Takada, 1991), increasingly greater attention is being given to outcome measures (Mukamel, 1997) such as QoL. However, outcomes as indicators of QoC are inherently more difficult to measure, particularly in LTC facility residents, because of the interplay of numerous factors, such as residents' characteristics, facility attributes, and variations in the delivery of care. To make fair comparisons in the performance of LTC facilities in terms of outcomes, statistical methods such as risk adjustment are necessary to control for contextual factors and distribution of resident characteristics across facilities (Arling, Karon, & Sainfort, 1997; Mor, Angelelli, Gifford, Morris, & Moore, 2003; Rosen et al., 2001; Perlman, 2009). "Risk" is conceptualized as the probability that an LTC facility resident will experience an adverse health outcome if the required care for its prevention is not provided (Arling et al., 1997; Zimmerman et al., 1995). There are multiple definitions of risk adjustment (RA) in the published literature. In clinical trials, for instance, Blumberg (1986, p. 355) defines it as "… a way to remove or reduce the effects of confounding factors in studies where the cases are not randomly assigned to different treatments. The key confounding factors are those aspects of health status that are causally related to the outcome under study" (Blumberg, 1986). An alternate definition of RA is "… a means of statistically controlling for group differences when comparing nonequivalent groups on outcomes of interest" (Hendryx et al., 2001, p. 226). Thus, service providers such as LTC facilities that have unequal case-mixes beyond their control would be unfairly compared with other LTC providers on the basis of QoL.

Determinants of QoL include, as noted in a preceding section, several health-related determinants such as health status, functional performance, cognition, continence and pain. As older adults consider their health status to be very important to their QoL (Flanagan, 1982), it is reasonable to hypothesize that the QoC that addresses their assessed health-related needs contributes to their QoL. Most definitions of QoC rest on two basic concepts: appropriateness of the process of care and the outcome or end results of care (Lohr, Yordy, & Thier, 1988). Others define QoC as "the performance of specific activities in a manner that either increases or at least prevents the deterioration in health status that would have occurred as a function of a disease or condition" (Brook & Kosecoff, 1988). In sum, there is a relationship between QoC and QoL; the former is viewed as a determinant of QoL, and the latter as an outcome measure of the former.

2.5 Measuring Quality of Life

There are several reasons for measuring LTC facility residents' QoL. First, measuring QoL is instrumental in understanding residents' self-reported views about their perception of their life in the LTC facility and how satisfied they are with their care. Second, it guides the development of evidence-informed clinical practice for making decisions about appropriate interventions (Gerritsen, Steverink, Ooms, de Vet, & Ribbe, 2007; Stewart & King, 1994; Varricchio & Ferrans, 2010). If clinicians or health care professionals are to rely on research findings to guide their clinical practice, they should ascertain the validity and reliability of the study prior to incorporating those findings into their practice (Varricchio, 2006). A third reason for measuring QoL is for evaluating the efficiency or effectiveness of implemented interventions. This would require that the QoL measure is sensitive to detect change over time. A fourth and final reason is that subjective QoL measures supplement objective (physical or biological) measures of health status in assessments of QoC (Carr & Higginson, 2001; Ferrans, 1990; Stewart & King, 1994). QoL measurements also have systemic benefits.

At a systemic level, global ratings of QoL assessments may contribute to shaping public policy for LTC, mobilizing advocacy, and introducing quality improvement (Kane, 1995; Kane, 1998). Quality of life measurement at the LTC facility level also facilitates comparisons or benchmarking of LTC facilities (Degenholtz et al., 2006; Kane et al., 2004; Mor et al., 2003). Benchmarking is usually relative to the performance of another LTC facility, to an average, or to an established national standard (Mor et al., 2003). Distinguishing LTC facilities by their QoL ratings may serve several purposes, such as instituting internal quality improvement initiatives and assisting consumers in selecting a LTC facility (Berlowitz et al., 2001b; Kane et al., 2004), demonstrating accountability to regulators, advocates and consumers (Epstein, 1998), and setting improvement targets in the overall performance of LTC facilities (Mor, 2005).

Measuring QoL for older adults in LTC facilities is as complex as the concept itself. However, as QoL has taken a high degree of importance as an outcome of care, its measurement is critical. There are numerous methodological and conceptual issues in measuring QoL in this vulnerable population that both researchers and clinicians need to be aware of. This section discusses these issues in detail and integrates the knowledge reported in the published QoL literature.

2.5.1 Measurement Focus – What to Measure?

The discussion outlined above concluded two interrelated and fundamental aspects of the concept of QoL: its subjectivity and multidimensionality (O'Boyle, 1994). Accordingly, QoL assessment questionnaires comprise subjective measures and multiple dimensions or domains.

There is general consensus that measurement of QoL should consist of domains and indicators (Verdugo, Schalock, Keith, & Stancliffe, 2005). Domains, as discussed above, are dimensions, facets or areas of QoL such as privacy, respect, dignity, and decision-making. Some facets of QoL are universal across cultures; others differ from one culture to another (World Health Organization Quality of Life Group, 1994). Indicators, on the other hand, are domain-specific conditions or behaviours whose presence or absence may determine an individual's QoL in a given domain. A domain may include one or several indicators. The challenge is deciding on the selection of domains and indicators.

Several useful criteria are available in the literature for the selection, measurement and use of QoL indicators (Karon & Bernard, 2002; Verdugo et al., 2005; World Health Organization Quality of Life Group, 1994). Conceptually, indicators should be based on sound QoL theory; that is, they should be relevant to QoL. In addition, they should assess both positive and negative aspects of one's QoL (Karon & Bernard, 2002). Indicators should also be applicable across diverse people, and should be sensitive to cultural and linguistic differences (World Health Organization Quality of Life Group, 1994). From a clinical perspective, indicators should be meaningful to the target population (e.g., residents of LTC facilities) and they should be easily understood by the respondents. They should also be useful in improving outcomes and potentially could be influenced by the actions of care providers. Finally, from a methodological perspective, indicators should be measurable and easily interpretable (Karon & Bernard, 2002; Verdugo et al., 2005). Researchers also agree that QoL measures, particularly health-related QoL measures, should include both subjective and objective indicators (Ferrans, 1990; Kane et al., 2003; Mandzuk & McMillan, 2005; Verdugo et al., 2005). However, the *interRAI_QoL Survey* as previously indicated consists of subjective indicators only because the objective dimensions of QoL are addressed through the comprehensive clinical assessment tools.

Subjective indicators reflect psycho-social phenomena and may be measures of individuals' values, beliefs, expectations and goals. They require individuals to make evaluative judgments about various aspects of their lives (Farquhar, 1995; Lawton, Winter, Kleban, & Ruckdeschel, 1999). Objective indicators, on the other hand, reflect physical and biological conditions that trained third-party assessors may objectively observe and measure (Lawton et al., 1999). Other non-clinical objective QoL indicators may include income, employment, housing, and education levels attained (Campbell, 1976; Mandzuk & McMillan, 2005). Objective indicators play a lesser role but they influence one's experience of the QoL, and as such they should be considered supplementary to subjective measures (Bankole et al., 2007; Campbell et al., 1976; Mandzuk & McMillan, 2005). Simply put, subjective indicators require a qualitative personal judgment of quality by the subject, while objective indicators may be observed and measured by third parties and determinations made of one's QoL (Lawton et al., 1999).

Subjective self-appraisals are considered by many to be the "gold standard" of QoL (Bankole et al., 2007). Several researchers support the use of subjective indicators (Degenholtz et al., 2008; Kane et al., 2003). Residents and their relatives value subjective measures because of the individual nature of QoL. Because of the inherently subjective dimensions of QoL, it is argued that only the individual may judge his or her life experience, values and beliefs (Thorgrimsen et al., 2003). There are, however, concerns that subjective indicators are not reliable measures for guiding clinical practice or policy formulation. Another concern may be the potential response bias associated with subjective indicators (Farquhar, 1995). Policy makers and health care planners may prefer objective measures because of their validity and reliability.

Proponents of health-related QoL support the use of objective indicators because they are observable and measurable (Brod, Stewart, Sands, & Walton, 1999). Muldoon et al. (1998) support making a distinction between objective and subjective indicators. However, Lawton et al. (1999) point out that the distinction between subjective and objective indicators is relative rather than absolute. These authors contend that even an individual reporting on objective indicators may make qualitative judgments. Nonetheless, it is generally supported that a comprehensive evaluation of QoL should consist of both objective and subjective indicators (Brod et al., 1999; Ferrans, 1990; Mandzuk & McMillan, 2005; Verdugo et al., 2005). In the design of QoL assessment instruments, consideration should also be given to the "economy of effort" (Jenkins, Jono, Stanton, & Stroup-Benham, 1990). These researchers suggest a balance between a long battery of measures and the burden on participating respondents.

In summary, the QoL literature makes a distinction between subjective and objective indicators. In health-related QoL, clinicians rely on objective measurements such as physical function or health status, while proponents of general (non-health) related QoL favour subjective measures. Regardless of the reported issues related to subjective and objective indicators, there is general consensus that both are necessary in QoL measurements.

2.5.2 Measurement Approach - How to Measure?

As is evident from the conceptual discussion, a large number of measurement instruments are available and are used in measuring QoL. These instruments vary in concept, construction and content. Some comprise a single item or question such as "are you satisfied with your life"? Others use multi-items or questions, which may or may not be grouped under categories or domains. Gill and Feinstein (1994) refer to "domain" as several items or questions having a particular focus (Gill & Feinstein, 1994). For example, in the *interRAI_QoL Survey* the ‘Privacy Items” domain consists of four statements to which a subject is asked to respond.

2.5.2.1 Rating Scales

The construction or design of these instruments also varies by the rating scale adopted. In QoL assessments of older adults, the optimal number of response options is controversial (Stewart & King, 1994). Some rating scales may simply be open ended without any response choices. In such instruments, individuals who are the subject of the assessment respond as they choose. Others use dichotomous (that is, yes or no) response choices. While such designs have been shown to be favoured by older adults (Yesavage et al., 1982), they reduce the respondent’s ability to discriminate to two choices and consequently may lead to a loss of information (Streiner & Norman, 2003). The *interRAI_QoL Survey* uses an ordinal type scale with a set of five response options ranging from zero to four: Never (0), Rarely (1), Sometimes (2), Most of the time (3), and Always (4). Other designs use a Likert-type scale such as Ferrans and Powers’ *Quality of Life Index – Nursing Home Version* with responses ranging from one (very dissatisfied/very unimportant) to six (very satisfied/very important; Ferrans & Powers, 1992). The issue of Likert scales and response choices for Asians was discussed in a preceding section.

The number of response options in Likert scales also varies. For instance, some scales may range from 3 to 10 points. Andrews and Crandall (1976) have suggested that a 7- point scale has more discriminatory power than a 5-point scale in assessment of QoL. Research studies have suggested that the minimum number of response options should be between five and seven (Streiner & Norman, 2008). Carp (1989) showed that 5-point scales were best liked by older adults. In another study of older adults 60 years and older in the evaluation of different types of response choices, items with 10 response options resulted in the best data quality, whereas items with only four options resulted in the worst (Rodgers, Herzog, & Andrews, 1988). However, for older adults living in LTC facilities, a five-point scale may provide the optimal number of response choices. As well, a 5-point scale allows residents to avoid choosing extreme response options (Kane, 2003).

2.5.2.2 Time Frames

Another aspect of measurement is the time frame of the questions in a QoL questionnaire. That is, is the respondent being asked to rate their perceived QoL over their life time, in the past two weeks, or in the present time (Stewart & King, 1994)? The element of time frame is very important because of its influence on older adults' perceptions and, consequently, on ratings of their QoL. Due to memory problems, shorter time frames are preferable as they help the older adult to focus on his or her current situation (e.g., pain; Flanagan, 1982). With respect to timing of QoL measurements, another issue is how often to measure it (Verdugo et al., 2005). Clinicians may prefer to do repeated measurements to determine the efficacy of a particular intervention over time (Verdugo et al., 2005). On the other hand, policy analysts or accreditation surveyors may be satisfied with a one-time snapshot. However, ultimately, the purpose of the QoL measurement will determine the frequency of its measurement.

2.5.2.3 Order of Administration

Kutner et al. (1992) suggest that the order in which questions in a QoL instrument are administered makes a difference in the older person's responses (Kutner et al., 1992). For instance, questions reminding the older person of losses or unhappiness might influence his or her responses to subsequent questions. The authors suggest that questions of less emotional effect should preferably precede those with more.

2.5.2.4 Scoring

Two scoring methods have been adopted in multi-domain QoL measurement questionnaires: (a) scoring and reporting by a single domain, or (b) scoring and reporting by the combined scores from all domains to give an overall composite QoL score. The purpose of a QoL assessment will guide the scoring method adopted. In clinical practice, single domain scores may be preferable to determine the appropriate interventions to improve residents' QoL. On the other hand, for the individual older adult, an overall composite score may have the advantage of representing the complete QoL (Verdugo et al., 2005). However, a primary weakness of a summary score is that differences in specific domains of QoL will be obscured. In contrast, for the purpose of benchmarking LTC facilities, overall composite QoL scores may be the choice. From a researcher's perspective, a primary advantage of aggregate scores is that they simplify the presentation of results, reduce the number of comparisons, and potentially increase power (Fairclough, 2005).

The use of summary scores across multiple domains, however, remains an unresolved issue among QoL researchers (Fairclough, 2005). Some prefer to report scores by specific domains by summing up the items within each domain, while others by the composite score of the entire domains within a scale. Summation of scores in rating scales is based on the assumption that all items within the scale are parallel measures of the overall construct that the scale is purported to measure. Similarly, in a scale that consists of items grouped under domains, summation across all domains assumes that all domains and the items within them tap into the same construct. If these assumptions are wrong, however, summation for the purpose of computing a composite or overall score would not be possible. A second issue related to summation of scores in a scale is the relative weights or importance of items or domains within a scale. Respondent older adults, as a heterogeneous population, may place different values to the items or domains within a scale. A single summary QoL score will not identify the older person's concern with a specific aspect of his or her life in the LTC facility. Similarly, in clinical practice, as interventions may affect QoL domains in different directions, a summary score may "cancel out" these effects (Stewart & King, 1991). However, Streiner & Norman (2008) suggest that in scales with 40 items and more, weighting contributes relatively little.

A third issue that may prevent summation of scores in rating scales is related to the data type measured by the scale. The type of data is an important factor for consideration because it will determine the choice of statistical methodology to be used for analysis; that is, the use of parametric vs. non-parametric statistical methods (Streiner & Norman, 2008). While some researchers are of the view that scores from ordinal rating scales may be treated as interval data (Carver, 1999; Ferrans, 1996; Ferrell, 1995; Morris et al., 2009), others argue against it but acknowledge that it is a common practice (Bowling, 2009; Townsend & Ashby, 1984). However, Streiner & Norman (2008) suggest that for pragmatic reasons, "under most circumstances, unless the distribution of scores is severely skewed, one can analyze data from rating scales as if they were interval without introducing severe bias". It is a common practice among researchers to treat data from ordinal scales as continuous data (Degenholtz et al., 2006; Degenholtz et al., 2008; Drageset et al., 2009; Duncan-Myers & Huebner, 2000; Watt & Konnert, 2007).

By assigning numeric values such as 0 to 4 to scales, a form of value or weighting is conferred (Fayers & Hays, 2005). For instance, in the *interRAI_QoL Survey*, 0 is assigned to "Never", 1 to "Rarely" and 4 to "Always" with respect to degree of satisfaction with a QoL measure. Fayers & Hays (2005) suggest that such interval scales can be used to quantify the distance between points along the scale. However, while these numbers are ranked and indicate progressively higher levels of satisfaction, unlike an interval scale the distance between them is not considered to be equal (Streiner, 2008).

2.5.3 Source of Measurement - Who is the Source of Information?

Clinicians and researchers may rely upon several sources of information for assessing the QoL of residents in LTC facilities. There is growing support through research studies that a direct assessment of the resident is the best method. There is general agreement that due to the highly subjective nature of the concept, any appraisal of QoL should rely, where possible, on the residents' perception (Thorgrimsen et al., 2003). In a critical review of 150 QoL instruments, researchers concluded that QoL can be measured appropriately only by the subject and not by experts (Gill & Feinstein, 1994). Other researchers concur that the individual in question is the most valid source of information (Novella et al., 2001; Thorgrimsen et al., 2003). Degenholtz et al. (2006) concluded that direct measurement of QoL compared to using external predictors was the preferred approach. In a review of 24 clinical studies between 1990 and 1999 that used proxy data as the source of information about older adults, other researchers reported that in many areas older adults were able to self-report (Neumann, Araki, & Gutterman, 2000). As the individual's subjective world is idiosyncratic, it is not directly accessible by others, even by close relatives (Thorgrimsen et al., 2003). Only residents can judge what they value most in their life in LTC facilities (Thorgrimsen et al., 2003). Even subjects with mild to moderate Alzheimer Disease have the capacity to provide valuable information for clinicians, but this may be supplemented by information from their caregivers (Kiyak, Teri, & Borson, 1994). Other research has confirmed that individuals with moderate dementia and associated cognitive impairment are still able to report on their QoL, even when they have poor insight into and awareness of their dementia (Brod et al., 1999; Gerritsen et al., 2007; Kane et al., 2003; Logsdon, Gibbons, McCurry, & Teri, 2002; Mozley et al., 1999). In a study of 177 pairs of patients and caregivers to assess the QoL of older adults with cognitive impairment, it was shown that almost 88% of the subjects with mild to moderate dementia were able to rate their QoL in an interview format (Logsdon et al., 2002). In a study of nursing home populations, it was estimated that 60% of the residents would be able to reliably report on their QoL (Kane et al., 2003).

However, while self-reported QoL ratings are accepted as the gold standard (Farquhar, 1995; Kane et al., 2003), certain circumstances arise where residents are unable to report on their QoL due to their physical or cognitive disabilities (Novella et al., 2001). In these situations, proxy respondents such as relatives or health care providers might be used as alternative sources of information (Brod et al., 1999; Logsdon et al., 2002; Novella et al., 2001). Still, even in these circumstances, rather than totally discounting residents' input, it is suggested that proxies may be involved to provide supplemental information to the residents' perceived QoL (Neumann et al., 2000). However, reliance on proxy reports is fraught with problems. There is substantial evidence of the lack of concordance between subjects' self-reports and proxy reports. For instance, a weak correlation has been reported between physicians' ratings of patients' QoL and patients' own ratings (Pearlman & Uhlmann, 1988). Other researchers have reported that proxies consistently rate QoL lower than individuals with or without cognitive impairment (Logsdon & Albert, 1999; Sainfort, Becker, & Diamond, 1996). Novella et al. (2001) reported a significant difference in the mean scores of subjects and their proxies in four subscales: physical health; mental health; general health; and depression. Teri and Wagner (1991) also reported a significant difference between subjects' and their proxies' ratings of depression. In subjects with cognitive impairment, there is greater disagreement between their ratings of QoL and proxies (Kiyak et al., 1994).

In a study of subjects with dementia, Thorgrimsen et al. (2003) reported that these subjects appeared to have a more positive outlook on their lives and roles, and had higher hopes for their QoL than their caregivers or health care professionals. One reason for this discrepancy is due to the very personal and subjective nature of QoL. Another reason may be that proxy ratings may be biased due to the proxy's own expectations and values and his or her relationship with the person being rated (Logsdon & Albert, 1999). Inferring residents' subjective QoL from proxies does not fully take into account the residents' values, needs, and adaptations to their life experience (Sainfort et al., 1996). Even clinicians or trained assessors could not with certainty determine what is important to the individual (Logsdon et al., 2002).

Logsdon et al. (2002) suggest that if the purpose of the QoL assessment is for deciding treatment options, it is very important to identify potential biases of proxy ratings. Several researchers concur with these authors (Kane, 2003; Novella et al., 2001). Thus, QoL assessments by proxies for persons with cognitive impairment should be used with caution (Novella et al., 2001). In order to obtain a comprehensive picture of patients' QOL, it would be advisable to compare patients' ratings with the assessments made by close informants (Becchi, Rucci, Placentino, Neri, & de Girolamo, 2004). The accuracy of proxies' ratings is higher when the information sought is concrete and observable (Novella et al., 2001) and when it relates to the conditions of life rather than the perceived experience of life (Ferrans, 1990).

In summary, there are two primary sources for QoL measurement: direct, self-reports of subjects of their perception of QoL, and reports from proxies such as health care providers and caregivers. There are advantages to both sources subject to circumstances. Where the subject is unable to communicate due to physical or cognitive impairments, the use of proxies can provide useful information. However, caution should be exercised when relying on proxy reports. A major drawback to this approach is that caregivers often have a poor knowledge about the life experience of their elderly relative. As well, reliance on proxies silences the very people who have intimate knowledge of their own life experience. In situations where reports are available from proxies, it is best to analyze these reports separately from those provided directly by subjects.

Aside from the fact that direct assessment of and self-reports from residents in LTC facilities is viewed as the “gold standard”, this method should also be supported from the perspective of consumer empowerment and active inclusion of older adults in decisions about their life in LTC facilities. As has been shown in the discussion on determinants of QoL, having a sense of control, autonomy and self-determination are viewed to be critically important by older adults. Accordingly, clinicians and researchers should make a deliberate effort in actively engaging residents of LTC facilities in the assessment of their QoL.

2.5.4 interRAI Self-Report Nursing Home Quality of Life Survey

The *interRAI_QoL Survey* is used in this study to evaluate LTC facility residents’ QoL. It has been designed for the comprehensive evaluation of residents’ experience in the LTC facility. It is a new instrument introduced by interRAI in 2009 (Morris et al., 2009). The interRAI network is a collaboration of researchers and clinicians from over 30 countries committed to improving health care for persons who are old, frail, or disabled. The goal of interRAI is to promote evidence-informed clinical practice and policy decisions through the collection and interpretation of high quality information about the characteristics and outcomes of persons served across a variety of health and social services settings, including LTC facilities. interRAI has developed a suite of assessment instruments for use in several health sectors, including LTC, home care, and acute care (Bernabei et al., 2009; Gray, 2009; Hirdes, 2008). Evidence of their contribution to these sectors can be seen from the series of publications in the peer-reviewed literature not only by interRAI researchers but also numerous other researchers who have relied upon the interRAI instruments in conducting their research. One such instrument in interRAI's integrated suite of instruments is the *Resident Assessment Instrument – Minimum Data Set 2.0* (RAI-MDS 2.0; Appendix A), which has been specifically designed for use in LTC facilities. The RAI-MDS provides for a comprehensive assessment of residents on multiple domains and is completed by clinicians using all sources of information available including direct interviews of residents, family, staff and volunteers, observation of the resident, and chart review. Assessment of residents by using RAI-MDS provides more accurate information about their needs and capacities, and contributes to quality improvement based on informed and resident-centred care planning (Hirdes, 1999).

The choice of the *interRAI_QoL Survey* for the purposes of this study was triggered by several factors. As indicated previously, the *interRAI_QoL Survey* was the outcome of the collaborative effort of interRAI's QoL Work Group made up of 20 researchers representing different countries from various continents. The instrument joins the suite of assessment instruments to form an integrated health information system. The instrument has been designed to be shorter than existing instruments in consideration of the target population. As the design team is a network of researchers from several countries, the construction of the instrument's items was sensitive to cultural considerations. The distributional properties of the instrument strives to prevent ceiling effects. Some items are more challenging to respond than others. For example, one of the instrument's 50 items states: "I can be alone when I wish" compared to "Some of the staff know the story of my life"Two items are phrased negatively: "I am bothered by the noise here" and "I am careful about what I say around staff".

Another reason for choosing the *interRAI_QoL Survey* was the choice of its scale. Its 5-point ordinal scale minimizes response bias in cultural groups who tend to have high social desirability bias. One other reason for this choice is that one of its items, “I tend to be happier than most other people” is a global dispositional measure. The inclusion of such a global item of satisfaction in QoL surveys is considered a necessity to ensure their completeness (Michalos, 1991). Another item, “I would recommend this site or organization to others” is a proxy measures for overall QoL rating, which is also desirable in the design of QoL instruments.

One final reason for choosing the *interRAI_QoL Survey* rather than an existing instrument *(e.g., Kane’s QoL Index for LTC)* was that the use of the interRAI instrument would allow comparison of the results from this study to the work of other researchers who use the same instrument. As well, the present study offers the opportunity to inform interRAI’s efforts in developing and refining QoL assessment instruments.

The design of the *interRAI_QoL Survey* instrument was based on an extensive review of the literature, deliberations on the concept of QoL as it pertained to the elderly residents of LTC facilities, and from both theoretical and practice perspectives what LTC facility residents valued most in the various aspects of their lives in LTC facilities.

As a first step, the Work Group defined the primary objective of the QoL instrument to be subjective evaluation of the residents’ experience in the facility. A secondary objective was for operational requirements of LTC facilities, including service improvement and benchmarking. Thus, the intended population of the QoL instrument is LTC elderly residents who represent a heterogeneous group with complex health conditions, varied health and functional status, value systems, and diverse ethno-cultural, educational, religion, and socio-economic backgrounds. The Work Group aimed to address two primary dimensions for the QoL instrument: satisfaction with life in the LTC facility and subjective evaluation of residents' QoL in the facility. The items in the QoL instrument reflect a balance between these two dimensions. Accordingly, the frame of reference for residents in responding to the questions in the QoL survey is "what life is like for you in the LTC facility". In its design, thus, the QoL instrument has a general focus on life in the LTC facility rather than health-related or functional capacity-related focus as is common in health-related QoL instruments. These issues are addressed by the RAI-MDS.

Next, the QoL Work Group generated and identified QoL issues of relevance to the target population. Quality of life items were generated and identified from literature searches of relevant journals and databases. As well, available instruments addressing institutional QoL and satisfaction were reviewed. The scientific experience in QoL research of the Work Group members and their respective country sensitivities further guided the selection of the items and categorical (domain) groupings. For face validity the Work Group ensured that each domain had at least 4 – 5 items, and that a few items yielded a negative response to prevent floor/ceiling effects. Factor analysis was also used for the appropriate assignment of items to domains. Eventually, 120 items were identified, which were subsequently reduced to the 50 items in the current instrument (Morris, personal communication, August 25, 2010). The 10 domains in the *interRAI_QoL Survey* appear to reflect Maslow's hierarchy of human needs such as physiologic needs (e.g., food, comfort); safety needs (e.g., freedom from harm); love needs (e.g., affection, meaningful relations); esteem needs (e.g., being appreciated by others); and self-actualization needs (e.g., self-fulfillment, learning). The ultimate aim of interRAI is to further revise the item set where warranted with the aim of minimizing burden on respondents.

A pilot test was conducted in 2007 at the Hebrew Seniors Life Center in Boston, Massachusetts with a repeat in 2009 (Morris, 2009). The pilot involved 420 residents in 17 nursing units at the Center with a response rate of 84%. Several measures were taken to test the psychometric properties of the instrument. First, it was determined that a QoL assessment by using the instrument was feasible in LTC facilities. Secondly, a cross-walk between 120 residents and facility staff showed a low correlation further emphasizing the subjective and individual nature of QoL and the gap between subject and proxy ratings. Further cross-walks between the QoL instrument and several interRAI scales such as the Cognitive Performance Scale, Depression Rating Scale, and the Activities of Daily Living Scale were also conducted. A third psychometric test involved examining the internal consistency of the QoL instrument. The Cronbach alpha coefficients for each of the sub-domains ranged from 0.48 to 0.76 and an overall item consistency of 0.91.

The instrument is currently being pilot tested in several countries including Japan, North America, Europe, and the South Pacific. One such study was conducted by the University of Michigan Institute of Gerontology in 2008 (James, 2010). The version used in that study was a predecessor to the version used in the current study with an overlap of 42 items. That study contributed to the development of the current interRAI QoL instrument. Outside the USA, this current study is one of the largest studies to further test the psychometric properties of the *interRAI_QoL Survey*. It is also one of the largest of its kind in Canada to study LTC facility residents' quality of life.

The *interRAI_QoL Survey* consists of 50 items, with four to six items in each of its 10 domains. These domains include privacy, food/meal, safety/security, comfort, making daily decisions (autonomy), respect, responsive staff, staff-resident bonding, activity option, and personal relationships (presence of friends). Figure 1 is a diagrammatic depiction of the *interRAI_QoL Survey* instrument, its components, and the relationship between its 10 domains and the items within them.

2.6 Review of Empirical Research on Quality of Life

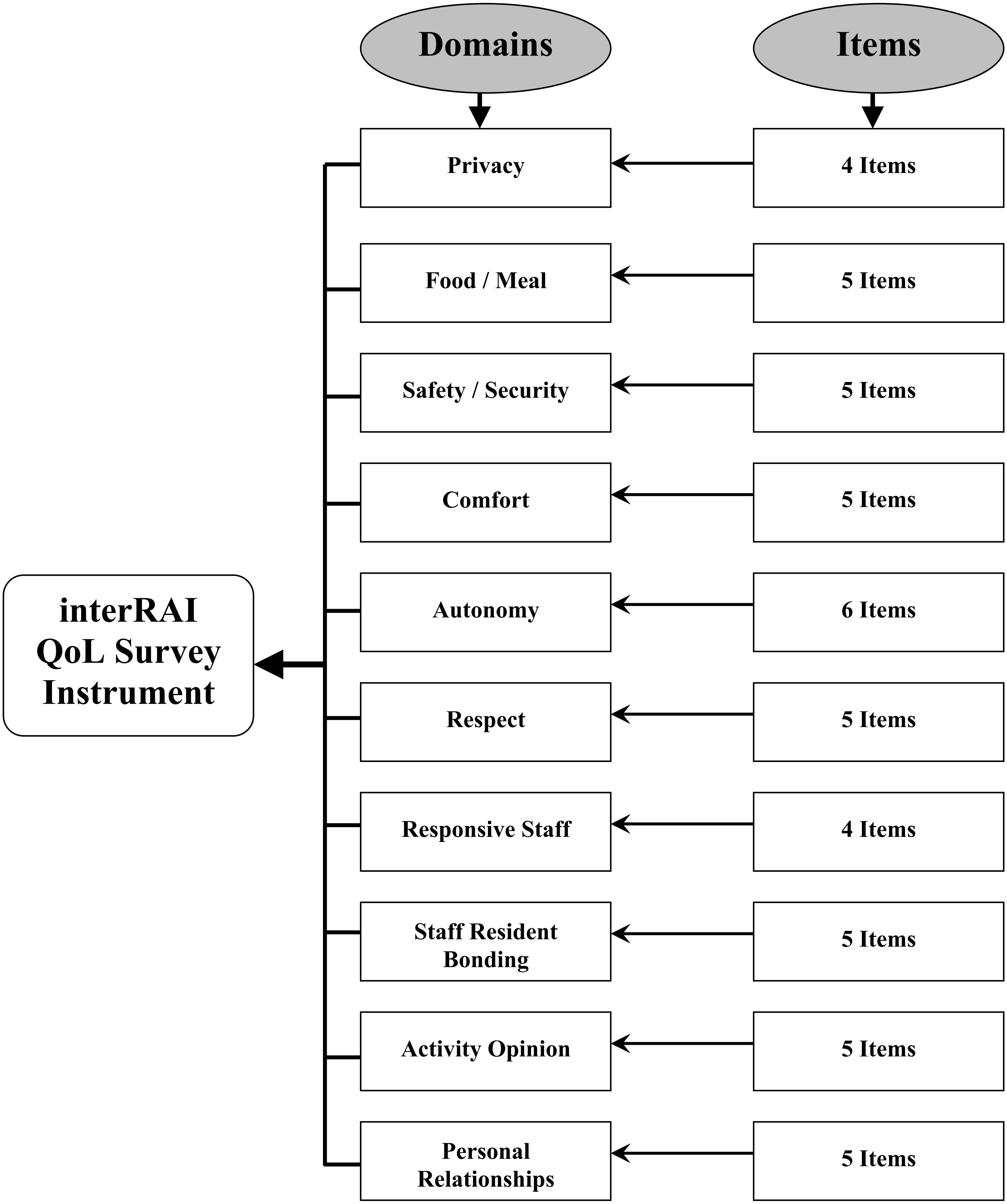
2.6.1 Quality of Life and LTC Resident Characteristics

In section 2.3 the general literature on QoL was reviewed. This section focuses on empirical research on QoL in LTC facilities. Research studies that evaluated the association of LTC facility residents' QoL with residents' socio-demographic and clinical characteristics were retrieved from the literature for a critical review. A summary of these studies, including their design, methodology and major findings, is presented in Table 2.

All 12 studies examined the relationship between residents' QoL and their socio-demographic and clinical characteristics. Varied degrees of associations were reported. Four of the 12 studies measured health-related QoL (HRQoL) and some aspect of residents' health status. For instance, Cuijpers, van Lammeren, and Duzijn (1999) examined the relationship of QoL and chronic illness. The investigators reported that the chronic conditions they investigated, such as lung and cardiac disease and cancer, were significantly related to some aspects of HRQoL, but that they contributed little power to the overall prediction of HRQoL. Similar results were shown with comorbidity of chronic illnesses. Elliot, McGwin, Jr., and Owsley (2009) reported that visual impairment was associated with a reduction in HRQoL.

Others explored the association of psycho-social aspects of HRQoL. For instance, Drageset et al. (2009a) reported that lower scores in social support, which was measured by attachment, nurturance and reassurance of worth, were associated with lower HRQoL (Drageset

Figure 1: Components of the inter RAI QoL Survey Instrument



et al., 2009a). Ozcan et al. (2005) reported a negative correlation between increased fear of falling and QoL. Other researchers used general QoL instruments to measure the effect of aspects of health status on one's QoL. Degenholtz et al. (2006) reported negative correlations between QoL and decline in physical functioning and visual acuity, incontinence, being bedfast, depression, and conflict in relationships. On the other hand, social engagement was shown by these investigators to have a positive influence on QoL. Other physical and psycho-social conditions have also been shown to be associated with decline in general QoL. Degenholtz et al. (2008), for instance, showed a negative association of stage II pressure ulcer, physical disability, depressive symptoms and pain with QoL. Duncan-Myers and Huebner (2000) reported on the positive influence of self-care, autonomy and control over decision-making. Similarly, other researchers reported the positive effect of perceived empowering care provided by staff (Tu et al., 2006), social support from staff and strong family relationships (Tseng & Wang, 2001) on QoL. The findings from these 12 empirical studies complement, as well as supplement the determinants of QoL noted above.

However, a critical review of these research studies showed several key methodological issues. Ten studies used cross-sectional designs, and two cohort prospective/longitudinal) designs. In the context of LTC and residents' perception of their QoL at time of the study, cross-sectional designs are best suited as they provide a snapshot of residents' QoL in the context of their characteristics (e.g., health status, functional abilities) and their experience in the social environment (e.g., relationships with staff and other residents) of the facility. Cross-sectional studies are also a convenient and an inexpensive way of examining relationships between study variables (Kleinbaum, Sullivan, & Barker, 2007). Yet, there are some disadvantages to cross-sectional studies. For instance, such studies can only provide a snapshot of participants' QoL at a

Table 2: Summary of studies examining the relationship of LTC facility residents' QoL and their characteristics

Study	Design & Setting	QoL Instrument(s)	Analysis	Major Findings
Cuijpers, van Lammeren, & Duzijn (1999)	Prospective cohort design; examined relationship of QoL and chronic illnesses in 211 residents in 5 residential homes in The Netherlands with reassessment a year later	Medical Outcome Study Short-form General Health Survey (20-item; MOS-SF-20) was used to measure HRQL	Descriptive statistics; two series of multiple regression analysis were conducted: (1) HRQL as the dependent variable and types of chronic illnesses as predictors; (2) HRQO domains as dependent variables and total number of chronic illnesses as predictor; to test the stability of HRQL over time, t-tests were conducted comparing the means of HRQL domains at time 1 and at time 2	Chronic illnesses investigated (lung and cardiac disease, peripheral atherosclerosis, diabetes mellitus, stroke, rheumatoid arthritis, cancer) were significantly related to aspects of HRQOL, but contributed little power to the overall prediction of HRQL. Similar results were shown with comorbidity of chronic illnesses.
Degenholtz et al. (2006)	Cross-sectional design; examined predictability of residents' QoL using external indicators (resident characteristics and facility attributes) from 2,829 residents in 101 NHs in several states (USA)	Kane's QoL Index for use in NHs (14-item) (Kane, 2003)	Descriptive statistics; Bivariate analysis; multivariate analysis (HLM) to assess association between QoL and resident and facility characteristics; used SAS PROC MIXED	(-) between QoL and physical function, visual acuity, continence, being bedfast, depression, conflict in relationships, (+) between QoL and social engagement; (-) between QoL and regulatory citations related to care, clean/safe environment
Degenholtz et al. (2008)	Cross-sectional and longitudinal study of self-reported QoL of residents in two NHs in Western Pennsylvania (USA); five waves of interviews were conducted at 6-month intervals for a total of 624 surveys involving 307 residents; studied association between changes in health status and QoL	Kane's QoL Index (Kane, 2003)	Descriptive and multivariate longitudinal analysis to examine association between QoL and changes in health status	Declines in QoL (domains of autonomy, security, and spiritual well-being) were associated with one or more Stage II or higher pressure ulcers for two consecutive 6-month periods Declines in QoL (dignity domain) associated with physical disability Decreases in QoL (comfort, meaningful activities, and food enjoyment domains) associated with increases in depressive symptoms Decreases in QoL (functional competence and dignity domains) associated with increases in pain Overall, self-reported QoL measure was related to clinical info in MDS, but the link was not strong.

Study	Design & Setting	QoL Instrument(s)	Analysis	Major Findings
Drageset et al., (2009)	Cross-sectional, descriptive, correlation design; examined impact of social support and sense of coherence on HRQoL in 227 cognitively intact residents in 30 NHs in Bergen, Norway	HRQoL was measured using the Short Form -36 Health Survey	Descriptive statistics; multiple regression general linear model; SPSS for Windows (v. 14.0)	Higher levels of attachment, nurturance and reassurance were associated with higher levels of mental health, social functioning and vitality as measures of HRQOL Lower scores in these areas were correlated with lower HRQoL
Duncan-Myers & Huebner (2000)	Cross-sectional design; examined relationship between QoL and degree of choice residents had in self-care and leisure in convenience sample of 21 residents in a NH in Ohio (USA)	Quality of Life Rating (QoLR)	Descriptive statistics and correlation analysis	Lowest QoL ratings on QoLR items of physical/bodily conditions, volunteer activities, amount of stress, hobbies, and access to educational activities; Highest ratings were on QoLR items of family involvement and support, living conditions, liking/loving of themselves, and receiving affection; (+) between total QoLR score and total Duncan Choice Index (self-care and leisure)
Elliot, McGwin, Jr., & Owsley (2008)	Cross-sectional design; examined relationship of HRQoL and visual and cognitive impairment in 382 residents in 17 licensed NHs in Birmingham, Alabama (USA)	The Nursing Home Vision-targeted Health-Related QoL Questionnaire to assess vision-targeted HRQoL focusing on general vision, reading, ocular symptms, mobility, psychological stress, ADLs, activities/hobbies, adaptation/coping and social interaction; the VF-14 to assess vision-targeted HRQoL focusing on difficulties with everyday tasks; the Medical Outcomes Study Short-Form 36 to assess generic HRQoL	Multiple linear regression to estimate association between vision and cognitive impairment and HRQoL scores adjusted for the potentially confounding effects of age, gender, race and number of chronic medical conditions	Reduction in HRQoL associated with vision impairment was similar for those with and without cognitive impairment
Luleci, Hey & Subasi (2007)	Cross-sectional design; examined relationship of resident characteristics and QoL in 107 residents in 3 NHs in Manisa, Turkey	WHOQOL-BREF	Analysis of variance (ANOVA) and unpaired t-tests were used in group comparisons; linear regression models were used to determine WHOQOL-BREF predictors.	(+) between QoL and independence in ADL, physical exercise habits, satisfaction with NH

Study	Design & Setting	QoL Instrument(s)	Analysis	Major Findings
Ozcan et al. (2005)	Cross-sectional design; explored the relationship of QoL and the risk factors for falls in 116 residents in a NH in Turkey	QoL Short Form – 12 (SF-12)	SPSS v 10.0; frequency distributions (i.e., mean; standard deviation; range); Pearson's correlation to analyze relationships between QoL and balance, functional mobility, proprioception, muscle strength, flexibility and fear of falling	Strong correlation between physical health component of SF-12, General Health Perception and balance; QoL score increased with increase in balance score; Negative correlation between increased fear of falling and QoL; Positive correlation between QoL and mobility; No change in QoL with aging, proprioception, and flexibility.
Tseng & Wang (2001)	Cross-sectional design; explored the relationship of QoL and related resident factors in a convenience sample of 161 residents in 10 NH in Taiwan	Ferran's QoL Index-Nursing Home Version (Ferrans, 1996)	SPPS for Windows statistical package was used for data analysis: frequency distributions, mean, standard deviation, standardized scores, one way ANOVA, Scheff's comparison procedure, Pearson correlation, and stepwise multiple linear regression	(+) between QoL and educational levels, socioeconomic status (+) between QoL and physical function, ADL, social support from care staff, social support from families, frequency of family interaction (-) between QoL and length of stay in NH ADL, social support from nurses, socioeconomic status, physical function and frequency of interaction with family were the significant predictors of QoL
Tu, Wang, & Yeh (2005)	Cross-sectional design; interview of 102 residents in 8 NHs for their perceived QoL	Quality of Life Index – Nursing Home Version	SPSS v. 10.0 for Windows; frequency distributions (i.e., mean and standard deviation), ANOVA, Pearson's correlation, and stepwise multiple linear regression.	Perceived empowering care, ADL, and marital status were significant predictors of QoL; empowering care is more important than ADL in influencing QoL
Urciuoli et al. (1998)	Cross-sectional design; evaluated the QoL of the oldest-olds in NH (n=29) and living at home (37)	Two QoL instruments: Profile of Elderly Quality of Life; LEIPAD (from the Leiden-Padua Project); both questionnaires were administered in format of structured interview	Descriptive statistics	The two groups had similar perception of QoL based on subjective assessment of own psychological well-being; this was attributed to NH resident adjustment over time, with the place of residence assuming less significance
Watt & Konnert (2007)	Cross-sectional design; evaluated the QoL perspectives of younger (under 65; n=43) and older (over 65; n=38) residents of a NH in Calgary, Canada	Both groups: Life Satisfaction Index (LSI-A); Younger group: Quality of Life Profile: Version for Persons with Physical and Sensory Disabilities (QOLP-PD);	Descriptive statistics; correlation to determine relationships between QoL and hypothesized contributing factors; independent t-tests for comparing responses of younger and older residents to	There were no age differences in QoL, suggesting the need for broad conceptualization of QoL in NH populations

Study	Design & Setting	QoL Instrument(s)	Analysis	Major Findings
		Older group: Quality of Life Profile: Seniors Version (QOLP-SV);	the LSI-A, the total QOLP-SV score, and on each of the nine sub-scales of the QOLP-SV.	

Abbreviations

(+)	positive association
(-)	negative association
ANOVA	analysis of variance
BV	bivariate
CI	confidence interval
HLM	hierarchical linear modeling
HRQL	health-related quality of life
MDS	minimum data set
MV	multivariate
NH	nursing home, nursing facility, long-term care facility
NS	non-significant
OR	odds ratio
QoL	quality of life
RR	relative risk
SAS	Statistical Analysis Software (SAS® 9.2)
SPSS	Statistical Package for the Social Sciences
USA	United States
V	Version
WHOQOLBREF	World Health Organization’s Quality of Life – BREF

specified time, which is at the time of the interview. However, unlike a disease condition where a cross-sectional study examines its presence at a point in time, LTC residents' ratings of their QoL are usually reflective of the summative evaluation of their life experience in the facility. Another limitation of cross-sectional studies is that causality between dependent and independent variables may not be established. While only associations may be determined between these variables, the strength of any association may be useful in care planning and LTC policy development. Cohort (prospective/longitudinal) studies, on the other hand, allow the repeated measurement of QoL over time. While only two of the studies reviewed used such a design (Cuijpers et al., 1999; Degenholtz et al., 2008), most recommended that future studies should use longitudinal designs. Longitudinal designs in the study of QoL may address the issue of missed or unaccounted LTC facility traits in examining relationships between dependent and independent variables (potential omitted variable bias) (Castle & Engberg, 2008b). However, a potential problem in cohort studies may be the loss of subjects due to drop out resulting from separation or even death, and consequently may not always be appropriate in the context of LTC. Such attrition of the cohort over the follow-up period could lead to biased results (Kleinbaum et al., 2007). In the two studies that used a longitudinal design, the researchers did not address non-response bias. Another disadvantage of longitudinal design studies, involving repeat measurements, is that they are often quite costly and time-consuming (Kleinbaum et al., 2007).

In all 12 studies, QoL was self-reported by the participants through structured interviews, using QoL instruments. While self-reported QoL is deemed the "gold standard", as previously noted, for evaluating a person's QoL because of its subjective qualities (Bankole et al., 2007), "self-reporting", without validation, potentially introduces information (response) bias. For instance, residents may report higher satisfaction with their lives in the facility as they may be reluctant to portray a negative image of the facility for reasons of social desirability or fear of repercussion despite assurances of confidentiality and anonymity. Such response biases may lead to misclassification, that is, an overestimated QoL.

There were several selection biases present in these studies. Participation in these studies by LTC residents was voluntary and subject to obtaining informed consent. The refusal rate in some of the studies ranged from 10% to 81%. Only two studies reported 100% participation (Elliott et al., 2009; Luleci et al., 2008). Two studies reported relatively good rates of participation, 68% (Duncan-Myers & Huebner, 2000) and 88% (Tseng & Wang, 2001). Volunteer subjects have been reported to be different from non-volunteers, and thus, may potentially have introduced selection bias in these studies (Melton III, Dyck, Karnes, O'Brien, & Service, 1993). Selection bias invalidates conclusions and generalizations because the responses of non-participants may be different from those of participants, which may potentially influence the conclusions obtained. However, given mandatory or legislative privacy and protection of personal health information safeguards, voluntary participation is unavoidable in these types of studies. While comparing study participants to non-participants is necessary for research integrity, only the study by Degenholtz et al. (2006) made such comparisons.

Exclusion was evident in all of these studies. For instance, selection criteria in some of the studies included residents who were cognitively intact (Cuijpers et al., 1999; Elliott et al., 2009; Tseng & Wang, 2001; Tu et al., 2006; Watt & Konnert, 2007). However, cognitive performance is relevant in self-reported measurement of QoL. Degenholtz et al. (2006) reported that in residents with poor cognitive function (scoring 4 - 5 on a 0 - 5 scale) only about 38% were able to complete 75% of the QoL instrument, and in those with better cognitive functions (scoring 0 – 3), only about 82% were able to complete 75% of the instrument. In five of the studies, cognitively impaired residents were excluded from participation. Elliot et al. (2008), however, included residents with MMSE scores between 13 and 24 with reliable QoL self-reports. Earlier research has shown that persons with mild to moderate cognitive impairment (MMSE ≥13) are able to reliably report on their health and well-being (Brod et al., 1999). In two of the studies inclusion of residents who spoke English or were able to communicate in English in the context of an interview introduced another selection bias (Cuijpers et al., 1999; Degenholtz et al., 2008). In the study by Tseng et al. (2001) in Taiwan, residents with severe language deficits were excluded. Such exclusion biases in studies may limit the external validity, and thus the results may only be generalized to cognitively intact individuals. However, the restriction of interviews to residents' ability to communicate in English may be associated with the language of the QoL instruments used. In LTC facilities where a sizable number of non-English speaking residents exist, conducting such interviews in the residents' preferred language may become necessary if QoL measurement will become an integral dimension of care planning.

Several potential measurement issues were also evident in the studies reviewed. One primary concern in studies involving interviews is the quality of those interviews. Only Degenholtz et al. (2006) addressed the issue of monitoring interviewers for quality, reliability and "drift". Most interviews were conducted by the researchers. One study used trained lay interviewers (Cuijpers et al., 1999). Two studies did not specify the method of QoL assessment (Duncan-Myers & Huebner, 2000; Elliott et al., 2009). In the study by Ozcan et al. (2005), facility staff conducted all assessments. In the Tseng and Wang (2001) study, literate residents completed the questionnaires themselves while the researchers interviewed and recorded the responses of those who were illiterate. There are advantages and disadvantages to these methods. Interviews by trained surveyors allow for higher reliability. Interviews by facility staff may introduce response bias as respondents may feel pressured to provide positive views. It is preferable to use interviewers who are not involved in the direct care of residents. Interviews provide an opportunity for surveyors to respond to residents' questions as necessary.

To control for potential confounding, the researchers in the two prospective studies ensured that no interventions were implemented in the facilities that had the specific goal of modifying or improving QoL (Cuijpers et al., 1999; Degenholtz et al., 2008). Such measures are considered necessary in prospective studies to prevent potential bias in the assessment of the outcome of interest. Statistical methods used varied across these studies. Some applied more rigorous methods than others. As shown in Table 2, eight of the studies used multiple regression analysis to adjust for potential confounders (e.g., age, gender, and race) and to examine the association between QoL and the independent variables. Three studies used descriptive and correlation analysis, and one study only used descriptive statistics. Only Degenholtz et al. (2006) studied the nested association between QoL, resident characteristics and facility attributes using multilevel statistical methodology. Elliot et al. (2009) included the interaction effect of cognitive and visual impairments in their multiple linear regression.

The nature of the 12 studies reviewed supports the multidimensionality of the QoL concept. Each of these studies examined a dimension of QoL by studying the association between QoL and socio-demographic or clinical characteristics in the subjects. For instance, Cujiters et al. (1999) reported an association between QoL and the presence of chronic illnesses. Degenholtz et al. (2006) reported a positive association between QoL and social engagement. Drageset et al. (2008) showed a negative association between lower scores in social support and health-related QoL. Duncan-Myers and Huebner (2000) showed a positive association between QoL and having control over self-care and leisure activities.

In summary, the review of these 12 studies supports the multidimensional concept of QoL, and both its objective and subjective dimensions. Each of these studies used a different QoL measuring instrument specific to the purposes of the studies making comparisons across studies difficult if not impossible. The findings of these studies contribute to the existing knowledge base and understanding of this complex concept. They also demonstrate that the concept of QoL encompasses a person's physical health, psychosocial well-being, functioning, and control over their lives in LTC facilities. The study by Degenholtz et al. (2006) recognizes the hierarchical nature of residents' quality of life data (that is, residents nested within LTC facilities) and the need to apply statistical methods to study QoL from a multilevel perspective. In the following section, a review of the literature on the association of QoL and facility attributes is presented.

2.6.2 Quality of Life and LTC Facility Attributes

Research studies that examined the relationship of residents' QoL exclusively with facility attributes were searched in the peer-reviewed literature published between 1995 and February 2010. However, of the 12 studies retrieved, only two examined residents' QoL (Franks, 2004; Lucas et al., 2007); the rest studied the effect of facility characteristics on LTC facility QoC, not QoL. Such results are indicative of a serious gap in research efforts considering the assumed importance QoL has taken for LTC facility residents and their families, service providers, and policy makers (Institute of Medicine, 1986). This current study is an attempt to fill this serious gap. The 12 retrieved research studies are summarized in Table 3 and show diversity in many respects, including sample size, quality measures, and methodology.

In these studies, a variety of quality measures were used in studying the relationship between organizational attributes and quality. A few defined quality by using Donabedian's conceptual framework, which was discussed above (Donabedian, 1988). Various degrees of association were shown in the 12 reviewed studies between organizational attributes and quality. For instance, Castle and Shea (1998) found inconsistent evidence that for-profit nursing homes provide poorer quality care to residents who had mental illness using measures of structure, process and outcome. On the other hand, O’Neill et al. (2003) reported a significant negative association between for-profit status and quality as measured by the total number of regulatory deficiency citations. Deficiency citations were used as measures of quality or actually the lack of quality. Interestingly, the researchers suggested that only a profit above a given threshold was associated with higher number of deficiencies. Other researchers support this finding (Harrington, Zimmerman, Karon, Robinson, & Beutel, 2000).Thus, it appears that a certain level of profit margin is reasonable in for-profit nursing homes unless structural and process efficiencies sought compromised quality. Chain affiliation was another structural characteristic that has been shown to have an association with nursing home quality. For example, non-chain affiliation was shown to have a significant positive effect on resident satisfaction (Lucas et al., 2007). Chain-affiliated nursing homes with higher occupancy rates and higher number of Medicare residents were cited more serious regulatory deficiencies (Kim, Harrington, & Greene, 2009). The researchers proposed that chain affiliation may subject nursing homes to efficiency scales compromising quality and leading to higher deficiency citations. As well, the higher proportion of Medicare residents may have a negative effect on the financial resources of nursing homes and may reduce their capacity to provide quality care. An organizational factor that has been hypothesized as influencing QoL is the type of facility in which residents lived. However, Franks (2004) was unable to show differences in perceived QoL scores between nursing homes and assisted living facilities. The distinction between nursing homes and assisted living facilities is that the latter is based more on a social model compared to the medical model in the former.

Table 3: Summary of studies examining the relationship between LTC facility attributes and residents' QoC/QoL

Study	Design & Setting	Quality Measures	Methods	Key Findings
Castle (2001)	Cross-sectional design; survey of 420 NHs (USA) to examine the association between NH administrator turnover and QoC outcomes.	Restraint use; pressure ulcers; urethral catheterization; psychoactive drug use; NH code violations;	Correlation; multivariate logistic regression analyses	Administrator turnover was associated with a higher than average proportion of residents who were restrained, were catheterized, had pressure ulcers, and were given psychoactive drugs.
Castle & Engberg (2008)	Cross-sectional design; survey of NH 6,005 administrators to examine influence of caregiver staffing levels, professional mix, agency staff, stability, and NH quality	Pain, pressure sores (low risk), pressure sores (high risk), physical restraint, catheterization	Regression analysis	Staffing levels alone were weakly associated with the quality measures; when the regression models included agency staff, stability and professional staff mix, staffing levels were generally associated with the quality measures (i.e., 15 of the 18 staffing coefficients were significant)
Castle, Engberg & Men (2008)	Cross-sectional study involving survey of 2,946 NH administrators to examine association between use of nurse aide agency staff and quality	14 quality measures from MDS; long-stay residents (ADL, pressure sores, physical restraint use, bladder or bowel incontinence, spending most of their time in bed or chair, urinary tract infection, moderate to severe pain, depression or anxiety, mobility problems); short-stay residents (delirium, moderate to severe pain, pressure sores)	Descriptive statistics, correlation, binomial negative multivariate regression analyses, and Huber-White sandwich estimator clustered by county to account for possible correlation of outcomes within markets	Nurse Aide agency staffing levels had a significant positive relationship with the quality measures; use of nurse aide agency staff of less than 14 full-time equivalents per 100 beds had little influence on quality, whereas nurse aide agency staff of more than 25 full-time equivalents per 100 beds had a substantial influence on quality; because of cross-sectional study, no causal direction could be determined.
Castle & Shea (1998)	Cross-sectional design; examination of relationship between profit status of 1,079 NHs (stratified sample) and QoC of 6,001 residents with mental illnesses (USA)	Structure (e.g., size of NH; availability of mental health professionals), process (e.g., evaluation or treatment by mental health professionals) and outcome (e.g., ADL, IADL, mortality) indicators of quality	Descriptive statistics and multivariate logistic regression	Consistent evidence was not found that for-profit NHs provide poorer quality care to mentally ill residents using measures of structure, process and outcome
Franks (2004)	Quasi-experimental (non-randomized) design of 43 pairs of residents in 20 assisted living facilities and NHs in three counties in Washington, DC (USA) to compare residents' perceived QoL	Ferrans and Powers Quality of Life Index – Nursing Home Version	Matched pair t-test; correlation; regression analysis on the QLI scores to control for confounders	No differences in QoL scores between NHs and Assisted Living facilities; negative correlation between QLI scores and physical well-being; negative relationships between QLI scores and level of physical disability regardless of type of facility
Harrington et al. (2000)	Cross-sectional design; examined association of	staffing hours, resident characteristics (e.g., ADL,	Descriptive, Pearson product correlation, multivariate analyses,	Fewer RN and NA hours were associated with total deficiencies and QoC deficiencies. Fewer

Study	Design & Setting	Quality Measures	Methods	Key Findings
	staffing to deficiencies in all certified NHs (USA)	pressure sores, mobility, depression, urinary incontinence), facility characteristics (e.g., size, profit status), state or regional factors related to survey procedures	ordinary least squares regression modeling, and alternative logistic regression	NA and other care staff hours were associated with QoL deficiencies (related to resident rights). Fewer administrative staff hours were associated with other deficiencies (e.g., related to medical records). NHs that had more depressed and demented residents had fewer deficiencies. NHs that were smaller and were non-profit or government-owned had fewer deficiencies. NHs with more residents with urinary incontinence and pressure sores and with higher percentages of Medicaid residents had more deficiencies, when staffing and resident characteristics were controlled.
Intrator, Zinn & Mor (2004)	Cross-sectional prospective study of residents in 663 facilities to examine the association between facility characteristics and rate of potentially preventable/avoidable hospitalizations of long-stay residents	Rate of preventable/avoidable hospitalizations for ambulatory care-sensitive (ACS) diagnoses	Multilevel multinomial logistic regression, in which hospitalizations for ACS diagnoses, other hospitalizations and death were all contrasted to remaining alive in the facility and residents were nested with NHs that were nested within markets	Facilities with nurse practitioner/physician assistants were associated with lower hospitalization rates for ACS conditions, but not with other hospitalizations; facilities with more physicians were associated with higher ACS hospitalizations; facilities providing intravenous therapy, and those that operated nurses' aide training program were associated with fewer hospitalizations of both types.
Kim et al. (2009)	Cross-sectional design; retrospective panel data study (1999 – 2003) of 2 groups of California freestanding NHs to examine relationship between NH characteristics and quality; one group was 201 NHs that consistently met the state's minimum standard for total nurse staffing level over the 5-year period; the other was 210 NHs that consistently failed to meet the standard over the same period.	Total and serious federal and state deficiencies	Poisson random effects model was used to estimate the relationships between RN staffing mix and the number of deficiencies.	RN to total nurse staffing ratio was not related to total deficiencies but was negatively related to serious deficiencies in NHs that consistently met the staffing standard, whereas the ratio was negatively associated with total deficiencies in NHs that consistently failed to meet the standard over the 5-year period. As the RN to licensed vocational nurse ratios increased, total deficiencies and serious deficiencies decreased in both groups of NHs. Profit status, occupancy rates, proportion of Medicare residents, and chain affiliation were all positively related to the number of total deficiencies in NHs meeting the state staffing standard. Chain affiliated NHs with higher occupancy rates and higher Medicare residents received more

Study	Design & Setting	Quality Measures	Methods	Key Findings
				serious deficiencies.
Lucas et al. (2007)	Cross-sectional design; examination of the relationships between NH resident satisfaction and NH organizational characteristics; used a stratified sample of 72 NHs from Maine and New Jersey (USA) and a randomized sample of 1,496 residents	Resident satisfaction measured by the Rutgers Satisfaction Assessment Tool – NH Resident	Descriptive statistics and bivariate analyses; HLM was used to examine relationships between resident satisfaction and organizational and resident factors.	Non-chain affiliation, higher total nurse, RN, and certified NA had significant positive effects on total resident satisfaction; provision of a family council had significant positive effect on total resident satisfaction; Residents in NHs with higher acuity levels, a higher percentage of Medicaid residents, and higher occupancy rates were associated with less total resident satisfaction; presence of a special care unit was associated with lower levels of satisfaction. Administrator experience nor key leadership turnover showed significant association with resident satisfaction in bivariate analyses Organizational effects contributed to 15% of the variance in resident satisfaction and resident effects contributed 21.5% of the variance
O'Neill et al. (2003)	Cross-sectional design; survey to examine relationships between profit levels and quality in proprietary and nonproprietary NHs, accounting for resident and market/NH characteristics; 1,098 NHs in California	Regulatory deficiency citations used as measure of quality (total and serious deficiencies)	Descriptive statistics and Tobit regression modeling using LIMPED v. 7.0	Proprietary NHs had significantly lower QoC than non-proprietary NHs; profit above a given threshold is associated with higher number of deficiencies.
Rantz et al. (2004)	Cross-sectional design; three-group exploratory study involving 92 NHs randomly selected from all NHs Missouri (USA)	Selected MDS quality indicators (e.g., ambulation, nutrition/weight, hydration, continence, pain management, skin integrity)	Descriptive statistics and Wilcoxon Rank Sum Test was used to test for group differences	Positive association between consistent nursing and administrative leadership, use of team and group processes, and an active quality improvement program. Smaller facilities showed better outcomes. No significant differences in costs, staffing, or staff mix were detected across good, average and poor outcome NHs.

Study	Design & Setting	Quality Measures	Methods	Key Findings
Schnelle et al. (2004)	Cross-sectional design; 21 NHs in California (USA) that reported significantly different and stable staffing data were compared on quality of care measures	Care process measures relevant to nurse aide job performance divided into four major domains: out of bed/social engagement; feeding assistance; incontinence care; exercise and repositioning	Descriptive statistics	Highest-staffed NHs performed significantly better on 13 of 16 care processes implemented by nurse aides compared to lower-staffed NHs

Abbreviation Legend

ACS	ambulatory care-sensitive
ADL	activities of daily living
IADL	instrumental activities of daily living
HLM	hierarchical linear modeling
MDS	minimum data set
NA	nursing assistant
OSCAR	On-Line Survey, Certification, and Reporting System
QoC	quality of care
QoL	quality of life
RN	registered nurse
NH	nursing home, nursing facility, long-term care facility
USA	United States
V.	version

Staffing is another organizational characteristic that has been extensively studied for its relationship to quality. Staffing by a higher proportion of registered nurses has been shown to be associated with QoC as measured by lower total deficiencies and QoC related deficiencies (Harrington et al., 2000; Schnelle et al., 2004). However, Rantz et al. (2004) found no significant differences in staffing or staff mix across good, average and poor outcome nursing homes. Similarly, Castle and Engberg (2008a) found weak associations between staffing levels alone and quality measures. However, in regression modeling that included agency staff, stability and professional staff mix, staffing levels were generally associated with the quality measures.

The use of agency nursing staff is quite common in nursing homes (Institute of Medicine, 2001) due to high staff shortage, turnover and absenteeism (Castle & Engberg, 2005). Use of agency nursing staff is associated with poor documentation of quality indicators (Strzalka & Havens, 1996) and increased workload of regular nursing home staff (Manias, Aitken, Peerson, Parker, & Wong, 2003). The use of nursing agency staff is also positively associated with quality indicators such as use of physical restraints, pressure ulcers and bowel and bladder incontinence (Castle, Engberg, & Men, 2008). While use of agency nursing staff is unavoidable, Castle, Engberg and Men (2008) showed that a threshold existed for agency staff use and poor outcomes. Use of agency staff less than 14 full-time equivalents per 100 beds had little influence on quality care, while more than 25 full-time equivalents per 100 beds had a substantial influence on quality.

Another aspect of staffing in nursing homes is the availability of specialized services. Availability of nurse practitioners or physician assistants has been associated with lower hospitalization rates for residents with ambulatory care-sensitive (ACS) diagnoses but not with other hospitalizations (Intrator, Zinn, & Mor, 2004). Facilities with more physicians were associated with higher ACS hospitalizations; facilities providing intravenous therapy, and those that operated nurses' aide training program were associated with fewer hospitalizations of both types. Table 4 outlines the various attributes of LTC facilities that were examined in these studies.

Table 4: LTC Facility Attributes and Quality of Care

LTC Facility Attributes	References
Profit status	Castle & Shea, 1998; Harrington, Zimmerman, Karon, Robinson, & Beutel, 2000; O'Neill, Harrington, Kitchener, & Saliba, 2003
Chain affiliation	Kim, Harrington, & Greene, 2009; Lucas et al., 2007
Type of facility (LTC facility vs Assisted living)	Franks, 2004*
Staffing	Castle & Engberg, 2008; Harrington et al., 2000; Kim et al., 2009; Lucas et al., 2007**; Rantz et al., 2004; Schnelle et al., 2004
Use of agency staff	Castle & Engberg, 2005; Castle, Engberg, & Men, 2008; Strzalka & Havens, 1996
Availability of specialized services	Intrator, Zinn, & Mor, 2004.
Leadership turnover	Castle, 2001

*Examined relationship between type of facility and quality of life.
**Examined relationship between staffing and resident satisfaction.

The key findings of these 12 studies should be viewed in light of their methodology, strengths, and limitations. As shown in Table 3, the studies varied considerably in terms of their sample size, sources of data, instrumentation, and statistical analyses. Except for one of the studies, the remaining used a cross-sectional design. The advantages and limitations of such designs were discussed in the previous section and will not be repeated here. While the one study by Franks (2004) used a quasi-experimental, non-randomized design, it was still a cross-sectional study as it provided a "snapshot" of residents' perceived QoL in nursing homes and assisted living facilities at a given point in time. All the studies were carried out in the United States. With respect to sample size, except for the studies by Franks (2004) and Schnelle et al. (2004), all studies used state or national databases for their data resulting in large sample sizes. Using national databases often has important limitations due to inaccurate reporting of administrative data such as staffing, case mix and inspection data (Mor, 2005). Inspections and resulting deficiency citations may also vary due to surveyor training and experience leading to information bias (Mor, 2005). Thus, differences in study findings may reflect differences in data quality as well as the influence of the independent variables. Large administrative data do not have data tailored to the specific purposes of a study and, thereby, may cause bias in the estimation of relationships between the dependent and explanatory variables (Castle et al., 2008).

Other selection biases in these studies may be associated with differences in resident case-mix as residents may have a choice in the type or location of the nursing home where they wish to be admitted. Similarly, nursing homes may choose the types of residents they wish to provide services to. Such biases affect the generalizability (external validity) of the study findings.

With respect to statistical analysis methods, as shown in Table 3, except for three studies, all others used rigorous statistical analyses such as multivariate regression, logistic regression, and hierarchical linear modeling. The latter method is useful in addressing ecological fallacies associated with clustering of residents in LTC facilities (Raudenbush & Bryk, 2002). Several of the studies used risk adjustment to control for resident case-mix (e.g., physical disabilities), staffing levels, and other facility factors such as ownership and size (Castle, 2001; Castle & Engberg, 2008b). Such risk adjustment is necessary for benchmarking, that is, the ability to compare QoC between facilities (Arling et al., 1997; Mukamel, 1997; Mukamel & Brower, 1998).

In summary, the review of the retrieved 12 research studies underscores the increased interest in the measurement of QoC in LTC facilities. This review, as well, documents the effort of researchers in defining QoC from a variety of dimensions. They show associations of varying degrees between organizational factors and QoC. However, despite the emphasis given to QoL in LTC settings as a critical outcome in evaluating LTC facility services, relatively few studies have directly examined the relationship of resident and facility characteristics with QoL. Of the 12 studies reviewed, only two studies examined the association between organizational factors and residents' QoL. However, the organizational factors studied only considered the type of facility (nursing homes versus assisted living facilities) and no other factors such as ownership, size, leadership, or staffing. The remaining 10 studies primarily focused on measuring QoC. The lack of empirical research to examine the effect of organizational factors specifically on residents' QoL is a serious gap. Given the growth in the importance of QoL as a measure of quality outcome in LTC facilities, it deserves to be addressed through rigorous research study, which this proposed study aims to do.

The review of the literature served as a basis for the design of the conceptual framework for the purposes of this current study. In the next section, this conceptual framework is discussed.

2.7 Conceptual Framework

Based on the review of the literature described in the preceding section on the concept of QoL and empirical research findings, a conceptual framework is proposed to guide this study. The framework offers an operational definition of LTC residents' QoL from three dimensions: (1) components or content of QoL; (2) determinants or predictors of QoL; and (3) inter-relationships of QoL components and predictors. The framework describes the relationship between residents' perceived QoL, as defined by the *interRAI_QoL Survey*, and residents' characteristics (i.e., intrinsic factors) and LTC facilities' attributes (i.e., extrinsic factors). The framework further explains these intrinsic and extrinsic factors as predictors of residents' QoL. Finally, the framework explains the potential interaction of these factors.

2.7.1 Content of QoL

As described above, the concept of QoL is multidimensional, personal, and subjective. There is general consensus that individuals are the best judge of their QoL given its subjective nature. For the purpose of this study, the content LTC facility residents' QoL is defined by the *interRAI_QoL Survey*. As described earlier, the instrument is characterized by 50 dimensions of QoL tapping into 10 domains. These domains and their respective descriptors are of vital relevance to residents due to the major changes that admission into LTC facilities means to them such as the loss of their privacy and autonomy, compromised independence and freedom, lack of options to make preferred choices, and forced relationships. While each of these 10 domains and the 50 indicators describe various aspects of QoL, collectively they offer an overall composite measure of residents' QoL in LTC facilities. Thus, residents' QoL may conceptually be characterized at two levels: (1) subscale (domain) level; and (2) overall QoL measure. Scoring is discussed in greater detail in the methodology section of this paper.

2.7.2 Predictors of QoL

The second dimension in the proposed framework is potential predictors of QoL. Two broad categories of predictors of LTC residents' QoL will be considered: (1) intrinsic factors; and (2) extrinsic factors. The first category of factors is the residents' socio-demographic characteristics, including age, gender, marital status, primary language (used as proxy measure for culture), religiosity, education, and length of stay. This category also consists of residents' clinical characteristics, including their cognitive and functional performance, health status, psycho-social well-being, conflicts with relationships, and mood. These variables were selected as potential predictors on the basis of the review of the literature described above. All of these resident-related attributes are referred to as intrinsic factors. These socio-demographic and clinical predictors are listed in Table 5, and are described in greater detail in section 3.6.1. Other personal attributes that may potentially influence individuals' perception of their QoL is their disposition, which is an affective component of overall life satisfaction as was described earlier. However, the exploration of this factor is beyond the scope of this study.

The second key factor that may potentially influence the perception of QoL is the organizational characteristics of LTC facilities. Such characteristics are also shown in Table 5 and include ownership, profit status, size, staffing ratios and composition, and leadership turnover. Another predictor of QoL that is included in the conceptual model is hours of care per resident per day as a measure of the quality of residents' care. Quality care has been shown as described earlier to influence QoL because of its importance to LTC facility residents, given their chronic and co-morbid health conditions. These facility characteristics are viewed as extrinsic factors.

Other extrinsic factors, including architectural designs such as building layout and esthetics (Barnes, 2002), and socio-cultural climates such as staff attitude, commitment, work routines, involvement in decision making, and relationships (Castle, 2006; Karsh, 2005; Kruzich, 1992; Moos, 1996) have been shown to influence quality of care and QoL. However, they are beyond the scope of this present study.

According to this conceptual framework, each of these factors and their inter-relationships influence residents' perception of their QoL.

Table 5: Resident characteristics and LTC facility attributes as potential predictors of residents' QoL

Residents' Socio-demographic Characteristics	Residents' Clinical Characteristics	LTC Facility Attributes
Age	Cognitive performance	Ownership
Gender	Functional performance	Profit status
Marital status	Health status	Geographic location
Primary Language (as proxy for culture)	Psycho-social well-being	Size
Religiosity	Mood	Leadership stability
Education	Behaviour	Accreditation status
Length of stay	Pain	Ratio of agency to regular staff
	Bladder incontinence	Ratio of registered nursing to non-registered nursing staff
	Bowel incontinence	Hours of care per resident per day (by categories of staff)
	Vision	Nursing staff turnover
	Hearing	
	Global disposition	

2.7.3 Inter-relationships of QoL Content and Predictors

A third and final aspect of the proposed conceptual model is that individual residents' perceptions of their QoL are correlated because they are "clustered" within LTC facilities (DeLong et al., 1997). Such data tend to be correlated due to residents' membership arising from their shared residence in the same LTC facility (Diez Roux, 2002). Thus, residents' self-appraised QoL is not independent but influenced by the QoL experiences of co-residents.

Residents' self-appraisal of their QoL may also be influenced by the inter-relationships between several of the components of the *interRAI_QoL Survey* instrument and the global dispositional item ("I tend to be happier than most other people"). For instance, a resident's disposition in life may influence how they appraise their various aspects of life in the LTC facility such as comfort, safety, and personal relationships with co-residents and staff.

In addition to the inter-relationships among components of QoL, the conceptual model also hypothesizes inter-relationships among several predictors of QoL that were examined in this study. For instance, marital status, religiosity, education levels, and culture have been shown in the literature to have mediational roles and may potentially have a positive influence on residents' QoL. Other predictors of QoL such as degree of independence in activities of daily living and severity of pain may influence depression as measured by DRS, another predictor of QoL. Similarly, a resident's psycho-social well-being as measured by the Index of Social Engagement may be influenced by their aggressive behaviour and conflicts in their relationships with family members, co-residents, or staff. Thus, residents' self-appraised QoL may be the net outcome of the interaction of several predictors.

In sum, this conceptual framework offers an operational definition of LTC facility residents' QoL through the use of domains and their components, clustering effect, potential predictors of QoL, inter-relationships among components, inter-relationships among several predictors, and finally, interaction between predictors and QoL components. Thus, residents' QoL is the net result of their introspective evaluation their life in the LTC facility as influenced by intrinsic and extrinsic factors.

3.0 Methods

3.1 Research Ethics Clearance

Full ethics approval for this study was granted on December 21, 2009 by the Office of Research Ethics, University of Waterloo (Appendix B). Approvals for subsequent amendments were received on February 3rd and April 7th, 2010 (Appendix C). Full ethical review was waived due to the lack of any known risks to the study participants. Each participating LTC facility was requested to obtain their own research ethics clearance from internal mechanisms, if any. Most facilities accepted the University of Waterloo's ethics clearance.

3.2 Design and Settings

This was a cross-sectional, correlational, and descriptive study designed to examine the relationships between self-reported QoL ratings, resident characteristics and facility attributes. The study was conducted with a sample of 928 residents recruited from LTC facilities in the Canadian provinces of Alberta, British Columbia, Manitoba, Nova Scotia, Ontario, and Saskatchewan.

LTC facilities in Canada are designed for the care of individuals who are no longer able to live independently in the community because of functional impairments and who require nursing and/or personal care 24 hours a day (Alberta Seniors and Community Supports, Government of Alberta, 2008; Department of Health, Government of Nova Scotia, 2009; Ontario Seniors' Secretariat, Government of Ontario, 2007). Functional impairments may include activities of daily living (ADL), such as bathing, dressing, eating, and toileting.

3.3 Recruitment and Consent

3.3.1 LTC Facilities

LTC facility recruitment began in October 2009 and continued until March 2010. Several approaches were used for the LTC facility recruitment. While most of the participating LTC facilities were recruited by the researcher, a small number of facilities that became aware of the study volunteered to participate. In Ontario, the researcher placed an advertisement in the electronic newsletters of the Ontario Long Term Care Association and the Ontario Association of Non-Profit Homes and Services. Others contacted the researcher having learned of the study from others. A recruitment letter was prepared and e-mailed to those who had expressed an interest (Appendix D). Overall, a convenience sample of 48 LTC facilities agreed to participate in the study.

The inclusion criteria included: (1) use of RAI-MDS 2.0 for at least one year to allow for full and quarterly assessments; (2) consent to provide RAI-MDS 2.0 data to the researchers either via (i) the Canadian Institute for Health Information (CIHI), (ii) their provincial health authority, or (iii) directly by the LTC facility; and (3) willingness to identify and designate an on-site study project designate and surveyors for the purpose of this study. There was no compensation available to the LTC facilities for participation in the study.

3.3.2 Resident Participants

For inclusion in this study, LTC facility residents had to meet the following criteria: (1) a Cognitive Performance Scale (CPS) score between 0 (intact) and 3 (moderate impairment); (2) the ability to communicate in English in the format of an interview; (3) availability of a complete RAI-MDS assessment, including admission background, full assessment, and, where applicable, quarterly assessment; and (4) a written informed consent. Residents who are in short-stay, palliative, or convalescent beds were excluded from the study as they may have represented a category of population who either requires or receives different levels of care compared to those who are in regular LTC beds.

Resident Assessment Instrument (RAI) Coordinators in each LTC facility identified from RAI-MDS 2.0 data residents who met the selection criteria. LTC facility staff who were most familiar with the residents approached and provided them with an information letter (Appendix E) prepared by the researcher. LTC facility staff then, using a recruitment script (Appendix F) also prepared by the researcher, explained to the residents the nature of the study and the protocol to be followed, including its privacy and confidentiality measures. Signed, informed consents were obtained from those residents who agreed to participate in the study (Appendix G). Signed consents were also obtained from LTC facilities for allowing the study to be conducted and for agreeing for the researchers to provide participating residents' personal identifier information to CIHI (Appendix H). To ensure protection of residents' identity, LTC facilities kept residents' signed consent forms in a secure location in the LTC facility. They provided the researchers with confirmation that signed, informed consents were obtained from the residents (Appendix I). To determine the response rate of study participants, the number of residents who were approached for recruitment, the number who refused and the number who consented for participation in the study were tracked and reported (Appendix J; Appendix K). Participating residents were not compensated for their participation in the study.

3.4 Surveyor Designation, Qualifications and Training

Facility representatives and designated surveyors received webinar training from the researcher about the study, how to conduct interviews, how to avoid influencing residents' responses, and how to complete the *interRAI_QoL Survey* Form. A registry of trained surveyors was maintained along with their credentials, if any, and position in the LTC facility. The Office of Research Ethics approved the training program. While these surveyors did not need to have any professional designation, the following qualities were considered necessary: (1) good interpersonal and communication skills, (2) ability to establish good rapport with residents, and (3) ability to put residents at ease. As well, designated surveyors should not be clinical or personal care providers to the residents they interviewed. In addition to the training, the LTC facility representative and surveyors were provided with a project website address where all information relevant to the QoL study project, including the training material, was posted.

Table 6: Distribution of Surveyors' Position in LTC Facilities

Surveyors' Position	% (n)
Management - administrative staff (non-care providers)	40.8 (43)
Students	22.3 (23)
Para care providers (social workers, recreation staff, pastoral care, and includes placement students)	22.3 (23)
Direct care providers (e.g., registered nursing staff, personal support workers)	9.7 (10)
Volunteers	4.9 (5)
TOTAL	100.0 (103)

3.5 Measurement of Response and Explanatory Variables and Data Sources

3.5.1 Quality of Life of Residents

Residents' self-reported QoL served as the dependent variable and was measured by using the *interRAI_QoL Survey* form (Appendix L), which was described in a preceding section.

Trained surveyors met with consenting residents in private, and interviewed them in a manner that was sensitive and considered residents' comfort and privacy. To help residents through the interview process and cue them to the possible response options, they were provided with a large print, friendly format copy of the six possible response options in the *interRAI_QoL Survey* (Appendix M; Bradburn, Sudman, & Wansink, 2004). Surveyors recorded residents' responses on a scannable copy of the *interRAI_QoL Survey*. Each interview was anticipated to be about 30 – 40 minutes in length subject to participants' comfort and preferences. The number and percentage of useable completed surveys received were tracked (Appendix K). Each completed *interRAI_QoL Survey* was visually scanned for completeness, and electronically scanned to generate an electronic data file. As each resident's survey was scanned, a unique study identification number (USID) was assigned to serve as the common link between QoL data as the dependent variable, and RAI-MDS 2.0 data and LTC facility attributes as the independent variables (IV).

As described previously, the *interRAI_QoL Survey* is made up of 10 domains with four to six items or components within each domain. The scale used is a five-point ordinal scale: Never (0); Rarely (1); Sometimes (2); Most of the time (3); Always (4). Participants also have the option of a "Don't know" (6) response. In addition to these participant responses, surveyors may use "Refused" (7) or "No response or cannot be coded from response" (8) codes as appropriate. Score options 6, 7 and 8 were considered "missing" and recoded as 2 (sometimes). The implications of this recoding are examined in section 3.7.4 in detail. Thus, in calculating residents' QoL scores, only ratings on the 5-point (0 to 4) scale were used. Two-level of scores were calculated: a domain specific score, and an overall aggregate score for the whole instrument.

3.5.2 Resident Assessment Instrument – Minimum Data Set 2.0

Residents' personal, clinical and functional characteristics served as the independent variables and were measured by RAI-MDS 2.0 (Appendix A). RAI-MDS 2.0, used in LTC facilities, is part of a suite of instruments designed by interRAI to provide an integrated health information system. It is an interdisciplinary instrument that provides standardized assessment of LTC facility residents, and serves to improve the quality of and outcomes of their care (Bernabei, 2009; Hawes, Morris, & Phillips, 1995; Rantz, Popejoy, Zwygart-Stauffacher, Wipke-Tevis, & Grando, 1999). It was introduced in the United States resulting from a report by the Institute of Medicine recommending that nursing home regulations shift their focus from assessment of structure and process to an outcome-focused approach (Institute of Medicine, 1986). The MDS component of RAI is a standardized assessment instrument (Morris, Hawes, & Fries, 1990). Under the RAI-MDS 2.0, each new resident is required to have a full assessment upon admission to a LTC facility, partial assessment every quarter (90 days) thereafter, and upon a significant change in health status (Morris et al., 1990). The RAI-MDS 2.0 consists of multiple domains, including identifying and socio-demographic information, cognition, communication/hearing, vision, mood and behaviour, psychosocial well-being, physical functioning and structural problems, continence, disease diagnoses, health conditions, oral/nutritional status, oral/dental status, skin condition, activity pursuit patterns, medications, special treatments and procedures, and discharge potential. Overall, there are more than 400 items describing residents' socio-demographic characteristics, care needs, strengths and preferences; thus, it contains detailed clinical information about the health status of residents (Morris et al., 1990), which contributes to comprehensive assessment and resident-centred care plan development (Hawes, Morris, & Phillips, 1997). The RAI-MDS 2.0 data result from the continuous observation and assessment of residents by LTC facility staff. The RAI-MDS 2.0 has been shown to be a valuable tool for assessing the QoC in LTC facilities (Jones, 2010; Mor, 2003; Zimmerman et al., 1995). This capacity is due to its embedded quality indicators (e.g., bowel/bladder incontinence), which reflect either processes or outcomes of care (Zimmerman, 2003). Some indicators are considered "incidence measures" as they indicate change in resident's health status over time or "prevalence measures" as they represent residents' health status at a point in time (Zimmerman, 2003). Moreover, some of these quality indicators have associated risk adjustment factors, which when adjusted enable fair comparisons of LTC facility performance on the basis of these outcomes (Berlowitz et al., 2001a; Zimmerman, 2003). Since its development in the early 1990s in the United States, RAI-MDS has been widely tested and utilized in many jurisdictions internationally and in several Canadian provinces.

In addition to being a well-proven clinical instrument, RAI-MDS 2.0 has also been shown to be a highly reliable research instrument that has been applied in many studies (Achterberg, van Campen, Pot, Kerkstra, & Ribbe, 1999; Burrows, Morris, Simon, Hirdes, & Phillips, 2000; Hawes et al., 1995; Hirdes, Fries, Rabinowitz, & Morris, 2007; Salvà et al., 2004). The psychometric properties of its assessment items and embedded scales (e.g., Cognitive Performance Scale; Depression Rating Scale) have been well established (Casten, Lawton, Parmelee, & Kleban, 1998; Frederiksen, Tariot, & De Jonghe, 1996; Goossen, 2002; Hawes et al., 1995; Morris, Nonemaker, Murphy, & Hawes, 1997; Phillips & Morris, 1997; Sgadari, Morris, & Fries, 1997) as well as its psychometric properties.

3.5.2.1 Sources of RAI-MDS 2.0 Data

In Canada, RAI-MDS has been implemented for use in LTC facilities in seven provinces (Alberta, British Columbia, Manitoba, Newfoundland, Nova Scotia, Ontario, Saskatchewan), and the Yukon Territory. LTC facilities in the six provinces agreed to participate in this study. Of the six provinces, only Manitoba, Nova Scotia, and Ontario submit RAI-MDS 2.0 data to the Canadian Institute for Health Information (CIHI). Accordingly, there were three primary sources for the RAI-MDS 2.0 data were used: (1) CIHI for Manitoba, Nova Scotia, and Ontario; (2) Provincial health authorities for Alberta and Saskatchewan; and (3) LTC facilities in British Columbia.

CIHI is an independent, not-for-profit organization that provides essential data and analysis on Canada's health system and the health of Canadians. CIHI tracks data in several health sectors. General hospitals, chronic care hospitals and mental health or psychiatric facilities supply CIHI with data related to their services. CIHI is also the repository of RAI-MDS data from LTC facilities. The Continuing Care Reporting System (CCRS) database is a resource for continuing care services, and includes standardized clinical, functional and service information about residents' care needs, preferences and strengths (Canadian Institute for Health Information, 2009). The researcher of this present study applied to CIHI and was granted access to the CCRS database under its Graduate Student Data Access Program (GSDAP) subject to stringent privacy and confidentiality safeguards.

To receive participating residents' RAI-MDS data from CIHI, the researcher submitted to CIHI residents' "identification information" portion (section "A") of the *interRAI_QoL Survey* form along with their assigned USIDs using secure methods specified by CIHI. The residents' identification information included (1) admission date (year and month); (2) first seven digits of resident's health card number; (3) last seven digits of resident's health record number; (4) gender; (4) birth date (year and month); and (5) province and facility identifiers. CIHI used this information to match and extract these residents' RAI-MDS data from the CCRS database. The RAI-MDS 2.0 data that were accessed for each participating resident were taken from the MDS assessment on record that was the most proximate to, but preceding, the QoL survey. The assessment had to be the most proximate because of the possible risk that residents' clinical status might change. Full RAI-MDS assessments are done upon residents' admission to the LTC facility, upon significant change to their clinical status and annually. Partial assessments are also completed quarterly. Thus, the gap between QoL interview and the MDS assessment could range up to 90 days and more depending upon the QoL interview date. As well, the assessment had to precede the QoL interview again because of the potential risk that residents' clinical status might change subsequent to the QoL assessment.

CIHI removed resident and facility identifiers from these data, linked these data to the USIDs provided by the researcher, and provided the linked "RAI-MDS-CCRS" data to the University of Waterloo in Statistical Analysis Software (SAS® 9.2) format. The researcher then linked the RAI-MDS-CCRS data to the *interRAI_QoL Survey* Data under conditions specified by CIHI. The resulting QoL-MDS data were subjected to statistical analyses. A similar process was used for the other two RAI-MDS sources.

3.5.3 LTC Facility Attributes

LTC facility organizational and programming attributes also served as independent variables and were measured by using the *LTC Facility Profile Form* (Appendix N). The form was designed by the researcher specifically for the purposes of this study based on an extensive review of the literature, including the empirical research review discussed in a preceding section. The facility attributes include objective measures such as facility size (that is, number of beds), geographic location (urban or rural), staffing levels, and leadership and staff turnover as conceptually associated with residents' QoL (Bliesmer, Smayling, Kane, & Shannon, 1998; Castle, 2001; Donoghue & Castle, 2006; Hillmer et al., 2005; Lucas et al., 2007; Mattiasson &

Andersson, 1995). The purpose of these data was for analyzing the effect of facility attributes on residents' QoL. Senior management of individual LTC facilities completed the Attribute Form. The LTC Facility Attribute Form was completed electronically. The QoL survey data were linked to the LTC facility attributes data by using facility identification numbers for analyses.

3.5.4 Privacy, Confidentiality and Records Management

To ensure the privacy and confidentiality of residents' personal health information the procedure described earlier was followed. All resident and facility identifier information was removed from all linked data.

Paper records are kept in secure storage at the Department of Health Studies & Gerontology, University of Waterloo. Access is restricted to authorized individuals only. Electronic data reside on a secure network server at the University of Waterloo with restricted access to authorized individuals.

3.5.5 Feedback to Participating Residents and LTC Facilities

Following the completion of the data collection, participating LTC facilities were provided with thank you letters (Appendix O). A similar letter was given to participating residents through the LTC facilities (Appendix P).

3.6 Response and Explanatory Variables

3.6.1 Resident Variables as Possible Predictors of Quality of Life

Resident variables that were selected as possible predictors of QoL and their source are listed in Table 7. These variables include scales that are embedded in the RAI MDS 2.0 assessment instrument. These are described below.

3.6.1.1 Cognitive Performance Scale

The Cognitive Performance Scale (CPS) is a hierarchical index used to rate the cognitive status of residents. It is based on a combination of items in the RAI-MDS 2.0 addressing short-term memory, daily decision-making, making self understood, and self-performance in eating. An algorithm is used to compute a categorical CPS scale that describes cognitive performance as intact (0) to very severe impairment (6) (Morris, Fries, Mehr, & Hawes, 1994). In previous research the CPS was found to be strongly correlated ($r = 0.86$) with the Mini Mental State Examination (Folstein, Folstein, & McHugh, 1975; Frederiksen et al., 1996; Hartmaier, Sloane, Guess, & Koch, 1995; Morris et al., 1994).

3.6.1.2 Activities of Daily Living Hierarchy Scale

The Activities of Daily Living Hierarchy (ADLH) scale is a measure of ADL performance using four assessment items from RAI-MDS: personal hygiene (G1ja), toileting (G1ia), movement – locomotion (G1ea), and eating (G1ha). The scale includes both early and late-loss ADL items, and early-loss ADLs are given lesser scores than ADLs lost at later stages. Based on these 4 ADL items, an algorithm is used to compute a 7 - point scale ranging from independence (0) to total dependence (6) (Morris, Fries, & Morris, 1999). The scale has been found to reliably detect changes in functional levels over time (Morris et al., 1999).

3.6.1.3 Changes in Health, End-Stage Disease, Signs and Symptoms Scale

The Changes in Health, End-Stage Disease, Signs and Symptoms Scale (CHESS) represents a measure of a person's health instability based on the following RAI-MDS assessment items: vomiting (J1o); dehydration (J1c); leaving food uneaten (K4c); weight loss

(K3a); shortness of breadth (J1l); and edema (J1g). This scale takes on values of either 0 (no symptoms), 1 (at least one symptom), or 2 (2 or more symptoms). A score of 1 is also added for each additional assessment item on end stage disease (J5c), decline in cognition (B6), and decline in ADL (G9) to result in a composite scale ranging from 0 (no instability) to 5 (highest level of instability). CHESS has been shown to be a strong predictor of mortality in LTC facility population (Hirdes, Frijters, & Teare, 2003)

Table 7: Resident variables and sources

Resident Variables	**Source**	**RAI-MDS 2.0 Item Code**
Age	RAI-MDS 2.0	AA3a
Gender	RAI-MDS 2.0	AA2
Marital status	RAI-MDS 2.0	A5
Primary Language (as proxy of culture)	RAI-MDS 2.0 (Admission Background Form)	AB8
Religiosity	RAI-MDS 2.0 (Admission Background Form)	AC1 (t) & (u)
Education (highest completed)	RAI-MDS 2.0 (Admission Background Form)	AB7
Length of stay (difference between admission and interview dates)	RAI-MDS 2.0 (calculated as the difference between admission date - Item AB- and date of QoL interview)	
Bladder incontinence	RAI-MDS 2.0	H1b
Bowel incontinence	RAI-MDS 2.0	H1a
Vision	RAI-MDS 2.0	D1 (3 & 4)
Hearing	RAI-MDS 2.0	C1 (3)
Cognitive performance	Cognitive Performance Scale (CPS)*	
Functional performance	Activities of Daily Living Hierarchy Scale (ADLHS)*	
Health status	Changes in Health, End-Stage Disease, Signs and Symptoms (CHESS) scale*	
Psycho-social well-being	Index of Social Engagement (*ISE*)*	
Mood	Depression Rating Scale*	
Behaviour	Aggressive Behaviour Scale*	
Pain	Pain Scale*	
Global disposition	*interRAI_QoL Survey*	Item c4f

* All scales are embedded in the RAI-MDS 2.0 and represent algorithms of several assessment items.

3.6.1.4 Index of Social Engagement

The Index of Social Engagement (ISE) is a measure of one's psycho-social well-being. It is based on six assessment items in the RAI-MDS 2.0: at ease interacting with others (F1a); at ease doing planned or structured activities (F1b); at ease doing self-initiated activities (F1c); establishes own goals (F1d); pursues involvement in the life of the facility (F1e); and, accepts invitations into most group activities (F1f). The scale is a composite of these six items with scores ranging from 0 to 6 with higher scores indicating higher level of social engagement (Mor et al., 1995).

3.6.1.5 Depression Rating Scale

The Depression Rating Scale is used as a screening tool for clinical depression. It is based on seven assessment items embedded in the RAI-MDS 2.0: negative statements (E1a); persistent anger (E1d); expressions of unrealistic fears (E1f); repetitive health complaints (E1h); repetitive anxious complaints (E1i); sad, pained, worried facial expression (E1l); and, tearfulness (E1m). Scale scores of three or greater are indicative of major depression in LTC facility residents (Burrows et al., 2000).

3.6.1.6 Pain Scale

The Pain scale takes into account two RAI-MDS assessment items on pain frequency and intensity. The scale scores may range from 0 to 4, where 0 = no pain (J2a = 0), 1 = pain less than daily (J2a = 1), 2 = daily pain but not severe (J2a = 2 AND J2b = 1 or 2), 3 = severe daily pain (J2a = 2 AND J2b = 3). The Pain scale has been shown to be highly predictive of pain on a Visual Analogue Scale in LTC facilities in the United States (Fries, Simon, & Morris, 2001).

A summary of the definitions of these scales that are embedded in the RAI-MDS 2.0 can be found in Appendix Q.

3.6.2 LTC Facility Variables as Possible Predictors of Quality of Life

The following facility attributes were examined for possible predictors of residents' QoL:

1. Ownership: Private, Municipal, Charitable
2. Profit status: For profit, not-for-profit
3. Geographic location: Rural; Urban[1]
4. Size (i.e., number of beds)
5. Accreditation status
6. Management staff hours
7. Registered nurse hours of care
8. Registered or licensed practical nurse hours of care
9. Total hours of care
10. Ratio of registered nursing staff to non-registered nursing staff
11. Registered nursing staff turnover
12. Non-registered nursing staff turnover
13. Leadership stability

Operational definitions of these attributes are provided in Table 8.

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[1] To determine the urban or rural location of LTC facilities, their postal codes were used. The second character of a postal code in Canada indicates a rural setting if it is a 0 or an urban setting if the numbers are from 1-9 (Canada Post, 2010).

Table 8: Operational definitions of LTC facility attributes

LTC Facility Attributes	Operational Definitions
Management Staff Hours/Resident/Week	Management Staff include: full-time or part-time administrator, assistant administrator, director of care, and assistant director of care
RN Hours of Care/ Resident/Day	Registered Nurse include: regular or agency registered nurses, including registered psychiatric nurses
RPN_LPN Hours of Care/Resident/Day	Registered or Licensed Practical Nurse include: regular or agency staff
Total Hours of Care/Resident/Day	Total Hours of Care includes hours worked by registered nurses, registered psychiatric nurses, registered practical nurses, licensed practical nurses, and personal support workers
Ratio of Registered Nursing Staff to Non-Registered Nursing Staff	Registered Nursing Staff include registered nurses, registered practical nurses, licensed practical nurses Non-Registered Nursing Staff include personal support workers, health care aides, nursing assistants, or continuing care assistants
Registered Nursing Staff Turnover	Number of separations (voluntary or involuntary) in previous calendar year (includes full-time or part-time staff) adjusted per 100 staff
Non-Registered Nursing Staff Turnover	Number of separations (voluntary or involuntary) in previous calendar year (includes full-time or part-time staff) adjusted per 100 staff
Leadership Stability	Leadership staff include: administrators, assistant administrators, directors or assistant directors of care Stability means 3 or more years tenure at the LTC facility

Abbreviations:
FTE = full time equivalents
RN = registered nurse (also includes registered psychiatric nurse)
RPN = registered practical nurse
LPN = Licenced practical nurse
PSW = personal support worker (also includes health care aids, nurses aids, and continuing care assistants

3.7 Data Analyses

The basic analytic design for this study was to examine the relationship between the dependent variable (QoL self-reports) and independent variables derived from RAI-MDS 2.0 and the LTC Facility Attributes data. Descriptive, bivariate and multivariate regression analyses were carried out using Statistical Analysis Software (SAS® 9.2) to describe QoL ratings and to determine their associations with selected resident characteristics and facility attributes. The distributional and psychometric properties of the *interRAI_QoL Survey* were also analyzed using SAS.

3.7.1 Sample Size

There are several viewpoints about determining the necessary sample size for a study. In regression analysis, Harris (1985) suggests that the number of participants should exceed the number of predictors (or independent variables) by at least 50. Neutens & Robinson (2001), on the other hand, suggest a general rule that a sample size should be at least twice the number of items in a scale. According to this rule, as the interRAI_QoL has 50 items, the desired sample size should be 100. For regression equations using six or more independent variables, Wilson Van Voorhis & Morgan (2007) consider an absolute minimum of 10 subjects per independent variable. Finally, according to Altman (1991), sample size in multiple regressions should be the square of the number of independent variables. On the basis of these various rules of thumb, with ten explanatory variables in the final chosen model, the sample of 847 used for regression analysis meets or exceeds the criteria for sample size.

3.7.2 Descriptive Analysis

3.7.2.1 LTC Facility Attributes

Distributional properties of LTC facility data were examined using frequencies, percentages, and means.

3.7.2.2 Study Resident Sample

To determine if the study resident sample was representative of LTC resident populations, the socio-demographic and clinical characteristics of four populations were compared based on CCRS aggregate data from Manitoba, Ontario and Nova Scotia obtained from CIHI: (1) residents who agreed to participate and completed the surveys, (2) residents who refused to participate or were unable to complete their surveys in participating facilities; (3) residents in all participating facilities; and (4) residents in all LTC facilities. Chi-square tests were carried out to determine if there were significant differences between the study sample and the three non-participating populations. CIHI was able to match 90% (n=725) of the residents who participated in the QoL survey from these three provinces to the RAI-MDS data in the Continuing Care Reporting System database.

3.7.2.3 Quality of Life Scores

As rationalized in a preceding section, while the *interRAI_QoL Survey* is an ordinal rating scale, the data generated were treated as interval. To compute residents' overall QoL scores, 49 of the 50 items included in the 10 domains were used. The one item that was not included in the calculation of the overall QoL score was the global dispositional measure (Item c4f in the *interRAI_QoL Survey*; Appendix L) noted in a preceding section. The two negatively phrased items were reversed so that 0 was 4, 1 was 3, 2 remained as 2, 3 was 1, and 4 was 0 to provide subscale and overall scores to reflect positiveness toward QoL. The distribution of residents' ratings by response options, including responses 6 (Don't know), 7 (Refused), and 8 (No response or cannot be coded) were examined.

3.7.3 Distribution of Mean QoL Scores

The distribution of QoL scores was examined by calculating the mean QoL score for each domain (subscale) and overall QoL scores by province, and 95% confidence intervals. The distribution of mean QoL scores for each domain by socio-demographic characteristics and clinical characteristics were also examined. The interRAI scales (e.g., Cognitive Performance Scale; Depression Rating Scale) were treated as categorical data for the purpose of statistical analysis.

3.7.4 Missing Values

In this study, responses 6, 7 and 8 to any of the *interRAI_QoL Survey* items were considered as missing values. It is important to address missing values as they may result in bias and cause difficulties in interpreting the results of a study (Fayers & Machin, 2007). There are three approaches for treating missing values. Case deletion is one approach where missing values are considered as missing and the entire survey response of those whose information is incomplete are discarded (Schafer & Graham, 2002). This is commonly known as case deletion or “listwise” deletion. In this approach attention is restricted to residents who have valid values for all the QoL items. While this is the simplest approach, it results in overall loss of data (and so loss of statistical power in the analysis) because the scores based on several items are excluded whenever even a single item is missing (Fayers & Machin, 2007; van Ginkel, Sijtsma, van der Ark, & Vermunt, 2010). If the proportion of anticipated data missing is large and the missing data are not completely at random, then case deletion may also lead to serious bias in the observed results because the residents with complete surveys may not be representative of the total study population (Shafer & Graham, 2002). Thus, in case deletion, there is concern that the characteristics of residents with missing data are different from those residents for whom complete data are available (Fayers & Machin, 2007).

The second approach to handling missing values is sample-mean imputation in which missing QoL values are replaced by the mean score of a domain (or subscale) calculated from those residents who completed the QoL survey (Fayers & Machin, 2007; Schafer & Graham, 2002). In this approach, it is assumed that the items within a domain are interchangeable and are equally reliable measures of its construct. It is also assumed that residents' scores in that domain are homogeneous (Fox-Wasylyshyn & El-Masri, 2005). A feature of this approach is that the estimate of the mean of the augmented dataset remains the same as the mean that is calculated for the original non-missing data. However, the estimate of the standard deviation will be reduced artificially as the imputed values are all placed at the centre (mean) of the distribution. This can lead to distorted significance tests and falsely narrow the confidence intervals (Fayers & Machin, 2007; Schafer & Graham, 2002).

The third approach to handling missing values is recoding missing values with the response "Sometimes" (2). This is a fairly simple approach with the advantage that it does not result in reduction of dataset, loss of sample size or loss of statistical power. However, this approach may underestimate the observed QoL rating of the sample, and increase the variability of the scores around the mean (i.e., larger standard deviation). The choice of "sometimes" with a value of 2 for recoding is the most optimal choice as it avoids the lower extreme values of 0 and 1 and the higher extreme values of 3 and 4. This approach was used in the pilot study of the *interRAI_QoL Survey* in Boston, Massachusetts with acceptable results (Morris, 2010). This recoding method was explored in this study and the distribution of missing values was examined.

3.7.5 Surveyors' Position in LTC Facility

The distribution of surveyors' position in LTC facilities was examined to determine if they had any influence on residents' self-reported QoL ratings. Frequencies, percentages, overall mean QoL scores and 95% confidence intervals were calculated.

3.7.6 Research Question 1

The first research question for this study was "What are the distributional and psychometric properties of the *interRAI Self-Report Nursing Home Quality of Life Survey*?"

The psychometric properties of the *interRAI_QoL Survey* were examined by assessing its reliability and validity. "Reliability refers to the reproducibility and consistency of the instrument. It refers to the homogeneity of the instrument and the degree to which it is free from random error" (Bowling, 2009). An instrument's reliability is determined through test-retest, inter-rater reliability, and internal consistency. "Validity is an assessment of whether an instrument measures what it aims to measure. It should have face, content, concurrent, criterion, construct (convergent and discriminant) and predictive validity. It should also be responsive to actual changes. Reliability affects validity, and an unreliable scale inevitably has low validity" (Bowling, 2009).

3.7.6.1 Reliability

Reliability of a rating scale means that "measurements of individuals on different occasions, or by different observers, or by similar or parallel tests, produce the same or similar results" (Streiner & Norman, 2003). To determine the reliability of the *interRAI_QoL Survey* instrument, testing assessed the extent to which its items measure the construct of QoL, its repeatability or stability, and its internal consistency (i.e., freedom from random error) (Bowling, 2009). Two specific tests were conducted to establish the instrument's reliability: test-retest and internal consistency. While inter-rater reliability testing is generally deemed essential for testing the reliability of measurement scales, it was not carried out in this study as trained surveyors in face-to-face interviews recorded residents' self-reported QoL ratings. In QoL measurements, where individuals self-assess their own QoL rather than assessed by proxies, inter-rater reliability is usually less of a concern than test-retest reliability (Fayers & Machin, 2007).

3.7.6.1.1 Test-retest Reliability

Test-retest reliability assesses the stability or repeatability of responses to the items in the instrument's subsequent administrations (Bowling, 2009; Streiner, 1993). It is a critical aspect of a measurement scale. A reliable measurement instrument should yield reproducible or similar values if used repeatedly with the same individual while his or her condition has not changed materially (Fayers & Machin, 2007). Instruments that measure symptoms or physical outcomes are likely to be highly consistent while those that measure subjective items, such as QoL, are likely to have lower reliability (Fayers & Machin, 2007). The target population, as well, is another factor in the extent of consistency achieved in test-retests. For instance, in instruments that are used with elderly populations, as in this study, high reliability may be difficult to achieve because of their complex frailty and health conditions. Thus, test-retest reliability levels may be influenced by either the items within an instrument or the qualities of the target population.

One other influencing factor is the time gap between the test and retest. A time gap that is too short might allow recall. However, the 50-item composition of the interRAI_QoL instrument will make it difficult for residents to remember their ratings at time one, thus, making the two ratings independent (Nunnally, 1978). On the other hand, a time gap that is too long might increase the likelihood of a change in the trait being measured (Arnold, 1991; Fayer & Machin, 2007). This latter point is particularly relevant to the target population in this study because of their health conditions.

In this study, a small subset of the study sample (n=22) agreed to be interviewed a second time. Each pair of interviews was conducted by the same interviewer after a period ranging from 3 days to 26 days, with 77% within two weeks depending on the availability of residents.

With respect to the sample size in test-retests, for a critical effect size of 0.80, at 5% level of significance and 90% power, and using a two-tailed test, the approximate number of subjects required would be 11 (Kraemer & Thiemann, 1987). On the other hand, for a critical effect size of 0.70, at 5% level of significance and 90% power, and using a two-tailed test, the approximate number of subjects required would be 16. The sample of 22 pairs in this study satisfies these requirements.

The stability of the instrument was measured by calculating the level of agreement (weighted kappa coefficients) between the initial and retest QoL item scores (Bowling, 2009; Landis & Koch, 1977; Streiner & Norman, 2008). The PROC FREQ procedure in SAS 9.2 was used to compute the weighted kappa coefficients with the AGREE option in the TABLES statement. Weighted kappa was used instead of unweighted kappa because it does not treat all disagreements equally (Sim & Wright, 2005). A second reason for using weighted kappa rather than unweighted kappa because the scale used in the *interRAI_QoL Survey* is ordinal and unweighted kappa is inappropriate for use with ordinal scales (Sim & Wright, 2005). The default Cicchetti-Allison weights were used in the computation of kappa coefficients rather than the Fleiss-Cohen weights. The TEST WTKAP option in the PROC FREQ statement was used in order to conduct a significance test on the weighted kappa. As SAS only calculates kappa for square tables, to square the tables pseudo-observations were added, but which were given the very small weight of 0.0000000001 (1E-10) so that its contribution to kappa will be negligible (SAS Institute Inc., 2002 – 2003; Stein, Devore, & Wojcik, 2005). Linear weights were used rather than quadratic because it was assumed that the difference between the categories (e.g., between 0 and 1, and between 1 and 2, etc.) in the ordinal scale had the same importance (SAS Institute Inc., 2002 – 2003).

3.7.6.1.2 Internal Consistency

Assessing the internal consistency of a rating scale is a necessary condition for measurement accuracy (Stones et al., 1996). Internal consistency refers to the extent to which items with a scale are inter-related (Fayers & Machin, 2007). As described earlier in this paper, the *interRAI_QoL Survey* has ten domains. Each domain has 4 – 6 items. The internal consistency of the instrument involves testing for homogeneity between items and their respective domains (Bowling, 2009; Streiner, 1993). The internal consistency of the *interRAI_QoL Survey* was be tested by calculating Cronbach's alpha.

Cronbach's alpha is an estimate of an instrument's internal consistency based on the correlations between all of the items within a scale or subscale (Fayers & Machin, 2007). It is also a form of reliability assessment of a scale (Fayers & Machin, 2007). Cronbach's alpha is a function of both the average correlation among items within a scale or subscale and the number of items in the scale (Fayers & Machin, 2007; Nunnally, 1978). Thus, alpha will increase as either of these increases. For example, Streiner & Norman (2008) show that for a scale with two items, the coefficient alpha is 0.57, with 4 items it is 0.73, and with 10 items it is approximately 0.80. An alpha of 1 would imply perfect correlation, while an alpha of 0 would imply no correlation. Thus, alpha is a measure of the consistency of the scale, and indicates the extent of inter-item correlation. For use in basic research, an internal consistency of 0.70 is considered acceptable for rating scales, but 0.90 or higher is suggested for clinical decision making (Fayers & Machin, 2007; Nunnally, 1978). As well, Ponterotto and Ruckdeschel (2007) suggest that for a scale with items more than 11 and a sample size over 300, coefficient alpha would have to be 0.90. However, Streiner & Norman (2008) suggest that alpha should not exceed 0.90.

Another beneficial use of Cronbach's alpha is in the development and selection of items for a scale (Fayers & Machin, 2007). If an item is removed and alpha changes little, that item may be a candidate for removal from the scale. Testing for the internal consistency of the *interRAI_QoL Survey* will help determine any inconsistencies in its items. In this study, the Cronbach's alpha coefficient for each of the domains and for the overall instrument was calculated.

3.7.6.2 Validity

While reliability measures the consistency of residents' responses to the *interRAI_QoL Survey*, validity measures its ability to measure the attribute of interest, that is, residents' QoL (Arnold, 1991; Bowling, 2009; Streiner & Norman, 2003). To establish its validity, two measures of validity were used to determine the extent to which the *interRAI_QoL Survey* measures the concept of QoL in LTC facility residents: content and convergent. These methods are described below.

3.7.6.2.1 Content Validity

Content validity is a subjective measure of the extent to which a rating scale measures what it purports to measure (Arnold, 1991; Streiner & Norman, 2008). Thus, each domain and the items within them should be relevant to the QoL construct. To assess the content validity of the *interRAI_QoL Survey*, the content validity matrix shown in Table 9 was constructed as suggested by Streiner & Norman (1993; 2008). The matrix maps its domains and items against two other QoL instruments, namely, the *Quality of Life Index* (Kane, 2003) and the Ontario Hospital Association's *LTC Resident and Family Member Evaluation Surveys* (Ontario Hospital Association, 2001).

The content validity of the *interRAI_QoL Survey* during its development phase was described in a preceding section of this paper. The ten domains and 50 items in the Survey are of great relevance to LTC facility residents because of the institutional impact on the lives of residents upon admission to a LTC facility. Examples of such impact include compromised decision making and independence, sharing common space, separation from families and friends, forced relationships with co-residents and staff, limited options to make choices, and total dependence on facility staff for all aspects of their life. These domains and items fit within Maslow's overarching hierarchy of human needs. Moreover, as noted earlier, each domain is characterized by 4 – 6 items. These items give a physical expression to their respective domains and globally to the scale as a whole. Comprehensive coverage is an important aspect of content validity (Fayes & Machin, 2007). It is apparent from the 50 items that they cover a wide range of relevant issues in the context of life in an LTC facility. As shown in Table 9, while there is considerable overlap between the *interRAI-QoL Survey's* domains and items with Kane's QoL Index and OHA's LTC Survey, there are a few distinct differences among them as well. While each of the three scales has items ranging from 47 to 59, there are differences in the distribution of items within their respective domains reflecting their attributed importance. In the first instance, Kane's Index places greater emphasis on spirituality with 4 items, whereas interRAI's has only one under its "activity" domain while OHA's does not have any. OHA's places greater

Table 9: Content validity matrix: Comparing interRAI_QoL Survey to Kane's QoL Index and OHA's LTC Facility Resident & Family Survey

Domains	**interRAI_QoL Items within Domains**	**Kane's QoL Index**	**OHA's LTC Facility Resident & Family Survey**
Privacy	4	5	2 (1 item in "Environmental Living" domain; 1 item in "Dignity" domain)
Food/Meal	5	3[1]	9
Safety/Security	5	5	1 (in "Living Environment" domain)
Comfort	6[2]	6	5 (in "Environmental Living" domain)
Make Daily Decisions (Autonomy)	6	4[3]	10
Respect	5	See footnote[4]	2 (two items in "Dignity" domain relate to respect)
Responsive Staff	4[5]	See "Dignity"	9[6]
Staff-Resident Bonding	5		2 (in "Staff Domain")
Activity Options	5	5[7]	10
Personal Relationships	5	5[8]	1 (in "Dignity" domain)
Functional Competence		5	
Spiritual well-being[9]	One item under "Activity Option" relates to "religious activities"	4	
Living Environment			9
Dignity	One item under "Respect" relates to dignity	5[10]	9
Global Quality Rating[11]	One item in "Comfort" relates to global disposition		3
TOTAL	**50**	**47**	**59**

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[1] Domain name is "Enjoyment"

[2] One of the items states "This place feels like home to me", which aligns with OHA's "[The facility] is a wonderful place"

[3] Domain name in Kane's QoL Index is "Autonomy"

[4] One item in Kane's "Dignity" domain relates to respect

[5] interRAI items align with Kane's "Dignity" domain items

[6] OHA's domain name is "Staff Domain"

[7] Domain name in Kane's QoL Index is "Meaningful Activity"

[8] One item aligns with interRAI's "Staff Resident Bonding"

[9] Only available in Kane's QoL Index; interRAI has one item under "Activity Options" about religiosity

[10] All five items in Kane's "Dignity" domain relate to how staff treat resident

[11] One of the three global quality indicator questions is about recommending the facility to others; the second one is about the facility being a wonderful place

Abbreviations: OHA = Ontario Hospital Association; LTC = long term care; QoL = quality of life importance on residents' "living environment" while the other two do not. A major distinction between Kane's Index and the other two scales is that Kane's includes a dedicated domain on "functional competence", which is a common element in health-related QoL instruments. Another major distinction between Kane's and the other two scales is that Kane's does not include a global dispositional item, which as was noted earlier is essential in the construction of such measurement scales. In contrast, interRAI's has such an item and OHA's has an overall quality rating. On the basis of this analysis, it may be concluded that the *interRAI_QoL Survey* instrument has content validity in the assessment of LTC facility residents' QoL.

This comparative analysis of the content of the *interRAI_QoL Survey* with Kane's QoL Index and OHA's LTC Facility Resident & Family Survey provides adequate evidence of its content validity. Further analysis of the psychometric properties of the *interRAI_QoL Survey* instrument such as its convergent validity is described below.

3.7.6.2.2 Construct Validity

The discussion in preceding sections clearly demonstrated that QoL is a construct; that is, unlike other traits such as temperature and weight that are observable and objectively measurable, QoL may only be assessed by inference (Streiner & Norman, 2003). The items within a scale, as in the 50-items in the *interRAI_QoL Survey*, are operationalizations of the construct of QoL. That is, all items in theory purport to reflect the same construct. Thus, construct validity is the validation that an instrument is indeed measuring its underlying concept (Bowling, 2009). It may be regarded as a construct's overarching quality beneath which fall all the other types of validity (e.g., face, content, and criterion). While the two sub-types of construct validity are convergent and discriminant validity only the former was tested in this study. Convergent validity is a measure of the extent to which the items within a scale that are hypothesized to be associated are correlated (Bowling, 2009). In other words, all items converge in measuring the same construct (e.g., QoL).

Convergent validity was assessed in this study by two methods. In the first method, the association between the *interRAI_QoL Survey* scores and those on the global dispositional item in the interRAI_QoL instrument, “I tend to be happier than most other people” was examined. Multinomial means and 95% confidence intervals were calculated. In the second method, the association between the *interRAI_QoL Survey* scores and scores on the interRAI_QoL item “I would recommend this site or organization to others” was examined consistent with the methods in the studies by Morris (2009) and James (2010). Multinomial means and 95% confidence intervals were calculated.

In summary, reliability is a necessary but not a sufficient condition for assessing a rating scale’s validity. Accordingly, the psychometric properties of the interRAI_QoL instrument were assessed by using a full battery of tests, including: (1) test-retest and internal consistency reliability; and (2) content and construct (convergent) validity.

3.7.7 Research Question 2

The second research question for this study was “To what extent are QoL ratings associated with residents’ socio-demographic and clinical characteristics?” Mean QoL scores for each domain were calculated to assess their relationships with residents’ socio-demographic and clinical characteristics. Quality of life scores were treated as continuous and residents’ characteristics as categorical data. Confidence intervals (CI; 95%) were calculated for statistical estimation.

3.7.8 Research Question 3

The third research question for this study was “To what extent are QoL ratings associated with LTC facility attributes?” Mean QoL scores and 95% CI for each domain were calculated for facility attributes (independent variables) that were categorical data (e.g., profit status). Pearson’s r was calculated for facility attributes that were continuous data (e.g., size). Multivariate models (see below) were also used to test this research question.

3.7.9 Multivariate Regression Analysis

Multivariate linear and logistic regression analyses were carried out to estimate the relationship between QoL as the dependent variable and resident and facility characteristics as the independent, explanatory variables. The purpose of these regression analyses was to find a model that best explained the relationship between QoL and resident and facility characteristics.

3.7.9.1 Linear Regression

The overall QoL score was treated as continuous in the multivariate linear regression analysis. A combination of categorical and ratio variables were used for the independent variables. The SAS procedure PROC REG was used to perform the regression modeling (SAS Institute Inc., 2002 - 2003). A fitted regression model and associated statistical inferences are based on various assumptions (e.g., linearity; normality) concerning the model. Violations of these assumptions may invalidate conclusions based on the regression analysis. Therefore, these assumptions were tested using various types of diagnostic procedures.

Initially, the linearity of the association between the dependent variable and the independent variables was tested by plotting the data. Correlations (PROC CORR) were run among the independent variables to help detect multicollinearity. The statistic called the

Variance Inflation Factor (VIF) was also used to test for multicollinearity by adding the VIF option in the model statement. Values above 2.5 may be a cause for concern (Allison, 2006). The residuals in the final model were examined for independence and distribution by running the "NORMAL PLOT" SAS procedure with the options of DW (Durbin Watson; test for independence) and SPEC (test for identical distribution) in the REG model statement. Further tests were carried out to detect outliers by using the INFLUENCE and R options in the model. The INFLUENCE option generates several outlier diagnostic tests. The R option prints out Cook's D that detects outlying observations by evaluating all the variables simultaneously. A Cook's D value that was greater than the absolute value of 2 was investigated. The overall fit of the model was checked by examining the F-value and its corresponding p-value (Prob>F). For a fit model, a Prob>F value of less than 0.05 was sought. Finally, the fit of the model was tested by the LACKFIT option in the model statement (Belsley, Kuh, & Welsch, 1980; Cody & Smith, 2005; Cook & Weinsberg, 1982).

3.7.9.2 Logistic Regression

In logistic regression, QoL was collapsed as a binary response (or outcome). Based on a distribution of the overall QoL scores for the sample, an overall QoL score of less than or equal to 117 (Q1 or 25%) was considered as low, and a score of greater than 156 (Q3 or 75%) was considered as high. Logistic regression analyses were conducted for both the low and high QoL scores as the dependent variables. Unlike ordinary linear regression, logistic regression does not assume that the relationship between the independent variables and the dependent variable is a linear one. Nor does it assume that the dependent variable or the residuals are distributed normally (Allison, 2006; Cody & Smith, 2005). Logistic regression was used to estimate the odds ratios associated with each independent variable. Logistic regression models were fit by using the SAS PROC LOGISTIC procedure (SAS Institute Inc., 2002 - 2003).

Several measures of model performance were tested such as the Hosmer and Lemeshow chi-square goodness of fit test (Hosmer & Lemeshow, 1989) and generating values for a Receiver-Operator Characteristics (ROC) curve. The Hosmer and Lemeshow test provides a chi-square-based test which assesses how well the data under analysis perform under the null hypothesis that the model fits the data. To reject the null hypothesis that the data fit this model, the chi-sq value should be low and the p value should not be significant. The LACKFIT option was specified in the model statement for this purpose. The ROC quantifies predictive ability. The area under the ROC curve can give insight into the predictive ability of the model. The C statistic gives the area under the curve. If it is equal to 0.5, the model could be thought of as predicting at random and values close to 1 indicate that the model has good predictive ability. Multicollinearity was also tested to determine any correlations between the explanatory variables (Allison, 2006; Cody & Smith, 2006).

In both linear and logistic regression analyses, automatic (e.g., forward selection or backward elimination) were used initially to get an appreciation of possible models. However, the manual backward elimination method was used to determine the best fitted model. In this method, all explanatory variables were initially entered and then systematically and one at a time eliminated from the model according to their p-values of less than 0.05. Alternative models were tested when collinearity might have been a problem or where theoretical reasons warranted it. In both linear and logistic regression models, in addition to the independent variables listed in Table 5, the interaction effects of several of these independent variables were examined. For instance, the interaction effects of social engagement and depression, social engagement and cognitive performance, activities of daily living and continence, and marital status and gender (female) were examined. In selecting the final model, consideration was given to statistical significance, theoretical and common sense, and parsimony (Cody & Smith, 2006).

4.0 Results

4.1 Descriptive Statistics

4.1.1 Characteristics of LTC Facilities

Forty-eight facilities from six provinces in Canada volunteered to participate in this study. Altogether, 928 residents participated with the largest participation (62%) being from Ontario. The distribution of LTC facility and resident participants is shown in Table 10. Of the 1,828 residents who were approached for participation, 55% (1,008) agreed to participate. Of those approached, 51% (928) completed the QoL interview.

Table 10: Distribution of LTC facilities by province

Province	**LTC Facilities** **% (n)**
Alberta	6.3 (3)
British Columbia	4.2 (2)
Manitoba	12.5 (6)
Nova Scotia	12.5 (6)
Ontario	62.5 (30)
Saskatchewan	2.1 (1)
Total	100.00 (48)

The distributional properties of the attributes of participating LTC facility are summarized in Table 11 and Table 12. As shown in Table 11, of the 48 facilities, the majority was privately owned (66.7%), for-profit (62.5%), urban (87.5%), and accredited (91.7%). The number of beds of these facilities ranged from 10 to 357 with a mean of 135.3, standard deviation of 65.9, and median of 129, with the majority (45.8%) being medium size (95 – 159).

Table 11: Distribution of LTC facility structural characteristics (N = 48)

Characteristics	% (n) or Mean ± SD (Median; Range)
Ownership	
Private	66.7 (32)
Municipality	6.3 (3)
Charitable	27.1 (13)
Profit Status	
For-Profit (Chain)	54.2 (26)
For-Profit (Not-chain)	8.3 (4)
Not-for-Profit	37.5 (18)
Geographic Location	
Urban	87.5 (42)
Rural	12.5 (6)
Facility Size	135. 3 ± 65.9 (129; 10 – 357)
Small (< 95 beds)	25.0 (12)
Medium (95 -159 beds)	45.8 (22)
Large (>159 beds)	29.2 (14)
Accreditation Status	
Accredited	91.7 (44)
Not Accredited	8.3 (4)

The staffing characteristics of the facilities are shown in Table 12. The operational definitions for these characteristics were provided in Table 8 in a preceding section. The mean management staff hours was 0.81 per resident per week with a standard deviation of 0.41 and range of 0.79; the mean registered nurse hours per resident per day was 0.38 with an standard deviation of 0.29 and a range of 1.53. The mean total hours of care, including registered and non-registered nursing staff, was 3.19 per resident per day indicating that most of the daily care to residents is provided by non-registered care staff. Staff turnover in LTC facilities is very high particularly in registered nursing staff with a mean of 27.3; that is, on average 27 registered nursing staff separated from the LTC facility in the past 12 months.

Leadership stability in the management team was low with only 12.5% having 3 or more years of service.

Table 12: Distribution of LTC facility staffing characteristics (N = 48)

Characteristics	**Values** mean ± SD (range); or % (n)
Management staff hours per resident per week	0.81 ± 0.41 (0.79)
Registered Nurse hours per resident per day	0.38 ± 0.29 (1.53)
Total Hours of Care per resident per day	3.19 ± 1.49 (8.76)
Ratio of Registered to Non-Registered Nursing Staff	0.87 ± 3.22 (22.5)
Proportion of registered Nursing Staff Turnover (in past year)	33.7 ± 40.26 (200.0)
Proportion of non-Registered Nursing Staff Turnover (in past year)	21.45 ± 24.67 (144.85)
Total Leadership Stability	
None or one member has 3 or more years of service	52.1 (25)
Two members have 3 or more years of service	35.4 (17)
Three to four members have 3 or more years of service	12.5 (6)

4.1.2 Characteristics of Resident Sample

The distribution of residents in LTC facilities by province is shown in Table 13. The majority of the residents (62%) were from Ontario, followed by Manitoba (15%). As shown in Table 14, 1,828 residents were approached by LTC facility staff for participation in this study. The initial response rate was 55.2%, but only 50.8% completed the survey.

Table 15 shows the distribution of participating residents' characteristics. Almost 75% of the residents were 75 years of age or over with a mean age of 80.2 and a standard deviation of 11.1. Almost two-thirds of the sample was female and only 21% married reflecting the older age of the participants. As ability to communicate in English was a required inclusion criterion, 96%

of the residents' primary language was English. The majority of the sample (60%) was not involved in religious practices as measured by either attendance a place of worship or finding strength in faith. Almost 45% of the residents had not completed high school compared to 29% who had post secondary education. Almost two-thirds of the residents had been in the LTC facility for 1 year or longer.

Table 13: Distribution of residents in LTC facilities by province

Province	Residents % (n)
Alberta	4.9 (45)
British Columbia	6.3 (58)
Manitoba	14.9 (138)
Nova Scotia	9.5 (88)
Ontario	62.4 (579)
Saskatchewan	2.2 (20)
Total	100.2* (928)

*Due to rounding

Table 14: Resident Response Rate

# of Residents Approached for Consent	Agreed to Participate	Refused to Participate	Completed Survey	# Unable to Complete due to any Reason
1828	% (n)	% (n)	% (n)	% (n)
	55.2 (1008)	44.8 (820)	50.8 (928)	4.4 (80)

On the Cognitive Performance Scale, 54% of the residents measured intact to borderline intact and 46% mild to moderate impairment. On measures of functional status, over half of the resident sample required extensive assistance or was totally dependent as measured by the Activities of Daily Living Hierarchy Scale. Almost 40% suffered from frequent bladder

Table 15: Resident Sample Characteristics

Variables	% (n)
Age	
< 64	10.6 (77)
65 – 74	14.6 (106)
75 – 84	31.5 (228)
85 and over	43.3 (314)
Total	100.0 (725)
Gender	
Male	34.5 (292)
Female	65.5 (555)
Total	100.0 (847)
Marital Status	
Married	21.0 (161)
Other	79.0 (607)
Total	100.0 (768)
Primary Language	
English	95.7 (694)
Other	4.3 (31)
Total	100.0 (725)
Religiosity	
Neither	60.3 (466)
Usually attends church, temple, synagogue, etc., ***OR*** *finds strength in faith*	14.5 (112)
Both	25.2 (195)
Total	100.0 (773)
Education (Highest level)	
Less than high school	44.9 (220)
High school	26.5 (130)
Post Secondary	28.6 (140)
Total	100.0 (490)
Length of Stay	
< 90 days	7.6 (64
90 days – 364 days	31.1 (263)
1 year or more	61.4 (520)
Total	100.0 (847)
Cognitive Performance Scale	
0 = Intact	31.1 (263)
1 = Borderline Intact	22.7 (192)
2 = Mild Impairment	26.0 (220)
3 = Moderate Impairment	20.3 (172)
Total	100.0 (847)
Activities of Daily Living Hierarchy Scale	
0 = Independent	12.2 (103)
1 = Supervision	14.6 (124)
2 = Limited Impairment	19.0 (161)
3 = Extensive Assistance (I)	32.4 (274)
4 = Extensive Assistance (II)	8.5 (72)
5+ = Dependent/Total Dependence	13.3 (113)
Total	100.0 (847)
Changes in Health, End-stage Disease and Signs and Symptoms (presence of symptoms)	
0 (not at all unstable)	52.3 (416)
1	30.8 (245)
2	13.3 (106)
3+ (highly unstable)	3.5 (28)
Total	100.0 (795)
Index of Social Engagement (psycho-social well-being)	
0 – 2	15.0 (126)
3 – 4	31.4 (264)
5 – 6	53.6 (450)
Total	100.0 (840)
Depression Rating Scale	
0	46.3 (392)
1 – 2	28.5 (241)
3 – 4	14.3 (121)
5 or more	11.0 (93)
Total	100.0 (847)
Pain Scale	
0 - No pain	51.0 (409)
1 - Less than daily pain	26.6 (213)
2 – 3 Daily pain (non – to severe)	22.4 (180)
Total	100.0 (802)
Aggressive Behaviour Scale	
0 = no signs of aggression	77.0 (652)
1+ = aggression	23.0 (195)
Total	100.0 (847)
Bladder Continence	
0 = Continent	38.3 (324)
1 - 2 = Usually/Occasionally Continent	26.8 (195)
3- 4 = Frequently Incontinent/Incontinent	38.7 (328
Total	100.0 (847)
Bowel Continence	
0 = Continent	59.9 (507)
1 - 2 = Usually/Occasionally Continent	22.6 (151)
3- 4 = Frequently Incontinent/Incontinent	17.6 (149)
Total	100.0 (847)
Vision	
0 = Adequate	65.9 (540)
1 = Impaired	25.9 (212)
2+ = Moderately – Severely Impaired	8.3 (68
Total	100.0 (820)
Hearing	
0 = Adequate	75.6 (620)
1 = Minimal Difficulty	18.5 (152)
2+ = Hears in Special Situation Only – Highly impaired	23.3 (48)
Total	100.0 (820)

incontinence, but only 18% from bowel incontinence. The majority of the resident sample (over 80%) had relatively stable health as measured by CHESS, 66% had adequate vision and 76% adequate hearing, and 22% reported daily pain. On behavioural measures, only 23% of the resident sample showed more than one sign of aggression as measured by the Aggressive Behaviour Scale, 25% had moderate or worse depressive symptoms as measured by the Depression Rating Scale, and over 53% had a high level of social engagement as measured by the Index of Social Engagement (ISE).

4.1.2.1 Comparison of Residents' Characteristics to LTC Facility Populations

To compare the sample of residents to other groups of residents, aggregate data were obtained from CIHI on four distinct groups of residents: (1) the resident sample; (2) those who refused to participate, including those who were not approached for participation or were unable to complete their interviews for any reason; (3) residents in participating LTC facilities in Manitoba, Ontario and Nova Scotia; and (4) residents in all LTC facilities in these three provinces. As was indicated in a preceding section, only LTC facilities in these three provinces submit their RAI_MDS data to CIHI. Residents in all four groups had interRAI CPS scores of 0 to 3.

4.1.2.1.1 Socio-Demographic Characteristics

As shown in Table 16, the majority of the residents (75%) were 75 years of age and over. There were significant differences in the age distribution between the sample and those who refused to participate, were unable to complete the survey, or were not approached for recruitment (Group 1). Almost two-thirds (65%) of the sample were female with no significant differences with either Group 1 or Group 2. Almost 20% of the residents were married with no significant differences with any of the other groups.

As the interviews were to be conducted in English, ability to communicate in English in the context of an interview was one of the criteria for participation. It is not surprising that 95.7% of the residents' primary language was English. There was a significant difference in the distribution of the primary language between the sample and the other three groups. This may be explained by the geographic location of some of the LTC facilities. For example, two large facilities were from Ottawa, Ontario where there it is very likely that residents' primary language may be French. It is also very likely that in LTC facilities situated in the Greater Toronto Area residents' primary language is other than English because of the high density of ethnic populations.

Over 50% of the resident sample was not involved in spiritual or religious activities, but there was not a significant difference between the sample and Group 1 and Group 2. The resident sample was more educated (secondary and post secondary) than either of Group 1 and Group 2 (33.4% vs 26.7% and 27.8% respectively). Level of education may have been a factor in volunteering to participate in the study.

With respect to length of stay, there was a significant difference in the resident sample and the other three groups: 12.3% (89) had less than 90 days stay, 27.4% (199) had 90 to 364 days, and 60.3% (437) had one or more years of stay.

4.1.2.1.2 Clinical Characteristics

Table 17 shows the distribution of the clinical characteristics of the residents in the four groups. As shown, 53.9% of the resident sample had intact to borderline intact cognitive status – a significant difference compared to the other three groups. The resident sample was also

Table 16: Distribution of Residents' Socio-Demographic and Service Utilization Characteristics

Variables	Participating Residents (Sample) % (n)	Refusing Residents[13] (Group 1) % (n)	Chi-Sq. Value DF P	Residents in Participating LTC Facilities in MB, ON & NS [14] (Group 2) % (n)	Chi-Sq. Value DF P	Residents in all LTC Facilities in MB, ON & NS [15] (Group 3) % (n)	Chi-Sq. Value DF P
Age							
0 – 44	--	--[16]	57.10 3 <0.0001	0.5 (21)	54.19 5 <0.0001	0.5 (312)	63.39 5 <0.0001
45 – 54	--	--		1.6 (68)		1.6 (973)	
55 - 64	7.9 (57)	4.0 (137)		4.6 (194)		4.5 (2669)	
65 – 74	14.6 (106)	8.9 (308)		9.9 (414)		9.7 (5739)	
75 – 84	31.4 (228)	29.6 (1024)		29.9 (1252)		31.1 (18349)	
85 and over	43.3 (314)	55.5 (1920)		53.4 (2234)		52.5 (30939)	
Gender							
Male	35.2 (254)	(33.9 (1167)	0.45 1 0.50	34.1 (1421)	0.32 1 0.57	30.4 (17907)	7.73 1 0.005
Female	64.8 (468)	66.1 (2278)		65.9 (2746)		69.6 (41017)	
Marital Status							
Married	19.7 (143)	21.4 (741)	1.04 1 0.31	21.1 (884)	0.74 1 0.39	21.3 (12566)	1.07 1 0.30
Other	80.3 (582)	78.6 (2717)		78.9 (3299)		78.7 (46415)	
Primary Language							
English	95.7 (694)	87.9 (3039)	38.38 1 <0.0001	89.2 (3733)	29.37 1 <0.0001	83.2 (49091)	80.62 1 <0.0001
Other	4.2 (31)	12.1 (419)		10.8 (450)		16.7 (9886)	
Religiosity							
Yes	28.1 (204)	26.3 (909)	2.41 2 0.30	26.6 (1113)	1.69 2 0.43	33.4 (19673)	31.55 2 <0.0001
No	54.2 (393)	57.3 (1983)		56.8 (2376)		43.9 (25870)	
Unknown	17.7 (128)	16.4 (566)		16.6 (694)		22.8 (13434)	

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[13] Includes those who refused to participate, were not approached for participation, or were unable to complete their interviews for any reason.

[14] CCRS data from Manitoba, Nova Scotia and Ontario (CIHI).

[15] CCRS data from Manitoba, Nova Scotia and Ontario (CIHI).

[16] -- Values suppressed to prevent residual disclosure in accordance with CIHI privacy and confidentiality policy.

Abbreviations: MB = Manitoba; ON = Ontario; NS = Nova Scotia; Chi-Sq = Chi-square; LTC = long term care; CCRS = Continuing Care Reporting System

Variables	**Participating Residents** **(Sample)** **% (n)**	**Refusing Residents[13]** **(Group 1)** **% (n)**	**Chi-Sq. Value** **DF** **P**	**Residents in Participating LTC Facilities in MB, ON & NS [14]** **(Group 2)** **% (n)**	**Chi-Sq. Value** **DF** **P**	**Residents in all LTC Facilities in MB, ON & NS [15]** **(Group 3)** **% (n)**	**Chi-Sq. Value** **DF** **P**
Education (Highest level)							
No Schooling	0.7 (5)	1.2 (42)	14.89 4 0.005	1.1 (47)	10.39 4 0.03	1.5 (865)	16.49 4 0.002
Less than high school	26.9 (195)	28.1 (972)		27.9 (1167)		33.0 (19498)	
High school	16.6 (120)	13.0 (449)		13.6 (569)		15.0 (8840)	
Post secondary	16.8 (122)	13.7 (474)		14.2 (596)		15.2 (8938)	
Unknown	39.0 (283)	44.0 (1521)		43.1 (1804)		35.3 (20836)	
Length of Stay							
< 90 days	12.3 (89)	17.8 (617)	14.006 2 0.0009	16.9 (706)	10.17 2 0.006	17.1 (10083)	12.76 2 0.002
90 days – 364 days	27.4 (199)	24.3 (840)		24.8 (1039)		24.5 (14436)	
1 year or more	60.3 (437)	57.9 (2001)		58.3 (2438)		58.4 (34462)	

significantly different from the other three groups in their level of independence in activities of daily living: 26.4% compared to 15.7% (Group 1), 17.5% (Group 2), and 20.4% (Group 3). In contrast, the resident sample was not significantly different from the other three groups in their health status as measured by CHESS, the interRAI scale that measures changes in health, end-stage disease, signs and symptoms.

The resident sample was significantly more socially engaged as measured by scores 5 – 6 of the interRAI Index of Social Engagement: 54.5% compared to 33.1% (Group 1), 36.7% (Group 2), and 31.7% (Group 3). The resident sample had also the least depressive disorders, showed the least degree of aggressive behaviour, was the most bowel and bladder continent, and suffered from the least visual and hearing impairment compared to the other three groups. With respect to experiencing pain, there was no significant difference between the resident sample and Groups 2 and 3, but there was a significant difference in the level of pain experienced by the resident sample compared to Group 1: 79.0% compared to 83.7%. Finally, in regards to the presence of conflicts in relationships, there was no significant difference between the resident sample and Groups 1 and 2; however, 20.8% of the resident sample experienced less conflict in their relationships than residents in Group 3 (26.9%).

Table 17: Distribution of Residents' Clinical Characteristics

Variables[17]	**Participating Residents (Sample) % (n)**	**Refusing Residents**[18] **(Group 1) % (n)**	**Chi-Sq. Value DF P**	**Residents in Participating LTC Facilities in MB, ON & NS** [19] **(Group 2) % (n)**	**Chi-Sq. Value DF P**	**Residents in all LTC Facilities in MB, ON & NS** [20] **(Group 3) % (n)**	**Chi-Sq. Value DF P**
Cognitive Performance Scale							
0 = Intact	31.0 (225)	15.4 (532)	221.54 3 <0.0001	18.1 (757)	156.22 3 <0.0001	20.9 (12319)	146.41 <0.0001
1 = Borderline Intact	22.9 (166)	14.3 (494)		15.8 (660)		17.6 (10355)	
2 = Mild Impairment	27.6 (200)	24.4 (843)		24.9 (1043)		21.2 (12476)	
3 = Moderate Impairment	18.5 (134)	46.0 (1589)		41.2 (1723)		40.4 (23831)	
Activities of Daily Living Hierarchy Scale							
0 = Independent	11.2 (81)	6.2 (213)	75.95 6 <0.0001	7.0 (294)	52.10 6 <0.0001	11.2 (6620)	73.83 6 <0.0001
1 = Supervision	15.2 (110)	9.5 (329)		10.5 (439)		9.2 (5398)	
2 = Limited Impairment	20.0 (145)	17.8 (616)		18.2 (761)		15.3 (9013)	
3 = Extensive Assistance (I)	32.4 (235)	32.0 (1108)		32.1 (1343)		30.6 (18075)	
4 = Extensive Assistance (II)	8.8 (64)	12.9 (447)		12.2 (511)		12.7 (7463)	
5 = Dependent	11.2 (81)	18.2 (628)		16.9 (709)		18.1 (10651)	
6 = Total Dependence	1.2 (9)	3.4 (117)		3.0 (126)		3.0 (1761)	
Changes in Health, End-stage Disease and Signs and Symptoms (presence of symptoms)							
0 (not at all unstable)	52.6 (381)	49.4 (1707)	4.61 5 0.47	49.9 (2088)	3.42 5 0.64	50.6 (29868)	4.65 5 0.46
1	30.8 (223)	31.9 (1104)		31.7 (1327)		30.8 (18179)	
2	13.0 (94)	13.7 (473)		13.6 (567)		13.4 (7886)	

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[17] Subject to distribution of data, some categories will be collapsed.

[18] Includes those who refused to participate, were not approached for participation, or were unable to complete their interviews for any reason.

[19] CCRS data from Manitoba, Nova Scotia and Ontario (CIHI).

[20] CCRS data from Manitoba, Nova Scotia and Ontario (CIHI).

Abbreviations: MB = Manitoba; ON = Ontario; NS = Nova Scotia; Chi-Sq = Chi-square; LTC = long term care; CCRS = Continuing Care Reporting System;

Variables[17]	**Participating Residents** **(Sample)** **% (n)**	**Refusing Residents**[18] **(Group 1)** **% (n)**	**Chi-Sq. Value** **DF** **P**	**Residents in Participating LTC Facilities in MB, ON & NS** [19] **(Group 2)** **% (n)**	**Chi-Sq. Value** **DF** **P**	**Residents in all LTC Facilities in MB, ON & NS** [20] **(Group 3)** **% (n)**	**Chi-Sq. Value** **DF** **P**
3	3.0 (22)	3.8 (132)		3.7 (154)		3.7 (2211)	
4	0.7 (5)	1.1 (37)		1.0 (42)		1.2 (729)	
5 (highly unstable)	0.0 (0)	0.1 (5)		0.1 (5)		0.2 (108)	
Index of Social Engagement (psycho-social well-being)							
0	0.7 (5)	4.5 (156)	138.10 6 <0.0001	3.8 (161)	96.94 6 <0.0001	6.1 (3571)	199.58 6 <0.0001
1	5.4 (39)	8.9 (308)		8.3 (347)		10.4 (6132)	
2	8.8 (64)	14.2 (491)		13.3 (555)		15.6 (9211)	
3	13.5 (98)	19.2 (663)		18.2 (761)		19.1 (11265)	
4	17.2 (1250	20.2 (698)		19.7 (823)		17.1 (10086)	
5	24.1 (175)	16.9 (583)		18.1 (758)		14.4 (8518	
6	30.2 (219)	16.2 (559)		18.6 (778)		17.3 (10198)	
Depression Rating Scale							
0	45.4 (329)	38.2 (1322)	13.40 3 0.004	39.5 (1651)	9.39 3 0.03	37.8 (22267)	21.93 3 <0.0001
1 – 2	29.7 (215)	33.3 (1153)		32.7 (1368)		30.6 (18038)	
3 – 4	13.8 (100)	16.6 (574)		16.1 (674)		16.5 (9742)	
5 or more	11.2 (81)	11.8 (409)		11.7 (490)		15.1 (8934)	
Pain Scale							
0 - No pain	52.4 (380)	61.5 (2127)	21.12 3 <0.0001	59.9 (2507)	14.73 3 0.002	54.2 (31982)	1.63 3 0.65
1 - Less than daily pain	26.6 (193)	22.2 (768)		23.0 (961)		24.8 (14618)	
2 - Daily pain but not severe	17.8 (129)	13.7 (473)		2.7 (113)		2.9 (1707)	
3 - Severe daily pain	3.2 (23)	2.6 (90)		2.7 (113)		2.9 (1707)	
Aggressive Behaviour Scale							
0 = no signs of aggression	77.1 (559)	62.5 (2162)	56.10 2 <0.0001	65.0 (2721)	41.29 2 <0.0001	63.7 (37555)	57.20 2 <0.0001
1-4 = mild to moderate aggression	19.4 (141)	30.5 (1053)		28.5 (1194)		29.3 (17280)	
5+ = more severe aggression	3.4 (25)	7.0 (243)		6.4 (268)		7.0 (4146)	
Relationship Conflict							
No/Missing	79.2 (574)	78.2 (2704)	0.34	78.4 (3278)	0.24	73.1 (43128)	13.36

Variables[17]	Participating Residents (Sample) % (n)	Refusing Residents[18] (Group 1) % (n)	Chi-Sq. Value DF P	Residents in Participating LTC Facilities in MB, ON & NS [19] (Group 2) % (n)	Chi-Sq. Value DF P	Residents in all LTC Facilities in MB, ON & NS [20] (Group 3) % (n)	Chi-Sq. Value DF P
Yes	20.8 (151)	21.8 (754)	1 0.56	21.6 (905)	1 0.63	26.9 (15853)	1 0.0003
Bladder Continence							
Continent	39.0 (283)	29.1 (1008)	45.56 4 <0.0001	30.9 (1291)	32.28 4 <0.0001	29.6 (17445)	49.81 4 <0.0001
Usually Continent	12.3 (89)	10.4 (361)		10.8 (450)		10.5 (6208)	
Occasionally Continent	11.2 (81)	10.0 (347)		10.2 (428)		9.4 (5568)	
Frequently Incontinent	15.7 (114)	17.9 (619)		17.5 (733)		21.5 (12699)	
Incontinent	21.8 (158)	32.5 (1123)		30.6 (1281)		28.9 (17061)	
Bowel Continence							
Continent	61.6 (447)	48.7 (1683)	54.36 4 <0.0001	50.9 (2130)	39.32 4 <0.0001	53.0 (31247)	38.75 4 <0.0001
Usually Continent	11.2 (81)	13.0 (451)		12.7 (532)		12.1 (7116)	
Occasionally Continent	10.1 (73)	9.4 (324)		9.5 (397)		8.2 (4865)	
Frequently Incontinent	7.4 (54)	10.7 (369)		10.1 (423)		10.7 (6310)	
Incontinent	9.7 (70)	18.2 (631)		16.8 (701)		16.0 (9443)	
Vision							
Adequate	67.6 (490)	59.4 (2053)	14.69 3 0.002	60.8 (2543)	24.66 4 <0.0001	60.9 (35904)	26.92 4 <0.0001
Impaired	24.1 (175)	27.7 (958)		27.1 (1133)		27.8 (16405)	
Moderately Impaired	4.7 (34)	6.9 (239)		6.5 (273)		6.7 (3952)	
Highly Impaired	2.1 (150	2.7 (95)		2.6 (110)		2.6 (1509)	
Severely Impaired	--	--		1.9 (80)		1.8 (1051)	
Missing	--	--		1.1 (44)		0.3 (160)	
Hearing							
Hears Adequately	75.0 (544)	64.6 (2233)	28.50 2 <0.0001	66.4 (2777)	34.82 3 <0.0001	65.2 (38428)	47.52 3 <0.0001
Minimal Difficulty	18.2 (132)	22.6 (782)		21.9 (914)		23.0 (13561)	
Hears in Special Situation Only	5.1 (37)	9.6 (332)		8.8 (369)		9.8 (5778)	
Highly Impaired	--	--		1.9 (79)		1.8 (1054)	
Missing	--	--		1.1 (44)		0.3 (160)	

4.1.3 Distribution of Mean QoL Scores

4.1.3.1 Missing Data

Each of the 50 items in the *interRAI_QoL Survey* measures residents' QoL on a five-point ordinal scale: Never (0); Rarely (1); Sometimes (2); Most of the time (3); Always (4). Residents also have the option of a "Don't know" (6) response. In addition to these resident responses, surveyors also had two other rating options as appropriate: "Refused" (7) or "No response or cannot be coded from response" (8). As shown in Table 18, 22.6% (n=2095) of the responses

Table 18: Distribution of Missing Data

Domain	**# Valid Responses**	**# Missing Responses**	**%[21]**
1. Privacy	705	223	24.0
2. Food/Meal	827	101	10.9
3. Safety/Security	710	218	23.5
4. Comfort	718	210	22.6
5. Make Daily Decisions (Autonomy)	715	213	23.0
6. Respect	749	179	19.3
7. Responsive Staff	674	254	27.4
8. Staff-Resident Bonding	695	233	25.1
9. Activity Option	755	173	18.6
10. Personal Relationships	637	291	31.4
Total Responses	7185	2095	22.6

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[21] Percentages are based on total possible responses (928) for each domain.

were treated as “missing”. The highest percentage of missing values was in the *Personal Relationships Domain* (31.4%) and the least percentage was in the *Food/Meal Domain* (10.9%). The mean QoL scores for each domain are shown in Table 19 when responses 6, 7 and 8 were treated as missing, when recoded as 2 (“sometimes”), and when the sample mean was substituted with the mean score of non-missing data (i.e., imputed mean). Recoding missing values with 2 (“sometimes”) reduces the estimated mean QoL of each domain but increases the overall mean score. However, recoding does not show systemic variation in standard deviations. This approach also avoids the use of extreme values. Sample-mean imputing, on the other hand, does not change the estimated domain mean QoL scores but artificially reduces the estimated standard deviation and falsely narrows the confidence intervals. Thus, this approach leads to distorted significance tests. It also assumes that items within each domain are interchangeable and are equally reliable measures of its construct, and that scores within domain are homogeneous. Accordingly, because of its advantages, recoding missing values as 2 (“sometimes”) was used.

4.1.3.2 Distribution of Residents’ Responses

The distribution of residents’ responses by rating options for each of the *interRAI_QoL Survey* items is shown in Table 20. It appears that residents in LTC facilities are mostly satisfied with their life and care. It also appears that residents were honest in the rating of their quality of life. For instance, their rating of the privacy of their personal information was lower than their privacy during visits or care. This is a reasonable finding as residents would not know with certainty if facility staff kept their personal information private, but they would know if they enjoyed privacy during visits with friends or family, and they had privacy during their care. Another example suggesting residents’ accuracy in responding to the survey is their satisfaction with their bath or shower with 48.3% (n=449) of residents rating this aspect of their life as

Table 19: Distribution of QoL mean scores when 6, 7, and 8 responses are treated as missing, when recoded as "sometimes", and when mean scores from non-missing data are assigned to missing values (imputed mean)

Scale	**6, 7, 8 treated as missing**			**6, 7, 8 recoded as 2**			**Mean Non-missing Value Assigned to Missing (Imputed Mean)**		
	Mean (SD)	**Median (Q1-Q3)**	**(N)**	**Mean (SD)**	**Median (Q1-Q3)**	**N**	**Mean (SD)**	**Median (Q1-Q3)**	**N**
1. Privacy	13.5 (2.6)	14.0 (12 - 16)	705	12.9 (2.8)	14.0 (11 - 15)	928	13.5 (2.3)	13.5 (13 - 15)	928
2. Food/Meal	13.3 (4.7)	14.0 (10 – 17)	827	13.2 (4.6)	14.0 (10 – 17)	928	13.3 (4.5)	13.3 (11- 17)	928
3. Safety/Security	16.4 (3.3)	17.0 (15 – 19)	710	16.0 (3.2)	17.0 (14 – 18)	928	16.4 (2.8)	16.4 (15 – 18)	928
4. Comfort	18.0 (4.4)	19.0 (16 – 21)	718	14.8 (3.8)	16.0 (12 – 18)	928	18.0 (3.9)	18.0 (17 – 20)	928
5. Make Daily Decisions (Autonomy)	16.8 (4.9)	17.0 (14 – 20)	715	16.3 (4.9)	17.0 (13 – 20)	928	16.8 (4.3)	16.8 (15 – 20)	928
6. Respect	14.9 (3.1)	15.0 (13 – 17)	749	14.5 (3.2)	15.0 (13 – 17)	928	14.9 (2.8)	14.9 (14 – 16)	928
7. Responsive Staff	11.8 (3.0)	12.0 (10 – 14)	674	11.4 (3.2)	12.0 (10 – 14)	928	11.8 (2.6)	11.8 (11 – 13)	928
8. Staff-Resident Bonding	13.5 (4.4)	14.0 (10 – 170	695	13.0 (4.3)	13.0 (10 – 16)	928	13.5 (3.8)	13.5 (12 – 16)	928
9. Activity Option	13.9 (4.5)	14.0 (11 – 18)	755	13.5 (4.4)	14.0 (10 – 17)	928	13.9 (4.0)	13.9 (12 – 17)	928
10. Personal Relationships	9.5 (5.5)	9.0 (5 – 14)	637	9.9 (5.0)	6.0 (3 – 14)	928	9.5 (4.5)	9.5 (8 – 12)	928

Abbreviations: SD = standard deviation; Q = quartile

Table 20: Distribution of residents' responses by rating options

Item	Valid Responses % (n)						Missing Values % (n)		
	0. Never	1. Rarely	2. Sometimes	3. Most of the time	4. Always	Any Valid Response	6. Don't Know	7. Refused	8. No response/ cannot be coded
1. Privacy									
1a. I can be alone when I wish	3.2 (30)	4.1 (38)	14.0 (129)	31.3 (290)	44.0 (408)	96.4 (895)	2.2 (20)	0.7 (6)	0.8 (7)
1b. When I have company, I can visit in private	2.7 (25)	5.5 (51)	10.2 (95)	23.1 (214)	53.8 (499)	95.3 (884)	3.0 (28)	0.4 (4)	1.3 (12)
1c. My privacy is respected when people care for me	1.2 (11)	1.5 (14)	7.5 (70)	28.0 (260)	57.1 (530)	95.4 (885)	3.3 (31)	0.3 (3)	1.0 (9)
1d. My personal information is kept private	1.3 (12)	0.9 (8)	5.3 (49)	21.0 (195)	53.1 (493)	81.6 (757)	16.0 (148)	0.3 (3)	2.2 (20)
2. Food/meal									
2a. I like the food here	3.5 (32)	7.0 (65)	21.6 (200)	36.9 (342)	29.2 (271)	98.1 (910)	0.9 (8)	0.4 (4)	0.7 (6)
2b. I enjoy mealtimes	3.7 (34)	7.9 (73)	15.6 (145)	29.5 (274)	42.0 (390)	98.7 (916)	0.3 (3)	0.3 (3)	0.7 (6)
2c. I get my favourite foods here	11.8 (109)	12.9 (120)	27.6 (256)	24.7 (229)	19.2 (178)	96.1 (892)	2.5 (23)	0.3 (3)	1.1 (10)
2d. I can eat when I want	18.3 (170)	15.0 (139)	11.3 (105)	22.0 (204)	26.5 (246)	93.1 (864)	3.9 (36)	0.7 (6)	2.4 (22)
2e. I have enough variety in my meals	6.1 (57)	8.6 (80)	12.3 (114)	30.0 (278)	39.7 (368)	96.7 (897)	1.5 (14)	0.3 (3)	1.5 (14)
3. Safety/security									
3a. I feel my possessions are safe	5.2 (48)	4.9 (45)	7.5 (70)	28.7 (266)	49.1 (456)	95.4 (885)	2.7 (25)	0.7 (6)	1.3 (12)
3b. I feel safe when I am alone	1.4 (13)	1.0 (9)	4.4 (41)	22.2 (206)	68.8 (638)	97.7 (907)	1.3 (12)	0.8 (7)	0.2 (2)
3c. People ask before using my things	7.0 (65)	5.3 (49)	9.1 (84)	20.6 (191)	40.2 (373)	82.1 (762)	13.0 (120)	0.7 (6)	4.3 (40)
3d. I feel safe around those who provide me with support and care	0.5 (5)	0.5 (5)	5.1 (47)	23.0 (213)	68.0 (631)	97.1 (901)	1.4 (13)	0.3 (3)	1.2 (11)
3e. If I need help right away, I can get it	2.7 (25)	6.4 (59)	14.4 (134)	33.9 (315)	37.4 (347)	94.8 (880)	4.0 (37)	0.3 (3)	0.9 (8)

Item	Valid Responses % (n)						Missing Values % (n)		
	0. Never	1. Rarely	2. Sometimes	3. Most of the time	4. Always	Any Valid Response	6. Don't Know	7. Refused	8. No response/ cannot be coded
4. Comfort									
4a. I get the services I need	1.5 (14)	2.4 (22)	7.1 (66)	35.4 (328)	49.5 (459)	95.8 (889)	2.2 (20)	0.7 (6)	1.4 (13)
4b. I would recommend this site or organization to others	5.5 (51)	2.6 (24)	6.9 (64)	19.4 (180)	60.0 (557)	94.4 (876)	3.3 (31)	0.4 (4)	1.8 (17)
4c. This place feels like home to me	15.2 (141)	8.9 (83)	12.6 (117)	21.8 (202)	37.2 (345)	95.7 (888)	1.9 (18)	0.8 (7)	1.6 (15)
4d. I can easily go outdoors if I want	9.8 (91)	8.0 (74)	8.9 (83)	16.4 (152)	51.1 (474)	94.2 (874)	3.5 (32)	0.5 (5)	1.8 (17)
4e. I am bothered by the noise here	38.2 (354)	23.7 (220)	18.9 (175)	8.6 (80)	8.8 (82)	98.2 (911)	0.5 (50)	0.7 (6)	0.7 (6)
4f. I tend to be happier than most other people	4.7 (44)	5.8 (54)	13.4 (124)	29.7 (276)	30.6 (284)	84.3 (782)	12.1 (112)	0.8 (7)	2.9 (27)
5. Make daily decisions (autonomy)									
5a. I decide when to go to bed and get up	7.0 (65)	6.1 (57)	9.3 (86)	24.5 (227)	50.0 (464)	96.7 (899)	1.6 (15)	0.4 (4)	1.1 (10)
5b. I decide how to spend my time	1.8 (170	2.4 (22)	7.9 (73)	29.1 (270)	55.1 (511)	96.2 (893)	1.7 (16)	0.4 (4)	1.6 (15)
5c. I can go where I want on the "spur of the moment"	12.5 (116)	11.4 (106)	11.5 (107)	22.8 (212)	33.7 (313)	92.0 (854)	5.1 (47)	0.4 (4)	2.5 (23)
5d. I control who comes into my room	9.3 (86)	9.1 (84)	12.8 (119)	27.2 (252)	35.1 (326)	93.4 (867)	4.3 (40)	0.4 (4)	1.8 (17)
5e. I can have a bath or shower as often as I want	32.5 (302)	15.8 (147)	9.5 (88)	13.0 (121)	22.2 (206)	93.1 (864)	4.0 (37)	0.7 (6)	2.3 (21)
5f. I decide how my money is spent	9.1 (84)	6.7 (62)	7.2 (67)	12.4 (115)	53.0 (492)	88.4 (820)	6.6 (61)	0.5 (5)	4.5 (42)
6. Respect									
6a. Staff pay attention to me	0.9 (8)	2.7 (25)	11.3 (105)	33.3 (309)	47.3 (439)	95.5 (886)	2.5 (23)	0.7 (6)	1.4 (13)
6b. I can express my opinion without fear of consequences	3.0 (28)	3.3 (31)	9.1 (84)	24.9 (231)	504 (468)	90.7 (842)	6.0 (56)	0.9 (8)	2.4 (22)
6c. I am treated with dignity by the people involved in my support and care	1.1 (10)	1.8 (170	6.3 (58)	25.3 (235)	60.6 (562)	95.0 (882)	2.5 (23)	0.4 (4)	2.1 (19)

Item	Valid Responses % (n)						Missing Values % (n)		
	0. Never	1. Rarely	2. Sometimes	3. Most of the time	4. Always	Any Valid Response	6. Don't Know	7. Refused	8. No response/ cannot be coded
6d. I am careful about what I say around staff	12.1 (112)	11.9 (110)	15.6 (145)	22.1 (205)	30.8 (286)	92.5 (858)	4.1 (38)	0.3 (3)	3.1 (29)
6e. Staff respect what I like and dislike	2.3 (21)	1.8 (17)	9.4 (87)	30.6 (284)	45.7 (424)	89.8 (896)	6.8 (63)	0.5 (5)	2.9 (27)
7. Responsive staff									
7a. Staff respond quickly when I ask for assistance	3.0 (28)	5.0 (46)	12.6 (117)	34.3 (318)	39.3 (365)	94.2 (874)	4.1 (38)	0.7 (6)	1.1 (10)
7b. My services are delivered when I want them	2.4 (22)	5.5 (51)	14.4 (134)	34.7 (322)	34.9 (324)	91.9 (853)	5.3 (49)	1.1 (10)	1.7 (16)
7c. The care and support I get help me live my life the way I want	4.7 (44)	6.5 (60)	11.1 (103)	29.9 (277)	39.6 (367)	91.7 (851)	5.4 (50)	0.9 (8)	2.1 (19)
7d. Staff act on my suggestions	5.7 (53)	8.1 (75)	18.3 (170)	26.2 (243)	20.7 (192)	79.0 (733)	16.7 (155)	0.7 (6)	3.7 (34)
8. Staff-resident bonding									
8a. Some of the staff know the story of my life	14.8 (137)	15.2 (141)	17.9 (165)	20.2 (187)	18.5 (172)	86.4 (802)	11.1 (103)	0.8 (7)	1.7 (16)
8b. Staff take the time to have a friendly conversation with me	6.4 (59)	10.7 (99)	21.9 (203)	24.5 (227)	33.3 (309)	96.7 (897)	1.7 (16)	1.0 (9)	0.7 (6)
8c. Staff talk to me about how to meet my needs	11.3 (105)	12.4 (115)	17.4 (161)	23.3 (216)	26.2 (243)	90.5 (840)	6.1 (57)	0.7 (6)	2.7 (25)
8d. I consider a staff member my friend	10.7 (99)	9.2 (85)	14.3 (133)	21.4 (199)	37.8 (351)	93.4 (867)	4.0 (37)	0.5 (5)	2.1 (19)
8e. Staff are open and honest with me	2.1 (19)	4.3 (40)	10.5 (97)	27.6 (256)	46.0 (427)	90.4 (839)	6.9 (64)	0.7 (6)	2.1 (19)
9. Activity option									
9a. I have enjoyable things to do here on weekends	13.2 (122)	16.6 (154)	23.4 (217)	19.4 (180)	21.6 (200)	94.1 (873)	2.9 (270)	0.9 (8)	2.2 (20)
9b. I do things that keep me mentally active	4.2 (39)	5.5 (51)	15.2 (141)	25.7 (238)	44.0 (408)	94.5 (877)	2.7 (250)	0.8 (7)	2.1 (19)
9c. I can take part in activities off the unit	8. (80)	8.0 (74)	15.6 (145)	23.0 (213)	39.3 (365)	94.5 (877)	3.0 (28)	0.4 (4)	2.1 (19)
9d. I participated in meaningful activities in the past week	15.3 (142)	11.0 (102)	12.8 (119)	20.0 (185)	30.9 (287)	90.0 (835)	6.3 (58)	0.7 (6)	3.1 (29)
9e. If I want, I can participate in religious activities that have meaning to me	5.9 (55)	5.2 (48)	8.3 (77)	15.2 (141)	58.7 (5450	93.3 (866)	3.9 (36)	0.5 (5)	2.3 (21)

Item	Valid Responses % (n)						Missing Values % (n)		
	0. Never	1. Rarely	2. Sometimes	3. Most of the time	4. Always	Any Valid Response	6. Don't Know	7. Refused	8. No response/ cannot be coded
10. Personal relationships (presence of friends)									
10a. Another resident here is my close friend	22.5 (209)	14.0 (130)	10.1 (94)	13.7 (127)	32.0 (297)	92.4 (857)	4.5 (42)	0.7 (6)	2.5 (23)
10b. I have people who want to do things together with me	15.6 (145)	12.5 (116)	19.3 (179)	19.3 (179)	23.6 (219)	90.3 (838)	6.4 (59)	0.7 (6)	2.7 (25)
10c. People ask for my help or advice	21.9 (203)	17.8 (165)	24.5 (227)	14.0 (130)	14.0 (130)	92.1 (855)	4.6 (43)	0.4 (4)	2.8 (26)
10d. I play an important role in people's lives	14.6 (135)	10.2 (95)	16.6 (154)	19.0 (176)	24.5 (227)	84.8 (896)	11.8 (109)	0.5 (5)	2.9 (27)
10e. I have opportunities for affection or romance	43.6 (405)	11.6 (108)	7.3 (68)	7.0 (65)	13.7 (127)	69.6 (646)	9.5 (88)	1.4 (13)	5.8 (54)

“never to “rarely”. One reason for such a low rating may be the influence of provincial legislation, which regulates the operation of LTC facilities by setting minimum standards of care. In consequence, and due to cost-cutting measures, residents may not receive a bath or shower as often as they wish. One final example demonstrating residents’ openness is their response to the *interRAI_QoL Survey* item “I have opportunities for affection or romance” with 55.2% (n=513) rating as “never” to “rarely”.

4.1.3.3 Distribution of Summary QoL Scores by Domain

Mean summary scores and 95% confidence intervals for each domain are shown in Table 21. Based on the standardized mean scores, residents rated their privacy and safety/security in the LTC facility highest followed by their being treated by staff with respect and how staff respond to their needs. Residents rated their personal relationships lower than any other domain.

Table 21: Overall Mean Quality of Life Scores and 95% Confidence Intervals by Domain

Domain	Mean (95% CI)	Range of Possible Scores	Standardized Mean Scores
Privacy	12.9 (12.7 – 13.1)	0 – 16	3.2
Food/Meal	13.2 (12.9 – 13.5)	0 – 20	2.6
Safety/Security	16.0 (15.8 – 16.2)	0 – 20	3.2
Comfort	14.8 (14.5 – 15.0)	0 – 20	2.5
Autonomy	16.3 (16.0 – 16.6)	0 – 24	2.7
Respect	14.5 (14.3 – 14.7)	0 – 20	2.9
Responsive Staff	11.4 (11.2 – 11.6)	0 – 16	2.9
Staff-Resident Bonding	13.0 (12.7 – 13.3)	0 – 20	2.6
Activity Option	13.5 (13.2 – 13.8)	0 – 20	2.7
Personal Relationships	9.9 (9.5 – 10.2)	0 – 20	2.0

Abbreviation: CI = Confidence interval

4.1.3.4 Distribution of Overall QoL Scores by Province

Provincial overall mean QoL scores and 95% confidence intervals are shown in Table 22. The overall mean QoL score for all six participating provinces was 135.4. Without adjusting for the residents' characteristics, it appears that residents in LTC facilities in Nova Scotia are significantly more satisfied with their QoL with an overall mean QoL score of 148.1 than residents in the other provinces (except in Saskatchewan). The next highest rating was by residents in Saskatchewant with an overall mean QoL score of 138.4 followed by Ontario with an overall mean score of 136.0.

Table 22: Overall Mean Quality of Life Scores

Province	**Overall Mean QoL**	**95% Confidence Interval**		**Range**
		Lower	**Upper**	
Alberta	124.7	116.9	132.6	41.0 – 186.0
British Columbia	128.1	121.0	135.2	74.0 – 191.0
Manitoba	131.1	126.1	136.1	49.0 – 180.0
Nova Scotia	148.1	143.2	153.0	77.0 – 193.0
Ontario	136.0	133.9	138.1	36.0 – 194.0
Saskatchewan	138.4	128.6	148.2	97.0 – 170.0
Overall	135.4	133.7	137.2	36.0 – 194.0

4.1.4 Surveyors' Status in LTC Facility and Overall Mean QoL Scores

Table 23 shows the relationship between surveyor status and the distribution of mean QoL scores by *interRAI_QoL Survey* domains. As shown, while the overall mean QoL was higher in the group of residents who were interviewed by volunteers, it was not significantly different from the ratings in the other groups. There were no significant differences between the mean QoL scores among the other groups. Thus, the surveyors' status in the LTC facility does not appear to have an influence on how residents rated their QoL.

Table 23: Relationship of Surveyor Position in LTC Facility and QoL Score Means by Domain

Variable (n)	Residents Interviewed % (n)	Privacy	Food/Meal	Safety/ security	Comfort	Autonomy	Respect
		Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)
Volunteer (5)	5.7 (53)	12.9 (12.2 – 13.7)	13.8 (12.6 – 15.0)	17.3 (16.5 – 18.1)	15.5 (14.5 – 16.6)	16.5 (15.1 – 17.9)	15.7 (14.7 – 16.7)
Direct care (10)	11.1 (103)	12.3 (11.7 – 13.0)	12.9 (12.0 – 13.7)	15.4 (14.6 – 16.1)	14.2 (13.4 – 15.0)	15.9 (14.9 – 16.9)	14.7 (14.0 – 15.4)
Para care (23)	26.4 (245)	12.7 (12.4 – 13.1)	13.6 (13.0 – 14.1)	16.1 (15.7 – 16.4)	14.7 (14.3 – 15.2)	16.2 (15.6 – 16.8)	14.1 (13.7 – 14.5)
Management/ Administration (43)	40.7 (378)	13.2 (13.0 – 13.5)	12.7 (12.2 – 13.2)	16.1 (15.7 – 16.4)	14.8 (14.5 – 15.2)	16.6 (16.1 – 17.0)	14.5 (14.2 – 14.8)
Student (23)	16.1 (149)	12.7 (12.2 – 13.2)	13.8 (13.1 – 14.4)	15.9 (15.3 – 16.5)	14.8 (14.2 – 15.4)	16.1 (15.3 – 16.8)	14.6 (14.1 – 15.2)
Total (103)	100.0 (928)						

Variable (n)	Residents Interviewed % (n)	Responsive Staff	Staff-resident Bonding	Activity Option	Personal Relation-ships	Overall QoL
		Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)
Volunteer (5)	5.7 (53)	12.1 (11.3 – 12.9)	13.5 (12.2 – 14.9)	12.6 (11.3 – 13.8)	7.9 (6.5 – 9.4)	137.9 (130.1 – 145.7)
Direct care (10)	11.1 (103)	11.0 (10.3 – 11.7)	12.9 (12.0 – 13.7)	13.2 (12.4 – 14.0)	10.1 (9.1 – 11.1)	132.6 (126.6 – 138.5)
Para care (23)	26.4 (245)	11.4 (11.0 – 11.8)	12.8 (12.3 – 13.3)	13.6 (13.0 – 14.1)	10.2 (9.6 – 10.8)	135.4 (132.0 – 138.8)
Management/ Administration (43)	40.7 (378)	11.3 (11.0 – 11.6)	13.0 (12.6 – 13.4)	13.7 (13.3 – 14.1)	10.0 (9.5 – 10.5)	135.9 (133.3 – 138.5)
Student (23)	16.1 (149)	11.6 (11.1 – 12.1)	13.1 (12.3 – 13.9)	13.5 (12.7 – 14.2)	9.4 (8.5 – 10.2)	135.4 (131.1 – 139.8)
Total (103)	100.0 (928)					

Abbreviation: CLM = Confidence limits (mean)

4.2 Research Question 1

The first research question for this study was “What are the distributional and psychometric properties of the *interRAI Self-Report Nursing Home Quality of Life Survey?”* To test the reliability of the *interRAI_QoL Survey*, two measures of reliability were conducted: test-retest and Cronbach’s Alpha.

4.2.1 Test-Retest Reliability

To establish the stability or consistency of the *interRAI_QoL Survey* over time, 22 residents were interviewed twice. Table 24 shows the timeframe within which the two interviews were conducted. The majority of the residents (77.3%; n=17) were interviewed within 14 days, 13.6% (n=3) in 22 days, and 9.1% (n=2) in 26 days. Table 24 shows the weighted kappa statistics between the two ratings. The first column shows the weighted kappa agreement for all 22 residents, and the second column for 17 of the residents who were interviewed within 14 days. Based on the levels of the strength of the agreement proposed by Landis and Koch (1977), 58% (n=29) of the agreements ranged from moderate to substantial, and 22% (n=11) fair. In 27 of the 50 items in the *interRAI_QoL Survey*, there was increased agreement in the two ratings in the group of residents who were re-interviewed within 14 days, but these did not change the level of the strength of the agreement. Based on these findings, the *interRAI_QoL Survey* may be considered to have moderate to substantial test-retest reliability.

Table 24: *interRAI_QoL Survey* test-retest reliability

InterRAI_QoL Items by Domain	Weighted Kappa Coefficients (3 – 26 days)	Weighted Kappa Coefficients (3 - 14 days)
1. Privacy		
1a. I can be alone when I wish	0.51	0.48
1b. When I have company, I can visit in private	0.57	0.56
1c. My privacy is respected when people care for me	0.36	0.41
1d. My personal information is kept private	0.32	0.28
2. Food/meal		
2a. I like the food here	0.13	0.38
2b. I enjoy mealtimes	0.60	0.64
2c. I get my favourite foods here	0.43	0.57
2d. I can eat when I want	0.41	0.37
2e. I have enough variety in my meals	0.43	0.47
3. Safety/security		
3a. I feel my possessions are safe	0.33	0.35
3b. I feel safe when I am alone	0.59	0.58
3c. People ask before using my things	0.44	0.42

InterRAI_QoL Items by Domain	Weighted Kappa Coefficients (3 – 26 days)	Weighted Kappa Coefficients (3 - 14 days)
3d. I feel safe around those who provide me with support and care	-0.10	-0.13
3e. If I need help right away, I can get it	0.64	0.67
4. Comfort		
4a. I get the services I need	0.19	0.15
4b. I would recommend this site or organization to others	0.47	0.43
4c. This place feels like home to me	0.65	0.63
4d. I can easily go outdoors if I want	0.28	0.25
4e. I am bothered by the noise here	0.46	0.42
4f. I tend to be happier than most other people	0.21	0.12
5. Make daily decisions (autonomy)		
5a. I decide when to go to bed and get up	0.48	0.54
5b. I decide how to spend my time	0.58	0.54
5c. I can go where I want on the "spur of the moment"	0.39	0.28
5d. I control who comes into my room	0.55	0.65
5e. I can have a bath or shower as often as I want	0.41	0.70
5f. I decide how my money is spent	0.35	0.45
6. Respect		
6a. Staff pay attention to me	0.54	0.55
6b. I can express my opinion without fear of consequences	0.53	0.62
6c. I am treated with dignity by the people involved in my support and care	0.28	0.26
6d. I am careful about what I say around staff	0.44	0.51
6e. Staff respect what I like and dislike	0.17	0.20
7. Responsive staff		
7a. Staff respond quickly when I ask for assistance	0.25	0.39
7b. My services are delivered when I want them	0.21	0.18
7c. The care and support I get help me live my life the way I want	0.16	0.14
7d. Staff act on my suggestions	0.48	0.58
8. Staff-resident bonding		
8a. Some of the staff know the story of my life	0.60	0.69
8b. Staff take the time to have a friendly conversation with me	0.39	0.50
8c. Staff talk to me about how to meet my needs	0.34	0.48
8d. I consider a staff member my friend	0.10	0.04
8e. Staff are open and honest with me	0.12	0.10
9. Activity option		
9a. I have enjoyable things to do here on weekends	0.19	0.33
9b. I do things that keep me mentally active	0.46	0.46
9c. I can take part in activities off the unit	0.33	0.38
9d. I participated in meaningful activities in the past week	0.52	0.50
9e. If I want, I can participate in religious activities that have meaning to me	0.80	1.00
10. Personal relationships (presence of friends)		
10a. Another resident here is my close friend	0.66	0.70

InterRAI_QoL Items by Domain	Weighted Kappa Coefficients (3 – 26 days)	Weighted Kappa Coefficients (3 - 14 days)
10b. I have people who want to do things together with me	0.33	0.40
10c. People ask for my help or advice	0.52	0.51
10d. I play an important role in people's lives	0.21	0.35
10e. I have opportunities for affection or romance	0.41	0.53

Note: Kappa Statistic and Strength of Agreement: <0.00 = Poor; 0.00 – 0.20 = Slight; 0.21 – 0.40 = Fair; 0.41 – 0.60 = Moderate; 0.61 – 0.80 = Substantial; 0.81 – 1.00 = Almost Perfect (Landis and Koch, 1977).

4.2.2 Internal Consistency (Cronbach's Alpha)

To test the internal consistency or homogeneity of the *interRAI_QoL Survey*, Cronbach's alpha coefficient was computed. The alpha coefficients are shown in Table 25. The analysis revealed alpha coefficients for each domain ranging from 0.60 to 0.82, and an overall alpha of 0.93 indicating strong internal consistency. Table 25 also shows that Cronbach's alpha coefficients in this study are comparable to the ones computed by Morris (2009) demonstrating a good internal consistency of the *interRAI_QoL Survey*.

4.2.3 Convergent Validity

The convergent validity of the *interRAI_QoL Survey* was evaluated by investigating the relationship between residents' QoL scores and their ratings to two items in the *interRAI_QoL Survey*: (1) the Global Disposition item ("I tend to be happier than most other people"), and (2) "I would recommend this site or organization to others".

Table 25: *interRAI_QoL Survey*'s internal consistency

InterRAI_QoL Items by Domain	No. of Items	Cronbach's Alpha	
		Current Study Sample	Morris (2009)
1. Privacy	4	0.68	0.48
2. Food/meal	5	0.82	0.75
3. Safety/security	5	0.68	0.66
4. Comfort	6	0.60	0.62
5. Make daily decisions (autonomy)	6	0.70	0.70
6. Respect	5	0.66	0.69
7. Responsive staff	4	0.76	0.76
8. Staff-resident bonding	5	0.75	0.73
9. Activity option	5	0.73	0.66
10. Personal relationships (presence of friends)	5	0.76	0.75
Total	**50**	**0.93**	**0.91**

4.2.3.1 Relationship between QoL Scores and Global Disposition Ratings

The convergent validity of the *interRAI_QoL Survey* was evaluated by two measures. First, the residents' mean QoL scores for each QoL domain were compared with their ratings to the Global Disposition item. The latter, as one of the items in the *interRAI_QoL Survey*, has the same response options from 0 – 4. Thus, the mean QoL scores in Table 26 correspond with each response option in the Global Disposition item. Second, the association between the overall mean QoL scores for each domain and the Global Disposition ratings was evaluated by calculating Pearson's r coefficients. The underlying hypothesis was that residents who reported high scores in their Global Disposition would also report significantly high quality of life in each of the domains.

As shown in Table 26, responses are skewed strongly toward more positive QoL levels. Over 60% of the residents rated their global disposition between “most of the time” (3) and “always” (4). The mean QoL scores of residents with higher Global Disposition were higher compared with those with lower Global Disposition ratings. An examination of the 95% confidence levels shows a significant difference in the mean QoL scores between residents who rated their global disposition as “most of the time” and “always” and those who rated theirs from “never” (0) to “sometimes” (2). The mean QoL scores were highest in the following domains: safety/security 17.2, comfort 16.6, and autonomy 18.2.

The Pearson’s correlation coefficients for the QoL ratings and the global disposition scores were found to be significant but modest ranging from $r = 0.21$ to $r = 0.39$ ($p<0.0001$). The correlation coefficients for privacy, food/meals, respect and personal relationships were relatively lower than the rest of the domains. Thus, there was evidence of convergent validity between the Global Disposition item and QoL subscales.

Table 27 shows the relationship between the ratings of the Global Disposition item and the overall mean QoL scores. As in Table 26, residents who scored high in their Global Disposition had significantly higher overall mean QoL scores using the 95% confidence levels as a rule of thumb. The correlation between the Global Disposition ratings and the overall mean QoL score was moderately strong with a Pearson’s $r = 0.46$ ($P<0.0001$).

Table 26: Relationship between *interRAI_QoL Survey* summary mean QoL scores and Global Disposition ratings

Scales		% (n)	interRAI_QoL Survey				
			Privacy Mean (95% CLM)	Food/Meal Mean (95% CLM)	Safety/Security Mean (95% CLM)	Comfort Mean (95% CLM)	Autonomy Mean (95% CLM)
Global Disposition Item of interRAI_QoL Survey	0	4.8 (44)	11.6 (10.3 – 12.8)	11.3 (9.5 – 13.1)	14.0 (12.5 – 15.6)	12.2 (10.5 – 13.9)	13.3 (11.2 – 15.3)
	1	5.8 (54)	11.7 (11.0 – 12.5)	11.7 (10.6 – 12.7)	14.0 (13.0 – 14.9)	11.9 (10.8 – 13.0)	13.5 (12.2 – 14.9)
	2	29.1 (270)	12.4 (12.1 – 12.8)	12.2 (11.6 – 12.7)	15.3 (14.9 – 15.7)	13.5 (13.1 – 13.9)	15.2 (14.6 – 15.7)
	3	29.7 (276)	13.3 (13.0 – 13.5)	13.0 (12.5 – 13.5)	16.3 (15.9 – 16.6)	15.1 (14.7 – 15.4)	16.5 (16.0 – 17.0)
	4	30.6 (284)	13.5 (13.1 – 13.8)	14.9 (14.4 – 15.4)	17.2 (16.9 – 17.6)	16.6 (16.3 – 17.0)	18.2 (17.7 – 18.7)
Correlation			0.21 (P < 0.0001)	0.25 (P < 0.0001)	0.32 (P < 0.0001)	0.39 (P < 0.0001)	0.31 (P < 0.0001)

Scales		% (n)	interRAI_QoL Survey				
			Respect Mean (95% CLM)	Responsive Staff Mean (95% CLM)	Staff-Resident Bonding Mean (95% CLM)	Activity Option Mean (95% CLM)	Personal Relationships Mean (95% CLM)
Global Disposition Item of interRAI_QoL Survey	0	4.8 (44)	12.7 (11.3 – 14.0)	9.9 (8.7 – 11.2)	10.3 (8.7 – 12.0)	10.8 (9.1 – 12.6)	7.1 (5.2 – 9.0)
	1	5.8 (54)	13.1 (12.1 – 14.1)	9.2 (8.2 – 10.2)	11.5 (10.2 – 12.7)	10.8 (9.5 – 12.1)	8.3 (7.0 – 9.6)
	2	29.1 (270)	13.7 (13.3 – 14.1)	10.5 (10.1 – 10.8)	11.6 (11.0 – 12.1)	12.1 (11.6 – 12.5)	8.5 (8.0 – 9.1)
	3	29.7 (276)	14.7 (14.3 – 15.0)	11.5 (11.2 – 11.9)	13.3 (12.8 – 13.7)	13.5 (13.1 – 14.0)	9.8 (9.2 – 10.4)
	4	30.6 (284)	15.7 (15.3 – 16.0)	12.7 (12.3 – 13.0)	14.8 (14.3 – 15.2)	15.8 (15.4 – 16.2)	11.9 (11.3 – 12.5)
Correlation			0.29 (P < 0.0001)	0.32 (P < 0.0001)	0.32 (P < 0.0001)	0.38 (P < 0.0001)	0.29 (P < 0.0001)

Abbreviations: QoL = quality of life; CLM = confidence limit (mean)

Table 27: Relationship between *interRAI_QoL Survey* overall mean QoL scores and Global Disposition ratings

Scales		% (n)	Overall Mean QoL	95% CLM
Global Disposition Item of interRAI_QoL Survey	**0**	4.8 (44)	113.2	100.9 – 125.4
	1	5.8 (54)	115.6	108.8 – 122.5
	2	29.1 (270)	124.9	122.1 – 127.7
	3	29.7 (276)	136.9	134.2 – 139.6
	4	30.6 (284)	151.2	148.7 – 153.7
Correlation			**0.46 P < 0.0001**	

Abbreviations: QoL = quality of life; CLM = confidence limit (mean)

4.2.3.2 Relationship between QoL Scores and "I would recommend this site or organization to others"

Table 28 shows the relationship between residents' QoL Scores and their ratings on the global item "I would recommend this site or organization to others". The convergent validity of the *interRAI_QoL Survey* was evaluated by two measures. First, the residents' mean QoL scores for each QoL domain were compared with their ratings to the "I would recommend this site or organization to others" item. The latter, as one of the items in the *interRAI_QoL Survey*, has the same response options from 0 – 4. Thus, the mean QoL scores in Table 28 correspond with each response option in the "I would recommend this site or organization to others" item. Second, the association between the overall mean QoL scores for each domain and the "I would recommend this site or organization to others" ratings was evaluated by calculating Pearson's r coefficients. The underlying hypothesis was that residents who reported high in their "I would recommend this site or organization to others" would also report high quality of life in each of the domains.

As shown in Table 28, responses are skewed strongly toward most positive QoL level of “always”. Almost 80% of the residents would recommend their LTC facility to others “most of the time” or “always”. The mean QoL scores of residents who rated this item higher were higher compared with those with lower ratings. An examination of the 95% confidence levels for all domains shows a significant difference in the mean QoL scores between residents who rated this item as “always” and those who rated it lower. The exception is for the “safety/security” and “comfort” domains where the significant difference in the mean scores was in the “almost all the time” or “always” ratings.

The Pearson’s correlation coefficients for the QoL ratings and the “I would recommend this site or organization to others” scores were found to be significant and moderately strong ranging from $r = 0.30$ to $r = 0.70$ ($p<0.0001$). This provides additional evidence for the convergent validity of the QoL subscales.

Table 29 shows the relationship between the ratings of the “I would recommend this site or organization to others” item and the overall mean QoL scores. As in Table 28, residents who scored high in this item had significantly higher overall mean QoL scores using the 95% confidence levels as a rule of thumb. The correlation between the “I would recommend this site or organization to others” ratings and the overall mean QoL score was fairly strong with a Pearson’s $r = 0.55$ ($P<0.0001$).

Table 28: Relationship between *interRAI_QoL Survey* summary mean QoL scores and "I would recommend this site or organization to others" item

Scales		% (n)	interRAI_QoL Survey				
			Privacy Mean (95% CLM)	Food/Meal Mean (95% CLM)	Safety/Security Mean (95% CLM)	Comfort Mean (95% CLM)	Autonomy Mean (95% CLM)
I would recommend this site/organization to others	**0**	5.5 (51)	11.1 (10.0 – 12.1)	9.4 (7.8 – 11.1)	12.1 (10.7 – 13.6)	7.6 (6.5 – 8.7)	12.7 (10.9 – 14.6)
	1	2.6 (24)	11.1 (9.9 – 12.3)	9.9 (7.9 – 11.8)	14.4 (13.3 – 15.4)	9.5 (8.6 – 10.3)	13.2 (10.8 – 15.5)
	2	12.5 (116)	11.7 (11.1 – 12.3)	11.6 (10.7 – 12.4)	14.0 (13.4 – 14.6)	11.5 (11.0 – 12.0)	14.4 (13.6 – 15.1)
	3	19.4 (180)	12.5 (12.1 – 12.9)	11.4 (10.7 – 12.0)	15.3 (14.9 – 15.7)	13.7 (13.3 – 14.1)	14.7 (14.0 – 15.3)
	4	60.0 (557)	13.5 (13.3 – 13.7)	14.6 (14.3 – 14.9)	17.1 (16.9 – 17.3)	16.7 (16.5 – 16.9)	17.7 (17.4 – 18.1)
Correlation			0.30 (P < 0.0001)	0.36 (P < 0.0001)	0.45 (P < 0.0001)	0.71 (P < 0.0001)	0.33 (P < 0.0001)

Scales		% (n)	interRAI_QoL Survey				
			Respect Mean (95% CLM)	Responsive Staff Mean (95% CLM)	Staff-Resident Bonding Mean (95% CLM)	Activity Option Mean (95% CLM)	Personal Relationships Mean (95% CLM)
I would recommend this site/organization to others	**0**	5.5 (51)	11.7 (10.5 – 12.9)	8.0 (6.9 – 9.2)	9.6 (8.2 – 11.1)	10.7 (9.3 – 12.1)	7.2 (5.7 – 8.6)
	1	2.6 (24)	11.9 (10.3 – 13.5)	8.6 (7.3 – 9.9)	10.5 (8.4 – 12.7)	10.6 (8.9 – 12.2)	9.2 (7.0 – 11.4)
	2	12.5 (116)	12.6 (12.1 – 13.1)	9.5 (8.9 – 10.1)	10.7 (10.0 – 11.5)	11.9 (11.1 – 12.7)	9.2 (8.3 – 10.0)
	3	19.4 (180)	13.5 (13.1 – 13.9)	10.3 (9.9 – 10.7)	11.8 (11.3 – 12.4)	11.8 (11.2 – 12.4)	8.9 (8.2 – 9.5)
	4	60.0 (557)	15.6 (15.4 – 15.8)	12.5 (12.3 – 12.7)	14.2 (13.9 – 14.6)	14.8 (14.5 – 15.1)	10.6 (10.2 – 11.0)
Correlation			0.34 (P < 0.0001)	0.41 (P < 0.0001)	0.44 (P < 0.0001)	0.35 (P < 0.0001)	0.32 (P < 0.0001)

Abbreviations: QoL = quality of life; CLM = confidence limit (mean)

Table 29: Relationship between *interRAI_QoL Survey* overall mean QoL scores and "I would recommend this site or organization to others" item

Scales		**% (n)**	**Mean**	**95% CLM**
I would recommend this site/organization to others	**0**	5.5 (51)	100.2	90.6 – 109.8
	1	2.6 (24)	108.8	98.1 – 119.6
	2	12.5 (116)	117.1	113.1 – 121.1
	3	19.4 (180)	123.9	120.9 – 126.9
	4	60.0 (557)	147.4	145.6 – 149.1
Correlation			**0.55 P < 0.0001**	

Abbreviations: QoL = quality of life; CLM = confidence limit (mean)

4.3 Research Question 2

4.3.1 Relationship of QoL Ratings and Residents' Socio-Demographic and Clinical Characteristics

The second research question for this study was "To what extent are QoL ratings associated with residents' socio-demographic and clinical characteristics?" To respond to this question, mean QoL scores and 95% confidence intervals for each domain were calculated to assess their relationships with residents' socio-demographic characteristics. All independent variables were treated as categorical data. Table 30 shows the bivariate associations for QoL ratings by socio-demographic characteristics. As shown, in overall QoL ratings, the only significant associations (based on non-overlapping confidence intervals) were found between QoL and religiosity and between QoL and education. Residents who usually attended a place of worship or found strength in faith reported significantly higher QoL than those who did not. Similarly, those who did both, reported significantly higher QoL than the other two groups. At the domain level, significant relationships between QoL and religiosity were shown in the "safety/security", "staff-resident bonding” and “activity” domains. Hence, religiosity has a positive association with overall QoL and may mediate the perception of QoL.

Highest education level attained is also shown to have an association with QoL. In overall QoL ratings, those with post secondary education reported significantly the lowest QoL compared to those with less than high school. At the domain level, higher education is shown to have a negative effect on QoL ratings in the “food/meal”, “autonomy” and “personal relationships” domains.

The only other socio-demographic characteristic which showed a significant association with QoL was age, but that was limited to the “privacy” domain. Residents in the 75-84 age group rated their QoL significantly higher than those in the 65-74 age group.

The relationship between mean QoL scores and residents’ clinical characteristics were also examined. Table 31 shows these bivariate associations where all clinical independent variables were treated as categorical data. The mean QoL scores and 95% confidence intervals for each domain were calculated to assess their relationships with residents’ clinical characteristics.

Residents with mild cognitive impairment reported significantly lower overall QoL and domain-specific QoL than those with intact cognition. Domains that are specifically affected are: “autonomy”, “respect”, and “staff-resident bonding’. In contrast, residents with moderate impairment reported higher QoL in the “food/meal” domain.

Table 30: Means and 95% confidence intervals for each *interRAI_QoL Survey* domain according to socio-demographic characteristics (categorical independent variables)

Variables (n)	Privacy	Food/Meal	Safety/ security	Comfort	Autonomy	Respect	Responsive Staff	Staff-resident Bonding	Activity Option	Personal Relationships	Overall QoL
	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)
Age											
< 65 (77)	13.0 (12.4 – 13.6)	13.1 (11.9 -14.2)	16.1 (15.3 -16.9)	14.6 (13.7 – 15.5)	16.1 (15.0 – 17.2)	14.5 (13.8 – 15.2)	11.5 (10.6 – 12.3)	13.3 (12.2 – 14.4)	13.3 (12.4 – 14.3)	10.3 (9.1 – 11.4)	135.7 (129.8 – 141.6)
65 – 74 (106)	12.2 (11.5 – 12.8)	13.2 (12.3 – 14.2)	15.9 (15.2 – 16.6)	14.7 (13.9 – 15.5)	16.6 (15.7 – 17.6)	14.0 (13.3 – 14.8)	11.0 (10.3 – 11.7)	12.9 (12.0 – 13.8)	13.7 (12.8 – 14.6)	10.1 (9.1 – 11.1)	134.3 (128.3 – 140.3)
75 – 84 (228)	13.2 (12.8 – 13.5)	13.6 (13.0 – 14.2)	16.3 (15.9 – 16.7)	15.0 (14.5 – 15.5)	16.8 (16.2 – 17.4)	14.6 (14.2 – 15.0)	11.9 (11.5 – 12.3)	13.4 (12.8 – 14.0)	13.6 (13.0 – 14.2)	9.9 (9.3 – 10.6)	138.2 (134.6 – 141.9)
85 and over (314)	13.0 (12.8 – 13.3)	13.1 (12.7 – 13.6)	16.2 (15.8 – 16.5)	15.1 (14.7 – 15.5)	16.4 (15.8 – 17.0)	14.8 (14.4 – 15.1)	11.3 (11.0 – 11.7)	12.8 (12.3 – 13.3)	13.5 (13.1 – 14.0)	9.3 (8.7 – 9.8)	135.6 (132.7 – 138.4)
Length of Stay											
< 90 days (64)	12.5 (11.8 – 13.2)	13.0 (11.9 -14.1)	16.3 (15.5 -17.1)	14.0 (13.1 – 15.0)	15.7 (14.4 – 16.9)	14.7 (13.9 – 15.6)	11.0 (10.2 – 11.9)	13.1 (12.1 – 14.1)	13.3 (12.1 – 14.6)	8.9 (7.6 – 10.3)	132.6 (124.9 – 140.3)
90 days – 364 days (263)	13.0 (12.6 – 13.3)	12.7 (12.1 – 13.2)	16.2 (15.8 – 16.6)	14.8 (14.3 – 15.2)	16.3 (15.7 – 16.9)	14.5 (14.1 – 14.9)	11.2 (10.8 – 11.6)	12.8 (12.2 – 13.3)	13.4 (12.9 – 13.9)	9.2 (8.6 – 9.8)	134.0 (130.6 – 137.3)
1 year – 3 years (520)	13.0 (12.7 – 13.2)	13.2 (12.8 – 13.6)	15.9 (15.6 – 16.2)	14.9 (14.6 – 15.2)	16.4 (15.9 – 16.8)	14.5 (14.2 – 14.7)	11.5 (11.2 – 11.8)	13.0 (12.6 – 13.4)	13.5 (13.1 – 13.9)	10.2 (9.7 – 10.6)	136.0 (133.7 – 138.3)
Gender											
Male (292)	13.0 (12.7 – 13.3)	12.8 (12.2 -13.4)	16.1 (15.7 -16.5)	14.9 (14.4 – 15.3)	16.4 (15.8 – 16.9)	14.3 (13.9 – 14.6)	11.3 (10.9 – 11.7)	13.0 (12.5 – 13.5)	13.5 (13.0 – 14.0)	10.1 (9.6 – 10.7)	135.4 (132.2 – 138.5)
Female (555)	12.9 (12.7 – 13.1)	13.2 (12.8 – 13.5)	16.0 (15.7 – 16.3)	14.7 (14.4 – 15.1)	16.2 (15.8 – 16.6)	14.6 (14.3 – 14.9)	11.4 (11.1 – 11.6)	12.9 (12.5 – 13.3)	13.5 (13.1 – 13.8)	9.6 (9.1 – 10.0)	135.0 (132.7 – 137.3)
Marital Status											
Other (607)	13.0 (12.7 – 13.2)	13.2 (12.8 -13.6)	16.1 (15.8 -16.4)	14.9 (14.6 – 15.3)	16.5 (16.1 – 16.9)	14.6 (14.3 – 14.8)	11.5 (11.2 – 11.7)	13.0 (12.6 – 13.3)	13.4 (13.1 – 13.8)	9.3 (8.9 – 9.7)	135.5 (133.3 – 137.7)
Married (161)	13.0 (12.6 – 13.5)	12.9 (12.2 – 13.6)	16.0 (15.5 – 16.5)	14.7 (14.2 – 16.9)	16.2 (15.6 – 14.9)	14.5 (14.0 – 14.9)	11.2 (10.7 – 11.7)	13.0 (12.4 – 13.7)	14.0 (13.4 – 14.7)	11.2 (10.4 – 12.0)	136.9 (133.0 – 140.7)
Primary Language											
Other (31)	12.9 (11.9 – 13.9)	13.3 (11.3 -15.2)	16.1 (14.8 -17.3)	15.1 (13.7 – 16.4)	17.1 (15.3 – 18.9)	14.2 (13.0 – 15.4)	11.7 (10.5 – 12.9)	12.5 (10.6 – 14.4)	13.0 (10.9 – 15.0)	9.8 (7.7 – 11.9)	135.6 (124.2 – 147.0)
English (694)	12.9 (12.7 – 13.2)	13.3 (12.9 – 13.6)	16.2 (15.9 – 16.4)	14.9 (14.7 – 15.2)	16.5 (16.1 – 16.9)	14.6 (14.4 – 14.8)	11.5 (11.2 – 11.7)	13.1 (12.8 – 13.4)	13.6 (13.3 – 13.9)	9.7 (9.3 – 10.1)	136.3 (134.2 – 138.3)

Variables	**Privacy** **Mean (95% CLM)**	**Food/Meal** **Mean (95% CLM)**	**Safety/ security** **Mean (95% CLM)**	**Comfort** **Mean (95% CLM)**	**Autonomy** **Mean (95% CLM)**	**Respect** **Mean (95% CLM)**	**Responsive Staff** **Mean (95% CLM)**	**Staff-resident Bonding** **Mean (95% CLM)**	**Activity Option** **Mean (95% CLM)**	**Personal Relationships** **Mean (95% CLM)**	**Overall QoL** **Mean (95% CLM)**
Religiosity[22]											
Neither (466)	12.8 (12.6 – 13.1)	13.1 (12.7 -13.5)	15.9 (15.6 -16.2)	14.8 (14.4 – 15.1)	16.2 (15.7 – 16.6)	14.3 (14.0 – 14.6)	11.3 (11.0 – 11.6)	12.7 (12.3 – 13.1)	13.2 (12.8 – 13.6)	9.5 (9.1 – 10.0)	133.9 (131.4 – 136.3)
Either (112)	13.2 (12.7 – 13.6)	13.8 (13.0 – 14.7)	16.1 (15.5 – 16.7)	15.2 (14.5 – 16.0)	16.9 (16.0 – 17.9)	15.1 (14.5 – 15.6)	11.5 (10.9 – 12.1)	13.0 (12.2 – 13.9)	14.1 (13.2 – 14.9)	9.7 (8.7 – 10.8)	138.6 (133.4 – 143.8)
Both (195)	13.3 (12.9 – 13.7)	13.2 (12.6 -13.8)	16.7 (16.3 -17.1)	15.0 (14.5 – 15.6)	16.5 (15.8 – 17.2)	14.9 (14.4 – 15.3)	11.7 (11.2 – 12.1)	13.9 (13.3 – 14.5)	14.3 (13.7 – 14.9)	10.6 (9.9 – 11.3)	140.1 (136.3 – 143.8)
Highest Education											
Less than high school (220)	12.9 (12.5 – 13.2)	14.2 (13.6 -14.8)	16.2 (15.8 -16.6)	15.3 (14.7 – 15.8)	17.0 (16.4 – 17.7)	14.7 (14.3 – 15.2)	11.9 (11.5 – 12.3)	13.6 (13.0 – 14.2)	13.9 (13.2 – 14.5)	10.9 (10.2 – 11.6)	140.5 (136.8 – 144.3)
High school (130)	13.2 (12.7 – 13.7)	13.2 (12.5 – 13.9)	16.4 (15.8 – 16.9)	15.3 (14.6 – 15.9)	16.6 (15.7 – 17.4)	14.8 (14.2 – 15.3)	11.5 (10.9 – 12.1)	13.3 (12.5 – 14.1)	13.3 (12.5 – 14.1)	9.6 (8.7 – 10.5)	137.1 (132.4 – 141.8)
Post secondary (140)	12.9 (12.5 – 13.4)	12.5 (11.7 -13.2)	16.1 (15.6 -16.6)	14.1 (13.5 – 14.8)	15.2 (14.4 – 16.0)	14.4 (13.8 – 14.9)	11.2 (10.7 – 11.7)	12.8 (12.1 – 13.5)	13.5 (12.8 – 14.3)	9.3 (8.5 – 10.1)	132.0 (127.6 – 136.4)

Abbreviations: QoL = quality of life; CLM = confidence limit (mean)

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[22] Religiosity measures include: (a) usually attends church, temple, synagogue, etc.; and (b) finds strength in faith.

Table 31: Means and 95% confidence intervals for each *interRAI_QoL Survey* domain according to clinical characteristics

Variables	**Privacy**	**Food/Meal**	**Safety/ security**	**Comfort**	**Autonomy**	**Respect**	**Responsive Staff**	**Staff-resident Bonding**	**Activity Option**	**Personal Relationships**	**Overall QoL**
	Mean (95% CLM)	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**
Cognitive Performance Scale											
0 = Intact (263)	13.2 (12.8 – 13.5)	12.7 (12.1 -13.2)	16.6 (16.2 -17.0)	15.3 (14.8 – 15.7)	17.4 (16.8 – 17.9)	15.1 (14.7 – 15.5)	11.6 (11.2 – 12.0)	13.6 (13.1 – 14.1)	13.9 (13.4 – 14.4)	9.8 (9.2 – 10.5)	139.2 (135.9 – 142.5)
1 = Borderline Intact (192)	12.8 (12.4 – 13.2)	13.1 (12.4 – 13.7)	15.8 (15.3 – 16.3)	14.4 (13.9 – 15.0)	16.0 (15.2 – 16.7)	14.4 (13.9 – 14.9)	11.2 (10.7 – 11.7)	13.0 (12.3 – 13.6)	13.4 (12.8 – 14.1)	9.9 (9.2 – 10.7)	134.1 (129.8 – 138.3)
2 = Mild Impairment (220)	13.1 (12.7 – 13.4)	12.7 (12.0 -13.3)	15.7 (15.3 -16.1)	14.5 (14.0 – 15.0)	15.3 (14.7 – 16.0)	14.2 (13.7 – 14.6)	11.0 (10.6 – 11.4)	12.5 (11.9 – 13.1)	13.3 (12.7 – 13.8)	9.7 (9.0 – 10.4)	131.9 (128.4 – 135.3)
3 = Moderate Impairment (172)	12.5 (12.1 – 13.0)	14.2 (13.5 -14.8)	15.9 (15.4 -16.3)	14.8 (14.2 – 15.3)	16.1 (15.4 – 16.9)	14.2 (13.8 – 14.6)	11.5 (11.0 – 11.9)	12.4 (11.8 – 13.1)	13.1 (12.4 – 13.8)	9.6 (8.8 – 10.3)	134.2 (130.3 – 138.0)
Activities of Daily Living Hierarchy Scale											
0 = Independent (103)	13.2 (12.7 – 13.7)	13.8 (13.0 -14.6)	16.8 (16.2 -17.3)	15.7 (15.1 – 16.4)	18.6 (17.9 – 19.4)	15.4 (14.7 – 16.0)	12.1 (11.5 – 12.7)	13.1 (12.2 – 14.0)	14.3 (13.4 – 15.2)	9.9 (8.8 – 11.0)	143.0 (138.1 – 148.0)
1 = Supervision (124)	12.9 (12.5 – 13.4)	12.5 (11.6 – 13.3)	16.3 (15.7 – 16.8)	15.2 (14.6 – 15.7)	17.6 (17.0 – 18.3)	14.3 (13.8 – 14.9)	11.5 (11.0 – 12.1)	12.8 (12.1 – 13.6)	14.1 (13.4 – 14.8)	10.4 (9.6 – 11.3)	137.7 (133.4 – 142.0)
2 = Limited Impairment (161)	12.8 (12.3 – 13.2)	13.2 (12.5 -14.0)	16.2 (15.7 -16.7)	15.0 (14.4 – 15.6)	16.6 (15.9 – 17.4)	15.0 (14.5 – 15.5)	11.5 (11.0 – 12.0)	13.2 (12.5 – 13.9)	13.7 (13.0 – 14.4)	9.9 (9.2 – 10.7)	137.2 (132.8 – 141.5)
3 = Extensive Assistance (I) (274)	12.9 (12.6 – 13.2)	13.3 (12.8 -13.8)	15.7 (15.3 -16.1)	14.7 (14.2 – 15.2)	15.7 (15.1 – 16.3)	14.2 (13.8 – 14.5)	11.2 (10.8 – 11.6)	12.8 (12.3 – 13.3)	13.3 (12.8 – 13.8)	9.7 (9.1 – 10.4)	133.5 (130.3 – 136.7)
4 = Extensive Assistance (II) (72)	12.7 (12.0 – 13.4)	12.4 (11.2 -13.5)	15.4 (14.7 -16.1)	13.7 (12.8 – 14.6)	14.0 (12.8 – 15.2)	14.3 (13.6 – 14.9)	10.3 (9.5 – 11.0)	12.8 (11.8 – 13.7)	12.2 (11.1 – 13.3)	9.1 (7.9 – 10.3)	126.7 (120.3 – 133.1)

Variables	**Privacy**	**Food/Meal**	**Safety/ security**	**Comfort**	**Autonomy**	**Respect**	**Responsive Staff**	**Staff-resident Bonding**	**Activity Option**	**Personal Relationships**	**Overall QoL**
	Mean (95% CLM)	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**
5-6 = Dependent – Total Dependent (172)	13.2 (12.7 – 13.8)	12.6 (11.7 -13.5)	16.0 (15.4 -16.6)	14.1 (13.3 – 14.9)	14.9 (13.9 – 15.9)	14.1 (13.5 – 14.8)	11.2 (10.5 – 11.8)	13.1 (12.2 – 14.0)	12.9 (12.1 – 13.8)	9.2 (8.3 – 10.1)	131.4 (125.8 – 137.0)
Changes in Health, End-stage Disease and Signs and Symptoms (presence of symptoms)											
0 = not at all unstable (416)	13.0 (12.8 – 13.3)	13.5 (13.1 -13.9)	16.2 (15.9 -16.5)	15.1 (14.7 – 15.4)	16.6 (16.1 – 17.1)	14.5 (14.2 – 14.9)	11.5 (11.2 – 11.8)	13.1 (12.7 – 13.6)	13.7 (13.3 – 14.2)	9.9 (9.4 – 10.4)	137.3 (134.7 – 140.0)
1 (245)	13.1 (12.8 – 13.5)	12.9 (12.3 -13.5)	16.0 (15.6 -16.4)	14.8 (14.4 – 15.3)	16.6 (16.0 – 17.2)	14.8 (14.4 – 15.2)	11.3 (10.8 – 11.7)	12.9 (12.4 – 13.5)	13.6 (13.0 – 14.1)	9.7 (9.0 – 10.3)	135.7 (132.5 – 139.0)
2 (106)	12.5 (11.9 – 13.0)	12.3 (11.4 -13.2)	15.6 (14.9 -16.2)	14.4 (13.6 – 15.2)	15.3 (14.4 – 16.2)	14.1 (13.5 – 14.8)	11.2 (10.6 – 11.9)	12.3 (11.5 – 13.2)	12.5 (11.6 – 13.3)	9.1 (8.1 – 10.1)	129.4 (123.8 – 134.9)
3- 5 = unstable to highly unstable (28)	13.0 (12.0 – 14.0)	13.1 (11.4 -14.9)	17.1 (16.1 -18.2)	14.7 (13.3 – 16.1)	15.2 (13.3 – 17.1)	14.8 (13.6 – 16.0)	11.3 (10.5 – 12.2)	13.1 (11.7 – 14.6)	13.4 (11.6 – 15.2)	8.7 (6.8 – 10.5)	134.5 (124.6 – 144.4)
Pain Scale											
0 = No pain (409)	13.1 (12.8 – 13.3)	13.6 (13.2 -14.0)	16.4 (16.1 -16.7)	14.9 (14.5 – 15.2)	16.6 (16.1 – 17.1)	14.7 (14.4 – 15.0)	11.6 (11.2 – 11.9)	13.0 (12.5 – 13.4)	13.3 (12.9 – 13.8)	9.7 (9.1 – 10.2)	136.7 (134.1 – 139.3)
1 = Less than daily pain (213)	13.1 (12.7 – 13.4)	13.1 (12.5 -13.7)	16.1 (15.7 -16.5)	15.2 (14.8 – 15.7)	16.6 (16.0 – 17.3)	14.6 (14.2 – 15.0)	11.6 (11.2 – 12.0)	13.3 (12.7 – 13.9)	14.2 (13.6 – 14.7)	9.9 (9.2 – 10.5)	137.7 (134.1 – 141.2)
2 – 3 = Daily pain (180)	12.8 (12.4 – 13.2)	12.3 (11.6 -13.0)	15.5 (15.0 – 16.0)	14.5 (13.9 – 15.1)	15.6 (14.8 – 16.4)	14.2 (13.6 – 14.7)	10.8 (10.3 – 11.3)	12.6 (11.9 – 13.2)	13.2 (12.6 – 13.9)	9.6 (8.9 – 10.4)	131.0 (126.8 – 135.3)
Index of Social Engagement (psycho-social well-being)											
0 (126)	12.6 (12.1 – 13.1)	12.9 (12.0 -13.7)	15.5 (14.9 -16.1)	14.0 (13.2 – 14.7)	14.4 (13.6 – 15.2)	14.1 (13.6 – 14.7)	11.0 (10.4 – 11.5)	12.3 (11.5 – 13.0)	11.7 (10.9 – 12.5)	8.8 (7.9 – 9.7)	127.1 (122.5 – 131.8)
1 (264)	12.9 (12.6 – 13.3)	13.2 (12.7 -13.8)	15.9 (15.4 -16.3)	14.7 (14.3 – 15.2)	16.5 (15.8 – 17.1)	14.3 (13.9 – 14.6)	11.3 (10.9 – 11.7)	12.8 (12.2 – 13.3)	12.8 (12.3 – 13.4)	9.3 (8.7 – 9.9)	133.7 (130.4 – 137.0)
2 or more 450)	13.0 (12.8 – 13.3)	13.0 (12.6 -13.4)	16.3 (16.0 – 16.6)	15.1 (14.7 – 15.4)	16.7 (16.2 – 17.2)	14.8 (14.5 – 15.1)	11.5 (11.2 – 11.8)	13.2 (12.8 – 13.6)	14.3 (13.9 – 14.7)	10.3 (9.8 – 10.7)	138.1 (135.6 – 140.6)
Depression Rating Scale											
0 (392)	13.2 (12.9 – 13.4)	13.1 (12.6 -13.5)	16.5 (16.2 -16.8)	15.3 (14.9 – 15.7)	17.0 (16.5 – 17.5)	14.9 (14.6 – 15.2)	11.8 (11.4 – 12.1)	13.4 (13.0 – 13.9)	13.9 (13.4 – 14.3)	9.9 (9.4 – 10.4)	138.9 (136.3 – 141.5)

Variables	Privacy	Food/Meal	Safety/ security	Comfort	Autonomy	Respect	Responsive Staff	Staff-resident Bonding	Activity Option	Personal Relationships	Overall QoL
	Mean (95% CLM)	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**
1 – 2 (241)	12.7 (12.3 – 13.0)	13.1 (12.6 -13.7)	15.8 (15.4 -16.2)	14.5 (14.0 – 15.0)	15.9 (15.3 – 16.5)	14.0 (13.6 – 14.5)	11.0 (10.6 – 11.5)	12.4 (11.9 – 12.9)	12.8 (12.2 – 13.3)	9.5 (8.8 – 10.1)	131.8 (128.4 – 135.1)
3- 4 (121)	13.1 (12.7 – 13.6)	13.1 (12.3 -14.0)	16.0 (15.4 – 16.6)	14.6 (13.9 – 15.3)	15.7 (14.9 – 16.5)	14.5 (13.9 – 15.0)	11.2 (10.7 – 11.7)	12.9 (12.1 – 13.7)	13.5 (12.7 – 14.2)	10.2 (9.2 – 11.2)	134.7 (130.0 – 139.4)
5 or more (93)	12.5 (11.8 – 13.2)	12.6 (11.6 -13.6)	14.8 (14.0 – 15.7)	13.6 (12.7 – 14.5)	14.9 (13.8 – 16.1)	13.9 (13.2 – 14.6)	10.5 (9.8 – 11.3)	12.3 (11.4 – 13.3)	13.6 (12.7 – 14.6)	9.4 (8.5 – 10.3)	128.3 (121.6 – 134.9)
Aggression Rating Scale											
0 = No signs of aggression 652)	13.0 (12.8 – 13.2)	13.0 (12.6 -13.3)	16.2 (16.0 -16.4)	15.0 (14.7 – 15.3)	16.4 (16.0 – 16.8)	14.7 (14.5 – 15.0)	11.5 (11.2 – 11.7)	13.1 (12.8 – 13.5)	13.7 (13.3 – 14.0)	10.0 (9.6 – 10.4)	136.6 (134.5 – 138.7)
1 = Aggressive (170)	12.6 (12.1 – 13.1)	13.1 (12.4 -13.9)	15.6 (15.0 -16.1)	14.1 (13.5 – 14.7)	15.9 (15.1 – 16.6)	13.6 (13.1 – 14.1)	10.7 (10.2 – 11.2)	12.4 (11.7 – 13.0)	12.7 (12.0 – 13.4)	8.7 (8.0 – 9.5)	129.4 (125.1 – 133.8)
Hearing											
0 – adequate (620)	13.0 (12.7 – 13.2)	13.3 (13.0 -13.7)	16.1 (15.9 -16.4)	15.0 (14.6 – 15.3)	16.5 (16.1 – 16.9)	14.6 (14.3 – 14.8)	11.4 (11.2 – 11.7)	13.1 (12.8 – 13.5)	13.6 (13.3 – 14.0)	9.9 (9.5 – 10.3)	136.6 (134.4 – 138.8)
1 – impaired (200)	12.8 (12.4 – 13.1)	12.3 (11.6 -13.0)	15.7 (15.3 -16.2)	14.4 (13.8 – 14.9)	15.6 (14.9 – 16.3)	14.3 (13.8 – 14.7)	11.1 (10.6 – 11.5)	12.3 (11.6 – 12.9)	13.0 (12.4 – 13.7)	9.3 (8.6 – 9.9)	130.6 (127.0 – 134.2)
Vision											
0 – adequate (540)	13.0 (12.7 – 13.2)	13.2 (12.8 -13.6)	16.1 (15.8 -16.3)	14.8 (14.5 – 15.1)	16.5 (16.1 – 16.9)	14.5 (14.2 – 14.8)	11.4 (11.1 – 11.7)	12.8 (12.4 – 13.2)	13.6 (13.2 – 13.9)	9.8 (9.3 – 10.2)	135.5 (133.2 – 137.9)
1 – impaired (253)	12.8 (12.4 – 13.1)	13.0 (12.4 -13.6)	16.0 (15.5 -16.4)	14.9 (14.5 – 15.4)	15.8 (15.2 – 16.4)	14.4 (14.0 – 14.9)	11.2 (10.9 – 11.6)	13.1 (12.5 – 13.6)	13.2 (12.6 – 13.8)	9.7 (9.0 – 10.3)	134.1 (130.7 – 137.4)
2 - moderately impaired (27)	13.6 (12.7 – 14.4)	12.1 (9.9 -14.2)	15.9 (14.6 -17.3)	14.1 (12.5 – 15.8)	16.0 (14.1 – 18.0)	14.9 (13.7 – 16.1)	11.2 (9.8 – 12.5)	13.9 (12.2 – 15.6)	14.0 (12.3 – 15.7)	10.8 (8.7 – 12.9)	136.5 (125.4 – 147.6)
Bowel incontinence											
0 – continent (507)	13.0 (12.8 – 13.3)	13.3 (12.9 -13.7)	16.3 (16.1 -16.6)	15.2 (14.9 – 15.5)	17.2 (16.8 – 17.6)	14.9 (14.6 – 15.1)	11.6 (11.3 – 11.9)	13.4 (13.0 – 13.8)	14.0 (13.6 – 14.4)	10.1 (9.7 – 10.5)	139.1 (136.8 – 141.3)
1 – usually continent (191)	12.7 (12.3 – 13.1)	12.6 (11.9 -13.2)	15.5 (14.9 - 16.0)	14.2 (13.6 – 14.8)	15.3 (14.6 – 15.9)	14.1 (13.6 – 14.5)	11.2 (10.7 – 11.7)	12.1 (11.4 – 12.7)	12.6 (12.0 – 13.3)	8.9 (8.2 – 9.6)	129.0 (125.1 – 132.9)

Variables	Privacy	Food/Meal	Safety/ security	Comfort	Autonomy	Respect	Responsive Staff	Staff-resident Bonding	Activity Option	Personal Relationships	Overall QoL
	Mean (95% CLM)	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**
2 – occasionally continent (149)	12.9 (12.4 – 13.4)	13.0 (12.2 -13.7)	15.8 (15.2 -16.3)	14.1 (13.4 – 14.7)	14.4 (13.5 – 15.3)	13.9 (13.3 – 14.4)	10.6 (10.0 – 11.2)	12.6 (11.9 – 13.3)	12.6 (11.9 – 13.3)	9.7 (8.9 – 10.6)	129.5 (124.9 – 134.1)
Bladder incontinence											
0 – continent (324)	13.2 (12.9 – 13.5)	13.0 (12.5 -13.5)	16.5 (16.2 -16.9)	15.3 (15.0 – 15.7)	17.6 (17.1 – 18.0)	14.9 (14.6 – 15.2)	11.7 (11.4 – 12.0)	13.4 (12.9 – 13.9)	14.0 (13.5 – 14.4)	10.2 (9.6 – 10.7)	139.8 (137.0 – 142.6)
1 – usually continent (195)	12.8 (12.5 – 13.2)	13.0 (12.4 -13.7)	15.7 (15.2 - 16.2)	14.7 (14.2 – 15.2)	16.3 (15.6 – 17.0)	14.6 (14.2 – 15.1)	11.3 (10.9 – 11.8)	12.7 (12.0 – 13.3)	13.6 (12.9 – 14.3)	9.7 (9.0 – 10.5)	134.5 (130.6 – 138.5)
2 – occasionally continent (328)	12.7 (12.4 – 13.0)	13.1 (12.6 -13.6)	15.7 (15.4 -16.1)	14.3 (13.8 – 14.8)	15.0 (14.4 – 15.6)	14.1 (13.7 – 14.4)	11.0 (10.6 – 11.4)	12.6 (12.2 – 13.1)	12.9 (12.4 – 13.4)	9.4 (8.8 – 10.0)	130.8 (127.8 – 133.8)

Abbreviations: QoL = quality of life; CLM = confidence limit (mean)

Similarly with the function of activities of daily living (ADL), there is a significant association with ADL functioning and perceived QoL. Residents needing extensive assistance reported significantly lower overall QoL compared to those who were independent or needed supervision only. At the domain level, QoL is significantly associated with "safety/security", "comfort", "autonomy", "responsive staff", and "activity option".

Health instability as measured by CHESS was not associated with QoL. Similarly, the presence of pain was not associated with overall QoL, but in the "food/meal" and "safety/security" domains, QoL was significantly associated with increased pain frequency and intensity.

Residents' psycho-social well being as measured by the Index of Social Engagement is significantly associated with their overall QoL. At the domain level, there is a trend with higher QoL across all domains. However, these associations are significant in the "comfort", "autonomy", "activity" and "personal relationships" domains. These domain level findings supports theoretically expected associations. Aggression is also negatively associated with QoL. As shown, residents with aggressive behaviour reported significantly lower overall QoL compared to those without. Specific to domains, aggression is also shown to have a significant influence on reported QoL in "comfort", "respect", "staff responsiveness" and "personal relationships".

There were no significant associations between vision loss and overall QoL nor domain specific QoL. Hearing loss interferes with communication, enjoying certain forms of activities such as listening to music or watching television, safety, and independence. The findings show that hearing loss has a significant association with overall QoL, and specifically in the "food/meal" domain. While in all other domains lower levels of QoL were apparent, these differences were not significant. This is of interest because of the theoretical expectation that hearing loss would influence residents' participation in social activities and personal relationships. A surprising finding was the lack of significant association between vision loss and QoL. Visual problems influence several functions such as ADL, toileting, eating, ambulation, and many other aspects of daily life such as personal relationships, watching television and enjoying scenery. While there was no signification association, there were lower reported QoL in the following domains: “food/meal”, “safety/security”, “comfort” and “autonomy”.

4.4 Research Question 3

4.4.1 Relationship of QoL Ratings and Facility Characteristics

The third research question for this study was “To what extent are QoL ratings associated with LTC facility attributes?” To answer this question, bivariate analyses were carried out to determine the association between facility structural and staffing characteristics and their self-rated QoL scores. Mean QoL scores and 95% CI for each domain were calculated for facility characteristics (independent variables) that were categorical data (e.g., profit status), as shown in Table 32. Two methods were used for the analysis of facility characteristics that were continuous data (e.g., size; staff hours). First, they were categorized, as shown in Table 33, by using cut-off points based on median and quartile percentages derived from univariate analyses. Second, they were treated as continuous data and Pearson’s r was calculated (e.g., size), as shown in Appendix R. These continuous variables, as defined in Table 8, include: facility size (i.e., number of beds), management staff hours per resident per week, registered nurse hours per resident per day, non-registered nurse hours per resident per day, total hours of care per resident per day, ratio of registered to non-registered nursing staff, registered nursing staff turnover, and non-registered nursing staff turnover.

Table 32: Relationship of residents' QoL and LTC facility attributes (categorical data)

Variable (n)	**Privacy**	**Food/Meal**	**Safety/ security**	**Comfort**	**Autonomy**	**Respect**	**Responsive Staff**	**Staff-resident Bonding**	**Activity Option**	**Personal Relationships**	**Overall QoL**
	Mean (95% CLM)	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**
Ownership											
Private (494)	12.7 (12.5-13.0)	13.7 (13.3-14.1)	16.1 (15.8-16.4)	14.9 (14.6 – 15.3	16.5 (16.0-16.9)	14.6 (14.4-14.9)	11.5 (11.2-11.8)	13.2 (12.8-13.6)	13.5 (13.1-13.9)	9.9 (9.5-10.4)	136.7 (134.2-139.1)
Municipal (64)	13.7 (13.1-14.3)	14.6 (13.7-15.5)	17.3 (16.6-18.1)	16.3 (15.6 – 17.0)	17.8 (16.7-18.9)	15.4 (14.8-16.0)	12.4 (11.8-13.0)	14.5 (13.6-15.4)	15.5 (14.5-16.5)	11.1 (9.9-12.3)	148.7 (143.2-154.1)
Charitable (289)	13.1 (12.8-13.4)	11.7 (11.1-12.2)	15.7 (15.3-16.1)	14.2 (13.8 – 14.7)	15.6 (15.0-16.1)	14.1 (13.7-14.4)	10.9 (10.5-11.2)	12.2 (11.7-12.7)	12.9 (12.4-13.4)	9.2 (8.7-9.8)	129.5 (126.4-132.5)
Profit Status											
For Profit (481)	12.8 (12.5-13.0)	13.6 (13.2-14.0)	16.0 (15.7-16.3)	14.9 (14.5 – 15.2)	16.5 (16.0-16.9)	14.6 (14.3-14.8)	11.4 (11.1-11.7)	13.1 (12.7-13.4)	13.5 (13.1-13.9)	10.4 (9.5-10.4)	136.2 (133.7-138.6)
Not For Profit (366)	13.2 (12.9-13.4)	12.4 (11.9-12.9)	16.1 (15.8-16.4)	14.7 (14.3 – 15.1)	16.0 (15.5-16.5)	14.4 (14.1-14.8)	11.2 (10.9-11.6)	12.8 (12.3-13.3)	13.4 (13.0-13.8)	9.5 (9.0-10.0)	133.7 (131.0-136.5)
Geographic Location											
Urban (772)	12.9 (12.7-13.1)	12.8 (12.5-13.1)	15.9 (15.6-16.1)	14.6 (14.3-14.8)	16.0 (15.7-16.4)	14.3 (14.1-14.6)	11.2 (11.0-11.4)	12.8 (12.5-13.1)	13.2 (12.9-13.5)	9.7 (9.3-10.0)	133.3 (131.4-135.3)
Rural (75)	13.7 (13.2-14.3)	15.5 (14.7-16.3)	17.9 (17.4-18.4)	17.0 (16.3-17.6)	18.7 (17.6-19.7)	16.2 (15.6-16.8)	12.8 (12.2-13.4)	14.8 (13.9-15.7)	16.2 (15.2-17.2)	10.6 (9.4-11.9)	153.3 (148.2-158.3)
Accreditation Status											
Yes (786)	13.0 (12.8-13.1)	13.0 (12.7-13.3)	16.0 (15.8-16.3)	14.8 (14.5-15.1)	16.4 (16.1-16.8)	14.5 (14.3-14.7)	11.3 (11.1-11.6)	12.9 (12.6-13.2)	13.4 (13.1-13.7)	9.7 (9.4-10.1)	135.2 (133.3-137.0)
No (61)	12.6 (11.8-13.4)	13.5 (12.2-14.8)	16.1 (15.2-17.1)	14.5 (13.4-15.5)	14.3 (12.6-15.9)	14.9 (13.9-15.8)	11.3 (10.5-12.2)	13.1 (11.7-14.4)	14.0 (13.0-15.1)	10.2 (8.8-11.7)	134.5 (126.5-142.6)
Total Leadership Stability											
1 (406)	12.7 (12.4-13.0)	13.0 (12.6-13.4)	15.8 (15.4-16.1)	14.6 (14.2-15.0)	16.0 (15.5-16.5)	14.4 (14.0-14.7)	11.1 (10.8-11.4)	12.9 (12.5-13.3)	13.1 (12.7-13.6)	9.7 (9.2-10.2)	133.5 (130.6-136.0)
2 (288)	13.0 (12.6-13.3)	13.6 (13.1-14.1)	16.2 (15.9-16.6)	14.9 (14.5-15.3)	16.4 (15.9-17.0)	14.7 (14.3-15.1)	11.7 (11.4-12.1)	13.3 (12.8-13.8)	13.4 (12.9-13.9)	9.8 (9.2-10.3)	137.0 (134.0-140.0)
3 (153)	13.5 (13.1-13.9)	12.1 (11.2-13.0)	16.4 (15.9-16.8)	15.0 (14.4-15.7)	16.7 (15.9-17.5)	14.5 (14.0-14.9)	11.2 (10.6-11.8)	12.5 (11.8-13.2)	14.5 (13.8-15.2)	9.9 (9.2-10.7)	136.3 (131.7-140.9)

Table 33: Relationship of residents' QoL and LTC facility attributes (categorical data)

Variable (n)	Privacy	Food/Meal	Safety/ Security	Comfort	Autonomy	Respect	Responsive Staff	Staff-resident Bonding	Activity Option	Personal Relationships	Overall QoL
	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)	Mean (95% CLM)
Facility Size (number of beds)											
Less than 95 (177)	12.5 (12.1-13.0)	13.6 (12.9-14.2)	16.1 (15.5-16.6)	14.9 (14.3-15.5)	16.2 (15.4-17.0)	14.6 (14.1-15.1)	11.3 (10.8-11.8)	12.8 (12.1-13.5)	14.0 (13.4-14.7)	10.2 (9.5-11.0)	136.3 (131.9-140.6)
95 – 159 (394)	13.0 (12.7-13.3)	13.4 (13.0-13.9)	16.2 (15.9-16.5)	14.9 (14.5-15.3)	16.6 (16.1-17.1)	14.7 (14.4-15.0)	11.6 (11.3-12.0)	13.3 (12.9-13.8)	13.3 (12.8-13.7)	9.6 (9.1-10.1)	136.6 (134.0-139.3)
Greater than 159 (276)	13.1 (12.8-13.4)	12.2 (11.6-12.8)	15.8 (15.4-16.2)	14.5 (14.1-15.0)	15.8 (15.2-16.4)	14.2 (13.8-14.6)	10.9 (10.5-11.3)	12.5 (12.0-13.0)	13.4 (12.9-13.9)	9.7 (9.1-10.3)	132.2 (129.0-135.4)
Management Staff Hours Per Resident Per Week											
1 (≤75) (683)	12.9 (12.7-13.1)	12.8 (12.4-13.2)	15.8 (15.6-16.1)	14.4 (14.3-14.8)	16.2 (15.8-16.6)	14.3 (14.1-14.6)	11.2 (10.9-11.4)	12.8 (12.5-13.2)	13.2 (12.9-13.5)	9.7 (9.3-10.1)	133.6 (131.5-135.6)
2 (>75) (164)	13.1 (12.6-13.5)	14.1 (13.5-14.8)	16.9 (16.4-17.3)	15.8 (15.2-16.3)	16.6 (15.9-17.4)	15.2 (14.7-15.7)	12.0 (11.5-12.4)	13.3 (12.7-14.0)	14.5 (13.9-15.2)	10.1 (9.3-10.9)	141.6 (137.5-145.6)
Registered Nurse Hours Per Resident Per Day											
1 (≤ 0.19) (203)	12.9 (12.5-13.3)	13.0 (12.4-13.7)	15.8 (15.4-16.3)	14.3 (13.8-14.9)	15.4 (14.6-16.1)	14.1 (13.6-14.6)	11.0 (10.5-11.5)	12.5 (11.8-13.2)	13.5 (12.9-14.1)	10.0 (9.3-10.8)	132.5 (128.5-136.6)
2 (≤0.21) (194)	13.0 (12.7-13.4)	13.5 (13.0-14.1)	15.8 (15.3-16.3)	14.8 (14.3-15.3)	17.1 (16.4-17.7)	14.8 (14.3-15.2)	11.4 (11.0-11.9)	13.5 (12.9-14.0)	14.1 (13.5-14.7)	10.2 (9.5-10.8)	138.3 (134.5-142.0)
3(≤0.49) (249)	12.8 (12.5-13.2)	13.1 (12.6-13.6)	16.4 (16.0-16.8)	15.1 (14.7-15.6)	16.4 (15.8-17.0)	14.8 (14.4-15.2)	11.6 (11.3-12.0)	13.2 (12.6-13.7)	12.7 (12.1-13.2)	9.2 (8.5-9.9)	135.3 (132.0-138.6)
4 (>0.49) (205)	13.0 (12.6-13.4)	12.5 (11.8-13.3)	16.0 (15.6-16.5)	14.8 (14.3-15.3)	16.3 (15.6-16.9)	14.3 (13.9-14.7)	11.2 (10.8-11.7)	12.6 (12.0-13.2)	13.8 (13.2-14.4)	9.8 (9.2-10.5)	134.2 (130.7-138.2)
Registered _ Licensed Practical Nurse Hours Per Resident Per Day											
1 (≤0.34) (231)	12.6 (12.2 – 13.0)	12.8 (12.3 – 13.4)	15.5 (15.1 – 16.0)	14.1 (13.6 – 14.7)	16.1 (15.5 – 16.8)	14.1 (13.6 – 14.5)	11.3 (10.8 – 11.7)	13.1 (12.5 – 13.7)	13.0 (12.5 – 13.6)	9.7 (9.1 – 10.3)	132.4 (128.8–136.1)
2 (≤0.41) (187)	13.5 (13.2 – 13.9)	13.6 (13.1 – 14.2)	16.6 (16.2 – 17.0)	15.8 (15.3 – 16.3)	17.3 (16.6 – 17.9)	14.9 (14.4 – 15.3)	11.5 (11.0 – 11.9)	12.8 (12.1 – 13.4)	14.6 (13.9 – 15.2)	9.9 (9.1 – 10.7)	140.4 (136.6–144.2)
3 (≤0.58) (178)	12.3 (11.9 – 12.7)	13.3 (12.7 – 14.0)	16.0 (15.5 – 16.4)	14.6 (14.0 – 15.2)	15.6 (14.8 – 16.4)	14.6 (14.1 – 15.2)	11.4 (10.9 – 11.9)	13.1 (12.4 – 13.8)	12.6 (11.9 – 13.3)	9.6 (8.8 – 10.4)	133.1 (128.8–137.4)
4 (>0.58) (251)	13.2 (12.9 – 13.5)	12.6 (12.0 – 13.2)	16.1 (15.7 – 16.5)	14.8 (14.4 – 15.2)	16.2 (15.6 – 16.8)	14.6 (14.2 – 14.9)	11.3 (10.9 – 11.7)	12.8 (12.3 – 13.3)	13.7 (13.2 – 14.2)	9.8 (9.2 – 10.4)	135.1 (131.9-138.3)
Total Hours of Care Per Resident Per Day											
1 (≤2.5) (180)	12.8 (12.4-13.2)	12.5 (11.8-13.1)	15.8 (15.3-16.3)	14.1 (13.5-14.7)	16.2 (15.5-17.0)	13.8 (13.3-14.3)	10.8 (10.3-11.3)	12.0 (11.3-12.7)	12.9 (12.2-13.6)	8.5 (7.8-9.2)	129.5 (125.4-133.6)

Variable (n)	**Privacy**	**Food/Meal**	**Safety/ Security**	**Comfort**	**Autonomy**	**Respect**	**Responsive Staff**	**Staff-resident Bonding**	**Activity Option**	**Personal Relationships**	**Overall QoL**
	Mean (95% CLM)	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**	**Mean (95% CLM)**
2 (>2.5) (667)	13.0 (12.7-13.2)	13.2 (12.9-13.6)	16.1 (15.9-16.3)	15.0 (14.7-15.3)	16.3 (15.9-16.7)	14.7 (14.4-14.9)	11.5 (11.2-11.7)	13.2 (12.9-13.5)	13.6 (13.3-14.0)	10.1 (9.7-10.5)	136.5 (134.6-138.7)
Ratio of Registered to non-Registered Nursing Staff											
1 (≤0.35) (408)	12.9 (12.6 – 13.2	13.7 (13.2 – 14.1)	16.0 (15.7 – 16.3)	15.1 (14.7 – 15.4)	16.6 (16.1 – 17.0)	14.5 (14.2 – 14.9)	11.5 (11.2 – 11.9)	13.3 (12.8 – 13.7)	14.1 (13.6 – 14.5)	10.5 (10.0 – 11.0)	138.1 (135.3 – 140.8)
2 (>0.35) (439)	12.9 (12.7 – 13.2)	12.5 (12.7 – 13.2)	16.1 (15.8 – 16.4)	14.5 (14.2 – 14.9)	16.0 (15.6 – 16.5)	14.5 (14.2 – 14.8)	11.2 (10.9 – 11.5)	12.6 (12.2 – 13.0)	12.9 (12.5 – 13.3)	9.1 (8.7 – 9.6)	132.4 (129.9 – 134.8)
Proportion Registered Nursing Staff Turnover											
1 (≤1) (257)	13.1 (12.8-13.4)	13.5 (12.9-14.0)	16.4 (16.0-16.8)	15.1 (14.7-15.6)	16.2 (15.5-16.8)	14.8 (14.4-15.2)	11.6 (11.3-12.0)	13.2 (12.7-13.8)	13.6 (13.0-14.2)	9.8 (9.1-10.4)	137.3 (133.9-140.7)
2 (≤6) (278)	12.7 (12.4-13.1)	13.0 (12.5-13.5)	15.9 (15.5-16.3)	14.6 (14.1-15.0)	16.0 (15.4-16.5)	14.6 (14.2-14.9)	11.3 (11.0-11.7)	12.9 (12.4-13.4)	13.4 (12.8-13.9)	9.8 (9.2-10.4)	134.1 (130.9-137.3)
3 (>6) (312)	13.0 (12.7 – 13.2)	12.8 (12.2 – 13.3)	15.9 (15.5 -16.2)	14.7 (14.2 – 15.1)	16.7 (16.1 – 17.2)	14.2 (13.8 – 14.5)	11.1 (10.7 – 11.5)	12.8 (12.3 – 13.2)	13.5 (13.0 – 13.9)	9.8 (9.2 – 10.3)	134.2 (131.2–137.2)
Proportion Non-Registered Nursing Staff Turnover											
1 (≤2.5) (212)	13.3 (12.9-13.7)	13.5 (12.9-14.1)	16.4 (16.0-16.8)	15.2 (14.7-15.7)	16.1 (15.4-16.8)	14.8 (14.3-15.2)	11.5 (11.1-12.0)	13.1 (12.5-13.7	14.2 (13.6-14.8)	9.9 (9.1-10.6)	138.0 (134.3-141.7)
2 (≤13.0) (398)	12.7 (12.4-13.0)	13.7 (13.3-14.1)	16.0 (15.7-16.3)	15.0 (14.6-15.3)	16.7 (16.3-17.2)	14.5 (14.2-14.8)	11.4 (11.1-11.7)	13.3 (12.9-13.7)	13.3 (12.9-13.8)	10.2 (9.7-10.7)	136.3 (134.3-139.4)
3(>13.0) (237)	13.0 (12.7-13.4)	11.5 (10.9-12.2)	15.7 (15.3-16.1)	14.1 (13.6-14.6)	15.7 (15.0-16.3)	143 (13.8-14.7)	11.1 (10.6-11.5)	12.2 (11.6-12.8)	13.0 (12.5-13.6)	9.0 (8.4-9.6)	129.6 (126.0-133.3)

Abbreviations: QoL = quality of life; CLM = confidence limit (mean)

As shown in Table 32, there were significant differences in overall mean QoL scores in LTC facilities that differed in their type of ownership (i.e., private, municipal and charitable). Municipal LTC homes had the highest mean score of 148.7 (95% CI: 143.2-154.1) and lowest scores were evident in charitable homes (129.5; 126.4 – 132.5). The differences in domain summary scores were significant in all but the "comfort" and "autonomy" domains. There were no significant differences in overall mean QoL in facilities that differed in profit status. At the domain level, however, residents in for-profit facilities rated their QoL related to "food/meal" significantly higher than those in not-for-profit LTC facilities.

The geographic location of the LTC facilities appears to influence QoL ratings. Residents in rural LTC facilities scored their overall QoL significantly higher than those residing in urban LTC facilities (overall mean score 153.3 compared to 133.3 respectively). With respect to domain summary scores, except for the "personal relationships" domain, all QoL scores were significantly higher in rural LTC facilities.

There were no significant differences in the domain-specific and overall mean QoL scores between accredited and non-accredited facilities. At the domain level, the QoL score in the "autonomy" domain was significantly higher than those in non-accredited facilities. Finally, total leadership stability had a significant association with some of the domain-specific QoL ratings. As noted in Table 8, leadership included administrators, assistant administrators, directors of care, and assistant directors of care. Stability was defined as having 3 or more years of tenure in the LTC facility. Leadership stability influenced residents' QoL significantly in "privacy" and "responsive staff" domains, but there were no significant differences in the overall QoL ratings.

As shown in Table 33, there was no significant association between overall QoL scores and the size of LTC facilities, measured in number of beds. However, residents in smaller homes rated their QoL related to "food/meal" and "responsive staff" domains significantly higher than those in larger homes. Residents in LTC facilities with higher ratio of management staff hours per resident per week rated higher overall QoL scores. Management hours also had a significant impact on QoL ratings in all domains except for “privacy”, “autonomy”, “staff-resident bonding”, and “personal relationships”. On the other hand, registered nurse hours per resident per week did not make a significant difference in overall QoL ratings. At the domain level, significant association was shown in the “comfort”, “autonomy” and “activity option” domains. Higher hours of care by registered or licensed practical nurses was significantly associated with overall QoL and selectively with summary domain QoL in the “privacy”, “safety/security”, “comfort”, “autonomy”, and “activity option” domains. However, total hours of care per resident per day did have a significant impact on overall QoL ratings, and in several domains: “comfort”, “respect’, “staff-resident bonding”, and “personal relationships”. A higher ratio of registered to non-registered nursing staff appears to have an inverse effect on QoL ratings. Registered nursing staff turnover did not have any significant effect on residents’ QoL ratings. However, non-registered nursing staff turnover had a significant effect in overall QoL as well as in several domains: “food/meal”, “comfort”, “staff-resident bonding”, “activity option”, and “personal relationships”.

4.5 Linear Regression

The overall QoL score was used as the dependent variable. The explanatory variables for the dependent variable were entered into the model as either categorical or ratio level continuous measures. For instance, aggression was used as a measure of resident behaviour. Both its continuous form (abs_nh2) and its collapsed form (aggression) were used. For a few of the variables (e.g., depression; highest education) dummy variables were created. Both resident characteristics and LTC facility attributes were entered into the model. Variables that did not reach statistical significance at the $p < 0.05$ level were removed from the model one at a time. These variables also included those that were found non-significant in bivariate analyses.

Table 34 shows the final multiple linear regression model. Based on resident characteristics alone, the model explains 20% of the variation in overall QoL (Adjusted R^2 = 0.20). When the LTC facility attributes are added were added to the model, the model explains 24% of the total variance in QoL (adjusted R^2=0.24) with F = 27.33, df=10, and p<0.0001. A significant F-value indicates that the set of independent variables in the model is related to the dependent variable, overall QoL. All of the listed variables are significant predictors of overall QoL.

While the p-value of religiosity_1 (0.07) as shown is not significant, religiosity_1 and religiosity_2 are dummy variables of the same overall variable (religion). The independent variables religiosity, index of social engagement and global disposition are shown to have a positive association with overall QoL, while activities of daily living and post-secondary education have a negative association as expected. Type of LTC facility ownership and their geographic location also had a positive association with overall QoL scores. The variance inflation factor (VIF) values for these variables fell between 1.03 and 2.6. Since these values do not exceed the general rule that VIF values should not exceed 10, multicollinearity of the independent variables was unlikely (Belsley, Kuh, & Welsch, 1980).

Test of assumptions for residuals were conducted by using the SPEC option in proc reg. These tests concluded that the residuals were independent from one another and identically distributed (Chi-square=67.56; p=0.09). The Shapiro-Wilks test (W: Normal statistic) indicates a normal distribution (W=0.99; p<0.002). As the test's p-value is significant, then the residuals come from a normal distribution (Christensen, 2011).

Table 34: Linear regression: Final model with overall QoL as dependent variable

Independent Variable	Parameter Estimate	Standard Error	p-value
Resident Characteristics			
Religiosity_1	4.64	2.52	0.07
Religiosity_2	7.12	2.06	0.0006
Activites of Daily Living Hierarchy	-1.36	0.57	0.02
Index of Social Engagement	1.06	0.55	0.06
Post-secondary education	-5.49	2.27	0.02
Global disposition_2	10.10	2.91	0.0005
Global disposition_3	26.97	2.73	<0.0001
Facility Attributes			
Rural	15.70	3.00	<0.0001
Ownership_1	4.43	1.85	0.02
Ownership_2	13.65	3.35	<0.0001

F = 27.33; df = 10; <0.0001; Adjusted R^2 = 0.24

<u>Codes:</u>

Religiosity_1 = religiosity as measured by attending a place of worship OR finding strength in faith; dummy variable 0= neither (reference group)
Religiosity_2 = religiosity as measured by attending a place of worship AND finding strength in faith; dummy variable 0= neither (reference group)
Activities of daily living hierarchy; dummy variable 0 = independent or limited supervision (reference group)
Index of social engagement; dummy variable 0 = isolated (reference group)
Post-secondary education = dummy variable 0 = no post-secondary education (reference group)
Global disposition_2 = interRAI_QoL Survey item with a rating of “sometimes”; dummy variable 0 = “never/rarely” (reference group)
Global disposition_3 = interRAI_QoL Survey item with rating of “almost all the time/always”; dummy variable 0 = “never/rarely” (reference group)
Rural = geographic location of facility; dummy variable 0 = urban (reference group)
Ownership_1 = Ownership type “private”; dummy variable 0 = “charitable” (reference group)
Ownership_2 = Ownership type “municipal”; dummy variable 0 = “charitable” (reference group)

The association between the dependent variable and the independent variables was linear based on a plot of the data. The distribution of the overall QoL scores was slightly skewed towards higher scores. The VIF values, as a measure of multicollinearity, were acceptable at 2.5 or less. The plot of the residuals showed a normal distribution. Tests that were carried out to detect outliers identified relatively few Cook’s D values that required scrutiny. However, these were not of a major concern and, consequently, they were not deleted from the model.

4.6 Logistic Regression

For logistic regression, QoL was collapsed as a binary response (or outcome). Based on a distribution of the overall QoL scores for the sample, an overall QoL score of less than or equal to 117 (Q1 or 25%) was considered as low, and a score of greater than 156 (Q3 or 75%) was considered as high. Logistic regression was used to predict low overall QoL. Similar to the process used in the multiple linear regression analysis, a manual method was used to identify the final model. Initially all variables were entered into the full model, including resident characteristics and facility attributes. Those that did not reach statistical significance at the $p < 0.05$ level were removed one by one. The final model is shown in Table 35. This is a good model with a high c statistic of 0.784. The Hosmer-Lemeshow Chi-square Goodness of Fit test was not significant indicating the model was a good fit.

In this model, the direction of parameter estimates is reversed compared to those in Table 34 because the dependent variable here is low QoL. For resident characteristics, the odds ratio estimates indicate that religiosity, social engagement, and global disposition play a protective role in residents' QoL. For instance, residents who are socially engaged have a lower odds of low QoL compared to residents who are not socially engaged. Also, residents with post secondary education have a 1.64 higher odds of reporting a low QoL compared to those who had no post secondary education. Facility attributes of rural location and ownership type also played a protective role. For instance, residents in rural LTC facilities had substantially lower odds of low QoL.

Table 35: Logistic regression: Full model with low QoL as dependent variable

Independent Variable	Parameter Estimate (Standard Error)	Odds Ratio (95% CI)	p-value
Resident Characteristics			
Religiosity_1	-0.19 (0.39)	0.83 (0.48 – 1.42)	0.49
Religiosity_2	-0.49 (0.27)	0.61 (0.39 – 0.97)	0.04
Activities of Daily Living Hierarchy	0.15 (0.23)	1.16 (1.03 – 1.30)	0.02
Index of Social Engagement	-0.14 (0.06)	0.87 (0.78 – 0.97)	0.01
Post-secondary education	0.49 (0.06)	1.64 (1.03 – 2.59)	0.04
Global disposition_2	-0.78 (0.24)	0.46 (0.28 – 0.76)	0.002
Global disposition _3	-2.26 (0.26)	0.10 (0.06 – 0.17)	<0.0001
Facility Attributes			
Rural	-1.61 (0.50)	0.20 (0.08 – 0.54)	0.001
Ownership_1	-0.30 (0.19)	0.74 (0.51 – 1.07)	0.11
Ownership_2	-0.90 (0.43)	0.41 (0.17 – 0.95)	0.04

C Statistic = 0.784; Log-likelihood ratio = 174.247, df = 10, p<0.0001
Hosmer & Lemeshow Goodness-of-Fit test: Chi-sq. = 8.17, df = 8; p>chi-sq = 0.42
AIC (intercept & covariates) = 813.820; SC (intercept & covariates) = 865.888

Codes:
Religiosity_1 = religiosity as measured by attending a place of worship OR finding strength in faith; dummy variable 0= neither (reference group)
Religiosity_2 = religiosity as measured by attending a place of worship AND finding strength in faith; dummy variable 0= neither (reference group)
Activities of daily living hierarchy; dummy variable 0 = independent or limited supervision (reference group)
Index of social engagement; dummy variable 0 = isolated (reference group)
Post-secondary education = dummy variable 0 = no post-secondary education (reference group)
Global disposition_2 = interRAI_QoL Survey item with a rating of “sometimes”; dummy variable 0 = “never/rarely” (reference group)
Global disposition_3 = interRAI_QoL Survey item with rating of “almost all the time/always”; dummy variable 0 = “never/rarely” (reference group)
Rural = geographic location of facility; dummy variable 0 = urban (reference group)
Ownership_1 = Ownership type “private”; dummy variable 0 = “charitable” (reference group)
Ownership_2 = Ownership type “municipal”; dummy variable 0 = “charitable” (reference group)

To consider how these explanatory variables behaved in a logistic regression with high QoL as the dependent variable, the model in Table 36 was generated. As demonstrated by the non-significant p-values, several explanatory variables in this model did not predict high QoL ratings. Further, both the AIC and SC values were higher than the model shown in Table 35. The c statistic of 0.729 was also lower for this model. Reduction of this model by eliminating the variables with non-significant p-values did not improve it as evidenced by the higher AIC and SC values shown in Table 37. As well, the c statistic (0.723) was further decreased slightly.

Accordingly, based on the logistic regression analyses, the preferred model selected is the full, unreduced model shown in Table 35 with low QoL as the dependent variable. Residents who were religious (religiosity_1 or religiosity_2), socially engaged, and had a positive global disposition (scored “almost all the time/always”) had a lower odds of reporting a low QoL. As well, those who resided in rural, private or municipal facilities were less likely to report a low QoL. On the other hand, those with post secondary education and were dependent in ADL, were more likely to report a low QoL.

In both linear and logistic regression modelstheoretically relevant two-way interaction effects were considered (e.g., social engagement and depression, social engagement and cognitive performance, and activities of daily living and continence). These were removed because they did not meet the 0.05 significance level.

Table 36: Logistic regression: Full model with high QoL as dependent variable

Independent Variable	Parameter Estimate (Standard Error)	Odds Ratio (95% CI)	p-value
Resident Characteristics			
Religiosity_1	0.38 (0.25)	1.46 (0.89 – 2.39)	0.13
Religiosity_2	0.63 (0.210	1.88 (1.26 – 2.82)	0.002
Activities of Daily Living Hierarchy	0.02 (0.06)	1.02 (0.91 – 1.51)	0.69
Index of Social Engagement	0.09 (0.06)	1.10 (0.98 – 1.23)	0.12
Post-secondary education	-0.34 (0.24)	0.71 (0.44 – 1.14)	0.16
Global Disposition_2	-0.008 (0.40)	099 (0.46 – 2.17)	0.99
Global Disposition _3	1.32 (0.36)	3.73 (1.86 – 7.50)	0.0002
Facility Attributes			
Rural	1.18 (0.27)	3.26 (1.90 – 5.58)	<0.0001
Ownership_1	0.48 (0.20)	1.62 (1.08 – 2.41)	0.019
Ownership_2	0.95 (0.32)	2.58 (1.39 – 4.80)	0.003

C Statistic = 0.729; Log-likelihood ratio = 110.855, df = 10, p<0.0001
Hosmer & Lemeshow Goodness-of-Fit test: Chi-sq. = 1.15, df = 8; p>chi-sq = 1.00
AIC (intercept & covariates) = 855.868; SC = 907.935

Codes:
Religiosity_1 = religiosity as measured by attending a place of worship OR finding strength in faith; dummy variable 0= neither (reference group)
Religiosity_2 = religiosity as measured by attending a place of worship AND finding strength in faith; dummy variable 0= neither (reference group)
Activities of daily living hierarchy; dummy variable 0 = independent or limited supervision (reference group)
Index of social engagement; dummy variable 0 = isolated (reference group)
Post-secondary education = dummy variable 0 = no post-secondary education (reference group)
Global disposition_2 = interRAI_QoL Survey item with a rating of “sometimes”; dummy variable 0 = “never/rarely” (reference group)
Global disposition_3 = interRAI_QoL Survey item with rating of “almost all the time/always”; dummy variable 0 = “never/rarely” (reference group)
Rural = geographic location of facility; dummy variable 0 = urban (reference group)
Ownership_1 = Ownership type “private”; dummy variable 0 = “charitable” (reference group)
Ownership_2 = Ownership type “municipal”; dummy variable 0 = “charitable” (reference group)

Table 37: Logistic regression: Reduced model with high QoL as dependent variable

Variables	Parameter Estimate (Standard Error)	Odds Ratio (95% CI)	p-value
Resident Characteristics			
Religiosity_1	0.35 (0.25)	1.41 (0.87 – 2.30)	0.17
Religiosity_2	0.60 (0.20)	1.83 (1.23 – 2.71)	0.003
Global Disposition_2	0.01 (0.40)	1.01 (0.46 – 2.19)	0.99
Global Disposition _3	1.35 (14.55)	3.85 (1.93 – 7.69)	0.0001
Facility Attributes			
Rural	1.15 (18.02)	3.15 (1.85 – 5.35)	<0.0001
Ownership_1	0.50 (6.02)	1.64 (1.11 – 2.44)	0.01
Ownership_2	0.95 (9.31)	2.59 (1.41 – 4.78)	0.002

C Statistic = 0.723; Log-likelihood ratio = 105.4214, df = 7, p<0.0001
Hosmer & Lemeshow Goodness-of-Fit test: Chi-sq. = 5.44, df = 8; p>chi-sq = 0.71
AIC (intercept & covariates) = 861.523; SC (intercept & covariates) = 899.457

Codes:

Religiosity_1 = religiosity as measured by attending a place of worship OR finding strength in faith; dummy variable 0= neither (reference group)
Religiosity_2 = religiosity as measured by attending a place of worship AND finding strength in faith; dummy variable 0= neither (reference group)
Activities of daily living hierarchy; dummy variable 0 = independent or limited supervision (reference group)
Index of social engagement; dummy variable 0 = isolated (reference group)
Post-secondary education = dummy variable 0 = no post-secondary education (reference group)
Global disposition_2 = interRAI_QoL Survey item with a rating of “sometimes”; dummy variable 0 = “never/rarely” (reference group)
Global disposition_3 = interRAI_QoL Survey item with rating of “almost all the time/always”; dummy variable 0 = “never/rarely” (reference group)
Rural = geographic location of facility; dummy variable 0 = urban (reference group)
Ownership_1 = Ownership type “private”; dummy variable 0 = “charitable” (reference group)
Ownership_2 = Ownership type “municipal”; dummy variable 0 = “charitable” (reference group)

5.0 Discussion

LTC facility residents' QoL is significantly associated with certain socio-demographic and clinical characteristics. Their QoL is also significantly associated with some physical and staffing attributes of the facility where they reside. The residents' self-reported QoL ratings in this study confirmed previously published reports that residents in LTC facilities have limited choices and personal control over their life (Guse & Masesar, 1999; Kane, 1991). For example, only 35% of residents rated positively[23] that they could have a bath or shower as often as they wanted, and only 62% reported positively that they could control who enters their room. While most LTC facilities have adopted resident-centred philosophies of care and have instituted measures in their physical design and programming to create "home-like" environments (Schroll, Jonsson, Mor, Berg, & Sherwood, 1997), only 59% of the respondents in this study reported positively that the LTC facility felt like home to them. These are important findings considering that for most residents the LTC facility becomes their permanent residence for the balance of their lives (Holtkamp, Kerkstra, Ribbe, Van Campen, & Ooms, 2000).

It is apparent from these findings that there is a gap between philosophies of care and their translation into a care environment where care is truly resident directed. Residents' ability to be actively involved in decisions concerning their care, their ability to make choices, their sense of autonomy, and the opportunity for personal relationships take on a great importance in shaping their QoL. While life expectancy in LTC facilities is relatively short, a great deal could be done to improve residents' QoL by assessing their self-reported QoL, identifying gaps or problems, and with the active engagement of the resident instituting and implementing a plan of care to address these gaps.

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[23] In this discussion, ratings of 3 (most of the time) and 4 (always) are reported as "positive response".

This study was one of the largest of its kind in Canada that explored the feasibility of administering such an instrument for LTC residents to self-report on their QoL. As well, this study examined the association between QoL and residents' select socio-demographic and clinical characteristics and LTC facility attributes. This study also identified which of these independent variables were potential predictors of QoL in LTC facility residents.

There are several benefits arising from this research. First, it contributes to the literature on LTC facility residents' self-reported QoL. Second, it contributes to interRAI's ongoing efforts to refine the *interRAI_ QoL Survey* instrument and to create a shorter version of it, which may place less of a burden on future surveyors and residents. Finally, this study has important implications for education of health care professionals and training of LTC facility staff and clinicians, and as a result, for clinical practice. Further, it has implications for LTC public policy development and directions for future research.

5.1 Descriptive Characteristics of Residents

Based on RAI-MDS data, the resident sample was found to be significantly different from the larger populations of LTC facilities in almost all characteristics except for gender, marital status, CHESS, and conflict in relationships. Thus, for the purposes of this study, the resident sample can not be considered as representative of the entire LTC facility population in Canada. Consequently, the results of this study can not be extrapolated beyond the study sample.

Two factors may have contributed to the lack of a representative sample. First, it may have been due to missing cases resulting from CIHI's ability to match only 90% (n=725) of the participating residents from Manitoba, Nova Scotia and Ontario to the CCRS database. There were also missing data from the RAI-MDS data that were directly obtained from LTC facilities and provincial health authorities in the remaining three provinces. In future studies measures should be taken to ensure a higher rate of data integrity. Second, the sample selection was not random but relied on LTC facility staff to recruit willing residents. While it was not this author's goal to generate a representative sample of LTC facility residents, it is still considered a limitation of this study with implications for future research that will be discussed later. Additional factors for a non-representative sample are discussed in section 5.9 on limitations.

5.2 Descriptive Characteristics of LTC Facilities

As with the resident sample, participating LTC facilities were a convenience sample. However, as it was not this author's goal to estimate and compare the level of self-reported QoL in LTC facilities, the distribution of participating residents' characteristics across the 48 facilities was not analyzed to establish comparability or for benchmarking purposes. Nevertheless, other researchers have argued that QoL data obtained from a representative sample of LTC facilities would have resulted in similar ratings (Degenholtz et al., 2006).

LTC facility attributes data, both structural and staffing, were reported by facility staff and this researcher was unable to verify their accuracy. Other researchers have suggested that staffing data reported by facilities may be subject to bias (Castle, 2008; Degenholtz et al., 2006). On the other hand, structural data such as ownership, profit status, number of beds and geographic location are considered reliable. In future studies, more reliable sources for such data such as agencies that fund LTC facilities should be sought.

5.3 Psychometric Properties of the interRAI_QoL Survey Instrument

Psychometric validation of any measurement instrument is essential in order to have confidence that the instrument measures what it aims to measure and that it does so without error (Bowling, 2009; Streiner, 1993). In addition, evaluation of psychometric properties should generally not be thought of as a "one time" activity. In that sense, this research contributes to an on-going research effort by the larger interRAI network to refine this instrument.

The reliability of the *interRAI_QoL Survey* instrument was assessed by subjecting it to two tests: test-retest reliability and internal consistency (Cronbach's alpha). It was demonstrated that it has moderate to substantial test-retest reliability, and high internal consistency (overall Cronbach's alpha coefficient of 0.93). The content and convergent validity of the instrument was also demonstrated. The instrument's content validity was analyzed against Kane's QoL Index (Kane, 2003) and the Ontario Hospital Association's LTC Resident and Family Member Evaluation Surveys (Ontario Hospital Association, 2001). The comparative analysis suggests that the *interRAI_QoL Survey* instrument has good content validity.

The convergent validity of the *interRAI_QoL Survey* was evaluated by investigating the relationship between residents' QoL scores and their ratings to two items in the *interRAI_QoL Survey*: (1) the Global Disposition item ("I tend to be happier than most other people"), and (2) "I would recommend this site or organization to others". Both analyses yielded moderate but significant evidence to support its convergent validity. Thus, we could accept residents' self-reported rating of their QoL as measured by the *interRAI_QoL Survey* instrument with confidence, and its applicability and clinical relevance in LTC facilities is supported.

5.4 Residents' QoL Ratings

The response rate for residents willing to participate in this study was about 51%. While such a response rate may have implications for the generalizability of the QoL findings and their prevalence, it does not affect the ability to use associations to test the validity of residents' self-report of their perception of their QoL.

In general, residents were positive (that is, they rated "almost always" or "always") about their QoL in LTC facilities. QoL ratings were highest in relation to "privacy" and "safety/security" domains, followed by "respect" and "responsive staff". Next were "autonomy", "activity option", "staff-resident bonding", "food/meal" and "comfort". Residents report least

QoL in relation to “personal relationships”, one of the higher basic human needs in Maslow’s hierarchy of needs.

While these results are positive, there are various aspects of residents’ QoL in LTC facilities that require particular attention. For instance, in the “personal relationships” domain, only 46% (n=424) of residents reported positively about having another resident in the facility as their close friend. Similarly, only 28% (n=260) reported positively as being sought after by others for help or advice, and only 43% reported playing an important role in peoples’ lives. From Maslow’s hierarchy of basic human needs, personal relationships are very important for QoL, particularly in LTC facilities where residents may be isolated from their familiar relationships and may find it difficult to form new relationships in their new surroundings. The lowest reported QoL level was related to affection or romance with only 21% (n=192) reporting positively in this area. This is not a surprising finding as almost two-thirds (65%) were female, and only 20% were married. While finding or creating opportunities for romance and affection may be a challenge given the distribution of gender and marital status, LTC facility staff should create opportunities for social engagement.

QoL ratings in the “responsive staff” domain also require particular attention considering that LTC facilities have been mandated to be resident-centred in their care planning. In spite of this, only 47% (n=435) of residents rated positively that facility staff act on their suggestions. Further, in the “autonomy” domain, only 35% (n=327) reported positively on their ability to have a bath or shower as often as they wanted. These findings support the work of other researchers who reported that life in LTC facilities is disempowering (Guse & Masesar, 1999; Kane, 1991). Despite best efforts from facility staff, residents do not feel that they have a voice in matters affecting their personal life in the LTC facility.

It is a common concern in QoL research that residents' responses may be biased due to social desirability or possible intimidation. In this present study, it is apparent that such concerns are not warranted. For instance, only 59% (n=547) reported that the facility feels like home; only 38% (n=359) reported that some of the staff know the story of their life, which is associated with the integrity of their personal identity; and only 44% (n=407) reported that they get their favourite foods in the facility.

Trained surveyors with a variety of associations (e.g., volunteers; students; administrative staff) with the facility conducted the QoL surveys. Surveyors' status in the facility did not have a significant impact on residents' overall QoL ratings. The results of this study, thus, demonstrate that appropriately trained non-clinical staff such as volunteers and students can administer the *interRAI_QoL Survey* instrument to assess residents' QoL quite reliably. Such surveys by non-clinical staff may have two advantages. First, it may reduce the risk of compromised quality of residents' self-reported QoL ratings. Second, it may reduce the burden on care staff from conducting QoL assessments. However, at the individual resident level, QoL assessment by clinicians or care staff will prove valuable in designing resident-centred care plans and interventions.

5.5 Bivariate Association of Residents' Self-Reported QoL and their Socio-demographic Characteristics

In overall QoL ratings, the only significant associations (based on non-overlapping confidence intervals) were found between QoL and religiosity and between QoL and education. Residents who usually attended a place of worship or found strength in faith reported significantly higher QoL than those who did not. Similarly, those who did both, reported significantly higher QoL than the other two groups. At the domain level, significant relationships between QoL and religiosity were shown in the "safety/security", "staff-resident bonding" and "activity" domains. Hence, religiosity has a positive association with overall QoL and may mediate the perception of QoL. This finding supports other research (Katsumo, 2003; Kirby, Coleman and Daley, 2004; Tarakeshwar et al., 2006; World Health Organization Quality of Life Group, 2006) that reported a positive relationship of QoL with religiosity. As religiosity and spirituality remain quite stable over the life course (Diehr et al., 2007; Idler, McLaughlin, & Kasl, 2009), they could be considered as a resource in mediating the perception of QoL and, consequently, supporting psychological well-being.

The positive association between QoL and religiosity may also be viewed from a social perspective. Religiosity may foster subjective well-being because it offers membership in a community based on common beliefs and practices. As well, aside from communion in a common faith, religiosity encourages social behaviours and social engagement, which has been positively associated with QoL (Degenholtz et al., 2006). Thus, the positive association of QoL with religiosity may be due to both the spiritual and social benefits it offers.

Residents with lower education (less than high school) reported significantly higher overall QoL than those with higher education, including high school and post secondary education, with the latter reporting the lowest QoL. Other research on the association of level of education and specific facets of QoL has reported conflicting results. For example, in relation to health, higher education was associated with higher health-related QoL (Drageset et al., 2009b). In a large study conducted by WHO on QoL, it was demonstrated that in all facets of QoL except in health, social care and self-esteem, lower education was associated with poorer QoL (Saxena et al., 2002). Similarly, in a seminal population study, higher levels of education resulted in greater overall life satisfaction (Campbell et al., 1976). However, in evaluating a particular facet of QoL such as housing, these investigators reported that people with less education had higher satisfaction with their lives from the perspective of their current housing situation compared to their preferred or expected housing. This may be attributed to the discrepancy between an individual's higher expectations that result from the education process and the reality of their actual housing situation. This argument may also apply to the results of this present study, which supports the theory that in the appraisal of QoL, there seems to be an element of relativity. Thus, residents in LTC facilities with higher levels of education may evaluate their current "housing" situation with their preferred "housing" and report dissatisfaction.

Marital status was not significantly associated with QoL. This finding differs from the work of other researchers (Huang, 1992; Tu et al., 2006). It is also inconsistent with the theory that marital status plays a protective or mediational role in the experience of QoL. As well, marital status is viewed as an asset that enhances social well-being (Campbell et al., 1976). The finding in this present study may be attributed to the relatively small sample (21%) of residents who were married.

Quality of life was not associated with length of stay. This finding is inconsistent with the results of other research, which showed significant associations between QoL and length of stay. However, results from previous research have also been inconsistent. Some researchers found a positive relationship (Noro & Aro, 1996), while others an inverse, negative relationship (Drageset et al., 2009b; 1996; Tseng & Wang, 2001). The association of QoL with length of stay may be viewed from two perspectives. On one hand, residents may, over time, view their experience in the LTC facility negatively, and as a result may become socially withdrawn leading to lower perception of QoL (Drageset et al., 2009b). On the other hand, residents may learn to adjust to their circumstance leading to a positive rating (Bowling & Gabriel, 2003).

5.6 Bivariate Association of Residents' Self-Reported QoL and their Clinical Characteristics

Residents with mild cognitive impairment reported significantly lower overall QoL and domain-specific QoL than those with intact cognition. Domains that were specifically affected were: “autonomy”, “respect”, and “staff-resident bonding’. In contrast, residents with moderate impairment reported higher QoL in the “food/meal” domain. These results are interesting as they suggest that a decline in residents’ cognitive capacity influences areas of higher needs such as “autonomy” and “respect”, but do not in basic areas of need such as “food/meal”.

Similarly with the function of activities of daily living (ADL), there was a significant association with ADL functioning and perceived QoL. Residents needing extensive assistance reported significantly lower overall QoL compared to those who were independent or needed supervision only. At the domain level, QoL is significantly associated with “safety/security”, “comfort”, “autonomy”, “responsive staff”, and “activity option”. Hence, these results are consistent with other research that a decline in functional capacity to perform ADL was associated with lower QoL (Bowling et al., 2002; Ozcan et al., 2005; Tseng & Wang, 2001).

Health instability as measured by CHESS was not associated with QoL. This finding was consistent with previous research, which concluded that assumptions about overall QoL should not be based on measures of their health status alone (Covinsky et al., 1999). Pain, another measure of health status, did not have the same relationship with all dimensions of QoL. While pain was not associated with overall QoL, it was significantly but negatively associated in the “food/meal” and “safety/security” domains. These results support the findings of other research (Jakobsson et al., 2003; Zanocchi et al., 2008). Such results are reasonably expected as pain and pain medication may curb one’s enjoyment of food, or result in a sense of insecurity. With respect to depression, there was a significant but negative association between depression and reported overall QoL. Depression also was shown to have significant associations with residents' perception of QoL in the "safety/security", "comfort", "autonomy" and "activity" domains. This finding supports the research by Dragomirecká et al. (2008) who reported that higher scores in depressive symptoms were associated with lower QoL.

Residents' psycho-social well being was measured by the Index of Social Engagement Scale and was found to be significantly associated with their overall QoL. This finding is consistent with other research (Degenholtz et al., 2006) and supports theoretically expected patterns between social engagement and QoL. At the domain level, significant associations are shown in the "comfort", "autonomy", "activity" and "personal relationships" domains.

Aggression was found to be significantly but negatively associated with QoL. Residents with aggressive behaviour reported significantly lower overall QoL compared to those without. Specific to domains, aggression was also found to have a significant influence on reported QoL in the "comfort", "respect", "staff responsiveness" and "personal relationships" domains. These findings are consistent with theoretically expected patterns as aggressive behaviour would negatively influence personal relationships with both staff and other residents, and the quality and extent of attention that residents who exhibit such behaviours receive from staff.

Hearing loss was found to be significantly associated with overall QoL, and specifically in the "food/meal" domain. Hearing loss interferes with communication, enjoyment of certain forms of activities such as listening to music or watching television, safety, and independence. It also influences residents' participation in social activities and personal relationships. Thus, the results shown are not surprising.

One final clinical characteristic that was examined was vision. An unexpected result was the lack of a significant association between vision loss and QoL. This was inconsistent with other research that found an inverse relationship between visual impairment and QoL (Elliott et al., 2009). As visual problems are expected to influence several functions such as ADL, toileting, eating, ambulation, and many other aspects of daily life such as watching television and enjoying scenery, a negative association with QoL would have been expected. It would be of interest to explore this factor through future qualitative research.

5.7 Bivariate Association of Residents' Self-Reported QoL and LTC Facility Attributes

Extensive research has been conducted on the association between residents' quality of care and LTC facility attributes such as ownership, size, geographic location and staffing (Castle & Shea, 1998; Castle, 2008; Hillmer, Wodchis, Gill, Anderson, & Rochon, 2005; Schnelle et al., 2004). This present study is one of the few that specifically examines the relationship between LTC facility attributes and specifically QoL rather than quality of care. A significant association was found between LTC ownership type (i.e., private, municipal and charitable) and overall QoL. Such a pattern was also found in all but the "comfort" and "autonomy" domains. Municipal LTC facilities had the highest mean scores, followed by for-profit facilities with charitable facilities having the lowest ratings. Another measure of ownership was profit status with municipal and charitable facilities being not-for-profit, and private facilities being for-profit. Profit status was not significantly associated with overall QoL unlike findings in other research (Kane et al., 2004). At the domain level, residents in for-profit facilities rated their QoL related to "food/meal" significantly higher than those in not-for-profit LTC facilities. Results from other research that has examined the relationship of quality of care and ownership have generally reported that not-for-profit facilities have better care outcomes than for-profit facilities (Hillmer, Wodchis, Gill, Anderson, & Rochon, 2005). This finding has very important implications to the LTC sector and to policy makers because of the stigmatized image that the profit sector has in society because of their profit margin. However, such conclusions should be guarded as resident characteristics were not adjusted among LTC facilities. Future research should explore the relationship of ownership and profit status with QoL taking risk adjustment into consideration.

The geographic location of LTC facilities was shown to be related to residents' QoL ratings. Residents in rural LTC facilities scored their overall QoL significantly higher than those residing in urban LTC facilities. With respect to domain summary scores, except for the "personal relationships" domain, all QoL scores were significantly higher in rural LTC facilities. These results are consistent with the research conducted by Kane et al. (2004) that showed a significant association between geographic location and specifically "comfort" QoL domain. Again, caution should be exercised in the interpretation of this finding as the number of facilities in rural communities was small (13%; n=6) compared to those in urban communities. The distribution of the resident sample was also relatively small (about 9%, n=75 vs 91%, n=772). However, a probable explanation could be that in rural communities, the LTC facility may be the largest employer, and hence, it may be highly likely that residents are known to care staff being from the same small community.

There were no significant differences in overall mean QoL scores between accredited and non-accredited facilities. However, at the domain level, the QoL score in the "autonomy" domain was significantly higher than those in non-accredited facilities. Similarly, no significant association was demonstrated between overall QoL scores and LTC facility size, measured in number of beds. However, residents in smaller homes rated their QoL related to "food/meal" and "responsive staff" domains significantly higher than those in larger homes. There are inconsistent reports from research on the association of facility size and QoL. For instance, Kane et al. (2004) could not show a significant association between size and quality of care (Kane, 2004). On the other hand, Rantz et al. (2004) reported that smaller facilities had better outcomes.

However, in the latter study, the researchers were using RAI-MDS quality indicators as the outcomes of care rather than QoL specifically.

Total leadership stability had a significant association with some of the domain-specific QoL ratings. As noted in Table 8, leadership included administrators, assistant administrators, directors of care, and assistant directors of care. Stability was defined as having 3 or more years of tenure in the LTC facility. Leadership stability influenced residents' QoL significantly in "privacy" and "responsive staff" domains, but there were no significant differences in the overall QoL ratings. Other research has demonstrated an association between administrator turnover and quality of care (Castle, 2001). This present research provides preliminary evidence on the positive influence that stability in the senior management team in LTC facilities has on residents' self-reported QoL.

Stability in registered nursing staff, as measured by separations in the past year, did not have any significant association with residents' QoL ratings. On the other hand, non-registered nursing staff turnover had a significant effect in overall QoL as well as in several domains: "food/meal", "comfort", "staff-resident bonding", "activity option", and "personal relationships". A possible explanation for this finding may be that these staff have more frequent contact with residents and are involved in their ADL activities, including feeding and bathing, and as a result have a greater opportunity to form relationships with residents.

Residents in LTC facilities with higher management staff hours per resident per week rated higher overall QoL scores. Management hours also had a significant impact on QoL ratings in all domains except for "privacy", "autonomy", "staff-resident bonding", and "personal relationships". This is an important finding as it underscores the role of leadership in achieving positive outcomes. Total hours of care by all care staff also had a significant impact on overall QoL ratings, and in several domains: "comfort", "respect', "staff-resident bonding", and "personal relationships". On the other hand, registered nurse hours per resident per week did not make a significant difference in overall QoL ratings. This finding was consistent with other research (Degenholtz et al., 2006). At the domain level, however, significant impact was shown in the "comfort", "autonomy" and "activity option" domains. Similarly, a higher ratio of registered to non-registered nursing staff did not have a positive impact on QoL ratings.

5.8 Predicting QoL in LTC Facility Residents

In the multivariate linear regression model, resident characteristics that were predictors of overall QoL score were religiosity, social engagement, activities of daily living (ADL), post secondary education and global disposition. All other socio-demographic (e.g., age, gender, marital status) and clinical characteristics (e.g., cognitive performance, depression, health status) did not have a significant effect at the multivariate level. Global disposition, religiosity, and social engagement had significant positive effects on overall QoL. On the other hand, post secondary education and decreased ADL performance had negative effects. The negative moderating effect of post secondary education was an unexpected surprise. However, this finding supports previous research by Campbell et al. (1976) that individuals with higher education had reported lower life satisfaction specifically related to housing. The authors attributed this result to the discrepancy between an individual's higher expectations that result from the education process and the reality of their actual housing situation. The finding of this present study may explain the theory that there is an element of relativity and a cognitive evaluative component in the self-appraisal of subjective QoL. That is, residents in this study may have evaluated their current living situation relative to their preferred or expected situation.

Based on resident characteristics, the linear regression chosen model could explain 20% of the variation in overall QoL (Adjusted $R^2 = 0.20$). When LTC facility attributes were added to the model, the model improved by an additional 4% (total adjusted $R^2 = 0.24$). These significant predictors were geographic location (rural relative to urban) and ownership (private and municipal relative to charitable).

The results of this multiple linear regression analysis have important implications. Some of the resident variable predictors are amenable to targeted interventions by facility staff. For instance, increased opportunities may be offered to residents to attend their preferred place of worship. Facility staff may also facilitate or encourage one-to-one meetings with the spiritual counsellor of their choice. With respect to social engagement, staff could arrange for frequent visits from family members, relatives, or friends who play an important role in their lives. While engagement in meaningful activities, which is one of the QoL assessment items in the *interRAI_QoL Survey*, was not included in the regression analyses, it is highly relevant to social engagement. Residents should be engaged in activities that are meaningful to them and that offer them enhanced opportunities for social engagement. As functional dependence in executing ADL is shown to have a significant negative predictive impact on QoL, improvement in ADL performance may enhance residents' QoL. Thus, LTC facility staff should plan and implement programs targeted to residents' specific limitations in ADL performance.

Global disposition is a personality trait. It is characterized by happiness, which researchers have used as measure of QoL (Campbell et al., 1976). The findings of this present study support previous work and report a significant positive association between global disposition and high QoL. At a first glance, some may argue that as a personal attribute (Campbell et al., 1976; Kozma, Stones & McNeil, 1991), global disposition may not be alterable by intervention. However, previous research has shown a relationship, albeit a weak one, between self-esteem and personal well-being (Campbell, 1976). Interventions could be targeted in the LTC facility to increase or support residents' self-esteem. For instance, individually tailored programs that centre on residents' wishes and preferences, and that offer opportunities for choices, self-control and independence may contribute to enhancing their self-esteem and, hence, contributing to their QoL.

In logistic regression, the significant predictors were common to those in linear regression. But, in the logistic regression model, low QoL was used as a binary dependent variable. The explanatory variables of religiosity, social engagement and a positive global disposition decreased the likelihood of residents reporting low QoL. LTC facility attributes of location in rural settings and ownership also decreased the likelihood of low QoL. On the other hand, post secondary education and dependence in ADL increased the likelihood of low QoL. These variables were found to have significant predictive roles in high QoL. In sum, this study makes an important contribution to the field of research on QoL. It identifies significant predictors of QoL that are amenable to interventions that are within the realm of care and services in LTC facilities with minimal burden on staff time.

5.9 Strengths and Limitations of Study

The resident sample size and the number of LTC facilities from six provinces in Canada involved in this studymake this study one of the largest of its kind in Canada. Despite the loss of 81 cases from the original sample of 928, the resident sample size of 847 was more than adequate for statistical power in bivariate and regression analyses. This study as well demonstrated the feasibility of conducting a national survey on QoL of a large scale. The design, administration and conduct of the survey offered many lessons for future research. For instance, how resident identifiers could be improved in the survey process to minimize the likelihood of missing cases. This study further demonstrated that residents' QoL could be assessed through self-reports. Anecdotal reports indicated that only few residents on an exceptional basis needed a break to complete the interview. Nonetheless, there were reports that the survey instrument was lengthy. Jenkins et al. (1990) have suggested that "economy of effort" should be taken into consideration in the design of QoL measurement instruments. The benefits of a longer "battery of measures" need to be balanced against the burden on respondents and surveyors.

The use of RAI-MDS as a source for objective, external indicators of QoL is another strength of this study. Other researchers have also relied upon RAI-MDS data for similar purposes (Degenholtz et al., 2006; Jones et al., 2003). These MDS quality indicators are potentially amenable to interventions (Kane, 2003) by clinical staff. They also allow clinicians to monitor residents' health status and QoL over time and make necessary adjustments. For example, clinicians could introduce interventions to address a resident's dependence in activities of daily living, which was shown in this study to be significantly but negatively associated with QoL. Social engagement, as measured by the Index of Social Engagement (ISE), which is an embedded quality indicator in RAI-MDS, was also shown to be significantly associated with QoL. Clinicians should determine with residents those institutional or personal factors that may contribute to their disengagement from social activities. For instance, physical limitations such as hearing loss or incontinence may be personal factors for disengagement. Institutional life, as was pointed out in Chapter Two, could have disempowering effects on residents leading to their social withdrawal.

While this study has several strengths, it also has limitations that need to be noted. One limitation was the cross-sectional nature of the data. However, as the study was by design descriptive about the distribution of LTC facility residents' self-reported QoL and explorative on possible associations with resident and facility characteristics, this was the appropriate approach. As well, the study findings allow generation of hypotheses on predictors of QoL for further study.

Resident sample recruitment was another limitation. Due to the large and cross-national scope of the study, this author relied on LTC facility staff to recruit candidates. While facility staff were provided with a script to standardize messaging during recruitment, no measures were introduced to determine if facility staff were selective in their choice of residents whom they approached with the exception of Cognitive Performance Scale (CPS) scores of 0 – 3. This may have contributed to response bias. It may also have contributed to the 51% response rate. Refusal to participate in the study may also result in non-response bias. Reasons for refusal were not documented. While a 51% response rate is considered low, in a population study on QoL in the United Kingdom researchers got 62% response rate with representative results (Bowling & Gabriel, 2004). Nevertheless, while a low response rate precludes generalizability of the findings, it did not deter residents from expressing their negative rating of their QoL in several aspects of their day-to-day life in the LTC facility.

A related limitation of the recruitment process was that the survey was conducted with a convenience sample of residents and LTC facilities, which reduces the generalizability of the results. Exclusion of residents with CPS scores greater than 3 (moderate impairment) also limits the generalizability of the study findings. Other research has suggested that individuals with moderate dementia and associated cognitive impairment are able to report on their QoL, even when they have poor insight into and awareness of their dementia (Brod et al., 1999; Gerritsen et al., 2007; Kane et al., 2003; Logsdon, Gibbons, McCurry, & Teri, 2002; Mozley et al., 1999). Future studies on QoL in LTC facility residents should explore the inclusion of residents who have more severe cognitive abilities, beyond CPS score of 3. Thus, as an observational study with volunteer LTC facilities and stringent resident selection criteria, the findings have reduced generalizability to LTC facility populations and the associations reported in the study should not be interpreted to be causal relationships.

Relying on RAI-MDS data from different sources, including facilities, provincial health authorities, and CIHI presented a major challenge. Consideration should be given in future studies to rely on a single source such as CIHI. A related limitation of the study was that CIHI was only able to match about 90% of the resident sample with the CCRS data. A primary source for this was errors in resident identifiers that LTC facility staff may have recorded on the *interRAI_QoL Survey* instrument. Future studies should attempt to minimize or eliminate these errors for a higher match rate.

While response bias due to, for example, social desirability or possible intimidation is a common source of concern in self-reported surveys, the items embedded in the *interRAI_QoL Survey* instrument allowed to test for this. For instance, fewer residents rated positively on the item related to privacy of their health information compared to privacy during care or visits. Residents could not with certainly know how staff treated their personal health information, but they could know if they enjoyed a visit in privacy. As well, residents' responses to items such as having favourite foods and ability to take bath as often as they wanted may be indicative of residents not being intimidated in expressing their view points about their life in the facility.

Another limitation of the study was the lack of monitoring the quality of the interviews conducted by surveyors. While the interviews were conducted by trained surveyors, unlike other research, they were not monitored for quality or reliability (Degenholtz et al., 2006). However, the surveyors' status in the LTC facility, which included students, volunteers, and care and management staff, did not have a significant impact on residents' self-reported QoL ratings.

One final limitation to be noted is the time gap between residents' RAI-MDS and QoL assessments. While the RAI-MDS data collected were the most proximate to (and preceded) the QoL assessment, there is still a time gap between RAI-MDS data and QoL assessment. While ideally both assessments should overlap, it would not be possible given the logistical issues and the economic burden on LTC facility staff to abstract the RAI-MDS data and the researchers to "clean" up and scan the data into a database. Other researchers have pointed out that this gap may influence the strength of the association between QoL and MDS quality indicators (Degenholtz, 2006). In future studies, special effort should be exercised to address this issue.

5.10 Potential Implications

The results of this study are of great relevance to LTC facility nursing and personal care staff, management staff, policy makers and researchers. Information from this study will benefit facility care staff by raising their awareness of the importance of residents' self-reported QoL and what residents are saying about their life in the facility. In the discussion above on associations between QoL and select resident characteristics and facility attributes, several examples of implications to practice were already identified. The findings of this study show that many of the resident factor correlates of QoL may be amenable for intervention. Aside from the statistical analyses, the residents' reported QoL highlights their view of their lives in the LTC facility. Where residents did not give high ratings of their QoL could be targets for intervention.

This study underscores the importance of QoL assessments. LTC facility staff should routinely assess residents' QoL and monitor changes in their self-reported QoL. As the *interRAI_QoL Survey* instrument allows for QoL assessment from a multidimensional perspective, it will assist facility staff to identify issues and concerns from a diverse set of measures. The assessment of residents' self-reported QoL as a subjective measure complements the objective measures of health outcomes as assessed by RAI-MDS. Early identification of reported gaps in QoL will lend itself to timely interventions and improved QoL. For instance, as social engagement was shown to have a significant and positive association with QoL, active engagement of families or persons with whom residents have meaningful relationships in the residents' lives such as attending special events (e.g., birthday celebrations) may prevent residents from feeling abandoned (Tseng & Wang, 2001). Further, as depressive symptoms were associated with poor QoL, interventions by clinicians to help improve residents' self-esteem and response styles to depressed moods, and provision of social support may improve their QoL (Kuehner & Buerger, 2005).

The study findings can also inform educators in the design of appropriate curricula for health care professionals. Information from this study could also inform the content of continuing education programs for staff. To increase the capacity of LTC facilities to be sensitive to residents' QoL and design of targeted interventions, strategies need to be adopted for sustained knowledge transfer (Stolee et al., 2010). Strategies for sustained knowledge transfer could include management support, designated time for QoL activities, and availability of staff skilled and trained in QoL (Stolee et al., 2010). Research on factors associated with the effectiveness of continuing education in LTC underscores the important role that management and organizational support play in introducing innovation in the workplace environment (Stolee et al., 2005). For QoL to be integrated into the care and service environment of LTC facilities, the model of communities of practice of the Seniors Health Research Transfer (SHRTN), which is designed to improve the health and care of seniors, could be adopted (Conklin et al., 2011).

Further, the demonstrated significant associations between QoL and resident and facility factors can inform public policy development. First, this study demonstrated that measurement of QoL on a large scale nationwide is feasible. Given the importance of QoL as an outcome of care and service, public policy could support the adoption of a standardized QoL assessment instrument. The *interRAI_QoL Survey* instrument was shown to have reliability and validity. Ongoing efforts by interRAI will yield a shorter version of the current instrument that will be more amenable for acceptance by LTC facilities. Aside from the first hand benefit to individual residents, policy makers may recognize the use of standardized instruments for measuring QoL for public reporting of LTC facility performance. The use of standardized instruments will ensure consistency of reporting. However, fair comparisons would require risk adjustment to control for confounding factors and their distribution across facilities (Arling, Karon, & Sainfort, 1997; Mor, Angelelli, Gifford, Morris, & Moore, 2003; Rosen et al., 2001; Perlman, 2009). Resident QoL outcomes could form part of provincial mechanisms that monitor care and service provision in LTC facilities.

As subjective self-appraisals are considered by many to be the "gold standard" for QoL measurement (Bankole et al., 2007), their adoption for use in LTC facilities will contribute to resident empowerment. Such a process will support and encourage residents' active engagement in decisions that affect their care and daily life in the LTC facility. This study demonstrated that residents do have a voice and they are not shy about expressing their views about their care and relationships. As baby boomers age and become the future residents of LTC facilities, they will be quite vocal about their wishes and will be strong advocates about shaping the environment where they will receive care, services and accommodation. The availability of a standardized QoL measurement instrument may provide them with the means to do so.

Finally, results of QoL assessments would provide useful information to residents' families and LTC advocacy groups. At the individual level, families could use such information to ensure that the wishes of their loved ones are fulfilled in an effort to improve their QoL. At a systemic level, advocacy groups could use such information to influence public policy development, or at a facility level to advocate for essential program development.

5.11 Recommendations for Further Research

Future research should consider addressing many of the limitations noted above. A few of these are discussed here. Residents may not always have the choice of the facility into which they are admitted. Future studies should include a qualitative component to assess whether the facility was a resident's first choice, and if not, what its impact on their relationships with family and friends has been. As the experience of admission to a LTC facility is personal and may mean different things to people, residents' perception of admission to LTC facility should also be explored and its relationship to QoL should be evaluated as it may have a profound effect on their QoL. Future research should also be directed at risk adjustment, as noted above. Such research would contribute to identifying those QoL factors that would need to be adjusted to make fair comparisons between facilities to support choice of facilities and public reporting. In this study facility attributes focused on structural attributes. Future research should also examine factors that contribute positively to the work environment as these may have important implications for staff morale and ultimately their attitude and the quality of their performance.

As was noted in section two of this paper, individual residents' perceptions of their QoL are correlated because they are "clustered" within LTC facilities (DeLong et al., 1997). Such data tend to be correlated due to residents' membership arising from their shared residence in the same LTC facility (Diez Roux, 2002).

Clustering of observations may violate the assumption of independence of the measurements that is made when using ordinary least squares regression procedures (Dobbs & Montgomery, 2005). If QoL observations for groups of residents within LTC facilities are correlated, the assumption of independence of these observations is violated (Dobbs & Montgomery, 2005). Such a wrongful assumption leads to underestimated standard errors. Because residents' QoL measurements are likely to be correlated, generalized estimating equations (GEE) regression modeling should be used in future research in the multivariate regression analyses to adjust for potential confounders and within-LTC facility clustering in the relationship between outcome and independent variables (Horwich et al., 2009). GEE modeling will also control for multicollinearity, which occurs when the independent variables in the model are correlated among themselves (Hosmer & Lemeshow, 1988; Leigh, 1988).

While a battery of tests were conducted in this present research on the psychometric properties of the interRAI QoL instrument, further research should attempt more rigorous tests such as factor analysis. If consideration is to be given to a national use of such an instrument, more rigorous testing would be useful. As public policy will support aging at home with appropriate community support, the design of future QoL assessment instruments should factor in the fact that future residents would be more frail and may have more severe cognitive impairments. This present study limited inclusion to those residents with CPS scores of 0 – 3. Further research should include residents with more severe cognitive impairments to test the reliability and validity of such instruments. Sample selection in this study was also limited to English-speaking residents. As cultural diversity increases in LTC facilities, future research should test the application of such an instrument in different languages.

This cross-sectional design for this study was appropriate to answer its research questions. However, future research needs to move beyond cross-sectional analyses. The effect of nursing interventions on the QOL of residents in LTC facilities, for instance, should be investigated through longitudinal studies.

In sum, this present research has made an important contribution to research on QoL. Future studies should address the build on the strengths of this study and the limitations that have been identified.

5.12 Conclusion

Measurement of QoL of LTC facility residents by a process of self-appraisal through the use of a standardized instrument is an important development in the LTC system. This study demonstrated that QoL assessment on a large scale is feasible. The subjective QoL assessment of residents complements the objective assessment of residents' health and functional assessment by the RAI-MDS. This study was able to demonstrate significant associations between QoL and select resident characteristics and facility attributes. Future refinements of the QoL instrument should consider the economic impact of its use and the cultural diversity of the LTC facility population.

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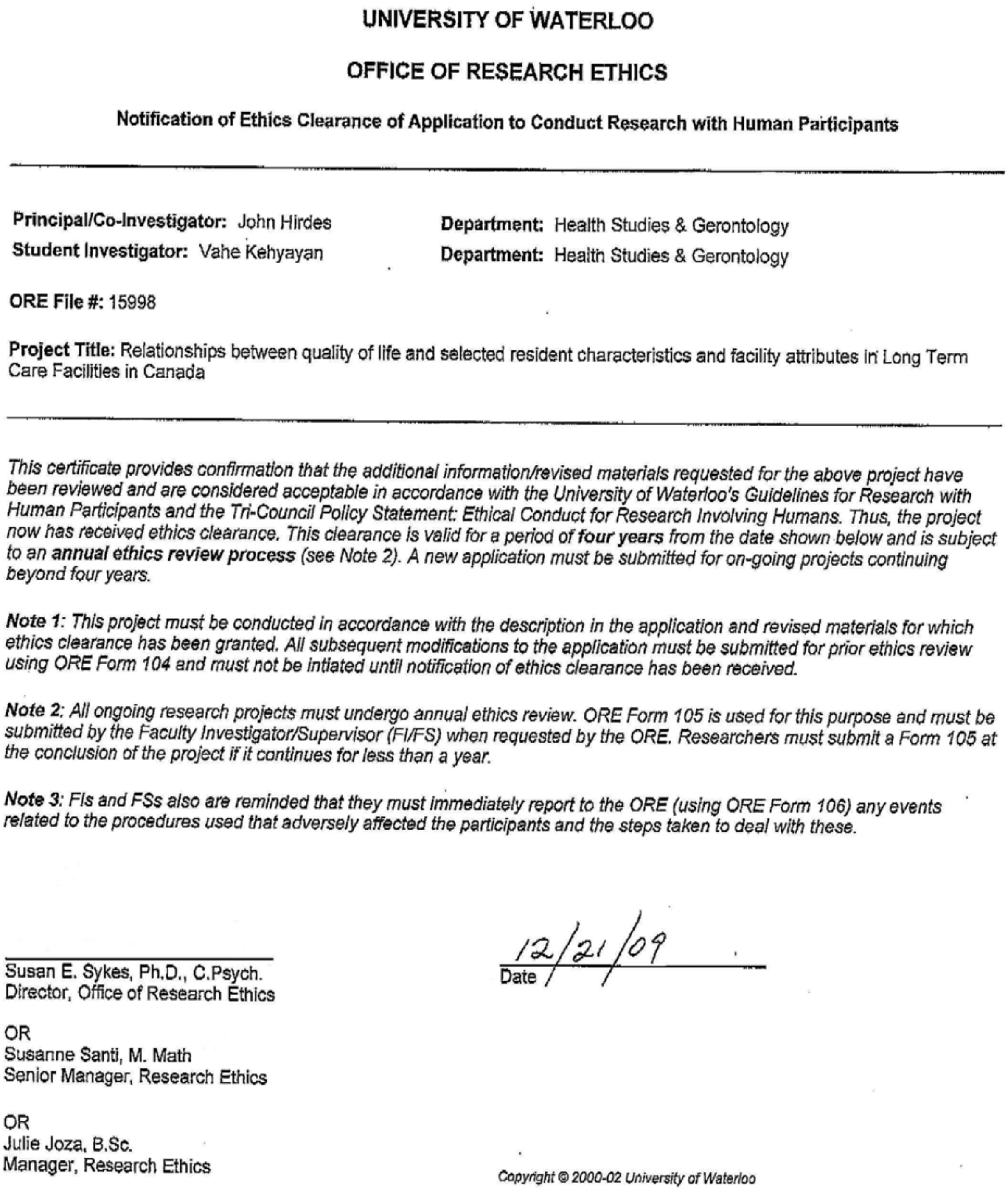
APPENDICES

APPENDIX A: Resident Assessment Instrument – Minimum Data Set (MDS) 2.0

Canadian Version – Full Assessment

Please visit http://catalog.interrai.org/catalog for information on how to obtain a copy of the RAI-MDS 2.0 (for long-term care facilities).

APPENDIX B: University of Waterloo, Office of Research Ethics full approval



UNIVERSITY OF WATERLOO

OFFICE OF RESEARCH ETHICS

Notification of Ethics Clearance of Application to Conduct Research with Human Participants

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Principal/Co-Investigator: John Hirdes **Department:** Health Studies & Gerontology

Student Investigator: Vahe Kehyayan **Department:** Health Studies & Gerontology

ORE File #: 15998

Project Title: Relationships between quality of life and selected resident characteristics and facility attributes in Long Term Care Facilities in Canada

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This certificate provides confirmation that the additional information/revised materials requested for the above project have been reviewed and are considered acceptable in accordance with the University of Waterloo's Guidelines for Research with Human Participants and the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans. Thus, the project now has received ethics clearance. This clearance is valid for a period of ***four years*** *from the date shown below and is subject to an* ***annual ethics review process*** *(see Note 2). A new application must be submitted for on-going projects continuing beyond four years.*

Note 1: *This project must be conducted in accordance with the description in the application and revised materials for which ethics clearance has been granted. All subsequent modifications to the application must be submitted for prior ethics review using ORE Form 104 and must not be intiated until notification of ethics clearance has been received.*

Note 2: *All ongoing research projects must undergo annual ethics review. ORE Form 105 is used for this purpose and must be submitted by the Faculty Investigator/Supervisor (FI/FS) when requested by the ORE. Researchers must submit a Form 105 at the conclusion of the project if it continues for less than a year.*

Note 3: *FIs and FSs also are reminded that they must immediately report to the ORE (using ORE Form 106) any events related to the procedures used that adversely affected the participants and the steps taken to deal with these.*

12/21/09
Date

Susan E. Sykes, Ph.D., C.Psych.
Director, Office of Research Ethics

OR
Susanne Santi, M. Math
Senior Manager, Research Ethics

OR
Julie Joza, B.Sc.
Manager, Research Ethics

UNIVERSITY OF WATERLOO
OFFICE OF RESEARCH ETHICS

Request for Ethics Clearance of a Revision or Modification
to an Ongoing Application to Conduct Research with Human Participants

ORE #: 15998

Date of Full Ethics Clearance: Dec 21/2009

Principal Investigator(s): Dr. John Hirdes

Department: Health Studies and Gerontology

Faculty Supervisor(s): Dr. John Hirdes	Student Investigator: Vahe Kehyayan
Department: As above	Department: As above

Title of Project:
Relationships between quality of life and selected resident characteristics and facility attributes in Long Term Care Facilities in Canada

---

1. Previous Modifications Associated with this ORE 101 Application
Have you previously submitted an ORE 104 for this project? Yes [ ] No [X]
If Yes, please provide the clearance dates for each previous modification under this ORE 101

2. Information Letter and Consent Form
Do the proposed revised procedures require any change(s) to the Information Letter-Consent Form currently in use Yes [X] No [ ]

If Yes, briefly describe these changes on the following table and attach a copy of the revised version of the Information Letter-Consent Form.

However, a new consent form is developed requesting consent to access RAI data for those residents who refuse to participate in the quality of life interview portion of the study.

3. Summary of the Nature, Description and Rationale for Proposed Modifications
On the following summary table, describe the nature of each modification requested under the current ORE 104 and provide a rationale for each proposed change.

4. Revised ORE 101 Pages

Attach all pages from the ORE Form 101 that have been revised due to the proposed modification.

Signature of Principal/& Co-Investigators
Investigator(s):____________________

Signature of Faculty
Supervisor(s): 1/15/10

Signature of Student
Investigator(s):____________________

Date: Jan 15/2010

FOR OFFICE OF RESEARCH ETHICS USE ONLY

[✓] *The current modification request to an ongoing project involving human participants has been reviewed and received ethics clearance as submitted.*

[ ] *The current modification request to an ongoing project involving human participants has been reviewed and requires revisions as outlined in the attached email.*

____________________ Date: 3 February 2010

Susan E. Sykes, Ph.D., C. Psych.
Director, Research Ethics
or
Susanne Santi, M.Math. or Julie Joza, BSc.
Senior Manager, Research Ethics Manager, Research Ethics

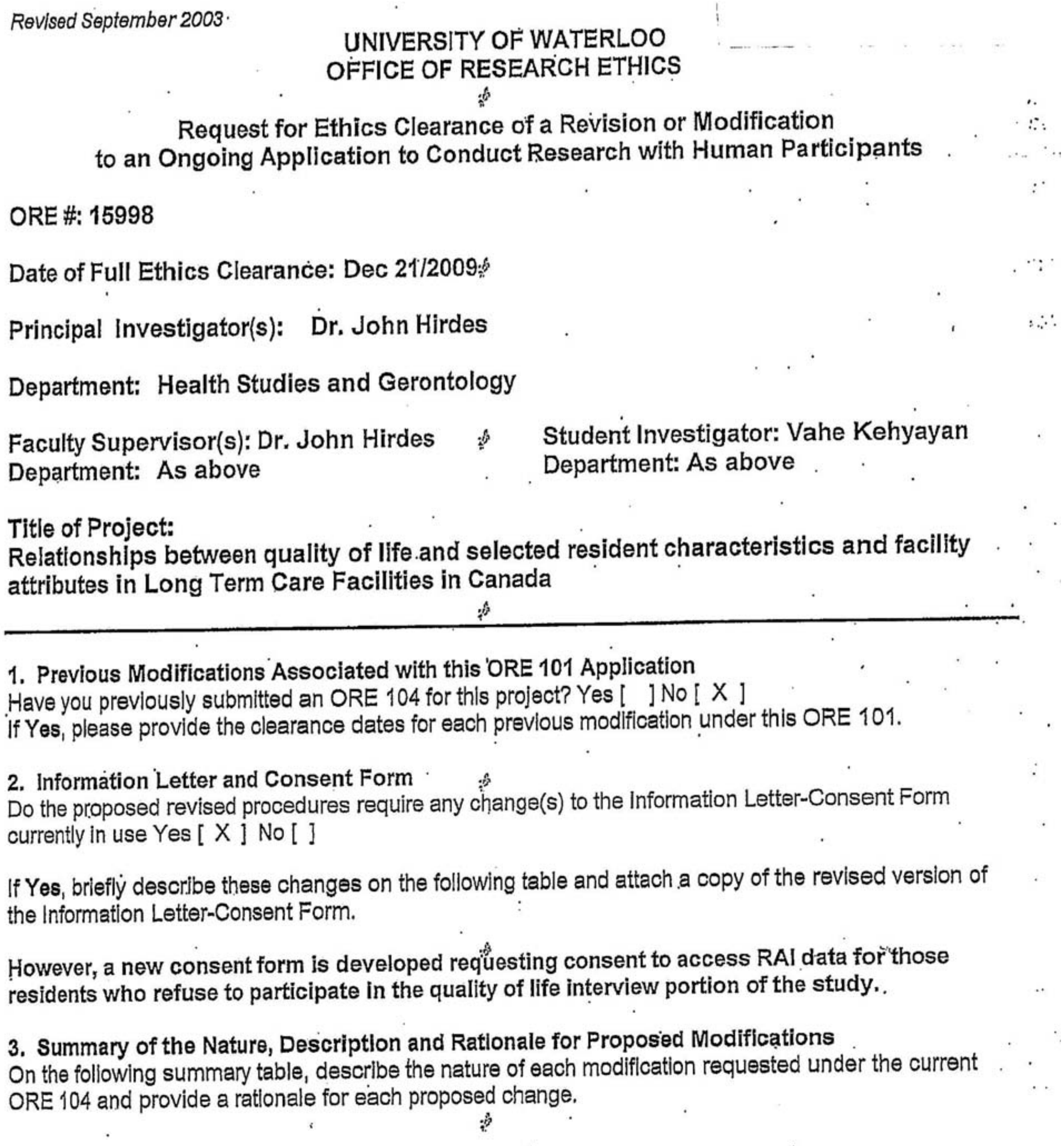
15 January 2010
Clearance 3 February 2010

Summary of Changes In ORE 104 (Request for Modification)	**√ If Yes**	**If Yes, Provide Additional Information and Append Documentation**
Adding a new condition or group. Revision to an existing procedure. *(Provide detailed explanation /rationale for change)*		
Information Letter and Consent Form? *(Provide a copy of revised Information Letter and Consent Form with changes underlined or grey-shaded. Do not use coloured marker)*	X	**The consent form and information letter to residents have been revised to accommodate CIHI's required modifications (see attached copies)**
Study instruments, questionnaires, interview questions etc? *(Provide copy of revised or additional questionnaires, interview questions, etc.)*		**The Facility Profile Form has been modified (see attached)**
Participant Sample *(Provide a detailed explanation/ rationale for changes to numbers of participants or sample characteristics).*	X	**We will not be requesting LTC facilities to identify and recruit residents with serious mental illness, including schizophrenia and bipolar disorder because of the potential for a very small sample of residents who may be identified in the Canadian Institute of Health Information database.**
Participant recruitment? *(Provide details on changes to recruitment procedures etc.)*		
Study end date? *(Provide revised date and detailed explanation /rationale for change)*		
Location of study *(Provide details on all new study locations)*		
Researcher changes? *(Include letter signed by investigator or supervisor stepping down and new investigator/supervisor)*		
Other Changes?	X	**A group of homes in Alberta, BC, and Saskatchewan are interested in participating in the QoL study. While they use RAI-MDS, they do not submit this data to CIHI. However, they will release de-identified data in a manner that is comparable to the measures adopted by CIHI.**

Note: Attached are sections C1 b and C2b of the ORE101 application form to which these changes apply. This proposed change will not affect the projected number of residents who will participate in the QoL survey

Attached are sections C1 b and C2b of the ORE101 application form to which these changes apply. This proposed change will not affect the projected number of residents who will participate in the QoL survey.

APPENDIX C: University of Waterloo, Office of Research Ethics modifications approvals



Revised September 2003

UNIVERSITY OF WATERLOO
OFFICE OF RESEARCH ETHICS

Request for Ethics Clearance of a Revision or Modification
to an Ongoing Application to Conduct Research with Human Participants

ORE #: 15998

Date of Full Ethics Clearance: Dec 21/2009

Principal Investigator(s): Dr. John Hirdes

Department: Health Studies and Gerontology

Faculty Supervisor(s): Dr. John Hirdes
Department: As above

Student Investigator: Vahe Kehyayan
Department: As above

Title of Project:
Relationships between quality of life and selected resident characteristics and facility attributes in Long Term Care Facilities in Canada

---

1. Previous Modifications Associated with this ORE 101 Application
Have you previously submitted an ORE 104 for this project? Yes [ ] No [X]
If **Yes**, please provide the clearance dates for each previous modification under this ORE 101.

2. Information Letter and Consent Form
Do the proposed revised procedures require any change(s) to the Information Letter-Consent Form currently in use Yes [X] No [ ]

If **Yes**, briefly describe these changes on the following table and attach a copy of the revised version of the Information Letter-Consent Form.

However, a new consent form is developed requesting consent to access RAI data for those residents who refuse to participate in the quality of life interview portion of the study.

3. Summary of the Nature, Description and Rationale for Proposed Modifications
On the following summary table, describe the nature of each modification requested under the current ORE 104 and provide a rationale for each proposed change.

4. Revised ORE 101 Pages

Attach all pages from the ORE Form 101 that have been revised due to the proposed modification.

Signature of Principal & Co-Investigators

Investigator(s):____________________

Signature of Faculty

Supervisor(s):____________________

Signature of Student
Investigator(s):____________________

Date: Apr 6/ 2010

FOR OFFICE OF RESEARCH ETHICS USE ONLY

[ ] *The current modification request to an ongoing project involving human participants has been reviewed and received ethics clearance as submitted.*

[✓] *The current modification request to an ongoing project involving human participants has been reviewed and requires revisions as outlined in the attached email.*

____________________ Date: 4/7/2010

Susan E. Sykes Ph.D. C. Psych.
Director, Research Ethics
or
Susanne Santi, M.Math. or Julie Joza, BSc
Senior Manager, Research Ethics Manager, Research Ethics

Summary of Changes In ORE 104 (Request for Modification)	√ If Yes	If Yes, Provide Additional Information and Append Documentation
Adding a new condition or group. Revision to an existing procedure. *(Provide detailed explanation /rationale for change)*	X	**30 residents will be interviewed a second time 4-5 days following the first interview using the same InterRAI quality of life survey.**
Information Letter and Consent Form? *(Provide a copy of revised Information Letter and Consent Form with changes underlined or grey-shaded. Do not use coloured marker)*	X	**The consent form has been revised to accommodate these 30 residents. Please see attached.**
Study instruments, questionnaires, interview questions etc? *(Provide copy of revised or additional questionnaires, interview questions, etc.)*	X	**In addition to the interRAI QoL survey questionnaire, these same 30 residents will be asked a single question rating their overall quality of life in the nursing home (please see attached form). The interRAI QoL survey form is also appended.**
Participant Sample *(Provide a detailed explanation/ rationale for changes to numbers of participants or sample characteristics).*		
Participant recruitment? *(Provide details on changes to recruitment procedures etc.)*	X	**From the overall sample, 30 residents will be asked if they agree for a second interview and to respond to the single overall QoL question.**
Study end date? *(Provide revised date and detailed explanation /rationale for change)*		
Location of study *(Provide details on all new study locations)*		
Researcher changes? *(Include letter signed by investigator or supervisor stepping down and new investigator/supervisor)*		
Other Changes?		

Attached are sections C1 b and C2b of the ORE101 application form to which these changes apply. This proposed change will not affect the projected number of residents who will participate in the QoL survey.

APPENDIX D: Information Letter to Participating LTC Facilities

Department of Health Studies
and Gerontology
Faculty of Applied Health Sciences

University of Waterloo
200 University Avenue West
Waterloo, ON N2L 3G1

INFORMATION LETTER TO PARTICIPATING LTC FACILITIES

Date:	February 8, 2010
Study Title:	Relationships between Quality of Life and Selected Resident and Facility Characteristics in Long Term Care Facilities in Canada
Principal Investigator:	Dr. John P. Hirdes, PhD University of Waterloo Scientific Director, Homewood Research Institute
Student Investigator:	Vahe Kehyayan, PhD Student Aging, Health & Well-being Health Studies & Gerontology University of Waterloo Waterloo, Ontario

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You are being invited to participate in a study to field test a new instrument entitled *interRAI Self-Report Nursing Home Quality of Life Survey* (QoL Survey)) Form to measure the satisfaction of residents in long term care (LTC) facilities. The QoL Survey Form was introduced by interRAI in June 2009. The purpose of the QoL Survey Form is to measure how residents in LTC facilities view their daily life in the facility. Instead of relying on facility staff evaluating residents' quality of life, this new QoL Survey Form is designed for resident self-reporting. This will give residents the opportunity to speak for themselves and express their own views about their life in the LTC facility. Such information may also assist staff to tailor residents' care and treatment to enhance their quality of life.

PURPOSE

The purposes of this study are to develop new measures related to quality of life in residents of long-term care (LTC) facilities in Canada, and to develop new insights on quality of life for these individuals.

OBJECTIVES

1. to evaluate the interRAI's Quality of Life (QoL) Instrument's internal reliability as applied to residents of long term care (LTC) facilities;
2. to examine the relationships between selected clinical and demographic characteristics and self-reported QoL in LTC facility residents; and

3. to examine the relationship of QoL ratings with LTC facility characteristics.

DATA COLLECTION

To achieve the purposes of this study, the following information will be collected:

(1) Residents will be interviewed by a trained interviewer using the QoL Survey Form and their self-reports on their quality of life will be recorded;
(2) Data from the residents’ completed Resident Assessment Instrument will be obtained from the Canadian Institute of Health Information (CIHI) under the Graduate Student Data Access Program; and
(3) Senior management of the facility will be asked to complete a Facility Profile Form.

RISKS AND POTENTIAL BENEFITS

This study is non-invasive and resident participation is voluntary. Lack of participation or participation in the study will not affect the care and treatment they receive in the LTC facility. The study involves interviewing and recording residents' responses to standardized questions in the QoL Survey Form, and evaluating the association of their quality of ratings to their personal and clinical characteristics and facility characteristics.

There are no immediate benefits to participating residents. However, their participation in the study will contribute to the design of a QoL Survey Form for implementation in LTC facilities in Canada. Once finalized, the QoL Survey Form will be integral to the suite of instruments used in LTC facilities to assess residents and could be used to modify or to provide care to them according to these assessments. The use of a reliable and valid QoL Survey Form will allow facilities to measure residents' level of satisfaction with their lives in the LTC facility and shape or modify their environment to enhance their quality of life. Thus, the QoL Survey Form may be of use to facility administration in their quality improvement initiatives.

interRAI and the scientific community that is interested in the care and quality of life of LTC residents may also benefit from this study. The scientific community will be able to compare the QoL Survey Form to other similar instruments and rank its qualitative strengths and limitations.

CONFIDENTIALITY & SECURITY

The identities of participating residents and LTC facilities will be protected. During the data collection phase unique identifiers will be used such that the identity of residents and LTC facilities are protected. CIHI will link residents’ quality of ratings to their characteristics as assessed in RAD-MDS and will provide a dataset to the researchers in a manner that protects the identity of participating residents.

Publications will not identify LTC facilities. Only aggregate summaries will be reported. Each facility will be provided with an aggregate report on quality of life ratings for their facility along with an average for all participating facilities. If sample sizes are small (e.g., less than 10) where there is a risk of resident identification, facility-specific scores will not be provided.

Paper records will be kept in secure storage at the Department of Health Studies & Gerontology, University of Waterloo. Access will be restricted to authorized individuals only. Electronic data will reside on a secure network server at the University of Waterloo with restricted access to authorized individuals. Data will be kept for seven years, after which the information will be destroyed through established secure procedures.

COMPENSATION

There is no funding to participating LTC facilities.

ROLE OF LTC FACILITIES

LTC facilities will be asked to designate a "Project Designee" (PD) to be the primary contact for this study. LTC facilities will also be asked to designate interviewers for conducting the quality of life surveys. Interviewers do not need to have any professional designation. Volunteers or students with good interpersonal and communication skills, ability to establish a good rapport with residents and put them at ease would be suitable. They should also have the ability to explain to the resident the nature of the project (with provided script) and obtain their consent. LTC facility staff who are involved in the direct care of residents cannot be surveyors.

Interviewers will receive training from the Student Investigator via teleconference. Project Designees and interested LTC facility staff may join in on these training sessions to become familiar with the role of interviewers.

QUESTIONS

For any questions about your role in this study, please contact Vahe Kehyayan, PhD student at (416)327-7007.

STUDY WITHDRAWAL

You may withdraw from the study at any time.

ETHICS CLEARANCE FOR STUDY

This study has been reviewed by, and has received ethics clearance through, the University of Waterloo, Office of Research Ethics. If you have any comments or concerns about this study you may contact Dr. Susan Sykes, the Director of the Office of Research Ethics, at (519) 888-4567 ext. 36005 or e-mail: ssykes@uwaterloo.ca.

STUDY RESULTS

A summary of the study findings may be made available to each participating site at the conclusion of the study.

Original Signed by

Vahe Kehyayan, PhD Candidate
University of Waterloo
Department of Health Studies &
Gerontology
University of Waterloo
Waterloo, Ontario N2L 3G1
416-327-7007
E-mail: vkehyaya@uwaterloo.ca

Original Signed by

Dr. John Hirdes
Department of Health Studies &
Gerontology
University of Waterloo
200 University Avenue West
Waterloo, Ontario N2L 3G1
519-888-4567 ext 32007
E-mail: hirdes@uwaterloo.ca.

APPENDIX E: Information Letter to Participating Residents

UNIVERSITY OF
Waterloo

**Department of Health Studies
and Gerontology
Faculty of Applied Health Sciences**

**University of Waterloo
200 University Avenue West
Waterloo, ON N2L 3G1**

INFORMATION LETTER TO PARTICIPATING RESIDENTS

Date:	April 7, 2010
Study Title:	Relationships between Quality of Life and Selected Resident and Facility Characteristics in Long Term Care Facilities in Canada
Principal Investigator:	Dr. John P. Hirdes, PhD Department of Health Studies & Gerontology University of Waterloo Waterloo, Ontario
Student Investigator:	Vahe Kehyayan, PhD Student Department of Health Studies & Gerontology University of Waterloo Waterloo, Ontario

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Dear Resident:

I am writing to invite you to participate in a study regarding the implementation of a new Quality of Life instrument in long-term care facilities in Canada. To help you make an informed decision about whether to participate in this voluntary study, this letter explains what the study is about, possible risks and benefits, and your rights as a participant. If you do not understand anything, please ask for an explanation before signing the consent form. Contact information for asking questions is provided below. You will be given a copy of this information letter and your consent form for your records, if you choose to participate in the study.

BACKGROUND AND STUDY PURPOSE

A collaborative network of researchers in over 30 countries, called interRAI, is committed to improving health care for persons who are elderly, frail, or disabled. The goal of interRAI is to promote evidence-based clinical practice and policy decisions through the collection and interpretation of high quality data about the characteristics and outcomes of persons served across a variety of health and social services settings, including long-term care facilities.

In June 2009, interRAI introduced a new instrument entitled "Quality of Life" to measure whether residents in long-term care facilities, like you, are satisfied with their quality of life. Instead of relying on facility staff to evaluate residents' quality of life, this new Quality of Life instrument is designed to facilitate resident self-reporting. The instrument intends to give residents the opportunity to speak for themselves and to express their own views about their lives. The residents' views may help facility staff tailor resident care and treatment, thereby enhancing resident quality of life. This empowers residents to influence all aspects of their lives and treatment. The study is being conducted in several long-term care facilities in Ontario and other provinces such as Alberta, British Columbia, Manitoba, Nova Scotia, and Saskatchewan.

STUDY PROCEDURE

Trained interviewers will ask you the Quality of Life instrument questions, and record your responses on paper. The interviews will be conducted in the privacy of your room or some other private space in the facility. Each interview is expected to last about 30 minutes. However, you may stop the interview at any time for any reason (e.g., to rest, to obtain a refreshment) or to withdraw from the study in case you change your mind. You may also complete the interview in several sessions to allow you to rest.

Four to five days following this interview, the same interviewer will interview a second time using the same Quality of Life instrument. The purpose of this second interview is to test the reliability of the instrument. This will be the last interview.

ROLE OF CANADIAN INSTITUTE FOR HEALTH INFORMATION

In addition to the interview described above, with your permission, the researchers need to access your health information, such as diagnosis, vision, hearing, activities of daily living, which is in the possession of the Canadian Institute for Health Information. The Institute is an independent, not-for-profit organization that maintains health information on residents of long-term care facilities, as part of the Continuing Care Reporting System (CCRS). This information is used for purposes of promoting sound health policy, effective management of the health system, and public awareness about factors affecting good health. To retrieve your health information, the Institute needs to receive from the researchers your health card number, facility health record number, gender, and date of birth (year and month) in order to identify the correct CCRS records to send to the researchers. With your permission, the Canadian Institute for Health Information will provide your personal health information from CCRS to the Quality of Life study researchers in a manner such that only the researchers will be able to identify you. The researchers will use your responses to the interview and the health information from the Canadian Institute for Health Information's CCRS database for the purpose satisfying the goals of the study as explained above. Once your interview responses and your health information are linked by the researchers, any personal information that may identify you will be deleted from the data files.

Finally, the researchers will keep all information about you for seven years, after which the information will be destroyed through established secure procedures.

CONSENT AND SUBSTITUTE DECISION MAKERS

In order for a resident in a long-term care facility to participate in the study, the resident must complete the attached consent form. This form obtains the resident's consent to participate in the study, and obtains the resident's permission for researchers to collect and release the resident's information as described above. When a resident is not legally capable of providing consent but is still capable of participating in the study (e.g. the resident is experiencing early-stage Alzheimer's disease), the resident's legally authorized substitute decision maker may complete the consent form on the resident's behalf. A resident who is not legally capable of providing consent may still be able to express their wishes in a meaningful way in which case the researchers will make every effort to honour the resident's wishes (for example, the resident may say that he or she wants to stop the interview to take a rest).

CONFIDENTIALITY

To ensure your privacy, your identity and personal identification information will be protected. During the data collection phase, unique identifiers will be used instead of residents' names.

Personally identifiable information about you will **not** be shared with the facility or anyone else, except the Canadian Institute for Health Information as described above. Any study results which are reported to facilities or the public will be based on aggregate (collective) data for each long-term care facility and all participating facilities. Information shared with the long-term care facility where you are staying will not permit the facility to identify you or any other residents.

The researchers will keep all information in secure and locked storage. Information which researchers share with the Canadian Institute for Health Information will be protected in accordance with the Institute's privacy and security policies.

RISKS

This study is non-invasive and your participation is voluntary. If you choose not to participate in this study, the care and treatment you receive in the facility will not be affected.

BENEFITS

Participating in the study provides no immediate benefits to you. However, your participation will contribute to the design of a Quality of Life Instrument for implementation in long-term care facilities in Canada. Once finalized, the Quality of Life Instrument will be integral to the suite of instruments used to assess residents in long-term care facilities. A reliable and valid Quality of Life Instrument will allow facilities to shape or modify care environments in order to enhance residents' quality of life.

The study will also benefit interRAI and the scientific community interested in the care and quality of life of long-term care facility residents. The scientific community will be able to compare the Quality of Life Instrument to other similar instruments and evaluate its strengths and limitations. The Quality of Life Instrument will also benefit society, and particularly the families of residents, by providing them with increased knowledge and appreciation of their loved ones' day to day lives. This information helps families intervene accordingly. Finally, the Instrument will also benefit advocacy groups who use reports on residents' quality of life to influence social policy development and funding decisions.

COMPENSATION

You will not be paid for participating in this study, and there are no costs to you for participating. Long-term care facilities participating in the study will not receive funding.

QUESTIONS

For any questions about your role in this study, please contact Vahe Kehyayan, PhD student at (416) 327-7007.

STUDY WITHDRAWAL

At any time, you may refuse to participate in the study or withdraw from the study.

STUDY APPROVAL

To ensure that our research protocol meets ethical standards for conducting research, this study has been reviewed by, and has received ethics clearance from, the University of Waterloo, Office of Research Ethics (and from your facility's research ethics board where required). Any future studies involving the information collected in this study will be subject to a new review and approval by the Office of Research Ethics.

If you have any comments or concerns about this study you may contact Dr. Susan Sykes, Director of the Office of Research Ethics, at (519) 888-4567 ext. 36005.

STUDY RESULTS

A summary of the study findings, which does not contain residents' names or identifying information, will be made available to each participating long-term care facility at the conclusion of the study.

Original Signed by

____

Vahe Kehyayan, PhD Candidate
University of Waterloo
Department of Health Studies &
Gerontology
University of Waterloo
Waterloo, Ontario N2L 3G1
416-327-7007
E-mail:
vkehyaya@mailservices.uwaterloo.ca

Original Signed by

____

Dr. John Hirdes
Department of Health Studies &
Gerontology
Aging, Health & Well-being
Faculty of Applied Health Sciences
University of Waterloo
200 University Avenue West
Waterloo, Ontario N2L 3G1
519-888-4567 ext 32007
E-mail: hirdes@uwaterloo.ca.

APPENDIX F: Resident Recruitment Script for QoL Study

UNIVERSITY OF
Waterloo

**Department of Health Studies
and Gerontology
Faculty of Applied Health Sciences**

**University of Waterloo
200 University Avenue West
Waterloo, ON N2L 3G1**

RESIDENT RECRUITMENT SCRIPT FOR THE QOL STUDY
(Recruitment is done by nursing home staff most familiar with resident)

Greetings (Good morning, afternoon, evening Mr., Mrs. Miss, Ms. <name>)

If you have a few minutes, I would like to tell you about a research study on the Quality of Life that researchers from the University of Waterloo are currently conducting. If you are interested, I would like to invite you to participate in this study.

I have a letter that explains this study. This will give you information so you can make an informed decision. It will tell you the purpose of the study. It will also tell you what is involved in the study. It will explain any possible risks and benefits from this study. It will tell you your rights about the study.

If you do not understand anything in the letter or anything I say, I can repeat anything you like. I can explain things more too. Just ask me. If you agree to participate, you will sign two copies of a consent form. You will be able to keep the letter and a copy of the consent form.

Background
This study is being conducted in several long term care facilities in Ontario and other provinces including Alberta, British Columbia and Nova Scotia.

A new Quality of Life instrument has been developed by researchers from over 30 countries, including Canada. These researchers are dedicated to improving the quality of care and life of old persons who live in nursing homes.

If you were to participate in this study, you will be able to tell how you feel about your life in the nursing home.

Study Procedure
Trained interviewers will interview you using the Quality of Life instrument, and they will record your responses on paper. The interviews will be conducted in the privacy of your room or some other private space in the facility. Each interview is expected to last about 30 minutes. However, you may stop the interview at any time for any reason (e.g., to rest, to obtain a refreshment) or to withdraw from the study in case you change your mind. You may also complete the interview in several sessions to allow you to rest.

Four to five days following this interview, the same interviewer will interview a second time using the same Quality of Life instrument. The purpose of this second interview is to test the reliability of the instrument. This will be the final interview.

In addition to the interview, with your permission the researchers will need to access your health information, such as diagnosis, vision, hearing, activities of daily living, which is in the possession of the Canadian Institute for Health Information. The Institute is an independent, not-for-profit organization that maintains health information on residents of long-term care facilities, as part of the Continuing Care Reporting System (CCRS). This information is used for purposes of promoting sound health policy, effective management of the health system, and public awareness about factors affecting good health. To retrieve your health information, the Institute needs to receive from the researchers your health card number, facility health record number, gender, and date of birth (year and month) in order to identify the correct CCRS records to send to the researchers. With your permission, the Institute will provide your personal health information from CCRS to the Quality of Life study researchers in a manner such that only the researchers will be able to identify you. The researchers will use your responses to the interview and the health information from the Institute's CCRS database for the purpose satisfying the goals of the study as explained above. Once your interview responses and your health information are linked by the researchers, any personal information that may identify you will be deleted from the data files.

Finally, the researchers will keep all information about you for seven years, after which the information will be destroyed through established secure procedures.

Privacy & Confidentiality

All information collected from you will be treated with utmost confidentiality. No one will see your information except for the researchers at the University of Waterloo. These researchers have received approval from the Research Ethics Committee at the University. The researchers have guaranteed that they will keep all information in secure storage at the University.

Risks & Benefits

The researchers do not anticipate any risk to you for your participation in this study. The study, as I explained, is only an interview and to record your responses to the questions in the Quality of Life Instrument.

Your participation is voluntary

If you choose not to participate in this study, the care and treatment you receive in the nursing home will not be affected.

There are no immediate benefits to you. However, your participation in the study will help the implementation of the Quality of Life Instrument in all long term care facilities in Canada.

Compensation

The researchers have not received any money to do this study. Accordingly, you or other residents will not be paid for participating in this study. There are no costs to you for participating in this study. The nursing home will not receive money either.

Questions

For any questions about your role in this study, please contact student researcher. His name is Vahe Kehyayan and he could be reached at (416)327-7007. If you wish, we could send him a message and he could call you here.

Study Withdrawal
You may withdraw from the study at any time.

The Interview
If you agree to participate in this study, an interviewer will come to see you.

The interview can be done in the privacy of your room or some other private location in the nursing home.

Each interview is expected to take about 30 minutes. However, you can stop the interview any time you like if you need to take a rest. Just let the interviewer know.

Consent
Mr., Mrs., Miss, Ms. <name>, do you have any questions about this study? Is there anything do you want me to repeat or clarify?

If you do not have any or anymore questions, would you like to participate in this study? Did you want your relative (daughter, son, husband, substitute decision maker) to also read the letter from the researchers before you make a decision?

If you feel comfortable making a decision to participate, here are two copies of the consent letter. Please read and sign them both. One copy is for you and the other will be kept on your personal file. I will witness your signature on both letters.

Concluding Remarks
- Scenario one: Resident refuses to participate
    - Thank you Mr., Mrs., Miss, or Ms. <name> for letting me explain this study to you. I can appreciate why you do not wish to participate.
- Scenario two: Resident accepts to participate
    - Thank you Mr., Mrs., Miss, or Ms. <name> for agreeing to participate in this study. If at any time you have any questions, I'd be happy to answer them for you.

APPENDIX G: Resident Consent Form

Department of Health Studies and Gerontology
Faculty of Applied Health Sciences

University of Waterloo
200 University Avenue West
Waterloo, ON N2L 3G1

RESIDENT CONSENT FORM

Study Title: Relationships between Quality of Life and Selected Resident and Facility Characteristics in Long Term Care Facilities in Canada

Principal Investigator: Dr. John P. Hirdes, PhD
Department of Health Studies & Gerontology
University of Waterloo
Waterloo, Ontario

Student Investigator: Vahe Kehyayan, PhD Student
Department of Health Studies & Gerontology
University of Waterloo
Waterloo, Ontario

Yes ☐ No ☐ I have read the Information Letter to Participating Residents, dated April 7, 2010, and understand what the Quality of Life Study is about.

Yes ☐ No ☐ I understand that I may withdraw from the study at any time, and this decision will not affect the care or treatment I receive.

Yes ☐ No ☐ I had the opportunity to ask questions about the study and my questions were answered.

Yes ☐ No ☐ I consent voluntarily to participate in the quality of life study as outlined in the information letter.

Yes ☐ No ☐ I also consent to be interviewed a second time following the first interview and respond to the same questions.

Yes ☐ No ☐ I have read and understood the section of the information letter entitled, “Role of Canadian Institute for Health Information.” I understand that my consent to participate in the study includes permission for the researchers to provide personal information about me to the Canadian Institute for Health Information who will then provide additional information about me back to the researchers.

Resident Name (PRINT): _________________________
Resident’s Signature: ____________________________
Witness Name (PRINT): ______________________ Witness Signature ________________

Date: ____________________________________ *(Month/Day/Year)*

APPENDIX H: LTC Facility Consent Form

**Department of Health Studies
and Gerontology
Faculty of Applied Health Sciences**

**University of Waterloo
200 University Avenue West
Waterloo, ON N2L 3G1**

LTC FACILITY CONSENT FORM

Study Title: Relationships between Quality of Life and Selected Resident and Facility Characteristics in Long Term Care Facilities in Canada

Principal Investigator:
Dr. John P. Hirdes, PhD
Department of Health Studies & Gerontology
University of Waterloo
Waterloo, Ontario

Student Investigator:
Vahe Kehyayan, PhD Student
Department of Health Studies & Gerontology
University of Waterloo
Waterloo, Ontario

STUDY APPROVAL

This study has been reviewed by and has received ethics clearance through the Office of Research Ethics, University of Waterloo. If you have any comments or concerns about this study, you may contact Dr. Susan Sykes, Director of the Office of Research Ethics, at (519) 888-4567 ext. 36005, or e-mail: ssykes@uwaterloo.ca.

CONFIRMATION OF LTC FACILITY

Yes ☐ No ☐ I have read the Information Letter.

Yes ☐ No ☐ I have had the opportunity to ask any questions related to this study and to receive satisfactory answers to my questions and any additional details I wanted.

Yes ☐ No ☐ I understand that there is no funding for participating in this study.

Yes ☐ No ☐ I have been informed that I may withdraw at any time.

Yes ☐ No ☐ I agree to allow the study to be conducted in this LTC facility.

Yes ☐ No ☐ I agree for the researchers to provide CIHI participating residents' personal information, and CIHI in turn to provide those residents' RAI-MDS data to the researchers in the form of a dataset that protects residents' identity.

Full Name of LTC Facility: ____

City: ______________________ Province:______________________

Signature of Facility Representative: ____________________________

Date: ___________________________________ *(Month/Day/Year)*

APPENDIX I: LTC Facility Confirmation of Obtaining Resident Informed Consents

Department of Health Studies
and Gerontology
Faculty of Applied Health Sciences

University of Waterloo
200 University Avenue West
Waterloo, ON N2L 3G1

CONFIRMATION BY LTC FACILITY OF OBTAINING INFORMED CONSENTS FROM PARTICIPATING RESIDENTS

Study Title: Relationships between Quality of Life and Selected Resident and Facility Characteristics in Long Term Care Facilities in Canada

Re: Confirmation by LTC Facility that informed consent were obtained from each participating resident

---

I ___________________________ confirm that we at the LTC Facility named below have obtained individually informed and signed consent from each resident participating in the above noted Quality of Life Study.

Name of LTC Facility: ______________________________

City and Province: _______________________________________

Employee Title: ___________________________

Employee Signature: ______________________________

Date: ______________________________________ *(Month/Day/Year)*

Signature of Witness: _____________________________

APPENDIX J: QoL Study Tracking Sheet

Department of Health Studies
and Gerontology
Faculty of Applied Health Sciences

University of Waterloo
200 University Avenue West
Waterloo, ON N2L 3G1

interRAI Quality of Life Study
Tracking Sheet

INSTRUCTION: Please complete this Tracking Sheet for all residents who are approached to participate in the Quality of Life Study. This Tracking Sheet is for the benefit of the LTC facility for tracking and coordination purposes only. This form is not to be submitted to the researcher. However, the total number of residents who were approached, number agreed and number declined to participate, as well as the number of residents who completed or did not complete the survey ought to be reported.

#	Date (Month/Day/Year)	Name (e.g., Jones, Emily	Room Number	Agreed to Study (Yes/No)	Consent obtained (Yes/No)	Completed Survey (Yes/No)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

NOTE: PLEASE DUPLICATE THIS PAGE AS REQUIRED AND RECORD A PAGE NUMBER FOR EACH SHEET AT TOP RIGHT CORNER.

APPENDIX K: QoL Study Resident Recruitment and Participation Summary Report

UNIVERSITY OF
Waterloo

Department of Health Studies
and Gerontology
Faculty of Applied Health Sciences

University of Waterloo
200 University Avenue West
Waterloo, ON N2L 3G1

interRAI Quality of Life Study
Resident Recruitment & Participation Summary Report

Instructions: Please complete and return to the researcher along with the completed QoL surveys.

Facility Name (Full):___________________________________

City __________________ Province _________________________

# of Residents who were Approached	# of Residents who Agreed to Participate	# Refused to Participate	# Completed the Survey	# Who were Unable to Complete for Any reason

APPENDIX L: interRAI Self-Report Nursing Home QoL Survey

To obtain a copy of the Survey form, please contact:

Dr. John Hirdes
Department of Health Studies & Gerontology
University of Waterloo
200 University Avenue West
Waterloo, Ontario N2L 3G1
519-888-4567 ext 32007
E-mail: hirdes@uwaterloo.ca.

APPENDIX M: QoL Survey Resident Cue Card

UNIVERSITY OF
Waterloo

Department of Health Studies
and Gerontology
Faculty of Applied Health Sciences

University of Waterloo
200 University Avenue West
Waterloo, ON N2L 3G1

Quality of Life Survey

Instruction: Please give a copy to the resident during the Quality of Life interview.

There are six possible answers to each of the questions in the Quality of Life survey. These are:

Never	Rarely	Sometimes	Most of the time	Always	Don’t know

There are no right or wrong answers to these questions. Please choose the answer that best describes your life in the nursing home or long term care facility.

APPENDIX N: QoL Study LTC Facility Profile Survey

To obtain a copy of this survey form, please contact:

Dr. John Hirdes
Department of Health Studies & Gerontology
University of Waterloo
200 University Avenue West
Waterloo, Ontario N2L 3G1
519-888-4567 ext 32007
E-mail: hirdes@uwaterloo.ca.

APPENDIX O: Thank You Letter to LTC Facilities Post Surveys

UNIVERSITY OF
Waterloo

Department of Health Studies
and Gerontology
Faculty of Applied Health Sciences

University of Waterloo
200 University Avenue West
Waterloo, ON N2L 3G1

April 16, 2010

Dear *Long Term Care Facility Participant*

Re: Relationships between Quality of Life and Selected Resident and Facility Characteristics in Long Term Care Facilities in Canada

---

Thank you for your participation in this study project. As a reminder, the purposes of this study were to develop new measures related to quality of life in residents of long-term care (LTC) facilities in Canada and to develop new insights on quality of life for these individuals. Specific objectives of this study were to: (1) evaluate the Quality of Life Instrument's internal reliability as applied to residents of LTC facilities; (2) examine the relationships between residents' self-reports on their quality of life and their clinical (e.g., diagnosis, functional performance) and demographic (e.g., age and gender) characteristics; and (3) examine the relationship of residents' Quality of Life ratings with the characteristics of the LTC facility.

Your participation in the study will contribute to the design of the Quality of Life Instrument.

Any data identifying your facility will be kept confidential. Once all the data are collected and analyzed for this project, analysis of conclusions may be shared with the research community through seminars, conferences, presentations, and journal articles. A summary report will be provided to you following the completion of the study. The study is expected to be completed by summer 2010.

As with all University of Waterloo projects involving human participants, this project was reviewed by and received ethics clearance through the Office of Research Ethics at the University of Waterloo. Should you have any comments or concerns resulting from your participation in this study, please contact Dr. Susan Sykes in the Office of Research Ethics at 519-888-4567, Ext., 36005 or ssykes@uwaterloo.ca.

Original Signed by

____

Vahe Kehyayan, PhD Candidate
University of Waterloo
Department of Health Studies & Gerontology
Waterloo, Ontario N2L 3G1
416-327-7007
E-mail: vkehyaya@mailservices.uwaterloo.ca

Original Signed by

____

Dr. John Hirdes
Department of Health Studies & Gerontology
University of Waterloo
200 University Avenue West
Waterloo, Ontario N2L 3G1
519-888-4567 ext 32007
E-mail: hirdes@uwaterloo.ca

APPENDIX P: Thank You Letter to Residents Post Surveys

**Department of Health Studies
and Gerontology
Faculty of Applied Health Sciences**

**University of Waterloo
200 University Avenue West
Waterloo, ON N2L 3G1**

April 16, 2010

Dear Participating Resident (c/o LTC Facility)

Re: Relationships between Quality of Life and Selected Resident and Facility Characteristics in Long Term Care Facilities in Canada

---

Thank you for your participation in this study project. As a reminder, the purposes of this study were to improve the quality of life of residents in long-term care facilities in Canada.

Specific objectives of this study were to determine if residents' quality of life responses depended on, say, their age or gender or wellness (for example, their mobility).

Your participation in the study will contribute to the implementation of a Quality of Life Instrument in long term care facilities in Canada. The Instrument would be used as part of quality of life assessment to determine where improvement may be needed.

Any data identifying you as an individual participant will be kept confidential. Once all the data are collected and analyzed for this project, analysis of conclusions may be shared with the research community through seminars, conferences, presentations, and journal articles. An executive summary will also be provided to the participating facility. This summary will reflect the combined responses of the participating residents and will not identify you or any other resident who participated in the study. The facility will make such a summary report available to residents. The study is expected to be completed by summer of 2010.

As with all University of Waterloo projects involving human participants, this project was reviewed by, and received ethics clearance through, the Office of Research Ethics at the University of Waterloo. Should you have any comments or concerns resulting from your participation in this study, please contact Dr. Susan Sykes in the Office of Research Ethics at 519-888-4567, Ext., 36005 or ssykes@uwaterloo.ca.

Original Signed by

Vahe Kehyayan, PhD Candidate
University of Waterloo
Department of Health Studies & Gerontology
Waterloo, Ontario N2L 3G1
416-327-7007
E-mail: vkehyaya@mailservices.uwaterloo.ca

Original Signed by

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APPENDIX Q: Definitions of Scales Embedded in RAI-MDS 2.0 Used for Analysis in QoL Study

Definitions of scales embedded in RAI-MDS 2.0 used for analysis in QoL Study

ACRONYM	SCALE	ITEMS IN THE SCALE	INTERPRETATION
ABS	**Aggressive Behaviour Scale (ABS)** Measure of aggressive behaviour	Verbal abuse Physical abuse Socially Inappropriate/ disruptive Resists care	Scores range from 0 to 12. Higher scores indicate higher levels of aggressive behaviour. 0 = no signs of aggression 1-4 = mild to moderate aggression 5+ = more severe aggression
ADL	**Activities of Daily Living (ADL) Hierarchy Scale** Measure of functional performance, reflecting a person's ability to carry out activities of everyday living	Personal hygiene Locomotion Toilet Use Eating	Scores range from 0 to 6: 0 = independent 1 = supervision required 2 = limited impairment 3 = extensive assistance required; level 1 4 = extensive assistance required; level 2 5 = dependent 6 = total dependence
CHESS	**CHESS Scale** Reflects a person's health instability.	Cognitive decline in last 90 days ADL decline in last 90 days Shortness of breath Dehydration/insufficient fluid Weight loss Decrease in amount of fluid/food Edema Vomiting	Scores range between 0 and 4, where: 0=Not at all unstable 4=Highly unstable
CPS	**Cognitive Performance Scale (CPS)** Describes the person's cognitive status	Daily decision-making Short-term memory Expression (i.e., – making self understood) Self-performance in eating	Scores range from 0 to 6: 0 = intact 1 = borderline intact 2 = mild impairment 3 = moderate impairment 4 = moderate to severe impairment 5 = severe impairment 6 = very severe impairment

ACRONYM	SCALE	ITEMS IN THE SCALE	INTERPRETATION
DRS	**Depression Rating Scale (DRS)** Describes the mood status of an individual	Negative statements Persistent anger Unrealistic fears Repetitive health complaints Repetitive anxious complaints Sad, worried facial expression Crying or tearfulness	Scores may vary between 0 and 14. 3+ indicative of possible depression 6+ indicative of more severe depression.
IOSE	**Index of Social Engagement** Describes the psycho-social well-being of an individual	At ease interacting with others At ease doing planned or structured activities At ease doing self-initiated activities Establishes own goals Pursues involvement in the life of the facility Accepts invitation into most group activities	Scores range from 0 to 6: Higher scores indicate a higher level of social engagement
PAIN	**PAIN** Summarizes the presence and intensity of pain	Pain frequency Pain intensity	Scores may range between 0 and 3: 0 = No pain 1 = Less than daily pain 2 = Daily pain but not severe 3 = Daily severe pain

APPENDIX R: Relationship of Residents’ QoL and LTC Facility Attributes (Pearson’s Coefficients) (N=847)

Variable	Privacy Mean QoL	Food/Meal Mean QoL	Safety/ Security Mean QoL	Comfort Mean QoL	Autonomy Mean QoL	Respect Mean QoL	Responsive Staff Mean QoL	Staff-resident Bonding Mean QoL	Activity Option Mean QoL	Personal Relationships Mean QoL	Overall QoL
Facility Size (beds)	0.05 NS	-0.07 NS	-0.07 *	-0.05 NS	-0.06 NS	-0.04 NS	-0.08 *	-0.05 NS	-0.04 NS	0.007 NS	-0.06 NS
Management staff hours per week	-0.04 NS	0.03 NS	0.04 NS	-0.004 NS	-0.003 NS	0.01 NS	0.02 NS	0.004 NS	0.07 *	0.03 NS	0.03 NS
RN hours of care per resident per day	0.04 NS	-0.07 *	0.08 *	0.08 *	0.04 NS	0.02 NS	0.05 NS	0.02 NS	0.03 NS	-0.03 NS	0.03 NS
RPN_LPN hours of care per resident per day	0.07 *	-0.18 ****	0.02 NS	-0.02 NS	-0.03 NS	-0.03 NS	-0.05 NS	-0.08 *	-0.008 NS	-0.05 NS	-0.06 *
Total hours of care per resident per day	0.04 NS	-0.10 **	0.02 NS	0.02 NS	-0.01 NS	-0.002 NS	0.005 NS	-0.03 NS	0.03 NS	0.02 NS	-0.005 NS
Ratio of Registered to non-registered staff	0.08 *	-0.04 NS	0.09 *	0.09 *	0.05 NS	0.04 NS	0.03 NS	0.03 NS	0.02 NS	-0.07 *	0.04 NS
Registered Nursing Staff Turnover	-0.08 *	-0.005 NS	-0.08 *	-0.11 **	0.01 NS	-0.09 **	-0.06 NS	-0.02 NS	-0.04 NS	-0.02 NS	-0.06 NS
Non-registered Nursing Staff Turnover	-0.08 *	-0.05 NS	-0.10 **	-0.07 *	0.01 NS	-0.04 NS	-0.05 NS	-0.05 NS	-0.08 *	-0.09 *	-0.08 *

* $p<.05$; ** $p<.01$; *** $p<0.001$; **** $p<0.0001$; NS = Not Significant