Self-report and Performance Measures Differ in Their Association with Home Care Use: An Exploratory Study

By

Cara Liane Brown

A Thesis submitted to the Faculty of Graduate Studies of

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Department of Community Health Science

University of Manitoba

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ABSTRACT

Functional status measures are used extensively to determine the home care needs and eligibility of older adults. However, it is unclear what type of functional status measure is best for these objectives. The purpose of this secondary analysis of the 2001 Aging in Manitoba Longitudinal Study survey and linked Manitoba Health administrative data was to investigate the concurrent and longitudinal relationship between three different measures of functional status and the formal home care use of older Manitobans. Analysis was structured with the Andersen-Newman Framework of Health Services Utilization (1973) as a guide. In these small exploratory study results, the self-report of capacity measure appeared most associated with home care use cross-sectionally, while the performance measure was best able to predict home care use two and a half years following the functional status assessment. Results emphasize that different types of functional status measures are not interchangeable.

ACKNOWLEDGEMENTS

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CHAPTER 1: INTRODUCTION AND BACKGROUND

Introduction and Purpose

Measurement of functional status is recognized universally as a valuable strategy for determining the home care service needs of older adults in both clinical and research contexts. However, there is no consensus on how best to measure functional status. *Functional status measures* refer to assessments that seek to determine an individual's level of independence in activities of daily living, such as getting dressed or doing the laundry. To date, research has focused primarily on examining the correlation between performance and self-report functional status measures rather than on the relationships between these different types of measures and home care utilization. As a result, there is a gap in knowledge for clinicians whose responsibility it is to assess for home care needs. Accuracy in functional status assessment is important in order to best allocate home care resources; however, efficiency in the assessment process is also important for time-constrained clinicians. These same issues are important when conducting community needs assessments. Should a resource-intensive performance assessment of function be used, or is a more efficient self-report assessment equally as accurate? An in-depth understanding of how different types of functional status measures identify and predict home care utilization is required in order to allow clinicians, as well as researchers and program developers, to make informed decisions when choosing a functional status measurement instrument. Poor functional status instrument choice could lead to inappropriate health care resource use or adverse functional and/or health effects for community-dwelling older adults.

In 2001, the Aging in Manitoba (AIM) Longitudinal Study had the opportunity to add a performance-based measure of functional status to the standard survey which already included self-report measures of functional status. Finlayson, Havens, Holm, and Van Denend (2003) describe the process of integrating the performance-based observation measure as well as report on correlations between the performance and self-report measures. This integration of the performance measure into the AIM survey provides an opportunity to look at the relationships between functional status measures and home care utilization. The original intent of including the performance measure was to determine which functional status measure "will be best able to predict health-service use over time" (Finlayson, Havens, Holm, & Van Denend, p.198).

The purpose of this small exploratory study was to investigate the relationship between three functional status measurement instruments and formal home care utilization in older adults. More specifically, the goal was to understand the ability of each instrument to differentiate between formal home care users and non users cross-sectionally as well as longitudinally in Winnipeg community-dwelling older adults. The Andersen-Newman Framework of Health Services Utilization (1973) was chosen to help guide the study design. A retrospective longitudinal design was used with secondary analysis of data from the Aging in Manitoba study (AIM) linked to Manitoba Health administrative data. The independent variables included three types of functional status measures: 1) self-report of usual behaviour, 2) self-report of capacity, and 3) performance, which were administered in the 2001 AIM interview. The dependent variable was whether or not someone was enrolled in the Manitoba Home Care Program,

either at the time of the 2001 AIM interview or in the two and a half years subsequent to the 2001 interview, depending on the specific research question under analysis.

Rationale

Functional status measures are used by home care coordinators, nurses, occupational therapists, and physiotherapists in order to screen, determine eligibility and determine specific service needs for home care services for older adults. Assessments by home care coordinators tend to be based on self-report questioning and informal observation while occupational therapy and physiotherapy assessments use a combination of standardized and unstandardized verbal and performance measures. The knowledge gap of the relationship between functional status measures and home care use has been a major factor in these inconsistencies between and within different professional groups. Deciding between functional status measures may appear inconsequential, but poor instrument choice has implications at an individual and community level. At an individual level, the result could be under-served older adults, leading to further functional and medical decline and the need to move into institutional care earlier than necessary. At a community level, the result could be unnecessary resource strain due to over-serviced older adults. It is important to learn more about the relationship between home care and functional status measures in order to allow health professionals to make educated and research-based decisions on what type of measure to use.

From a program planning and research perspective, a more thorough understanding of the relationship between different functional status measures and home care utilization could provide useful information to the Manitoba Home Care Program

and Manitoba Health, specifically with potential for improved accuracy in community needs assessments.

There is little information that compares the association of different functional status measurement types to formal home care use. Only three studies were found to be related to this topic. Two of them compare functional status measures but to outcomes other than home care. Reuben, Siu and Kimpau (1992) compared the ability of two performance measures and one self-report measure to predict death OR nursing home placement using logistic regression modeling for 149 elderly subjects. All three measures were found to be predictive of death or nursing home placement. Angel, Ostir, Frisco and Markides (2000) found that a performance measure of mobility was more predictive of mortality than a self-report measure. Finally, one study examined the relationship between various self-report measures of disability and the concurrent use of home health care (Jenkins & Laditka, 2003). They found that home health care use was most likely when the presence of both "assistance" and "difficulty" were included in the self-report measures.

This study makes a unique contribution to the functional status literature. It is the second known study to compare the abilities of different functional status measures in differentiating between home care users and non-users. Even more significant is this study's inclusion of a performance measure in addition to self-report measures. The inclusion of a performance measure is challenging in research contexts because of their resource-intensive nature, however, the addition of a performance measure in the AIM 2001 interview has made it possible to compare performance and self-report measures in differentiating home care users from non users.

The Manitoba Home Care Program

The Manitoba Home Care Program is a provincial program that was developed to "help people live at home, remaining independent for as long as possible, thereby avoiding or delaying the need for individuals to go into long term care facilities" (Winnipeg Regional Health Authority, 2006, ¶ 1). The program was established in 1974 and is the oldest universal province-wide program in Canada. In 2002-03, it was estimated that 35,000 Manitobans received home care services. Although the program is province-wide, it is administered at a regional level. Staff of the provincial government develops home care policy, monitors activity, develops standards and provincial outcomes and manages and develops information systems; the responsibility for service delivery is left to the regions (Manitoba Health, 2004). To be eligible for home care services in Winnipeg, "individuals must be a Manitoba resident, registered with Manitoba Health, require health services or assistance with activities of daily living, require service to remain safely in their homes and require more assistance than available from existing supports and community services" (Winnipeg Regional Health Authority, 2006, Section 5).

The Manitoba Home Care Program provides many services including assessment for eligibility and needs, care planning, case management, service coordination, health teaching, occupational and physical therapy assessment and services, assessment for and facilitation of long term care placement, self-managed/family-managed care, home component of palliative care, nursing services, personal care assistance, meal preparation, cleaning and laundry services, respite/family relief, access to adult day care services,

medical equipment/supplies as assessed as being necessary to support the client's care plan, and a home oxygen therapy program (Roos, Stranc, et al., 2001).

An individual's eligibility for enrolment into the Manitoba Home Care Program is dependent upon an assessment made by a home care case coordinator. Since more detail on performance of activities of daily living (ADL) and instrumental activities of daily living (IADL) can be gleaned from a performance assessment, the case coordinator may seek assistance with home care eligibility and care planning decisions by requesting that an occupational therapist or physiotherapist conduct a performance assessment of functional status. Once an individual is deemed eligible for home care services, the case coordinator develops a plan of care that guides the amount and type of services that will be provided by the home care program.

The only significant change to the Manitoba Home Care Program during the time of this study has been the implementation of the Minimum Data Set for Home Care (MDS-HC tool) (H. Perry, Home Care Coordinator, personal communication, November 2005). This is a standardized assessment tool that includes measures of the individual's social, functional, cognitive and medical status (Black, Mitchell, Finlayson, & Peterson, 2000). For the assessment of functional status, the MDS-HC uses self-report functional status measures. The MDS-HC tool was gradually implemented in the Winnipeg Regional Health Authority Home Care Program commencing in 2001 with 61% of clients being assessed with the MDS by October 2003 (Leslie Orlikow, MDS Specialist, 2003). H. Perry (personal communication, November 2005) reported that the implementation of

the MDS-HC tool has resulted in increased thoroughness of home care case coordinator assessments.

Chapter Summary

Functional status assessments are used daily by various health care professionals to assess a person's need for home care services, and have potential benefits as a measure of future home care needs in community needs assessments. However, functional status is measured in many different ways and the relationship between different types of functional status measures and home care services is not yet well understood. The 2001 AIM survey and linked administrative data contains information that can be used for an exploratory investigation of the relationship between three different functional status measures and the use of the Manitoba Home Care Program, which is a formal home care program provided to Manitobans in their own homes. It is anticipated that understanding how different types of functional status measures are able to differentiate between home care users and non users will assist clinicians and researchers with choosing the most efficient and accurate functional status measure.

CHAPTER 2: GUIDING CONCEPTUAL MODEL: THE ANDERSEN-NEWMAN FRAMEWORK OF HEALTH CARE UTILIZATION (1973)

The Andersen Behavioral Framework of Health Services Utilization (Andersen, 1968) was originally developed in the 1960's to help understand why families use health services, to help define and measure access to health care and to help with policy development and implementation on equitable access to health services. The model has had many adaptations over the last forty years. The version of the model to be used in this particular study is the Andersen-Newman Framework of Health Services Utilization (Andersen & Newman, 1973) (Figure 1.1). This more recent model uses the individual rather than the family as the unit of measurement.

The Andersen-Newman framework suggests that societal determinants such as technology and norms influence individual determinants both directly and through the health services system (including its resources and organization). The individual determinants then influence the health services used by an individual.

The individual determinants consist of: "1) the predisposition of the individual to use services; 2) his ability to secure services; and 3) his illness level" (Andersen & Newman, 1973, p .107) (Figure 1.2). The *predisposing* component includes variables that may predispose one individual to use more health services over another individual. These predisposing characteristics are all present prior to the onset of illness. People that have certain characteristics are more likely to use health services, even though these characteristics are not directly responsible for health service use. For example, although age alone is not a reason to seek health services, those who are older are more likely to seek health services. Therefore age is considered a predisposing condition.

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┌─────────────────────┐                           ┌─────────────────────┐
│ Societal            │                           │ Health Services     │
│ Determinants:       │──────────────────────────▶│ Systems:            │
│   • Technology      │                           │   • Resources       │
│   • Norms           │                           │   • Organization    │
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            \                                       /
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              ┌──────────────────────────┐
              │ Individual               │
              │ Determinants:            │
              │   • Predisposing         │
              │   • Enabling             │
              │   • Illness level        │
              └──────────────────────────┘
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              ┌──────────────────────────┐
              │ Health Services          │
              │ Utilization:             │
              │   • Type                 │
              │   • Purpose              │
              │   • Unit of              │
              │     Analysis             │
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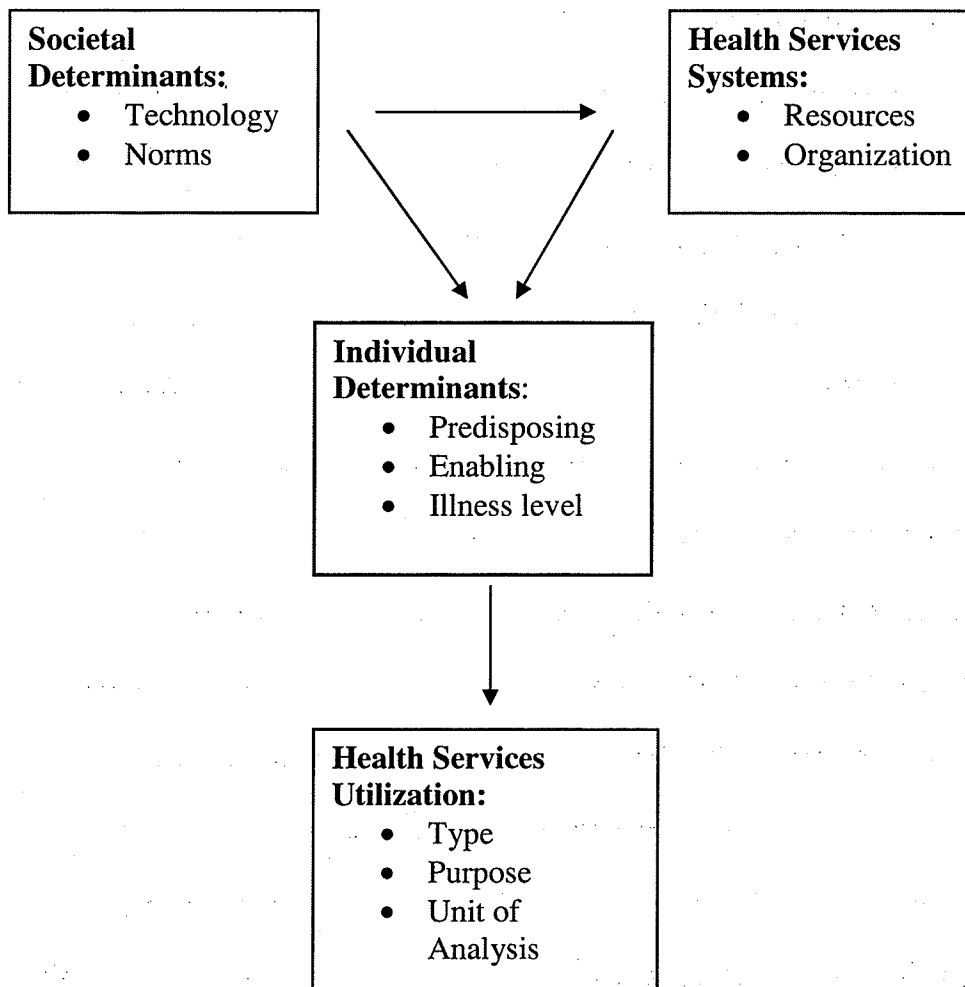
Figure 1.1: Andersen-Newman Framework for Health Services Utilization (1973)

From: Andersen & Newman (1973), p. 98, used with permission from Blackwell Publishing Inc.

Predisposing →

Enabling →

Illness Level (Need)

Demographic
- Age
- Sex
- Marital status
- Past illness

Family
- Income
- Health insurance
- Type of regular source
- Access to regular source

Perceived
- Disability
- Symptoms
- Diagnoses
- General state

Social Structure
- Education
- Race
- Occupation
- Family size
- Ethnicity
- Religion
- Residential mobility

Community
- Ratios of health personnel and facilities to population
- Price of health services
- Region of country
- Urban non urban character

Evaluated
- Symptoms
- Diagnoses

Beliefs
- Values concerning health and illness
- Attitudes toward health services
- Knowledge about disease

Figure 1.2: Individual Determinants of the Andersen-Newman Framework of Health Services Utilization (1973)

From Andersen & Newman (1973), p.107, used with permission from Blackwell Publishing Inc.

Predisposing characteristics are broken into three categories: 1) demographic, 2) social structural and 3) attitudinal-belief variables. The demographic variables include age, sex, marital status and past illness. Social structural variables reflect an individual's status in society and include education, race, occupation, family size, ethnicity, religion, and residential mobility. Attitudinal-belief variables are included because "what an individual thinks about health may ultimately influence health and illness behavior" (Andersen & Newman, 1973, p. 108). This category includes values concerning health and illness, attitudes towards health services and knowledge about disease.

The *enabling* component of the Andersen -Newman framework reflects that a person must have the appropriate resources to access health services before the services can be accessed. "A condition which permits a family to act on a value or satisfy a need regarding health service use is defined as enabling" (Andersen & Newman, 1973, p.109). Enabling components include family and community related resources. Family enabling components may include: income, health insurance, type of regular source of care, and access to a regular source of care. Community enabling components include: ratios of health personnel and facilities to population, price of health services, region of country and urban-rural character.

The illness component represents the most immediate cause of health service use and is also referred to as the *need* component. The illness component consists of both the perception of illness by the individual or family member (perceived) and the clinical evaluation of the existence of need for care (evaluated). Perceived variables may include measures of disability (such as number of disability days), symptoms, diagnoses or general state of health. Evaluated variables may include any clinical scale used in

physical or mental evaluation of an individual. Andersen-Newman purports that through the use of this model, the major determinants of health services utilization have been addressed, so that the need for new explanatory variables is minimal.

The Andersen-Newman framework has been chosen to guide and structure this study for two primary reasons. First, it provides consistency with the existing home care literature and facilitates comparisons between the current study and previous research on this topic. These comparisons are more easily made because the Andersen-Newman framework has been used almost exclusively to classify predictors of home care use in previous literature (Chappell, 1994). Second, this model is well tailored to evaluating the association of both self-report and performance-based measures with home care utilization. Self-report measures are an individual's perceived level of need, whereas a performance measure is a level of need evaluated by a health professional. These two concepts of need (perceived and evaluated) are explicitly addressed in the Andersen-Newman framework as influencing health service use by an individual, resulting in a sound match between the study's aim and the conceptual model.

Use of the Andersen-Newman framework has been both praised and criticized in the literature, with the strongest criticism being that the model has explained very little variance in studies examining the predictors of health care utilization (Porter, 2000). The best explanation of variation has been by Kempen and Suurmeijer (1991) who have explained up to 60% of the variance in the amount of home care services used by individuals in the Netherlands. Nevertheless, this model continues to be the model of choice in the health care utilization literature and the use of the model continues to be honed by researchers.

The Andersen-Newman framework allows for a broad view of the predictors of individual health services utilization as it incorporates *Societal Determinants, Health Services Systems* and *Individual Determinants*. The Individual Determinants component specifically has been used recurrently in literature studying the predictors of home care utilization. This current study will also focus on the *Individual Determinants* component of the Andersen-Newman framework since the primary focus of this current study is on individual functional status.

In summary, the use of the Andersen-Newman framework in this study allows for comparison with other home care literature, a broad view of the individual, and an acknowledgement of the importance of perceived as well as evaluated level of need.

CHAPTER 3: LITERATURE REVIEW

The literature relevant to this study is discussed in three main sections. The first

focuses on functional status measures and includes a definition of functional status, a

discussion of measurement issues related to functional status measures, and a summary of

what is known about the correlation between different types of functional status

measures. The second section discusses relationships between functional status measures

and home care including cross-sectional and longitudinal literature. Finally, predictors of

home care use (other than functional status) are discussed and structured using the

Andersen-Newman framework.

Literature Search Strategy

The literature search strategy was approached systematically and began by

citation-tracking the primary article instigating this study (Finlayson et al., 2003). Next,

reference lists for these journal articles were assessed for further material. To capture all

relevant articles, an electronic database search was then initiated using two guiding

questions and using the key terms embedded within them:

1. *What are the methodological and theoretical considerations with measuring*

    both observed and self-reported functional status in older adults?

    The term *functional status* and all related terms were searched (activities of

    daily living (ADL), functional ability, functional assessment, functional status,

    geriatric functional assessment, instrumental activities of daily living (IADL),

    and self care). Added to this term were the terms *self-report measures* (and

    the related terms observation, observational methods, self assessment, self-

report) and *performance* (and the related terms physical performance, task performance and analysis).

2. *Does measurement of functional status predict home care use?*

The term *functional status* and all related terms were searched with the addition of the terms *predictive factors* (and the related terms predictive research, probability, risk, risk factors, causality) and *home care services* (and the related terms homemaker services, home health care, home nursing, home nursing (professional)).

The search for both guiding questions was conducted using the following databases: Ageline 1978-June 2007, Allied and Complementary Medicine Database (AMED) 1985-June 2007, CINAHL 1982-June 2007 and MEDLINE (1966 to In-process and other citations June 2007) (through SilverPlatter).

To ensure that all relevant articles were captured, all reference lists were first screened for relevant articles and citation tracking of the most relevant articles was undertaken. Articles were excluded if their definition of functional status did not include ADL or IADL activities (for example, pulmonary function tests). Further exclusion/inclusion criteria for articles in this review are outlined in each section of the literature review.

Functional Status Measures

Defining Functional Status

Many models and frameworks have been developed to guide thinking about the concept of human functioning. The main models and frameworks used in the literature

are: the International Classification of Impairments, Disabilities and Handicaps (ICIDH) (WHO, 1980), The International Classification of Functioning, Disability and Health (World Health Organization, 2001), "The Disablement Process" (Verbrugge & Jette, 1994) and the sociological framework developed by Nagi (1965). Since each of these frameworks interprets terms such as functional status, functional limitations, disability, and impairments differently, it is important to clarify the definition that will be used in this study for the term "functional status."

This study will adhere to a definition of functional status published by Wang (2004). He defines functional status as a concept that describes a person's ability to perform activities that are necessary for daily living. Although Wang's definition of functional status incorporates a person's abilities for self care, productivity, leisure and social interactions, this literature review and study will be limited to examining a person's abilities with ADL and IADL activities (self care and productivity) due to the data available through the AIM 2001 survey.

Keeping in mind the definition of functional status chosen for this study, a review was made of the aforementioned frameworks for disability and their related terminology. The goal of this exercise was to establish the terminology in these disability frameworks that matches or incorporates the study definition of functional status in order to create inclusion/exclusion criteria for the literature review. A term common to all the frameworks is *impairment*, which is defined as an abnormality or loss of a body part or structure. Since the study term of functional status is activity based, the definition of impairment does not match and thus articles addressing only impairment were excluded.

The definitions for the terms *limitations* and *disability* tend to overlap and both incorporate aspects of functional status. The definitions for the term *limitations* have the most variations, ranging from being synonymous with *impairments* (as in the WHO 1980 document) to being a term to depict difficulty executing activities (as in the 2001 WHO framework). Verbrugge and Jette. (1994) define limitations as "restrictions in performing fundamental actions used in daily life by one's age-sex group" (p. 3) and Nagi views limitations as operating only at the level of individual performance, explaining that limitations are in the "functioning or performance of the human organism" (Nagi, 1976, p.441). In this literature review, the term *impairments* will be used to describe a person's difficulty with executing tasks without context such as lifting a book from a table, writing a sentence, or picking up beans with a spoon and placing them in a can.

The measurement of *disability* is generally defined as a person's difficulty with performance or "doing" of an activity or task. Nagi describes a disability as a "limitation in performance of socially defined roles and tasks within a sociocultural and physical environment" (Nagi 1965 as quoted by Verbrugge & Jette, 1994, p.2) and by Verbrugge and Jette (1994) as "difficulty doing activities of daily life" (p.3). The WHO in 1980 defined disability as "restriction or lack of ability to perform an activity in a normal manner" (p. 28) and in 2001 the concept of disability includes impairments, activity limitations, and participation restriction. In this literature review, the term *disability* will be used to describe difficulties performing tasks with social or environmental context such as getting dressed, doing the laundry, or using the telephone. However, since the measurement of functional status can potentially fall within the definitions for *limitations*

and *disability* as defined by popular disability frameworks, this literature review includes articles that address both concepts.

Methods of Measuring Functional Status

Two primary methods can be used when measuring a person's functional status: the person can be observed performing a functional task or the person can be asked to self-report their ability to perform certain tasks. The superiority of performance versus self-report measures has been debated without resolution. The main advantage of self-report measures is their clinical utility; they are low in cost, fast and easy to administer (Angel & Frisco, 2001; Cress et al., 1995; Harris, Jette, & Campion, 1986; Schenkman, Scherer, Riegger-Krugh, & Cutson, 2002; Skruppy, 1993). However, these advantages must be balanced with the limitations of self-report measures. One limitation is that self-report measures may present difficulties with recall. For example, one study showed that subjects did not recall all the human assistance they received, especially in the area of IADL. The authors suggested that providing a list of examples can help to avoid this problem (Keller, Kovar, Jobe, & Branch, 1993). A second limitation with self-report measures is the lack of standardized wording used in the questions. "Seemingly minor differences in the wording of questions can have large effects on the proportion of elderly respondents who report difficulty or the receipt of help with specific ADLs . . ." (Rodgers & Miller, 1997, p. 34). A third limitation is that self-report measure results can fluctuate depending on an individual's emotional status. People tend to express affective distress as physical illness, and those with depression or low levels of physical competency or personal control consistently underestimate their abilities (Angel & Frisco, 2001; Jang,

Mortimer, Haley, & Graves, 2002; Steverink, Ormel, & Deeg, 1996a; Kempen, van Heuvelen, et al., 1996). A fourth limitation is that self-report of functional status is vulnerable to response shift, or an individual's tendency to change their expectations of their own performance based on recent health events or their advancing age. For example, someone who is asked if they have any difficulty doing their own laundry may every year report that "no, they do not have difficulty doing their laundry", when in fact, they are mentally (consciously or unconsciously) adding the disclaimer "for my age" to the end of the response (Finlayson et al., 2003). In order to help control for this, it is suggested to administer performance-based measures prior to self-report measures (Daltroy, Larson, Eaton, Phillips, & Liang, 1999; Hoeymans, Feskens, van den Bos, & Kromhout, 1996).

The advantages of performance measures are that they are less influenced by poor cognitive functioning, educational level, language and culture (Angel & Frisco, 2001; Cress et al., 1995; Guralnik, Branch, Cummings, & Curb, 1989; Hoeymans et al., 1996; Myers, Holliday, Harvey, & Hutchison, 1993; Rozzini, Frisoni, Bianchetti, Zanetti, & Trabucchi, 1993), in addition to being more sensitive to the use or non-use of aids and/or outside help. Their disadvantages are that they are expensive, time consuming and require special training for examiners, adequate space, and special equipment (Angel & Frisco, 2001; Applegate, 1990; Avlund, 1997; Guralnik et al., 1989; Harris et al., 1986; Kempen, Steverink, et al., 1996; Kempen, van Heuvelen, et al., 1996; Myers et al., 1993; Skruppy, 1993). Performance measures also present a risk of injury to the subject (Guralnik et al., 1989) and Myers and colleagues. (1993) demonstrated that they are less acceptable to subjects than self-report methods as 54% of a sample refused to complete at

least one of the performance tasks in her study of 99 community-dwelling older adults. Finally, performance measures reflect performance at only a single point in time (Branch & Meyers, 1987; Cress et al., 1995).

A further consideration for the measurement of functional status is whether the objective is to measure usual behaviour (how the individual usually functions) or capacity (maximum ability to perform a particular activity). Usual behaviour can be more significantly affected by nonphysical performance abilities such as mental state and sources of social support, whereas capacity is largely determined by physiological constraints. For self-report measures, the difference between usual behaviour and capacity can be reflected in the wording of the questions. Questions measuring usual behaviour ask an individual "Do you (e.g., do your laundry by yourself?)" whereas questions that measure capacity would ask "Can you (e.g., do your laundry by yourself?)". Myers and Huddy (1985) showed that older adults underestimate their ability to perform tasks they no longer perform. This implies that asking about someone's usual activities is a more reliable measure of ADL performance, but on the other hand, will not necessarily capture an individual's true physical or cognitive capabilities (Branch & Meyers, 1987). There are concerns specifically around self-report of IADL since there can be considerable variation in the reasons why people do not perform IADL activities and why they are dependent on help for IADL (Avlund, 1997). Some reasons for not performing IADL are: no need, somebody else does it, not motivated to do it or does not know how to do it, physical inability, health problems, fear of falling and environmental obstacles (Myers et al., 1993). The level of disability or needs of a population may differ depending on whether functional status was assessed

using measures of capacity or measures of usual performance. Therefore, comparison of these methods of functional status measurement for predicting health service use is indicated as well as comparing self-report and performance-based measures.

Although the psychometric properties of both performance and self-report measures can be highly variable depending on the exact tool being used, some broad conclusions have been drawn about the psychometric properties of self-report and performance measures in general. In terms of reliability, the test-retest reliability of both performance and self-report measures has been found to be moderate to high and declines with age (Crawford, Jette, & Tennstedt, 1997; Hoeymans, Wouters, Feskens, van den Bos, & Kromhout, 1997), although performance measures have superior reproducibility.

Some generalizations can be made regarding the validity of functional status measures as well. The testing of criterion validity is challenging as there is no gold standard in the field (Fisher, 1992a; Guralnik, 1987; Law, 1993). Nevertheless, self-report measures are believed to have both predictive and concurrent criterion validity since higher functioning on self-report measures is associated with lower mortality and higher outcomes on other health measures such as global health. Self-report measures also are considered to have construct validity since ADL self-assessments are related to physical performance components (Angel & Frisco, 2001; Myers & Huddy, 1985). On the other hand, self-report measures have been criticized for having poor validity if no strict definitions are included for the activities being assessed (Angel & Frisco, 2001; Guralnik et al., 1989). The validity of performance measures are less discussed in the literature and only good face validity has been reported to date (Avlund, 1997; Guralnik et al., 1989; Harris et al., 1986; Kempen, Steverink, et al., 1996).

It has been suggested that performance measures are superior in their ability to detect change (Guralnik et al., 1989; Kempen, Steverink, et al., 1996) since performance measures are sensitive at detecting mild degrees of health impairment "before overt disability is apparent" (Rozzini et al., 1993), while this sensitivity was not present in self-report measures (Guralnik et al., 1989; Schenkman et al., 2002).

The measurement of functional status is not as clear-cut as some other measurements in the health field such as measuring blood pressure. When using functional status measures, it is important to keep in mind the following limitations in the psychometric design of functional status measures. One issue is that we know little about the relative challenge of most ADL and IADL activities. Therefore variable tasks are included in scales with no hierarchical importance assigned (Fisher, 1992b). Another complicating factor is that tools with several items are often summed, even though the content validity of the single items is not known, and the different items include more than one dimension. Tools using summary scores often "conceal as much information as they reveal" (Angel & Frisco, 2001; Applegate, 1990; Avlund, 1997). For example, a scale may include the two items: put on your pants and brush your hair. Let us imagine that two people are being assessed on their ability to perform these items. One of the individuals cannot put on her pants independently, but is able to brush her hair independently since her limitation is that she cannot reach her feet. The other individual's limitation is that he cannot reach his arms overhead, so he can put on his pants independently but not brush his hair. If both receive one point for each task they can perform, they would both have a score of one despite having different patterns of disability.

Scales of IADL and/or ADL have also been criticized for being insensitive to mild and moderate difficulties because they do not include the level of difficulty an individual has with tasks or because they are very coarsely scaled (Fisher, 1992b). Scales also tend to disregard the influence of personal effort and external support (Applegate, 1990; Eakin, 1989; Feinstein, Josephy, & Well, 1986; Fisher, 1992b).

In summary, there are several different methods available for measuring functional status. The measurement of functional status is a task wrought with methodological challenges; it is a complex concept to measure as it brings together various constructs such as physical and mental health, and the social and structural environment. Each method of measuring functional status has its limitations, the most significant being that performance measures are resource intensive.

Associations between Different Types of Functional Status Measures

Since there is debate over whether self-report or performance measures are superior, it is important to determine if these two types of measures correlate or if they are actually capturing different constructs.

Comparing Self-report and Performance Functional Status Measures

There has been considerable effort in the literature to compare self-report and performance measures, however collating the information is challenging due to the use of different disability models and terminology and the multitude of functional status instruments available.

To summarize the literature, studies were divided into three categories as identified in Figure 3.1. Studies that compare a self-report measure and a performance

measure of *limitation* are included in Category 1. Category 2 includes those studies that compare a self-report measure of *disability* with a performance measure of *limitation* and Category 3 includes studies that compare a self-report measure and a performance measure that both address *disability*. No studies were found with a self-report measure of limitation and a performance measure of disability. Walking and rising from a chair presented challenges for categorizing between limitations and disability. Whenever possible, walking and rising from a chair were categorized as a measure of limitation if the walking had no social or environmental context (i.e., can you walk 400 metres? or walking speed). Walking was categorized as a measure of disability if environmental or social context was present (i.e., can you walk by yourself through your house?). However, the categorization of these two mobility tasks is not perfect as mobility is commonly included in ADL scales and it did not seem logical to separate the mobility component from the scale even if it seemed to address a different functional construct (impairment versus disability).

All studies presented in Figure 3.1 were examined in detail to determine the types of association found between performance and self-report measures. However, for the purposes of this literature review, only studies in Category 3 will be discussed in detail as the review revealed that this category of studies is the best methodological match to the measures used in this current study. This study is interested in a person's ability to perform whole functional status tasks rather than skills related to the tasks.

		Performance	
		Limitation*	**Disability****
Self-report	**Limitation**	*Category 1:* 1. Kempen, Steverink, et al., 1996 2. Kempen, van Heuvelen, et al., 1996 3. Ferrer, Lamarca, Orfila & Alonso, 1999 4. Angel, Ostir, Frisco & Markides, 2000 5. Simonsick et al., 2001	No studies found.
	Disability	*Category 2:* 1. Myers & Huddy, 1985 2. Guralnik et al.,1994 3. Reuben, Valle, Hays & Siu, 1995 4. Kivenen, Sulkava, Halonen, & Nissinen, 1998 5. Sherman & Reuben, 1998 6. Simonsick et al., 2001 7. Owens et al., 2002	*Category 3:* 1. Kaufert et al., 1979 2. Elam et al., 1991 3. Kelly-Hayes, Jette, & Wolf, 1992 4. Myers et al., 1993 5. Greiner, Snowdon, & Greiner, 1996 6. Kempen, Steverink, et al., 1996 7. Sinoff & Ore, 1997 8. Wijlhuizen & Ooijendijk, 1999 9. Finlayson, Havens, Holm & Van Denend, (2003) 10. Rogers et al., (2003)

Figure 3.1: Studies Comparing Self-report and Performance Measures Classified by the Level of Functional Status Measurement

Limitation refers to the ability to perform tasks without social or environmental context (e.g., lifting a book from a table, writing a sentence, picking up beans with a spoon and placing them in a can).

**Disability* refers to the ability to perform tasks with social or environmental context (e.g., getting dressed, doing the laundry, using the telephone).

All of the Category 3 studies directly matched the ADL and IADL tasks when

looking at the correspondence between self-report and performance. For example, if the

performance tasks included dressing, using the telephone and doing laundry, the self-

report measure also asked the person's ability to perform the tasks of dressing, using the

telephone and performing laundry. The details of these studies in terms of sample size,

measurement strategies used, statistical strategy and results can be found in Figure 3.2.

In general, most of these studies had variable results with some studies reporting high

correlations and others reporting low or no correlation. The tasks across studies were

also reviewed and these correlations also did not appear to be stable across tasks. For

example, for indoor transfers, some studies found only slight correlation (Sinoff & Ore,

1997; Wijlhuizen & Ooijendijk, 1999) while others found moderate (Elam et al., 1991) or

high (Kaufert et al., 1979; Kelly-Hayes, Jette, & Wolf, 1992) correlations between self-

report and performance measures. One explanation for the variability in study results is

that different functional status assessments were used in the studies. Another explanation

is that the methodology and statistical approaches also varied from study to study. A

third explanation was suggested by Myers, Holliday, Harvey and Hutchinson (1993) who

found good correspondence (greater than 80% agreement) for five of the 14 IADL

measured tasks and found that those tasks with good correspondence were those where

specific wording of the item closely reflected what subjects were asked to do for the

performance measure.

Figure 3.2: Category Three Studies: Examination of Correlations Between Self-report and Performance Measures

Author, Date	Sample	Self-report Measure (of Disability)	Performance Measure (of Disability)	Analysis	Results
Kaufert et al. (1979)	n = 92 -75+ years -Recruited from physician's general practice	Questionnaire administered in patient's home	Observation of 13 ADL / IADL - Raters also used medical tests and patient charts.	Concordance	Indoor mobility: 93 - 98% Stairs and outdoor mobility: 68 – 84% ADL: 93-97% IADL: 49-63%
Myers et al. (1985)	n = 99 -60 and 92 years -Canada	14 items from a 50 item IADL questionnaire rated on difficulty	14 tasks developed to mirror specific items from the IADL questionnaire (observed difficulty)	Concordance	Over 80% for: telling time, phone use, cooking light meals, cooking full meals, reaching Over 60% for: writing, reading label, opening variety of medication bottles, sweeping Over 50% for: walking, telephone directory
Elam et al. (1991)	n = 73 -60+ years -Hospitalized – -US	Rate ability in 5 ADL tasks (walk, dress, eat, transfer, phone)	5 corresponding tests	Phi coefficients	Less than 0.30 for eating, 0.30-0.70 for dressing, telephone and transfers, 0.80 for walking.
Kelly-Hayes, Jette & Wolf (1992)	n = 1453 -63 to 72 years -Community-dwelling -Massachussetts	6 ADL tasks from Katz, Mahoney, and Barthel indexes	6 ADL tasks from Katz, Mahoney, and Barthel indexes	Cross tabulations/ extension of McNemar's	Overall difference between performance and self-report = 3.1-6.5%. Self-reported disability was greater than observed disability.

Author, Date	Sample	Self-report Measure (of Disability)	Performance Measure (of Disability)	Analysis	Results
Greiner, Snowdon & Greiner (1996)	n=629 -Nuns 75 -102 years	"Compared to sisters your age, would you say your ability to take care of yourself is excellent, very good, good, fair or poor?"	Ability in six activities of daily living (bathing, dressing, moving from sitting to standing, walking, toileting, and feeding). No aids allowed.	Correlation coefficients	Self-rated function negatively correlated with total number of dependent ADLs (-0.58, p<.001).
Kempen, Steverink, Ormel & Deeg (1996)	n = 753 -57+ years - Netherlands	"Can you dress self?" "Can you get around the house?" And 11 self-report items (summary score)	From Longitudinal Aging Study Amsterdam study: putting on and taking off jacket; walking 6 m	Multiple regression, correlation coefficients	Performance tests explain most of variation in summary self-report score (r^2 = 38.8%). For walking, performance task explained 15.3% of variation in self-report score. For dressing, performance task explained 12.5% of variation in self-report score.
Sinoff and Ore (1997)	n = 126 -Geriatric ward and daycare -Israel	Self-report version of Barthel Index	Barthel Index	Percentage exact agreement with Kappa coefficient	Kappa ranges from 0.103 (continence) to 0.398 (toilet transfer) indicating slight agreement

Author, Date	Sample	Self-report Measure (of Disability)	Performance Measure (of Disability)	Analysis	Results
Wijlhuizen and Ooijendijk (1999)	n = 93 -67 to 86 years -Living independently in Netherlands	10 questions with responses based on difficulty	10 associated tasks	Cohen's kappa	Kappa 0.16 (toilet) to 0.45 (chair transfer) indicating slight to moderate agreement.
Finlayson, Havens, Holm and Van Denend (2003)	n = 138 -Aging in Manitoba study -77+ years -Community dwelling	9 tasks: 1) Capacity "Can you .. ?) 2) Behaviour ("Do you .. ?)	9 tasks from Performance Assessment of Self Care Skills (PASS)	Spearman's rank correlation	Self-report of capacity and performance r= 0.56, p=0.12 Self-report of behaviour and performance r=0.49, p=0.19.
Rogers et al. (2003)	n = 57 -70+ years -Community dwelling -US	PASS 3.1 items converted to self-report questions (capability)	PASS 3.1 home version	Percent agreement	Physical IADL: 46.1% Functional mobility: 57.5% Cognitive IADL: 68.1% Personal Care: 69%

One task that seemed to have some consistency in the results was *indoor walking*. Indoor walking tasks had moderate to high associations in all of the studies (Elam et al., 1991; Kaufert et al., 1979; Kelly-Hayes et al., 1992; Sinoff & Ore, 1997; Wijlhuizen & Ooijendijk, 1999) except for one study where there was no difference in the performance score between those who reported no difficulty on self-report measures and those who did report difficulty on self-report measures (Myers et al., 1993). In addition, multiple regression demonstrated that the performance of mobility explained 15.3% of the variation in a self-report score (Kempen, Steverink, et al., 1996).

Two of three studies demonstrated moderate agreement for *bathing* whether measured by percent agreement or Spearman correlation (Kaufert et al., 1979; Sinoff & Ore, 1997; Wijlhuizen & Ooijendijk, 1999).

ADL tasks with variable results were *dressing*, and *feeding*. For dressing, results varied from slight (Sinoff & Ore, 1997; Wijlhuizen & Ooijendijk, 1999) to moderate (Elam et al., 1991) to high agreement (Kaufert et al., 1979; Kelly-Hayes et al., 1992). A similar situation was found for feeding as results ranged from slight (Sinoff & Ore, 1997; Wijlhuizen & Ooijendijk, 1999) to low (Elam et al., 1991) to high agreement (Kaufert et al., 1979; Kelly-Hayes et al., 1992).

Very few studies looked at IADL tasks instead of, or in addition to, ADL tasks. Only two of the studies looked at telephone use. Phi coefficients demonstrated moderate correlation between performance and self-report measures (Elam et al., 1991) while in another study there was no difference in performance between those who report independence and those who report dependence in self-report (Myers et al., 1993). Only one study looked at *housework* and *shopping* as individual tasks and the results indicated

a low percent agreement of 49% for housework and 55% for shopping (Kaufert et al., 1979).

One study that should be highlighted is that by Finlayson, Havens, Holm and Van Denend (2003) since it used the same data and sample as this current study. Finlayson and colleagues looked at the correlations between performance and self-report summary scores of nine tasks: indoor mobility, dressing upper body, telephone, medication, pay bills, home repairs, first aid, shopping and laundry. No significant correlations were found between the performance measure and self-report of capacity (r = 0.56, p = 0.12) and the performance measure and self-report of behaviour (r = 0.49, p = 0.19). In summary, the correlation of self-report and performance measures of disability has considerable variation from no correlation to moderate correlations. This variability seems to depend on the exact functional status measurement tool used and which functional tasks are examined. It has become clear that neither self-report nor performance-based measures are superior (Myers et al., 1993), rather they measure different constructs (Angel & Frisco, 2001; Parker, Thorslund, & Lundberg, 1994), and some authors suggest that they may be complementary (Guo, Matousek, Sonn, Sundh, & Steen, 2000; Reuben et al., 2004).

Comparing Different Types of Self-report Measures

As discussed earlier, there are different types of self-report measures depending on the wording of the self-report item. One type is to ask a person's capacity ("Can you?"); another is to ask a person of their usual behaviour ("Do you?"). A third way is to ask someone the amount of difficulty they have with a particular task. These different forms of self-report questions have been compared in an attempt to determine the extent

to which a person's answer may differ depending on the wording of the question. One source of differences between the responses of self-report questions is gender differences, particularly for measurement of IADL (Myers et al., 1993). Avlund (1991) demonstrated that men and women are both able to perform the same basic activities of daily living (BADL) but significant differences exist in the IADL that men and women perform in their daily routines. For example, more women than men actually perform cooking and cleaning, even though they reported to have more difficulty with these tasks than men did. This same pattern was found with men for repair activities. A study by Allen, Mor, Raveis, & Houts (1993) has demonstrated that half the help received by men in tasks typically thought of as "women's work" is attributable to gender-role responsibilities rather than functional disability.

To summarize, neither self-report nor performance measures have been found to be superior in the literature, in fact it is becoming more accepted that these methods of functional status measurement measure different constructs due to their low to moderate level of correlation. Different types of self-report measures are more congruent, but still tend to yield different results.

Relationships between Functional Status and Home Care Utilization

The literature was reviewed to determine what we know about the relationships between functional status and home care, both cross-sectionally and longitudinally, as well as to see if there is information on how different types of functional status measures are associated with home care use.

Cross-sectional Relationship between Functional Status and Home Care Utilization

Three Canadian studies were found that looked at the cross-sectional relationship between functional status and home care utilization. The earliest was completed in 1998 using data from the 1994/95 Canadian National Population Health Survey (Wilkins & Park, 1998). This survey measured dependence in IADL's with the question: "Because of any condition or health problem, do you need the help of another person: preparing meals? Shopping for groceries or other necessities? Doing normal everyday housework? Doing heavy household chores such as washing walls, yard work, etc.?" (p. 32) and measured dependency in ADL's by extending the question to "Personal care such as washing, dressing or eating? Moving about inside the house?" (p. 32). The odds of using home care was ten times greater for people who did versus did not require help with ADL or IADL tasks (OR = 10.8 (CI 8.07 - 14.40)).

The next study was published in 2003 by Forbes and colleagues using data again from the Canadian National Population Health Survey, but using data from three different years (1994/95, 1996/97, 1998/99) and using a more specific outcome regarding the type of home care service received. Their results demonstrated that the ability of functional status to predict home care use varied depending on the specific home care service being studied as the outcome. For example, they found that persons who did not need help with housework were more likely to have received nursing services and those who needed help with housework were more likely to have received home care for housework services. In addition, those who needed help with personal care did not have any higher use of nursing services than those that did not; rather, they were more likely to receive housework assistance.

Finally, Carriere (2006) used data from the 2003 Canadian Community Health Survey to demonstrate that people who report needing help with ADL and IADL activities are more likely to receive home care services (data were not shown).

The Predictive Ability of Functional Status for Determining Home Care Utilization

Previous research has thoroughly investigated how functional status influences subsequent home care utilization. This review focuses on studies that examine a Canadian population using a longitudinal research design. Studies focusing on a specific diagnosis were excluded. These criteria limited the field to five studies (Doupe, 2004; Finlayson, 2002; Hall & Coyte, 2001; Shapiro, 1986; Shapiro & Tate, 1997).

The earliest study by Shapiro (1986) had a sample consisting of 2993 Manitoban older adults from the Manitoba Longitudinal Study on Aging who had undergone an interview in 1971. Those participants who did not use home care services between 1975 and 1978 were compared to those who did, and the predictors of home care utilization were modeled using logistic regression with independent variables drawn from the 1971 interview. Difficulty in coping with IADL's was one of the best predictors of subsequent home care use, preceded only by age.

Another study by Shapiro and Tate (1997) had a primary focus of investigating home care service use of individuals with cognitive impairment, but also included functional status in its modeling. For this sample of 226 Manitobans aged 65 and over, the odds of receiving home care was four times higher if an individual had one or more ADL problems versus no ADL problems (OR 4.52, CI 1.74 - 11.76, $p = .002$) and the

odds were also four times higher for individuals with three or more IADL problems versus one or more ADL problems (OR 4.40, CI 1.75 – 11.08, p = .002).

Hall and Coyte (2001) reviewed the Ontario household sample of the 1994/95 Population Health Survey Health file and linked it to the Ontario Home Care Administrative System database. The sample of 3830 persons 25 years and older was examined to evaluate the relevant predictors of home care utilization. Using logistic regression modeling, they found that the odds of receiving home care in one year following the survey were higher for people who received assistance with ADL/IADL's versus those who did not (OR = 2.14 (1.21 – 3.76)).

Doupe (2004) used the Aging in Manitoba Longitudinal Study to look at predictors of home care utilization. In univariate analyses, those who reported needing help in ADL and IADL tasks in 1990 had an increased risk of using home care services in the subsequent 30 months. In addition, those who had a decrease in independence in ADL and IADL tasks between 1983 and 1990 were also at increased risk of using home care services. Multivariate analyses supported the finding that decreased independence in ADL and IADL tasks predicts subsequent home care use.

In contrast, Finlayson (2002) found that changes in ADL's and IADL's were not factors that predicted home care use in 616 of the Aging in Manitoba Longitudinal Study participants. She used logistic regression with concatenation and investigated whether or not differences in ADL and IADL's between 1983 and 1990 predicted home care service receipt in 1996. Finlayson postulated that the contrasting results of this study with other work on the predictors of home care utilization could be explained several ways. It could be an artifact of including only survivors in the sample. It could be due to looking at

changes over time rather than baseline status or it could be due to a ceiling effect (lack of sensitivity in the measure for people with higher levels of function) in the ADL and IADL measures.

Chappell (1994) conducted a review of the home care utilization literature. Her review validated that functional status predicts home care use since she found research supporting that functional disability is a major predictor of home care services for different countries, with different samples, different health care systems, different measurement types and different comparison groups.

Associations between Functional Status Measurement Types and Home Care Utilization

One article was found that looked at different types of functional status measures and compared their abilities to identify formal home care users. This cross-sectional study by Jenkins and Laditka (2003) was conducted on 7241 community-dwelling Americans aged 70 years and over. The purpose of the study was to compare different disability measurements (as determined by two different types of self-report measures of functional status) and investigate their association to home care utilization.

Data were collected from the 1993 Survey of Asset and Health Dynamics Among the Oldest Old (AHEAD), including one question on whether or not they received home care within the previous year and questions relating to whether or not they receive help and/or if they have difficulty performing five ADL's. The phrasing of the self-report questions of ADL's were "Does anyone help you . . .? If yes, do you have difficulty even when someone is helping you? And if no, do you have difficulty . . . without help?" This

phrasing of the ADL questions resulted in four categories of disability: potential disability (receives help but has no difficulty), independent disability (has difficulty but does not receive help), dependent disability (has help and has difficulty) and inclusive disability (encompasses all combinations of difficulty and help).

Jenkins and Laditka (2003) looked at the home care use of those with a "moderate disability" in each of the four disability categories. Moderate disability was defined as needing assistance for two or more ADL items. In logistic regression, the odds of using home care was greater for people with moderate disability versus no disability in all four of the disability categories, but the categories that incorporated whether or not someone received help had much higher odds ratios. This indicates that a self-report measure that asks about the *help* someone receives for ADL's is more related to home care use than a measure that asks someone how much *difficulty* they are having in completing ADL's.

In summary, there is evidence that functional status is valid in its ability to predict health service use. However, predictive studies to date have used only one type of functional status measure (most commonly self-report). There are few studies examining how different methods of functional status measurement differentiate between home care users and non-users.

Relationships between Individual Determinants of the Andersen-Newman Framework and Home Care Utilization

Variables other than functional status that may influence the use of home care services will be discussed using the "Individual Determinants" component of the Andersen-Newman Framework of Health Services Utilization (1973).

Cross-Sectional Relationship between Individual Determinants and Home Care Utilization

This information was gleaned from cross-sectional studies with a sample from Canada or the United States. Effort was made to ensure the studies focused on older adults whenever possible. The methodological details of the studies included in this review are summarized in Figure 3.3. Of note is that two of the studies used the type of home care service as the outcome rather than a simple yes/no home care outcome (Diwan, Berger, & Manns, 1997; Forbes et al., 2003).

Predisposing Factors

There is strong evidence from cross-sectional studies that *age* is associated with home care use as older persons are reported to be heavier users of home care services (Carriere, 2006; Coughlin, McBride, Perozek, & Liu, 1992; Diwan et al., 1997; Wilkins & Park, 1998). However, studies that looked at specific types of home care service as the outcome of interest found that the relationship between age and home care service depends on the type of service that is being received. For example, Forbes and colleagues (2003) found that those over 65 years were more likely to use housework home care assist only in 1994/95 and that age was not associated with nursing service use in any of the years studied. Diwan and colleagues found that the odds of receiving homemaker services were slightly higher for older versus younger people, but that there was no association between age and nursing services or age and receiving personal care assistance from a home health aide.

Author, Year	Sample	Geographic Location of Sample	Statistical Methodology
Carriere, 2006	n = 322,000 who received formal care n= 85,000 who received combination of formal and informal care Aged 65 and over	Canadian Community Health Survey	Coefficient of variation
Coughlin, McBride, Perozek & Liu, 1992	n = "over 6000" "Disabled" persons 65 and over. Disabled = had needed help or expect to need help with ADL or IADL for 3 months or longer.	US National Long Term Care Survey	Tobit estimation
Diwan, Berger & Manns, 1997	n = 270 "Poor and frail elders" Aged 55 and older, receiving home care services	Georgia	Logistic regression
Forbes et al., 2003	n = 379 in 1994/95 n = 368 in 1996/97 n = 381 in 1998/99 Aged 18 and over	Canadian National Population Health Survey	Logistic regression
Wilkins & Park, 1998	n=16,231 Aged 18 years and over	1994/96 Canadian National Population Health Survey	Logistic regression

Figure 3.3: Studies Used for Review of Identifiers of Home Care Utilization According to Andersen-Newman Framework (1973)

The relationship between *sex* and home care use is not clear from cross-sectional studies. One study found that being female is associated with increased home care use (Coughlin et al., 1992). On the other hand, two other studies, one Canadian and one American found no relationship at all between sex and home care use (Diwan et al.,

1997; Wilkins & Park, 1998). Forbes and colleagues (2003) found that men were more likely to use home nursing in 1996/97 and that females were more likely to use homemaking services in 1994/95, thus demonstrating that the association between home care and sex may depend on the type of service that is being received.

None of the studies reviewed looked at the relationship between *marital status* and home care use. They all however looked at the *number of people the participants lived with* and if there was a relationship between this and home care use. Four of the studies found that those who live alone are more likely to receive home care services (Carriere, 2006; Coughlin et al., 1992; Diwan et al., 1997; Wilkins & Park, 1998). More specifically, Forbes and colleagues (2003) and Diwan and colleagues found that those who live alone are more likely to receive housekeeping services but are not more likely to receive nursing or assist with personal care. In addition, Carriere and Coughlin and colleagues found that those who lived with others were less likely to receive home care than those who lived alone, but were more likely to receive home care than those who lived only with a spouse.

Only one American study looked at the association between *nationality* (race) and home care use and found no significant association.

Education and *health beliefs* were not included in any of the reviewed studies. However, Strain (1991) found a statistically significant but weak relationship between health beliefs and a combination of health services (including general practitioners, medical specialists, emergency clinics, other hospital services, medical labs, pharmacists, public health nurses and home care).

Enabling Factors

The findings regarding the association between home care use and *income* are contradictory in cross-sectional studies. One American study (Diwan et al., 1997) found no association between income and home care, another American study (Coughlin et al., 1992) found that those with higher income are more likely to use home care services and a third Canadian study (Wilkins & Park, 1998) found that those with higher incomes are less likely to use home care services. Finally, Forbes and colleagues (2003) found that those with a higher income were more likely to receive home nursing services in 1994/95; otherwise they did not find any association between income and nursing services and homemaking services.

Social contact and *physician access* were not examined by any of the reviewed studies.

Need Factors

Wilkins and Park (1998) found that people with poor or fair *self-rated health* were more likely to receive home care services than people that rate their health as good or better. Again Forbes and colleagues (2003) looked at a more specific outcome of service type and found that in two of the three study years, people with perceived poor health were more likely to receive nursing services, whereas there was no association between perceived health and the receipt of homemaking services.

Health conditions of the participants were studied in different ways by four of the reviewed studies. Wilkins and Park (1998) looked at several different health conditions and found that only stroke and cancer increased a person's home care use. Carriere

(2006) found that people who have two or more chronic conditions use home care more than those with zero or one chronic condition. Diwan (1997) found that people who have more diseases or illnesses have increased nursing use but not necessarily more homemaking or personal care home care services. Finally, Forbes and colleagues (2003) found little relation between chronic conditions and home care use except that people without chronic conditions were more likely to having nursing service in one of the three years studied.

Mental status was examined only by Diwan and colleagues (1997). They found that people with cognitive impairment were less likely to have homemaking services.

Past home care use and *depression* were not included in any of the reviewed cross-sectional studies.

In summary, research tells us that home care users are older, tend to live alone, have a poorer self-rated health and tend to have more health conditions than those who don't use home care.

The Ability of Individual Determinants to Predict Home Care Utilization

This information was gleaned from prospective studies that had sample data from Canada or the United States. Effort was made to ensure the studies focused on older adults whenever possible. The methodological details of the studies included in this review are summarized in Figure 3.4.

Author, Year	Sample	Geographic Location of Sample	Time-frame for Follow-up	Statistical Methodology
Doupe, 2004	N = 2655 -aged 65+	Manitoba	30 months	Survival analysis
Evashwick, Rowe, Diehr, & Branch, 1984	N = 1317 -aged 65+	Massachussetts	2 years	Multiple regression
Finlayson, 2002	N = 616 -born 1911 or earlier	Manitoba	Examined change in status between 1983 and 1990 and how this differentiated individuals in 1996	Logistic regression
Hall & Coyte, 2001	N = 3830 -aged 25+	Ontario	1 year	Logistic regression
Manheim, Guihan & Hughes, 1995	N = 907 -mean = 77.9 years	United States	Within 1 year	Logistic regression
Shapiro, 1986	N = 2772 -aged 70+	Manitoba	4 to 7 years	Logistic regression
Shapiro & Tate, 1997	N = 226 -aged 65+	Manitoba	Within 1 year	Logistic regression

Figure 3.4: **Studies Used for Review of Predictors of Home Care Utilization According to the Andersen-Newman Framework of Health Utilization – Individual Determinants (1973)**

Predisposing Factors

Three of the studies reviewed demonstrate that as *age* increases, so does home care use (Evashwick, Rowe, Diehr, & Branch, 1984; Hall & Coyte, 2001; Shapiro, 1986). In addition, Doupe (2004) found an interaction effect in that younger participants with

health limitations were more likely to use home care. Only the study by Manheim, Guihan & Hughes (1995) failed to find a relationship between age and home care utilization.

Sex also has a strong ability to predict home care users. The odds of receiving home care services are higher for women than men, even when age is controlled for (Hall & Coyte, 2001; Manheim, Guihan, & Hughes, 1995; Shapiro, 1986). By studying interaction effects, Doupe (2004) found that men with health limitations were more likely to be home care users. The predictive ability of *marital status* is less clear. Two studies found that married persons use less home care services (Evashwick et al., 1984; Hall & Coyte, 2001), while two other studies found no association between marital status and home care utilization (Manheim et al., 1995; Shapiro, 1986). Furthermore, Evashwick and colleagues. found that widowed persons also use less home care services, perhaps suggesting that those who have never had a life partner are more likely to receive home care services than those who have not. This finding was supported by Finlayson (2002) who found that changes in marital status (for example, changing from being married to being widowed) had no association with home care use.

Besides marital status, a person's living arrangements have also been investigated as potential predictors of home care service use. Three authors looked specifically at the *number of people living with the study participant.* Finlayson (2002) looked at the changes in the number of people the participant lives with while Manheim and colleagues. (1995) and Shapiro and Tate (1997) looked at the number of people living with the participant at one point in time. Both Finlayson and Manheim and colleagues. found no relationship between the number of people living with a participant and home

care utilization whereas Shapiro and Tate found that the odds of receiving home care is higher for persons who live alone than people who live with others. Shapiro (1986) looked at where the participant's nearest relative lived – in the household or outside of the household. The odds of receiving home care services were higher for people whose nearest relative lived outside the household versus living within the household.

Education was clearly not related to home care use in the studies examined (Evashwick et al., 1984; Hall & Coyte, 2001; Shapiro, 1986; Shapiro & Tate, 1997). For *nationality*, two studies that looked at this variable found no relationship between nationality and home care utilization (Hall & Coyte; Manheim et al., 1995) and one study found that persons of white race use less home care (Evashwick et al.).

None of the studies reviewed looked specifically at *health beliefs* and their influence on home care utilization.

Enabling Factors

Three of the Canadian studies found that those with a lower *income*, or those whose income adequacy declined over time received more home care services than those with higher incomes or those whose income adequacy remained stable or improved over time (Finlayson, 2002; Hall & Coyte, 2001; Shapiro, 1986). Conversely, the two American studies found no relationship between income and home care utilization (Evashwick et al., 1984; Manheim et al., 1995).

Shapiro (1986) looked at the effect of *social contact* on home care utilization by measuring the daily contact of relatives with participants. Those who had daily contact with relatives were more likely to receive home care services. However, Finlayson

(2002) found that a change in social support (as measured by a gain or loss of relatives, stability regarding the proximity of relatives, number of close friends and change in whether or not the participant had someone to call for help) did not affect home care utilization.

Need Factors

Three Canadian studies looked at the need factor of *self-rated health*. They found that if a person perceived their health to be poor OR if their self-rated health remained stable at fair, poor or bad over time, they were more likely to use home care services (Finlayson, 2002; Hall & Coyte, 2001; Shapiro, 1986). Contrary to these results, the two American studies did not find any relationship between self-rated health and home care utilization (Evashwick et al., 1984; Manheim et al., 1995).

Another well studied need variable is a person's *health conditions*. Once controlling for other factors, two of the Canadian studies did not find any association between a person's health conditions or a change in the number of their health conditions and their home care utilization (Finlayson, 2002; Shapiro, 1986). In contrast, Doupe (2004) found that males with at least two physical impairments were more likely to use home care services. The two American studies found contrasting results. Evashwick and colleagues. (1984) found that if a person had a physical condition, they were more likely to use home care and Manheim and colleagues (1995) found that those with diabetes had an increased use of home care services.

Three studies looked at a person's *past home care use* or if they had experienced a change from no home care to home care service utilization over time and found that past

home care use is highly predictive of a person's current home care utilization (Finlayson, 2002; Hall & Coyte, 2001; Manheim et al., 1995).

Shapiro and Tate (1997) found that both those with cognitive impairment and dementia were higher users of home care than those without impairment or dementia. In contrast, two other studies found no association between mental status and home care utilization (Manheim et al., 1995; Shapiro, 1986). The difference in findings could be because the secondary data used in the study by Shapiro and Tate included a more thorough assessment to determine cognitive impairment and dementia, such as standardized cognitive assessment, neuro-psychological examination and physician examination .

The variable *physician access* has not yet been shown to be a significant predictor of home care utilization in longitudinal studies (Evashwick et al., 1984; Hall & Coyte, 2001; Manheim et al., 1995; Shapiro, 1986). *Depression* was not investigated in the studies that were reviewed.

In summary, previous research tells us that home care use is higher for those people who are older, female, have a lower income, have increased social supports and lower self-rated health.

Chapter Summary

In summary, there is a large body of literature that describes the different types of functional status measures available and the advantages and disadvantages of each. The literature acknowledges that different types of functional status measures address different constructs, and therefore the "best" measure to use is determined by the situation. There is also a large body of literature addressing the predictors of home care

and there is ample evidence to suggest that functional status is a main predictor of home care use. However. the literature does not compare the different types of functional status measures and their ability to identify and predict home care service use.

CHAPTER 4: METHODS

This study is a secondary analysis of data taken from the 2001 Aging in Manitoba Longitudinal Study interview and linked Manitoba Health administrative data housed at the Manitoba Centre for Health Policy (MCHP).

Research Questions

Research Question 1

Among community dwelling older adults, is there a cross-sectional association between use of formal home care services and three different functional status measures?

Research Question 2

Among community dwelling older adults, are three different functional status measures able to predict formal home care service use in the two and a half years following the assessment?

Background on the Aging in Manitoba Study

The purpose of the Aging in Manitoba Longitudinal Study (AIM) is to examine aging and related processes and determine their impact on the quality of life of older adults. It is the largest continuous, representative population-based longitudinal study of aging in Canada. The AIM data can be linked with health services utilization and mortality data from Manitoba Health which is housed at the Manitoba Centre for Health Policy (Sylvestre, Havens, & Hall, 2004).

AIM is a longitudinal panel study that has included almost 8947 older adults from Manitoba. Three independent cross-sectional samples were conducted in 1971, 1976 and

1983. These samples were followed by interviews in 1983-1984 (for the 1971 and 1976 samples), 1990, 1996 and 2001. The original sample was a random one of 4803 people drawn from the computerized records of the Manitoba Health 1970 master registry of Manitobans 65 years and older and stratified by residence status (community or institutional) and region of residence (one of seven geographic regions). This sample was then matched according to area of residence, residence status, age and gender. The intent of this matched sample was to allow for substitution in case of death, serious illness, migration or changed residence status (Mossey, Havens, Roos, & Shapiro, 1981).

The same sampling strategy was used in 1976 and 1983 except that participants were age 60 or over. To determine the sample size, the "smallest percentage which would guarantee sufficient respondents being drawn from each identified area" (Province of Manitoba, 1990, p.12 as cited by Chipperfield, Havens & Doig, 1997, p. 611) was used. The 1971 sample consisted of 4803 people, the 1976 sample consisted of 1302 people and the 1983 sample consisted of 2874 people (Sylvestre et al., 2004) (Figure 4.1).

Written consent was obtained from all participants to be interviewed, for access to their Manitoba Health services data and for follow-up (Hall & Havens, 1997). The surveys were conducted as face-to-face interviews in the participants' residence. The survey contains core questions which have been consistent over the 30 years of the study and questions that have changed from survey to survey in order to address current issues and interests (Sylvestre et al., 2004).

The linked Manitoba Health data referred to earlier is provincial health-service utilization data that includes medical, hospital, personal care home and home care service

utilization data. The AIM study also has access to information that includes the date, place and time of death for the participants in the study from Manitoba Vital Statistics and the Statistics Canada Mortality Data Base which is also housed by MCHP (Sylvestre et al., 2004).

1971	1976	1983	1990	1996	2001
Group 1 enters: 4803		Follow-up: 1517	Follow-up: 630	Follow-up: 214	Follow-up: 53
	Group 2 enters: 1302*	Follow-up: 882	Follow-up: 554	Follow-up: 310	Follow-up: 153
		Group 3 enters: 2874	Follow-up: 2034	Follow-up: 1344	Follow-up: 806
Totals		5273	3218	1868	1012

Figure 4.1: Design of the Aging in Manitoba Longitudinal Study (Total sample = 8947)

Note: 32 people were selected in both1971 and 1976. They are designated as being first interviewed in 1971 for all following waves.
From: Sylvestre et al., 2004, p.3

This sample does not seem to be affected by selection bias, likely due to the low non-response rate (which has ranged in follow-up years from 4.6% in 1983 to 7.7% in 2001) (Hall & Havens, 1997; Sylvestre et al., 2004) and the use of the population registry. However, healthy, independently functioning persons and those of lower achieved education level seem to be slightly over represented (Roos & Shapiro, 1981). The sample is comparable to Manitoba and Canada's older population (Chipperfield, Havens, & Doig, 1997).

Sample Selection

The study sample for the current work is 138 participants who completed the

interview supplement of the Performance Assessment of Self-Care Skills (PASS) (Rogers

& Holm, 1994) in addition to the rest of the interview schedule in 2001. The 2001

sample consisted of interviews of 1012 of a possible 1152 surviving participants from the

1996 panel (resulting in a completion rate of 92.3%). To be eligible for administration of

the PASS supplement, participants had met the following inclusion criteria:

1. Lived in Winnipeg; and
2. AIM interviewer had few or minimal concerns about fatigue, length of interview, cognitive status or physical frailty.

Exclusion criteria were also considered in the selection of the PASS participants.

Excluded were those who:

1. Lived in personal care homes;
2. Had a proxy respondent for the complete interview;
3. Used a proxy for much (i.e., more than 12 items) of the interview and was not sufficiently able to complete PASS items because they were: unable to hear and follow directions or too physically incapable or ill;
4. Were hostile toward the interview or interviewer;
5. Reported that either a service or staff person "usually helps" them with "getting in and out of bed" (as determined by item 121 in the AIM interview);
6. Reported that either a service or staff person "usually helps" them with ALL three of the following tasks:
   a) doing light housework (item 81.b.1 in AIM interview)
   b) getting about the house (item121.b.2) and
   c) washing or bathing or grooming (item 121.b.).

The rationale for exclusion criteria numbers five and six were to ensure that there was not

undue risk in completing the PASS assessment (Finlayson et al., 2003).

A total of 170 persons were deemed eligible to complete the PASS supplement,

however 32 refused to complete it, resulting in a total of 138 people completing the

PASS.

Study Variables

Independent Variables

The independent variables consist of three functional status measures completed by the PASS subsample in the 2001 AIM interview. The 2001 survey included two self-report measures (one of capability and another of usual behaviour) that are included in the core questions of the AIM interview, as well as the PASS supplement, a performance-based observation measure of functional status. Each of these three measures had seven tasks in common which allowed for direct comparison between the measures.

Self-report ADL and IADL Questions

The sources of the seven ADL and IADL self-report tasks are: a version of the original Index of Activities of Daily Living by Katz et al. (1963) as modified by Loomis (1971), the Shanas Index of Disability (SID) (1968), and the IADL scale developed by Lawton and Brody (1969). More specifically, the tasks and their source are:

1) Shopping (Lawton & Brody, 1969)
2) Managing financial matters (Lawton & Brody, 1969)
3) Laundry (Lawton & Brody, 1969)
4) Taking medications (Loomis, 1971)
5) Nursing care (Shanas et al., 1968)
6) Use of telephone (Lawton & Brody, 1969)
7) Getting around the house (Shanas et al., 1968)

In the 2001 AIM interview, these seven ADL and IADL items were asked using two types of wording. One method was to ask what the person can do ("Are you capable of . . . without any help from anyone?) and will be referred to in this study as "self-report of capacity". The other method was to ask what the person actually does ("Does anyone usually help you with . . . ") and will be referred to in this study as "self-report of

behaviour". The capacity wording was added to reflect a concern regarding gender bias in the "do you" wording of IADL questions.

The self-report of capacity method had the response options of *yes* or *no* in the 2001 AIM interview schedule. The self-report of behaviour questions had the following response options:

      1 = no one helps me with this task
      2 = someone in the house helps me with this task
      3 = someone from outside the house helps me with this task
      4 = a service helps me with this task
      5 = facility staff help me with this task.

Based on research conducted by Finlayson, Mallinson and Barbosa (2005), a decision was made to change this five point scale to a two point scale (1 = no one helps me with this task, 2 = someone helps me with this task) for this study. The rationale for this recoding was that Finlayson and colleagues demonstrated that the original five point scale does not classify people in an orderly hierarchical fashion and that the extra steps in the rating scale do not assist in pinpointing a person's functional abilities or deficits. Rather, a two point scale that classifies the individual as requiring help or no help was found to be more valid for making comparisons over time and setting. They demonstrated this by conducting Rasch analysis of the five point scale. Rasch analysis is a statistical method used to transform ordinal indexes into linear measures. The five point scale was likely unable to classify people in a hierarchical fashion because the scale was originally developed to identify resource needs for the older adult, rather than measuring functional status.

In the original development of the AIM self-report scales, various sources were consulted to confirm content validity. These sources included: content of ADL and

IADL scales in the literature, needs expressed by older people in conferences and opinions of professionals who work with older adults (Division of Research, 1973).

The Modified Performance Assessment of Self-Care Skills (Home) (PASS)

Several performance measures were systematically reviewed in order to select one to include as a supplement to the 2001 AIM survey. The PASS was chosen as the instrument of choice as it met the following criteria: 1) it can be administered by lay interviewers after training; 2) it had the greatest number of matching items with the AIM self-report measures; 3) each item on the instrument can be used on its own; and, 4) it is possible to write new items for the PASS (Finlayson et al., 2003).

The PASS assesses functional status by direct observation of daily tasks. The PASS is used for research and clinical purposes to determine "continued competence for independent living and as a baseline measure for rehabilitative interventions" (Holm & Rogers, 1999; Rogers, Holm, Beach, Schulz, & Starz, 2001). The PASS is standardized in that it specifies task conditions, instructions and materials needed (Finlayson et al., 2003). The use of assistive technology is allowed in the performance of the tasks. For example, if a person normally wears glasses to read, or a cane to walk, they can use these devices in completing the PASS tasks.

A modified version of the PASS was used for the AIM study. PASS items were selected from the 2.1 and 3.1 versions. Some items were modified and some items were developed and added. In choosing the items to be used, the following considerations were made: 1) that a range of physical and cognitive abilities were reflected; 2) that risk of injury and/or social discomfort for the participant and interviewer were minimized; 3) that required equipment could be easily and inexpensively obtained; and, 4) that all the

items could be completed in 30 to 40 minutes. In order to ensure that a range of physical and cognitive abilities were reflected, the tasks were divided into the three categories of Easy, Moderate and Difficult items. In order to determine the difficulty level of the tasks, Rasch analysis of all of the ADL and IADL self-report of behaviour items from the 1996 AIM interview was conducted and used to identify the relative difficulty of items (Van Denend, 2001).

The final item selections were the PASS 3.1 items: mobility in the house, medication routine, paying bills and flashlight repair, and modified PASS 2.1 items: getting dressed, heavy housework, shopping, as well as newly developed items of first aid and doing laundry (Figure 4.2). Dressing and repairs items were not used in this study as the dressing self-report of behaviour item was inadvertently omitted in the interview booklet construction (personal communication, M. Finlayson, June 2005) and the PASS repairs item evaluates a different level of difficulty than the self-report measures.

	Use PASS 3.1 item	Modify PASS 2.1 item	Develop PASS item
Easier items	Mobility in the house Medication routine	Getting dressed	
Moderate items	Paying bills		First aid
Difficult items	Flashlight repair	Heavy housework Shopping	Doing laundry

Figure 4.2: Final PASS Items, by Difficulty Level and Development Status
From: Finlayson et al. (2003), p.189

The development of modified or new items was initiated with an activity analysis for each item. Activity analysis is a process of breaking down a task into its component parts (Lamport, Coffey, & Hersch, 1993). The components of the activity were then put into the PASS format so that the conditions and directions for each component were clear. Once the components were incorporated into a format conducive to administration and scoring, the new and modified PASS items were pilot tested and modifications were made. Some of these modifications included the development of kits that included materials for administering the PASS and "interviewer tips" to cue the interviewer to remember specific conditions or pointers.

Scoring for the PASS is divided into three categories: Independence, Safety and Adequacy. Independence refers to the level and type of assistance required to initiate, continue and complete the task. Safety refers to the level of risk involved in completing the task and Adequacy refers to the quality of the product as well as the proficiency of the task process. Since the primary focus of this study is on a person's independence in functional status tasks, only the independence score was used.

The PASS independence scoring was modified for the AIM survey. In the original tool, the assessor records each time the subject requires assistance and what type of assistance is provided. For the AIM survey, it was decided to revise the hierarchy of assistance from a nine to a five point scale as shown in Figure 4.3. The assessors recorded the type and frequency of assists given to the subject according to the scale in Figure 4.3 for each subtask. This information regarding the assistance given was then coded as four point scale for each task as shown in Figure 4.4.

Original Scale	Modified Scale for AIM
1. Encouragement	1. *Social emotional encouragement*: Smiles, nods, verbal positives for trying
2. Verbal non-directive 3. Verbal directive	2. *Verbal assists*: Non-directive verbal inquiries indicating a problem, verbal directives
4. Gestures	
5. Task/environment rearrangement 6. Demonstration	3. *Visual assists or task simplification:* Gestures, pointing, breaking down task, moving items to simplify task completion, demonstrating task components
7. Physical guidance 8. Physical support	4. *Physical assists*: Maneuvers body part into place, lifts body part
9. Total assistance	5. *Total assist*: Does for subject

Figure 4.3: Revision of PASS Scoring for AIM 2001 Interview

Score	Independence Level
3	No assists given for task initiation, continuation or completion
2	No Level 4-5 assists given, but occasional Level 1 – 3 assists given
1	No Level 5 assists given; occasional Level 3 or 4 assists given, or continuous Level 1 – 2 assists given
0	Level 5 assists given, or continuous Level 4 assists given

Figure 4.4: Coding of PASS for AIM 2001 Interview

From: Holm, 2001, slide 68.

For this study, the PASS scores were further collapsed so that each task was scored as a one, indicating that the individual was completely independent in that particular task or a zero, indicating that the person was not completely independent in that particular task. The score of one was given if the individual did not require any assists at all (a score of three as shown in Figure 4.4) and given a zero if they did require some type of assist to complete the task (a score of zero, one, or two as shown in Figure 4.4).

Content validity for the original PASS tool was ensured by including tasks that matched or reflected those used in geriatrics and rehabilitation functional assessments (Holm & Rogers, 1999). For the modified version used in the AIM study, content validity was ensured by consulting an expert panel including two occupational therapists with experience working with older adults, two occupational therapy researchers, and two occupational therapy graduate students (Finlayson et al., 2003).

The construct validity of the PASS has been ensured by administering it to a variety of populations including well older adults. Groups with identified health problems have consistently scored lower and had more variability on the PASS than well adults. As well, those with diagnoses or impairments that are considered more debilitating have had more difficulty with the items, and those who have less debilitating diagnoses scored worse in IADL tasks than the "well older adult" group (Holm & Rogers, 1999; Rogers et al., 2001).

Inter-rater reliability specifically for the independence scale ranges from a kappa of 0.56 to 0.91 for functional mobility, 0.74 to 0.97 for personal care, and 0.02 to 1.00 for the IADL items. However percent agreement was much higher for all tasks (ranging

from 95 to 99%), which indicates a high level of inter-rater reliability. Having lower kappa ratings as found with the IADL tasks is not unusual for a criterion-referenced instrument (Rogers et al., 2001). Inter-rater reliability was ensured for the modified AIM version of the PASS in the 2001 interviews by training all fourteen interviewers in a two-day training session that was conducted by M. Holm, the co-creator of the instrument. The interviewers were shown videotaped assessments to facilitate consistency among raters. Interviewers practiced administering the PASS on each other using the PASS kits prepared for the AIM interviews.

Collapsing Functional Status Variables

For this study, the seven functional status tasks for each measurement method were collapsed to result in one score for each participant for each measurement method. The rationale for using a collapsed functional status variable was that cell counts at the individual task level were not adequate for statistical analysis. The following process was used to collapse the functional status variables from the task level. For each participant, the number of tasks for which they were dependent was counted. Therefore, the higher the score, the more dependent the individual is, and the lower the score, the more independent they are. For example, if a participant was dependent in two of the seven of the PASS tasks, their performance score would be two (of a possible seven). However, the same individual may self-report that they are capable of performing all of these tasks independently, resulting in a score of zero (of a possible seven) for self-report of capacity. Finally, perhaps the individual's spouse always completes the laundry in their household, resulting in a score of one (of a possible seven) for self-report of behaviour.

Dependent Variable

The dependent variable for both research questions was Winnipeg Regional Health Authority home care utilization. However, in order to address the two separate research questions, two home care outcome variables were required; one that measured home care utilization at the time of the 2001 interview and one that measured subsequent home care utilization.

The outcome measure addressing cross-sectional home care use takes into consideration whether or not participants were receiving home care services at the time of the 2001 AIM interview. In order to be considered as "receiving home care services at the time of the 2001 AIM interview", the participant must have been enrolled in the home care program on the day of the AIM 2001 interview, *and* their home care admission was required to be at least 30 days in length (the 30 days needed to include the day of the 2001 AIM interview). Enrolment in the home care program for at least 30 days was required to avoid the inclusion of individuals who were assessed by the home care program but then did not receive any services due to ineligibility or due to the prospective client declining home care services.

To address the second research question related to prospective home care use, an investigation was made of home care utilization following the AIM interview. A two and a half year follow-up period was ultimately chosen as it provided the most statistical flexibility yet kept the follow-up period as short as possible in light of other events that may confound the use of home care. In order to be considered as "enrolled into the Manitoba Home Care Program following the 2001 AIM interview", the individual had to be enrolled in the Manitoba Home Care Program for at least thirty days at least once in

the two and a half years following the 2001 AIM interview. For this analysis, those who were receiving home care at the time of the 2001 AIM interview were excluded, as well as anyone who died before experiencing the outcome of interest (home care).

The home care utilization data are extracted from the Population Health Information System (POPULIS) housed by MCHP. The Aging in Manitoba study is able to link the data from POPULIS to the Aging in Manitoba interview data. The original source for the home care data is the Manitoba Support Services Payroll database (MSSP). This database was developed in 1988 as a payroll system for direct service workers employed by the Department of Health. However, its role has evolved and it also includes a master file of the Provincial Home Care clients. MCHP added this MSSP home care data to POPULIS and examined the utility of this data in 2001 when Manitoba Health asked MCHP to evaluate trends and use of Manitoba home care. The MSSP system was found to capture 90% of those receiving home care and 80% of the delivered home care services. A weakness in the system identified by MCHP was the inconsistencies in closing home care cases (cases tended to be left open when no services were being provided) (Roos, Mitchell, Peterson, & Shapiro, 2001). A further limitation is inconsistencies in the use of Program and Service Plan codes. If a client is registered in one program and then transferred or added to another, it is frequently not captured, and service codes were present for only 41% of clients in 1998/99 (Roos, Mitchell, et al., 2001).

Control Variables

There are many variables other than functional status that could explain the use of home care by the study participants. These need to be controlled for so that the

relationship between the independent and dependent variables can be considered fairly. In order to select appropriate control variables, the Andersen–Newman Framework of Health Services Utilization (1973) was used. Since the primary purpose of the current study is to identify functional status measures or tasks that are able to predict home care utilization, a limited number of variables were chosen from the 2001 interview schedule to represent the Individual Determinants component of the Andersen-Newman framework. In choosing variables, effort was made to represent each of the Individual Determinants components and to choose variables that are closely linked to functional status and home care utilization in the literature. The control variables that were chosen for analytic consideration are listed in Figure 4.5 and further details regarding the original AIM questions and coding can be found in Table 1, Appendix 3.

The 2001 AIM survey question used to look at health beliefs was: "Do you seem to get the kinds of illnesses that doctors can't do much for?" For income, the participants were asked to provide their total *individual* income before deductions and the response options were categorized into blocks of $5,000 (i.e., less than $5,000, between $5,000 and $9,999, etc.).

The Life Space Index is a measure derived from the life space measure developed by Cumming and Henry (1961). This measure was originally developed:

from the concept 'social life space' and has been used to test the hypothesis that as individuals grow older, they become increasingly disengaged from society. . . All Aging in Manitoba surveys (1971, 1976, 1983, 1990, 1996, and 2001) use questions derived from Cumming and Henry (1961). For example, questions regarding the frequency of interaction and time spent with relatives were asked in

all of the AIM surveys. . . .the number of neighbours, persons seen for specific

purposes and if employed, the number of persons seen at work, are also included

in all the AIM interviews as a part of the Life Space Index (Mair, 2001, Section

23, ¶ 1, 7).

The Life Space score is essentially an estimate of the number of separate contacts a

person makes with others in the course of a month and does not consider the length of

interactions (Cumming & Henry, 1961).

Variable	Measurement Strategy
Predisposing	
Age	Age in years
Sex	M or F
Marital status	Marital status
Household size	Number of adults in household
Education	Education in years
Nationality	Founding nations or other nations
Health beliefs	"Do you get the kinds of illnesses that doctors can't do much for?"
Enabling	
Income	Personal income range before deductions
Social contact	Life Space Index
Physician access	Yes or No
Need	
Self perceived health	"How is your general health?"
Depression	CES-D 10 Scale
Number of health conditions	Count of self-reported health conditions
Past home care use	Self-reported nursing or homemaker services in the past year
Mental status	MSQ 10

Figure 4.5: Selected Control Variables and Measurement Strategies

To determine the participant's access to a family doctor the item "Do you have a regular doctor or clinic which you use for your health needs?" was used.

Depression was examined using the Center for Epidemiological Studies Short Depression Scale (CES-D 10) (Stanford Patient Education Research Center, 2007). This scale asks ten questions related to feelings or behaviours that may indicate depression and results in a score between 0 and 30 points. This scale was developed and tested for reliability and validity by Andresen, Malmgren, Carter and Patrick (1994). The scale was found to have adequate test-retest reliability ($r = 0.71$), and was reliable in its ability to identify those with depressive symptoms. The CES-D 10 was found to be valid as it corresponded well with the criterion measure, the CES-D 20. Andresen and colleagues suggest considering the purpose of the tool when considering a cut-off score for the CES-D 10. They examined both eight and ten as cut off scores and found a high false positive rate with a cut-off of eight and low false positive and false negative scores with a cut-off score of ten. However, the cut-off score of eight resulted in a better match of prevalence of depression as compared to the CES-D 20. For this study, a score of ten or over was considered to indicate potential depression since this score is most robust in terms of sensitivity and specificity and determining prevalence was not a focus of this study.

To determine self-reported number of health conditions, participants were read a list of 22 health conditions (for example, hypertension, a stroke in the last year, chest problems, etc.) and asked if they had any of these conditions. Then the number of reported conditions was counted.

The Mental Status Questionnaire (MSQ 10), Canadian Version consists of ten questions that address orientation in time and place, remote memory, and general

knowledge. It was originally developed to be an objective measure of cognitive status in the elderly living both in the community and institutions. Cut-off scores used have varied by author and have depended on factors such as education and ethnicity. As well, there are varying opinions on what cut-off score would suggest that an individual has an *impairment* in cognitive function (Mair, 2001). A cut-off score of eight was chosen for this study (nine and ten indicates intact cognitive status) in order to ensure adequate cell counts for statistical analysis of this data.

Data Collection and Ethical Considerations

Approval for this study was granted from the Bannatyne Campus Health Research Ethics Boards on September 26, 2005 and from The Health Information Privacy Committee on December 7, 2005 (Appendix 1). Following ethical approval, data were requested from AIM.

An AIM confidential information agreement was signed by the primary investigator allowing confidential use of the Aging in Manitoba data. This agreement stipulates that all information provided to the primary investigator will not include any identifying information. All data linkages to the Manitoba Health administrative data were done by AIM staff (also as per AIM policy) to assure that no identifying information was released to the primary investigator (no identifiers such as name, address, Manitoba Health number etc. are contained in the file). To assure confidentiality of the study population, the agreement also stipulates that reporting cannot be done on cases of groups of five or less or percentage values of less than one.

No recruitment was done as this study consists solely of secondary data analysis. Written consent was obtained from all participants for the 2001 survey and for accessing their health administrative data (Appendix 2). Both the recruitment letter and consent forms from the 2001 interview were approved by the Bannatyne Campus Health Research Ethics Boards.

During the period of data analysis, the data were stored electronically on a personal home computer as well as on a flash drive which was kept in a locked filing cabinet. The computer files were password protected. The "Confidential Information Agreement Regarding Use of Aging in Manitoba Data" stipulates that upon completion of the research project (including related publications) all AIM information must be promptly returned to the AIM study or destroyed/deleted.

Data Analysis

Data analysis occurred in three main parts. The first task was to conduct descriptive analyses, the second was to address the first research question and the third was to address the second research question.

Descriptive Analyses

Descriptive analyses were conducted with several goals in mind. The first goal was to describe the study participants according to the control variables chosen from the Andersen-Newman framework (Table 1, Appendix 3). This task included looking at differences and similarities between the sample in this study, the 2001 AIM sample as a whole and the Winnipeg population using data from "The Aging in Manitoba Longitudinal Study: Thirty Years Later, 1971-2001" report (Sylvestre et al., 2004) and

the 2003 Manitoba Health Population File. The second goal was to describe the home care use of the sample including any demographic or social similarities or differences between home care users and non users. The third goal was to explore the functional status profile of the participants for all three measurement formats.

Prior to completing descriptive analyses, data were reviewed for missing variables. For the variable income, 16 of the 138 participants refused to answer or reported that they "didn't know". Therefore, for 13 of the participants, "last observation carried forward" was used from the 1996 AIM survey to decrease the missing values in this variable.

Values were also missing for the variable *health beliefs* (two missing values). Once the descriptive analysis was completed, missing values for the variables *income* and *health beliefs* were imputed using the missing value analysis feature with SPSS software. Logistic regression was used with a dependent variable of "home care use at the time of the 2001 AIM interview" and the independent variables included all the control variables except for *income* and *health beliefs*.

Refusals were also present in the PASS data. Logistic regression was completed with these refusals coded in two ways. They were coded the first time as *missing* and then the second time as *dependent*, with home care use at the time of the 2001 interview as the outcome. Results for the analyses were similar. Thus, the code of *dependent* was maintained due to the author's clinical experience that refusal to perform a task can be a protective strategy employed by individuals who doubt their ability to complete the task.

Analytic Strategy for Question 1

A series of logistic regression modeling was the main statistical strategy used to directly address the research question. The analytic plan contained four main components: 1) choosing a control variable to use in logistic regression modeling, 2) looking at relationships between functional status measures and home care utilization with logistic regression modeling, 3) looking at the relationship between the functional status measures and home care with the inclusion of a control variable using logistic regression modeling and 4) post hoc analyses to look more specifically at the functional status measures and associated home care use at a task level.

A rule of thumb for multivariate modeling is that there needs to be at least ten outcomes of interest for each independent variable included in the logistic regression model (Katz, 2005). Since it was determined in preliminary analyses that there were only 24 persons receiving the outcome of interest (receiving home care), only two variables should be entered into the logistic regression model at once. This is the rationale behind using a series of logistic regression models to answer the research question rather than entering all the variables into one model.

The outcome variable of interest for Question #1 was home care use at the time of the 2001 AIM interview. For all analyses, p values of 0.05 or less were considered significant.

Choosing the Control Variable

Control variables and their coding used in this component of the analysis can be found in Table 1, Appendix 3. Several steps were taken in order to choose a control variable for inclusion in final modeling of the research question. Step One was Phi correlation analyses to determine if associations existed between the control variables. The phi coefficient measures association between binary variables and can be interpreted in the same way as a correlation coefficient (Simon, 2006).

Step Two was univariate logistic regression modeling where each control variable was the independent variable and home care use the dependent variable. In the third step, multivariate logistic regression modeling was completed where the two most significant variables from Step Two (according to their p values) from each *Individual Determinants* component were modeled together. For example, the two most significant predisposing variables from Step Two were included in one model, the two most significant variables in the enabling component from Step Two in a second model and the two most significant variables from the need component from Step Two in a third model. Decisions for choosing the control variable for the final modeling of the research question with the independent variables (functional status measures) were made using individual variable p values from Step Three.

Relationships between Functional Status Measures and Home Care Use

In preparation for final modeling, functional status measures were first explored by looking at Pearson correlation coefficients between the three measurement types.

Then univariate logistic regression was conducted for each functional status measure with home care use as the dependent variable. Finally, a series of logistic regression modeling was conducted using the control variables previously selected from Step Three of the control variable modeling and the three functional status measures.

Post Hoc Analyses

Ideally it would be informative to be able to analyze each functional status task in more depth in order to increase understanding of which tasks are indicative of home care use. For example, is it more informative to assess an individual using all seven of the tasks examined in this study, or are there one or two tasks that are particularly important in determining home care use? This question is important both for clinical and research purposes in order to maintain efficient use of resources, especially since performance assessments are resource intensive. However, sample size limited the statistical analyses that can be conducted at the task level. Therefore, post hoc analyses were planned to try to learn more about the relationships between functional status measures and home care use at the task level.

To examine the functional status measures at an individual task level, two main strategies were used. The first was to examine the patterns of functional status ability using concatenation. Concatenation is simply a process of developing a character string for each participant that indicates their individual pattern of functional status. For example, if the numeral 1 is used to indicate that a individual is independent in a particular task and the numeral 2 is used to indicate dependence, a person with the character string of 1112111 would indicate that the individual is dependent only in the fourth task and independent in all the other tasks. Once concatenation was completed,

frequency distributions were run to determine the most common patterns of functional status abilities for home care users and non users.

The second strategy was to use Chi square testing (with two-tailed Fisher's tests where appropriate) of each functional status task for each measurement method and home care use to determine if there are differences between home care users and non users in terms of their ability to perform specific functional status tasks.

Analytic Strategy for Question 2

The analytic strategy for answering Question #2 was the same as that of Question #1 with the following exceptions. First, the outcome of interest for this question is prospective home care use and thus the dependent variable is home care use in the two and a half years following the 2001 AIM interview. Second, since there are 30 people who experienced the outcome of interest, there was greater flexibility in logistic regression modeling as three variables could be entered into each model. Therefore, any time two variables were entered into a model to address Question #1, three variables were entered into a model when addressing Question #2. This allowed for the inclusion of a multivariate model that included all three functional status tasks.

CHAPTER 5: DESCRIPTION OF THE SAMPLE

The purpose of this chapter is to provide a description of the Aging in Manitoba (AIM) participants in this study. This will be done in three sections. Section 1 provides the demographic, social and health context of participants (control variable exploration). Section 2 describes the home care use of this sample (dependent variable exploration). Section 3 provides the functional status context of the participants by reporting the participants' level of independence according to the three functional status measures used in the 2001 AIM interview (independent variable exploration).

Section I: Demographic and Social Context of the Participants

Predisposing Characteristics

Variables in this category include age, sex, marital status, household size, education, nationality and health beliefs. For the 138 persons included in this study, participants ranged from 78 to 98 years of age with the mean age being 82.9 years (SD = 4.5 years). The sample was skewed towards the younger end of the age range, which is visually shown with the count of participants at different ages in Figure 5.1. There was a higher percentage of females than males in this sample (60.9% female) (Figure 5.2), although there were no significant differences found between the ages of males versus females (Mann Whitney U = 2189.00, NS).
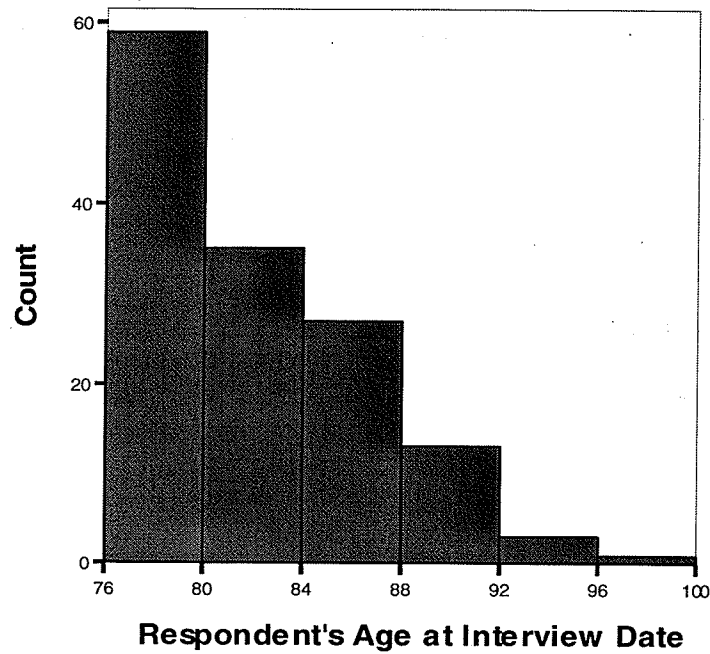
Figure 5.1: Histogram Illustrating Participant's Ages at Time of 2001 AIM Interview (n = 138)

Variable	Variable Categories	2001 AIM Subsample (%) (N = 138)	2001 AIM Sample (%) (N = 1012)	Manitoba Population 2000 (%)
Age Category	77 – 84	68.1	50.8	67.0
	85 +	31.9	49.1	33.0
Sex	Male	39.1	38.6	36.16
	Female	60.9	61.4	63.83

Figure 5.2: Age and Sex Comparison of Study Participants with 2001 AIM Sample and 2000 Manitoba Population Statistics

Note: Source of 2001 AIM sample and 2000 Manitoba population statistics: The Aging in Manitoba Longitudinal Study: Thirty Years Later, 1971-2001 (Sylvestre et al., 2004).

The age and sex of the sample in this study was compared descriptively with the age and sex of the AIM sample as a whole and the Manitoba population in the year 2000. It was not possible to complete statistical comparisons as the full 2001 AIM sample and the Manitoba population data are at an aggregate level. The age distribution of this AIM study subsample was slightly younger than the entire 2001 AIM sample, but was similar to the Manitoba population in the year 2000 as indicated in Figure 5.2. The percentage of males versus females was consistent across the subsample for this study, the entire 2001 AIM sample and the Manitoba population in 2000 (within 3%) (Figure 5.2).

For current marital status, the participants were predominately married (43.5%) or widowed (48.6%) at the time of the 2001 AIM interview (Table 5.1). The majority of participants responded that they lived alone (48.6%) or with one other person (43.5%) (Table 5.1). The range was one to four persons living with participants. When asked how many school grades the participants had completed, 29.7% of the sample had completed one to eight years of school, 21% had completed nine to ten years of school, 29.7% had completed eleven to twelve years of school and 19.5% had completed thirteen or more years of school (Table 5.1).

For nationality, 57.9% of the sample reported being from a founding country (11.6% Canadian, 46.3.0% British Isles or French) and 41.9% reported being from a non-founding country (11.6% German, 7.2% Scandanavian/Dutch/Belgian, 7.2% Polish, 10.1% Russian, and 5.8% Other European) (Table 5.1).

For health beliefs the majority of participants (60.1%) disagreed with the statement "Do you seem to get the kinds of illnesses that doctors can't do much for?" indicating positive health beliefs (Table 5.1).

Table 5.1: Frequency Distributions of Predisposing Control Variables

Variable	Response Categories	Frequency Distributions	
		N	(%)
Age	78 to 84 years	94	68.1
	85 to 98 years	44	31.9
Sex	Male	54	39.1
	Female	84	60.9
Marital Status	Single/Divorced/Separated	11	7.9
	Married	60	43.5
	Widowed	67	48.6
Household Size	Lives alone	67	48.6
	Lives with one person	60	43.5
	Lives with two to four others	11	7.9
Education	1 to 8 years	42	29.7
	9 to 10 years	29	21.0
	11 to 12 years	41	29.7
	13 or more years	27	19.5
Nationality	Canadian	16	11.6
	British Isles or French	64	46.3
	German	16	11.6
	Scandinavian/Dutch/Belgian	10	7.2
	Polish	10	7.2
	Russian	14	10.1
	Other European	8	5.8
Health Beliefs	Agree	36	26.1
	Neutral or N/A	17	13.7
	Disagree	83	60.1

Enabling Characteristics

The participant's enabling characteristics can be described by their individual income, social contact and access to a family doctor. The most commonly reported individual income was between $10,000 and $14,999 (21%) and $15,000-$19,999

(17.4%) (Table 5.2). Only five (3.6%) respondents reported not having a regular doctor (Table 5.2).

Table 5.2: Frequency Distributions of Enabling Control Variables

Variable	Response Categories	Frequency Distributions	
		N	(%)
Personal Income Range (before deductions)	Less than $5,000	6	4.3
	$ 5,000 to $9,999	13	8.7
	$10,000 to 14,999	29	21.0
	$15,000 to 19,999	25	17.4
	$20,000 to 24,999	19	13.8
	$25,000 to 29,999	14	9.4
	$30,000 to 39,999	17	12.3
	$40,000 and over	15	10.9
	Refused	3	2.2
Have regular doctor?	Yes	133	96.4
	No	5	3.6
Life Space Score	20 to <35	16	11.6
	10 to <20	110	79.7
	0 to <10	12	8.7

Need Factors

The participant's perceived need factors can be described by their self-rated health, their perceived number of health conditions, perceived prior home care and nursing service use. Their evaluated need can be described by a depression scale (CES-D 10), and a mental status screen (MSQ-10).

Two-thirds (60.1%) of the sample rated their health to be Good or Excellent and one third (39.9%) of the sample rated their health to be Fair, Poor or Bad (Table 5.3). Slightly more than one quarter (28.3%) of participants had a score of ten or over on the CES-D 10 (Table 5.3) which is indicative of depression.

Table 5.3: Frequency Distributions of Need Control Variables

Variable	Response Categories	Frequency Distributions	
		n	(%)
Self-rated Health	Excellent, Good	83	60.1
	Fair, Poor, Bad	55	39.9
Depression (CES-D 10)	Score under 10	99	71.7
	Score 10 or over (indicative of depression)	39	28.3
Number of Health Conditions	0	8	5.8
	1	10	7.2
	2	17	12.3
	3	25	18.1
	4	22	15.9
	5	14	10.1
	6	9	6.5
	7	12	8.7
	8	11	8.0
	9, 10 or 11	10	7.2
Had home care service?	Yes	25	18.1
	No	113	81.9
Had nursing service?	Yes	12	8.7
	No	126	91.3
Mental Status (MSQ10)	9-10 correct	115	83.3
	5-8 correct	23	16.7

Out of a total possible of 22 health conditions, the minimum and maximum number of health conditions the participants reported was zero and eleven. The mean number of health conditions was 4.4 with a standard deviation of 2.7. The most commonly reported number of health conditions was three for 18.1% of the sample (Table 5.3). The five most frequently reported health conditions in the last year were

arthritis (67.4%), heart problems (44.2%), hypertension (44.2%), ear problems (42.8%) and eye problems (38.4%).

For past home care use, 8.7% of the participants reported using nursing services at some point in the previous year and 18.1% of the participants reported using home care services at some point in the last year (Table 5.3). The majority of the participants scored nine or ten correct on the MSQ-10 which is indicative of intact mental status (83.3%) (Table 5.3).

Section II: Home Care Utilization of the Participants

Home care utilization was examined in two ways. First, the number of participants who were receiving home care at the time of the AIM 2001 interview was examined. Of the 138 people in the sample, 24 (17%) of them were receiving Manitoba home care services at the time of the 2001 AIM interview (Table 5.4).

Next, the number of people who entered home care in the two and a half years following the AIM interview was examined. This longitudinal view had 110 people at baseline since the 24 people who had home care at the time of the 2001 AIM interview and four people who died before experiencing the outcome of interest were excluded. Of these 110 people, 30 became enrolled in the Manitoba Home Care program in the two and a half years following their AIM interview and 80 people did not (Table 5.4).

Table 5.4: Summary of Manitoba Home Care Utilization by Study Participants

Participants	Count
Cross-sectional Home Care Use	
Total number of study participants	138
Number of participants receiving home care at the time of 2001 AIM interview	24
Number of participants not receiving home care at time of 2001 AIM interview	114
Longitudinal Home Care Use	
Total number of study participants (excluding those who had home care at the time of the 2001 interview and those who died in the follow-up period)	110
Number of participants entered into home care program in 2.5 years post AIM interview	30
Number of participants not entered into home care post AIM interview (excluding those who had home care at the time of the 2001 AIM interview)	80
Number of participants dying in the 2.5 year follow-up period before experiencing outcome of interest	4

For the 30 participants who were enrolled in the home care program after the 2001 AIM interview, the distribution of time to occurrence (enrolment into home care) is shown in Figure 5.3.

The data were examined to determine if there were any differences between the participants who were receiving home care at the time of the 2001 AIM interview and those who were not receiving home care for the variables age, sex, marital status, income, self-rated health and number of health conditions.

Months Elapsed between Interview and Onset Home Care
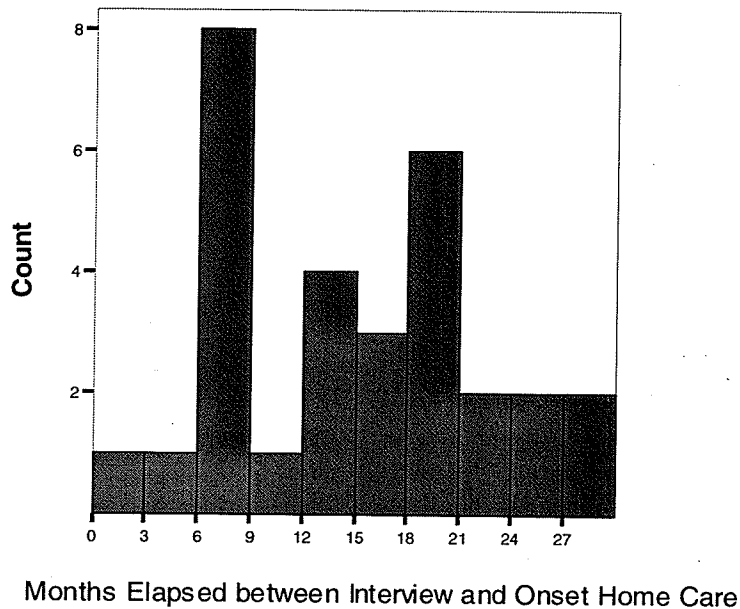
Figure 5.3: Time in Months from the 2001 AIM Interview to Enrolment in Manitoba Home Care Program

For age, there was a higher proportion of older people using home care as compared to younger people at the time of the 2001 interview (Mann-Whitney = 1007.00, p = 0.041) and those who had three or more health conditions were more likely to use home care services than those with two or less health conditions (Mann Whitney = 958.50, p = 0.020).

At the time of the 2001 AIM interview, there was no statistically significant difference between the proportion of men and women using home care services (18.5% of men and 16.7% of women, x^2 = 0.078, df = 1, NS) (Table 5.5). There was no statistically significant difference between those who were married and those who were widowed, separated, divorced or single and their use of home care services at the time of 2001 AIM interview (x^2 = 2.421, df = 1, NS) (Table 5.5). Those with an income under

81

the poverty line (less than $20,000 per year) were just as likely as others to receive home care services ($x^2 = 3.751$, df = 1, p<0.053) (Table 5.5). Finally, there were no statistically significant differences found between home care and non home care users for self-rated health ($x^2 = 2.482$, df = 1, NS) (Table 5.5).

Table 5.5: Chi Square Results: Control Variables by Home Care Users and Non Home Care Users

Variable		Home Care User? (n (%))		Totals
		No	Yes	
Sex	Male	44 (81.5)	10 (18.5)	54 (100)
	Female	70 (65.1)	14 (16.7)	84 (100)
	Total	114 (82.6)	24 (17.4)	138 (100)
		$x^2 = 0.078$, df = 1, NS		
Marital Status	Single, Widowed, Divorced or Separated	61 (78.2)	17 (21.8)	78 (100)
	Married	53 (88.3)	7 (11.7)	60 (100)
	Total	114 (82.6)	24 (17.4)	138 (100)
		$x^2 = 2.421$, df = 1, NS		
Income	Under $20,000	56 (76.1)	17 (23.9)	73 (100)
	$20,000 and over	58 (89.1)	7 (10.9)	65 (100)
	Total	111 (82.2)	24 (17.8)	135 (100)
		$x^2 = 3.751$, df = 1, p=0.053		
Self-rated Health	Excellent, Good	72 (90.4)	11 (13.3)	83 (100)
	Fair, Bad, Poor	42 (76.4)	13 (23.6)	55 (100)
	Total	114 (82.6)	24 (17.4)	138 (100)
		$x^2 = 2.482$, df = 1, NS		

Section III: Functional Status Profile of the Participants

This section will first compare the functional status of the full 2001 AIM sample to the sample used for this study, then it will discuss the functional status of the sample at the time of the interview. Finally, the differences in functional status between home care users and non users at the time of the 2001 AIM interview will be examined.

In order to determine if the functional status of this AIM subsample is consistent with the functional status of the 2001 AIM sample as a whole, aggregate data were obtained from AIM for the independent variables. Table 5.6 compares the subsample for this current study and the 2001 AIM community-dwelling sample. The self-reported independence of the AIM subsample was consistently higher than the 2001 community-dwelling AIM sample and ranged between 2.1% more independent (for the "actually walks in house" task) to 12.7% more independent (for the "capacity to manage finances" task).

Turning to the sample used in this study, the range and mean were calculated for each of the three functional status measures. For the PASS, the range was 0-7 tasks dependent with a mean of 4.01. For the self-report of capacity task, the range was 0-5 tasks dependent with a mean of 0.48 and for the self-report of behaviour measure, the range was 0-7 tasks dependent with a mean of 0.92. Figure 5.4 shows the dependency levels of participants as determined by the three functional status measures. This figure (5.4) emphasizes that the performance measure depicts the sample as more dependent than the self-report measures.

Table 5.6: Proportion of Participants that are Independent in Self-report Functional Status Measures: Community-Dwelling Participants of 2001 AIM Sample Compared to PASS Subsample

Self-report Item	AIM (n = 827)	PASS Subsample (n = 138)	Difference
Capacity to manage finances?	78.6	91.3	12.7
Capacity to shop?	73.0	84.8	11.8
Capacity to do laundry?	71.6	81.9	10.3
Actually manages own nursing care?	86.8	97.1	10.3
Capacity to do nursing care?	88.3	97.8	9.5
Actually shops?	64.9	73.9	9.0
Actually manages finances?	71.3	79.0	7.7
Capacity to take own medication?	91.9	98.6	6.7
Actually does the laundry?	58.6	65.2	6.6
Actually manages own medication?	90.7	96.4	5.7
Actually uses phone?	94.7	98.6	3.9
Capacity to use phone?	94.9	98.6	3.7
Capacity to get around house?	96.6	99.3	2.7
Actually can get around house?	97.9	100	2.1

The home care users and non users were compared using an independent t-test to determine differences in dependence for the three functional status measures. T-tests were used as this variable is being treated as a continuous variable for subsequent logistic regression analyses. First this analysis was done cross-sectionally for home care users and non users at the time of the 2001 AIM interview. T-tests showed that there were significant differences between the home care users and non home care users for both the self-report measures (Table 5.7). However, there was no difference between the home care users and non users' abilities to perform activities of daily living according to the

PASS (Table 5.7). These findings were confirmed using a Mann Whitney U test (Performance: 1028.5, p = .054; Capacity: 934.0, p = .002; Behaviour: 913.0, p = .006).
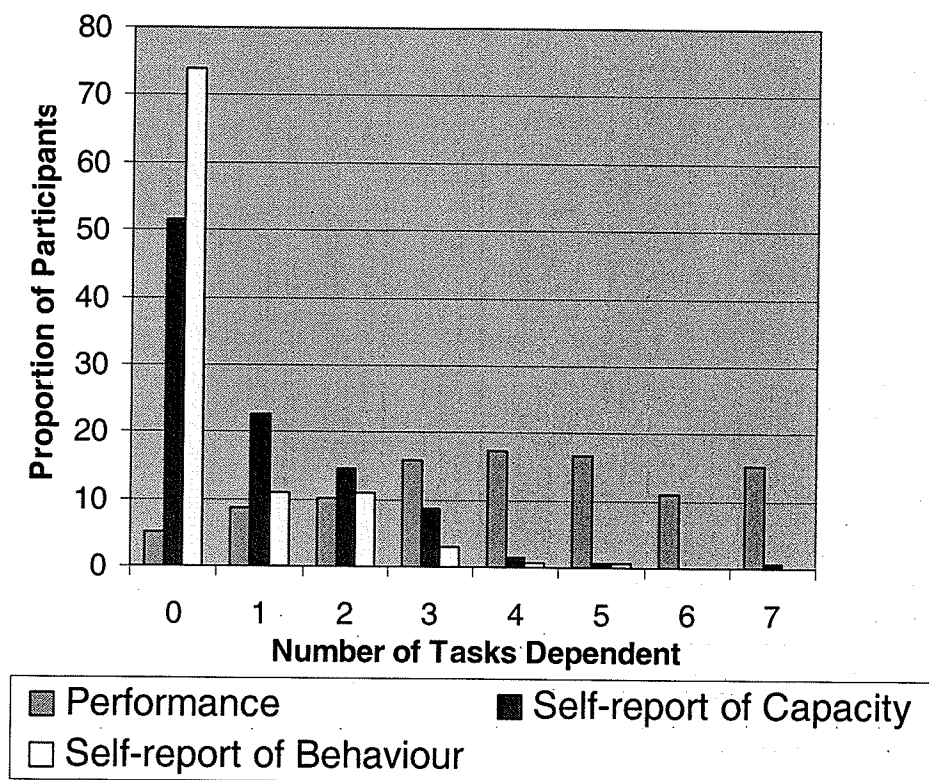
Figure 5.4: Proportion of Participants Dependent for Each of the Three Functional Status Measures (Performance, Self-report of Behaviour, Self-report of Capacity).

Table 5.7: T-tests (Two-tailed) of Functional Status Variables and Home Care Use at the Time of the 2001 AIM Interview

	t	df	p value
Performance	1.850	136	.067
Capacity	3.907	136	.000
Behaviour	2.783	136	.006

T-tests were then completed for the prospective home care users and non users. T-tests showed that there was a significant difference between the home care users and non users' abilities to perform activities of daily living according to the PASS, but that there was no difference according to the self-report measures (Table 5.8). This was again confirmed with Mann Whitney U tests (Performance: 861.5, p = .022; Capacity: 1148.0, p = .617; Behaviour: 1094.5, p = .431).

Table 5.8: T-tests (Two-Tailed) of Functional Status Variables and Home Care Use in the 2.5 Year Follow-up Period

	t	df	p value
Performance	2.167	108	.032
Capacity	.441	108	.660
Behaviour	1.087	108	.279

Table 5.9 shows more detail in terms of the participant's dependence for each of the functional status tasks. For four of the seven PASS tasks, over 50% of the sample was dependent. The PASS shopping (76.1% dependent) and medications (74.6% dependent) tasks presented the most difficulty, while the participants were also challenged by the paying bills (56.5% dependent) and first aid (52.2%) tasks.

For the two self-report measures, the tasks that presented the most difficulty to participants were the laundry, shopping and paying bills tasks. This pattern was only slightly different from the performance assessment, as two of the three most difficult tasks were the same for all three measures: shopping and paying bills. Indoor walking and telephone use were the two tasks with the highest levels of independence for all three measures.

Table 5.9: Proportion of Participants Dependent in Individual Functional Status Tasks

Task	Performance Measure	Self-report of Capacity Measure	Self-report of Behaviour Measure
Telephone	34.1 (n = 137)	1.4	1.4
Paying bills	56.5 (n = 128)	8.7	21.0
Indoor Walking	5.1	0.7	0.0
First Aid/Nursing Care	52.2 (n = 134)	2.2	2.9
Shopping	76.1 (n = 132)	15.2	26.1
Laundry	47.1 (n = 127)	18.1	34.8
Medication	74.6 (n = 136)	1.4	2.9 (n = 137)

Note: n = 138 unless otherwise indicated

Chapter Summary

The 138 people in this current study were comparable to the Manitoba population in terms of age and sex. These participants were predominantly married or widowed, tended to have positive health beliefs and rated their health as good or excellent, yet had less than one social contact daily and reported having arthritis.

Twenty-four of the 138 participants were enrolled with the Manitoba Home Care Program at the time of the 2001 AIM interview. In the two and a half years subsequent to the interview, four people died and another 30 people were enrolled in the Manitoba Home Care Program. The home care users at the time of the 2001 interview tended to be older and reported a higher number of health conditions than the non users.

Descriptively, it appears that the sample in this current study was more independent than the 2001 AIM community-dwelling sample as a whole. The functional status of this study sample varied depending on the functional status measure used. If using the PASS, the sample appears much more dependent (needing help for four of seven tasks) than if using the self-report measures (needing help for zero to one of the tasks). According to the self-report measures, home care users at the time of the 2001 AIM interview were more dependent than non users, however no differences were apparent using the PASS. The opposite was found if looking at home care users in a longitudinal fashion; home care users were more dependent according to the PASS but no differences were found between the groups using the self-report measures.

CHAPTER 6: RESULTS: CROSS-SECTIONAL ASSOCIATIONS BETWEEN FUNCTIONAL STATUS MEASURES AND HOME CARE USE

This chapter outlines the results found in addressing the first research question:

Among community dwelling older adults, is there a cross-sectional association between

use of formal home care services and three different functional status measures?

Choosing the Control Variable

Correlations between the binomial control variables were investigated using phi

coefficients (Table 6.1). There was a significant and strong correlation between current

marital status and whether or not someone lived alone (phi = 0.852, p< 0.005), in that

those that were married were most likely to be living with at least one other person.

There was also a moderate association between sex and marital status in that males were

associated with being married and females were associated with being single, widowed,

divorced or separated (phi = 0.525, p<0.005). Other pairs of variables were found to

have significant but low associations (phi <0.30 to 0.50, p < 0.005), such as sex and

social network (phi = 0.48), sex and income (phi = 0.35), education and income (phi =

0.32), health beliefs and self-reported health (-0.33).

Pearson correlation coefficients were also calculated between continuous

variables (Table 6.2). The only correlation found was a low negative correlation between

age and education, in that the older the participants were, the less education they tended

to have (r = -.29, p<0.005).

Table 6.1: Correlations between Control Variables (Phi Coefficients)

	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	-.03	-.15	-.18*	-.14	.06	-.09	-.11	-.01	.08	.06	.00	.11
2. Sex		.53**	.48**	.02	.10	.00	.35**	-.13	.05	-.15	-.04	.00
3. Current Marital Status			.85**	.19*	.05	.00	.29**	-.24*	.12	-.06	-.16	-.09
4. Household Size				.13	.03	.10	.28**	-.22*	.02	-.13	-.16	-.11
5. Education					-.10	.04	.32**	-.01	-.21*	.07	.06	-.22*
6. Nationality						-.18*	-.14	-.10	.24**	-.04	-.01	.09
7. Health Beliefs (N = 136)							-.07	.01	-.33**	-.25**	-.21*	-.12
8. Income (N = 135)								-.07	-.14	-.08	.04	-.15
9. Social Contact									.06	.00	-.02	.01
10. Self perceived Health										.20*	.15	.16
11. # of Health Conditions											.14	.02
12. Depression												.21**
13. Cognitive Status												

*= p<0.05, **=p<0.005

Table 6.2: Correlations between Continuous Control Variables (Pearson Correlation Coefficients)

	# Health Conditions	Education
Age	.07	-.29*
# Health Conditions		-.10
*= p<0.005		

The results of univariate logistic regression to examine the relationship between each of the control variables and the dependent variable can be found in Table 6.3. To summarize, both *age* and self-reported *number of health conditions* of participants demonstrated a significant ability to identify whether or not someone had home care at the time of the 2001 AIM interview. The odds of having home care at the time of the 2001 AIM interview were higher for older versus younger participants and for those with a higher versus lower number of self-reported health conditions. It is worth noting that the variables *lives alone* and *income* have p values that almost reach significance, indicating perhaps that those who receive home care services have a tendency to have higher incomes and live with at least one other person.

Multivariate analysis was then conducted of the control variables. Three different logistic regression models were developed, one for the Predisposing variables, one for the Enabling variables and one for the Need variables. For each model, the two most significant variables from the univariate analysis were entered. The results are shown in Table 6.4. The same variables were most significant in the multivariate modeling as in univariate modeling (number of health conditions and age). Income became significant in the multivariate modeling, but was not included in further analyses since the variables of age and number of health conditions were more significant.

Table 6.3: Univariate Logistic Regression of Each Control Variable with Home Care Use at Time of 2001 AIM Interview

Variable	Variable Categories	B	SE	p value	Odds Ratio	Lower CI	Upper CI
Predisposing							
Age at 2001 AIM interview	Age	0.120	0.048	0.013	1.127	1.026	1.238
Sex	M						
	F	-0.128	0.457	0.779	0.880	0.360	2.153
Current Marital Status	Single, widowed, divorced or separated						
	Married	-0.747	0.487	0.125	0.474	0.183	1.230
Lives alone?	Yes						
	No	-0.904	0.472	0.055	0.405	0.106	1.021
Education	Yrs education	-0.083	0.088	0.343	0.920	0.775	1.093
Nationality	Founding countries						
	All others	0.801	0.457	0.079	2.227	0.910	5.450
Health Beliefs	Disagree						
	Agree or neutral	.539	.452	.233	1.714	.707	4.158
Enabling							
Income	Under $20,000						
	$20,000 or more	-0.922	0.487	0.058	0.398	0.153	1.032
Social Contact	Lifespace 1,2,3						
	Lifespace 4,5	-0.531	0.627	0.397	0.588	0.172	2.010
Need							
Self perceived health	Good or excellent						
	Fair, bad or poor	0.706	0.453	0.119	2.026	0.833	4.926
# Health Conditions	# health conditions	0.023	0.085	0.017	1.225	1.036	1.447
Depression	CES-D10 score under 10						
	CES-D score 10 or over	0.591	0.472	0.272	1.680	0.666	4.239
Cognitive Status	MSQ 9 or 10						
	MSQ ≤8	0.925	0.524	0.077	2.522	0.903	7.041

Table 6.4: Multivariate Logistic Regression of Control Variables for Individual Determinants Components with Home Care Use at the Time of 2001 AIM Interview

Model		B	SE	p values	Odds Ratio	Lower CI	Upper CI
Predisposing Model	Age	.101	.050	.046	1.106	1.002	1.221
	Lives Alone?	-.625	.498	.209	.535	.202	1.420
Model x^2 = 7.870, df = 2, p = .020							
Enabling Model	Income	-.962	.491	.050	.382	.146	1.001
	Social Contact	-.650	.644	.313	.522	.148	1.844
Model x^2 = 4.812, df = 2, p = 0.090							
Need Model	# Health Conditions	.199	.005	.020	1.220	1.032	1.441
	Cognitive Status	.915	.541	.090	2.498	.866	7.207
Model x^2 = 8.497, df = 2, p = 0.014							

To summarize to this point, analyses revealed that the two variables *age* and *number of health conditions* were superior to the other control variables at identifying home care users at the time of the 2001 AIM interview. In addition, these two variables were not correlated. Therefore both were chosen for further analysis in multivariate modeling.

Addressing Question #1

Results of Pearson correlation coefficients between functional status measures can be found in Table 6.5. Results show that all the measurement types are correlated, however the performance measure was associated weakly with both the self-report measures and the correlation between the two self-report measurers was strong (r = .760, p<.01).

Table 6.5: Correlations between Functional Status Measures (Pearson Correlation Coefficients)(n = 138)

	Self-report: Capacity	Self-report: Behaviour
Performance	.328	.413
Self-report: Capacity		.760
* All significant at p<0.001		

Results of the univariate logistic regression of the functional status measures with home care use at the time of the 2001 AIM interview can be found in Table 6.6. The two self-report measures were significantly able to identify home care users, and the performance measure was not. The odds of using home care was one and a half times higher for those who reported being independent versus dependent according to the self-report of behaviour measure to two times higher for those who reported being independent versus dependent according to the self-report of capacity measure.

Table 6.6: Univariate Logistic Regression of Functional Status Variables and Home Care at the Time of the 2001 AIM Interview

Model	B	SE	p values	Odds Ratio	Lower CI	Upper CI
Performance	.215	.119	.070	1.240	.983	1.565
Model x^2 = 3.98, df = 1, p = .061						
Self-report: Capacity	.711	.216	.001	2.036	1.332	3.113
Model x^2 = 11.381, df = 1, p = .001						
Self-report: Behaviour	.424	.168	.012	1.528	1.099	2.123
Model x^2 = 6.498, df = 1, p = .011						

Multivariate modeling consisted of comparing a series of logistic regression models. First, logistic regression models were developed where each model included one functional status measure and one control variable. Each functional status measure was modeled once with age as the control variable and once with number of health conditions as the control variable (Table 6.7). All of the models were significant, but the two models that contained the variable "self-report of capacity" were stronger in their ability to identify home care users as shown by the overall model chi square values and the significant p values for the individual self-report of capacity variable.

Next, the functional status variables were modeled together to test the hypothesis in the literature that different types of measures are complementary in nature (Table 6.8). Including more than one functional status measure in a model did not improve the overall ability to identify home care users (as seen by the overall model chi square values) and the self-report of capacity measure continued to be the only functional status variable to have significant p values at the individual variable level.

In summary, the self-report of capacity measure appears to best differentiate home care users from non-users. Both self-report measures were significantly associated with home care use in univariate analyses, but once a control variable was introduced, the self-report of behaviour variable was no longer significant.

Table 6.7: **Multivariate Logistic Regression of Functional Status Measures and Control Variables with Home Care Use at the Time of 2001 AIM Interview**

Model	Variables	B	SE	p values	Odds Ratio	Lower CI	Upper CI
Performance and Age	Performance	.170	.124	.171	1.185	.929	1.512
	Age	.105	.049	.031	1.111	1.010	1.222
Model x^2 = 8.198, df = 2 , p = 0.017							
Self-report of Capacity and Age	Self-report of Capacity	.611	.230	.008	1.842	1.173	2.893
	Age	.079	.051	.126	1.082	.978	1.197
Model x^2 = 13.672, df = 2, p = .001							
Self-report of Behaviour and Age	Self-report of Behaviour	.327	.174	.061	1.386	.985	1.950
	Age	.092	.050	.069	1.096	.993	1.210
Model x^2 = 9.817, df = 2, p = .007							
Performance and # Health Conditions	Performance	.182	.123	.138	1.200	.943	1.526
	# Health Conditions	.181	.085	.034	1.198	1.013	1.416
Model x^2 = 8.099, df = 2, p = .017							
Self-report of Capacity and # Health Conditions	Self-report of Capacity	.616	.226	.006	1.851	1.190	2.879
	# Health Conditions	.133	.091	.141	1.143	.957	1.365
Model x^2 = 13.550, df = 2, p = .001							
Self-report of Behaviour and # Health Conditions	Self-report of Behaviour	.324	.178	.069	1.382	.975	1.960
	# Health Conditions	.147	.091	.105	1.158	.970	1.383
Model x^2 = 9.150 , df = 2 , p = .010							

Table 6.8: **Multivariate Logistic Regression of Functional Status Measures with Home Care Use at the Time of 2001 AIM Interview**

Model	Variable	B	SE	p values	Odds Ratio	Lower CI	Upper CI
Performance and Self-report of Capacity	Performance	.101	.131	.442	1.106	.855	1.430
	Self-report of Capacity	.645	.229	.005	1.906	1.217	2.987
	Model x^2 = 11.978 , df = 2 , p = .003						
Performance and Self-report of Behaviour	Performance	.119	.131	.365	1.126	.871	1.455
	Self-report of Behaviour	.352	.181	.052	1.422	.997	2.029
	Model x^2 = 7.333, df = 2, p = .026						
Self-report of Capacity and Self-report of Behaviour	Self-report of Capacity	.781	.378	.039	2.183	1.040	4.582
	Self-report of Behaviour	-.067	.297	.821	.935	.522	1.675
	Model x^2 = 11.433, df = 2, p = .003						

Post Hoc Analyses

The results for Research Question #1 suggest that the self-report of capacity functional status measure best differentiates home care users from non users. In order to understand this phenomenon better, concatenation was performed of the capacity measure.

Concatenation showed that 102 of the 138 participants reported themselves to be independent in all seven of the functional status tasks. The second most common pattern found was that 10 persons reported that they were independent in all tasks except for laundry. The third most common pattern reported was that 9 individuals reported that

they were independent in all tasks except for laundry AND shopping. Details of the rest of the frequencies cannot be reported due to an n of five or less. The top three most common patterns of functional status were the same for home care users and non users.

Chi square analyses results for each individual capacity task can be found in Table 6.9. These analyses showed significant differences between the home care users and the non users for the tasks of managing medications, managing finances and laundry. More specifically, those who reported that they were incapable of performing laundry, managing medications or managing finances were more likely to be receiving home care services.

Chapter Summary

Results of univariate logistic regression indicated that the home care users were older and had more health conditions. The only strong correlation found between control variables was that persons who were married were unlikely to live alone. There was a moderately strong correlation between the two self-reported functional status measures and only weak correlations between the performance and self-report measures. Both self-report measures were associated with home care use but the capacity measure appears to be more strongly related as it remained significant after accounting for a control variable while the self-report of behaviour measure did not. Home care users tended to report more difficulty carrying out the tasks of laundry, managing medications and managing finances.

Table 6.9: Chi Square Results: Functional Status Capacity by Home Care Use

Self-report of Capacity Task		Home Care User?		
		Yes	No	Totals
Telephone	Independent	24	112	136
	Dependent	0	2	2
	Total	24	114	**138**
	Fisher's Exact Test (2 tailed) = **1.0**			
Medication	Independent	22	114	136
	Dependent	2	0	2
	Total	24	114	**138**
	Fisher's Exact Test (2 tailed) = **0.029**			
Managing Finances	Independent	18	108	126
	Dependent	6	6	12
	Total	24	114	**138**
	Fisher's Exact test (2 tailed) = **0.007** (1 expected cell count <5).			
Walking	Independent	24	113	137
	Dependent	0	1	1
	Total	24	114	**138**
	Fisher's Exact Test (2 tailed) = **1.0**			
Nursing Care	Independent	22	113	135
	Dependent	2	1	3
	Total	24	114	**138**
	Fisher's Exact Test (2 tailed) = **0.78**			
Shopping	Independent	17	100	117
	Dependent	7	14	21
	Total	24	114	**138**
	Fisher's Exact test (2 tailed) = **0.056** (1 expected cell count <5).			
Laundry	Independent	14	99	113
	Dependent	10	15	25
	Total	24	114	**138**
	Fisher's Exact test (2 tailed) = **0.003** (1 expected cell count <5).			

CHAPTER 7: RESULTS: LONGITUDINAL ASSOCIATIONS BETWEEN FUNCTIONAL STATUS MEASURES AND HOME CARE USE

This chapter outlines the results found in addressing the second research question: Among community dwelling older adults, are three different functional status measures able to predict formal home care service use in the two and a half years following the assessment?

Choosing Control Variables

Univariate logistic regression of the control variables with home care use in the two and a half year follow-up period as the dependent variable is shown in Table 7.1. To summarize, Table 7.1 indicates that health beliefs was the only significant variable in univariate analysis to be able to predict home care utilization. The odds of using home care services were higher for those with negative versus positive health beliefs.

Multivariate analysis was then conducted with the control variables. Three different logistic regression models were developed, one for the Predisposing variables, one for the Enabling variables and one for the Need variables. For each model, the three most significant variables found in univariate analysis were entered. The results are shown in Table 7.2. The health beliefs variable continued to be the strongest predictor of home care use but seemed to be influenced by the inclusion of the nationality variable and vice versa. The nationality variable became significant in the multivariate model (p = 0.047) indicating that the odds of receiving home care services was higher for people from founding versus non-founding countries.

Table 7.1: Univariate Logistic Regression of Each Control Variable and Home Care Use in the Two and a Half Year Follow-up Period (n = 110)

Variable	Variable Categories	B	SE	p value	Odds Ratio	Lower CI	Upper CI
Predisposing							
Age at 2001 AIM interview	Age	.068	.050	.175	1.071	.970	1.182
Sex	M						
	F	.243	.435	.577	1.275	.544	2.989
Current Marital Status	Not Married						
	Married	.201	.429	.640	1.222	.527	2.832
Lives Alone?	Yes						
	No	-.302	.430	.482	.739	.319	1.715
Education	Years of Education	.002	.081	.977	1.002	.856	1.174
Nationality	Founding Countries						
	All Others	-.760	.470	.106	.468	.186	1.175
Health Beliefs	Disagree						
	Agree or Neutral	.922	.438	.035	2.514	1.065	5.936
Enabling							
Income	Under $20,000						
	$20,000 or over	.134	.429	.756	1.143	.493	2.649
Social Contact	Lifespace 1,2,3						
	Lifespace 4,5	-.735	.630	.243	.479	.140	1.647
Need							
Self rated health	Good or Excellent						
	Fair, Bad or Poor	.655	.438	.135	1.925	.815	4.545
Number of Health Conditions	Count of Health Conditions	.134	.084	.109	1.143	.971	1.347
Depression	CES-D 10 score under 10						
	CES-D 10 score 10 and over	-.762	.547	.164	.467	.160	1.364
Cognitive Status	MSQ10 score 9 or 10						
	MSQ 10 score 8 or less	.336	.595	.572	.572	.436	4.496

Table 7.2: Multivariate Logistic Regression of Control Variables for Individual Determinants Components with Home Care Use in the Two and a Half Year Follow-Up Period (n = 110)

Model	Variables	B	SE	p value	Odds Ratio	Lower CI	Upper CI
Predisposing	Health Beliefs	1.075	.465	.021	2.930	1.178	7.288
	Nationality	-.994	.500	.047	.370	.139	.986
	Age	.064	.053	.229	1.066	.960	1.184
	Model x^2 = 10.184, df = 3, p = 0.017						
Enabling	Income	.080	.434	.855	1.083	.462	2.537
	Social Contact	-.721	.634	.255	.486	.140	1.685
	Model x^2 = 1.340, df = 2, p = 0.512						
Need	# Health Conditions	.124	.087	.155	1.132	.954	1.342
	Self-perceived Health	.593	.459	.196	1.810	.736	4.452
	Depression	-.891	.561	.112	.410	.136	1.233
	Model x^2 = 6.795, df = 3, p = 0.079						

One variable that best identified home care users from each Andersen-Newman component of Individual Determinants in the multivariate regression just described (according to p values) was then selected (health beliefs, social contact and depression). These three variables were then entered into a logistic regression model in order to determine if the significance of the variables would increase if modeled together (Table 7.3). Modeling the variables in this way did increase their individual significance levels overall, but the variables of health beliefs and nationality continued to have the most significant p values.

Table 7.3: Multivariate Logistic Regression of Most Significant Control Variable from Each Andersen-Newman Component with Home Care Use Within the Two and a Half Year Follow-Up Period (n = 110)

Variables	B	SE	p value	Odds Ratio	Lower CI	Upper CI
Predisposing: Health Beliefs	1.062	.458	.020	2.891	1.179	7.089
Enabling: Social Contact	-.819	.663	.217	.441	.120	1.617
Need: Depression	-1.017	.577	.078	.362	.117	1.120

Model: x^2 =9.167, df = 3, p = .02

Phi coefficients of the control variables were already calculated for the analysis of Research Question #1 and indicated a weak correlation between the variables of health beliefs and nationality (r = -.18, p<0.01).

To summarize to this point, the purpose of the previous statistical analysis was to choose control variables to include in final logistic regression modeling. Nationality and health beliefs were the two variables included in final modeling as they had the highest levels of significance and were only very weakly negatively correlated.

Addressing Research Question #2

Pearson coefficient correlations between the functional status measures were calculated for answering Research Question #1 (Table 6.5). The performance and self-report measures were found to be weakly correlated while the two self-report measures were strongly correlated (r= .760, p < 0.01). Univariate logistic regression of the three

functional status measures and their ability to predict home care use in the two and a half years following the 2001 AIM interview is shown in Table 7.4. The performance measure was the only measure found to have a significant ability to predict home care use. The odds of receiving home care services were 1.27 higher for those who were more dependent versus independent in their activities of daily living according to the performance measure.

Table 7.4: Univariate Logistic Regression of Functional Status Measures and Home Care Use in Two and a Half Year Follow-up Period (N = 110)

Measure	B	SE	p value	Odds Ratio	Lower CI	Upper CI
Performance	.240	.114	.036	1.271	1.016	1.591
Model x^2 = 4.699, df = 1. p = .030						
Capacity	.131	.294	.657	1.140	.640	2.029
Model x^2 = 0.192, df = 1, p = .661						
Behaviour	.190	.178	.285	1.210	.854	1.714
Model x^2 = 1.127, df = 1, p = .288						

Multivariate analysis of the functional status measures was then conducted in order to directly compare the abilities of the three different measurement types at predicting home care use (Table 7.5). The overall model was not significant, but it showed the same type of pattern shown in the univariate analysis, where the performance measure was superior to the self-report measures at predicting future home care use at the individual variable level.

Table 7.5: Multivariate Logistic Regression of Functional Status Measures with Home Care in Two and a Half Year Follow-Up Period

Variables	B	SE	p value	Odds Ratio	Lower CI	Upper CI
Performance	.228	.122	.061	1.256	.990	1.595
Capacity	-.177	.406	.663	.838	.378	1.856
Behaviour	.131	.255	.607	1.140	.691	1.881

Model: $x^2 = 4.978$, df = 3, p value = 0.173

The final step in the logistic regression modeling was to incorporate the control variables in the modeling. Since three variables could be used in the modeling, the best functional status predictor (performance) was modeled with two control variables (health beliefs and nationality) using backwards regression. This resulted in a final model that included all three of the variables (Table 7.6). In this model, the performance measure continues to significantly predict home care use. This model indicated that those people who did not believe that they have control over their health, were more dependent in a performance assessment of function and were from a founding nation were most likely to receive formal home care services.

Table 7.6: Final Logistic Regression Model for Research Question #2

Variable	B	SE	p value	Odds ratio	Lower CI	Upper CI
Health beliefs	1.061	.476	.026	2.888	1.137	7.335
Performance	.276	.124	.026	1.318	1.033	1.681
Nationality	-1.210	.532	.023	.298	.105	.846

Model: $x^2 = 14.090$, df = 3, p = 0.003

Post Hoc Analyses

The results of Research Question #2 show that of the three measures studied, the PASS performance measure best predicts the future home care use of older Manitobans. In order to understand this phenomenon better, concatenation was performed of the PASS measure.

The most common pattern of functional status abilities for the PASS measure was that 14 people were dependent in all the tasks except for walking. The second most common pattern was that another 14 persons were dependent in all tasks except for walking AND telephone tasks. In looking at the non home care users only, the most common pattern was that of being dependent in all tasks except for telephone, walking and laundry (n = 6). The most common pattern for home care users was that of being dependent in all tasks except for telephone and walking tasks (n = 8).

Chi square results for each individual performance task can be found in Table 7.7. These analyses showed that there were significant differences between the home care users and the non users for the tasks of laundry, shopping and paying bills. More specifically, those that received formal home care services were more likely to score as requiring assistance for the tasks of laundry, paying bills and shopping on the PASS performance measure.

Table 7.7: Chi Square Results: Functional Status Performance Measure by Prospective Home Care Use

Task		Yes	No	Totals
		Home Care User?		
Telephone	Independent	57	19	76
	Dependent	23	10	33
	Total	80	29	109
	Pearson Chi Square = .331, **p = .565**			
Medication	Independent	22	4	26
	Dependent	58	26	84
	Total	0	30	110
	Pearson Chi Square = 2.426, **p = .119**			
Pay bills	Independent	37	4	41
	Dependent	36	24	60
	Total	73	28	101
	Pearson Chi Square = 11.119, **p = .001**			
Walking	Independent	77	29	106
	Dependent	3	1	4
	Total	80	30	110
	Fisher's Exact Test (2 tailed) = **1.0**			
Nursing Care	Independent	39	11	50
	Dependent	40	18	58
	Total	79	29	108
	Pearson Chi Square = 1.116, **p = .291**			
Shopping	Independent	19	2	21
	Dependent	57	27	84
	Total	76	29	105
	Pearson Chi Square = 4.300, **p = .038**			
Laundry	Independent	46	10	56
	Dependent	27	19	46
	Total	73	29	102
	Pearson Chi Square = 6.824, **p = .009**			

The PASS performance measure has several subtasks within each item. This additional detail provided the opportunity to examine the subtasks for laundry, shopping and bills to determine which subtasks were most challenging to the AIM participants.

For the paying bills task, the task requests the participant to write two different cheques to pay two separate bills. The subtasks include:

1. Write date correctly and legibly
2. Write the name of the payee correctly and legibly
3. Selects the correct amount to be paid
4. Writes the bill in cursive correctly and legibly
5. Writes the bill amount in numeric correctly and legibly
6. Writes the signature correctly and legibly

For this task, four to seven of the 30 home care users needed assistance to complete the subtasks for writing the first cheque, and then three or less home care users needed help to complete each of the subtasks in writing the second cheque.

The laundry task includes the following subtasks:

1. Sorts items efficiently and correctly
2. Folds all items neatly
3. Matches socks correctly
4. Places folded items in basket efficiently and completely
5. Lifts basket efficiently
6. Carries basket across room efficiently and maintains balance

For this task, six of the 30 home care users needed assist for the first subtask and four persons needed assist for the second subtask. For the remainder of the subtasks, zero to one of home care users required assistance.

The shopping task consists of the following subtasks:

1. Identifies all five items on the shopping list correctly
2. Chooses item as indicated by gathering items in one location or pointing
3. Selects correct amount to pay for the five grocery items
4. Identifies correctly that change returned is incorrect
5. Correctly identifies the amount that should have been returned

For each of the subtasks between six and ten of the 30 home care users required assistance for each of the subtasks.

Chapter Summary

Results of univariate logistic regression identified negative health beliefs as the only control variable that predicted future home care. In multiple regression of the control variables, nationality was also found to be a significant predictor of home care use.. In univariate modeling, the performance measure was the only functional status measure able to predict future home care use. Participants who received home care had the most difficulty with the laundry, shopping and paying bills tasks. The final logistic regression model showed that home care users in the two and a half years following the 2001 AIM interview are those that performed poorly on the PASS, had negative health beliefs and were from a founding country.

CHAPTER 8: SUMMARY AND DISCUSSION

In this chapter, a summary response will be provided to each of the two research questions addressed in this study, the findings for each question will be compared to the literature and the implications of this study in relation to the literature will be discussed. In addition, the meaning of the research results when linking the findings of the two research questions will be discussed. Also to be addressed is the methodology used in this study and finally, future directions on this research topic will be suggested.

Research Question 1

Among community dwelling older adults, is there a cross-sectional association between use of formal home care services and three different functional status measures?

The results of this exploratory study suggest that the functional status measure that best differentiated between home care users and non users was the self-report of capacity measure. Although both of the self-report measures were able to identify home care users in univariate analysis, only the self-report of capacity measure remained significant once a control variable was incorporated into the modeling.

The finding that the self-report of capacity measure is the strongest at identifying home care users is consistent with the mandate and the entry criteria for the Manitoba Home Care Program. Individuals are eligible for Manitoba Home Care if they are unable to complete their activities of daily living due to medical or functional impairments. Individuals are not eligible for home care services if they do not usually perform certain tasks; it is the person's capability to perform tasks rather than their usual behaviour that would determine their eligibility for home care. Policy makers and program planners can

be reassured by these results since they indicate that the Manitoba Home Care Program services are being distributed within Winnipeg according to the program's mandate.

However, a surprising finding was that there was no difference between home care users and non users in their independence according to the performance measure. It was expected that people who received home care would demonstrate an increased dependence score on the performance measure. A potential explanation is that people who receive home care are those who believe they require home care services subjectively, and that this subjective need is not related to their actual performance in functional status tasks. People who subjectively believe that they require home care assistance may be more likely to actively seek out home care services or to accept home care services when they are offered. If this were the case, the actual performance of functional tasks between the two groups may be similar as their service use is based more on their perceived need rather than their actual performance.

Another explanation for the lack of differences between home care users and non users in respect to the performance measure could be that there are non home care users who are receiving informal assistance from family and friends. A third explanation could be a lack of sensitivity of the performance measure which may have occurred from collapsing the original scoring of each individual task and then using a summary measure of several tasks. The lack of difference between the home care users and non-users functional status according to the performance measure indicates that more research on people's actual ability to perform functional status tasks and their home care use is indicated. From a policy and program perspective, it is important to know if those receiving home care services are those that actually have a lower level of function than

those that don't receive home care, or if home care services are actually distributed according to perceived need.

Of the seven functional status tasks investigated, the ones that seem to be more challenging for home care users are laundry, managing medications and managing finances. Managing finances is not a task that can be provided by the Manitoba Home Care Program and thus the inclusion of this task in the results may be more a reflection of the needed skills associated with managing finances. For example, managing finances requires cognitive skills as well as skills required for transporting oneself to the bank.

In looking to the literature, only one other study has compared different measurement strategies and related it cross-sectionally to home care use. Jenkins and Laditka (2003) found that there was a difference between measurement methods in being able to identify home care users, as was found in this current study. However, Jenkins and Laditka used only self-report measures rather than comparing performance measures and self-report measures. In the Jenkins and Laditka study and this study, the different self-report measures were able to identify home care users, but to differing degrees. Taken together, these two studies indicate that further research is required to better understand the relationship between different measurement methods and home care use.

The two control variables (age and number of health conditions) found to be significantly related to cross-sectional home care use univariately have both been identified previously in the literature as influencing home care use (Carriere, 2006; Coughlin et al., 1992; Diwan et al., 1997; Wilkins & Park, 1998). Two variables which have been identified in previous literature as related to home care which were not found to be significant in this study were living alone and self-rated health status. One possible

explanation for not finding a relationship between these two variables and home care use is that this study does not have strong power due to the small sample size. An alternate explanation for the lack of association between the two variables and home care use is the age of this particular sample. Participants were older than the studies reviewed and thus it could be that the people in this current study are also living with individuals who are older (especially in the instance of living with a spouse) and who are unable to assist another person with functional activities. For self-rated health, it could be that response drift played a role in these participants' responses, and that they felt that their health is good compared to other people their age, rather than compared to their level of health at an earlier age. The finding that a need variable (self-perceived functional status) was most relevant to health service use is consistent with the premise of the Andersen-Newman framework that need factors are most closely related to health utilization. Previous research that has been structured using the Andersen-Newman framework (Doupe, 2004) supports this view.

This study provides further support that functional status is an important variable to consider when determining the home care needs of older adults. Although further research is required to validate the findings in this study, it suggests that clinicians working with community-dwelling older adults could choose to use a self-report of capacity measure when screening for a person's current home care needs, rather than expending extra resources on completing a performance measure with these individuals. This type of functional status assessment can easily be completed over the phone for persons without hearing impairment, thus making it a very flexible and low cost screening tool.

Research Question 2

Among community dwelling older adults, do any of the three different functional status measures predict formal home care service use in the two and a half years following the assessment?

The results of this exploratory study suggest that of the three measures studied, the PASS performance measure is the most appropriate measure to use when predicting prospective home care use by older adults.

The finding that the PASS was best able to predict home care use reinforces a hypothesis that has been discussed in the literature but not empirically tested. The hypothesis is that performance measures are more sensitive to change and pick up impairments before individuals themselves are aware of the decline (Guralnik et al., 1989, Kempen, van Heuvelen, et al., 1996). The concept behind this hypothesis is that performance measures are completed using standardized equipment and standardized instructions. When performing everyday activities, people may be making small adaptations to compensate for declining physical and cognitive abilities without being aware of these compensations they are making. Therefore, when administered a performance measure, they are forced out of their normal daily pattern and are not able to use the adaptations that they have developed and thus may perform worse on these measures than they actually perform in day to day activities.

When looking at the individual task level, it seems that the tasks that set apart the home care users from the non users are those of laundry, bills and shopping. The paying bills task included writing two separate cheques to pay two separate bills. The home care users needed more assistance in writing the first cheque than the second. This seems to imply that the difficulty encountered with this task was the novelty of the task, and that

once the task was familiar, the participants had less difficulty with the task. For the laundry task, participants needed help primarily for the subtasks of sorting items efficiently and folding all items neatly, whereas they did not require assistance for the tasks that required mobility and strength such as lifting the laundry basket and carrying it across the room. For the shopping task, the home care users had approximately the same amount of difficulty for each subtask. Since the shopping and paying bills tasks were seated tabletop tasks, the primary demands of these tasks were in the domains of cognition and fine motor skills. The difficulties that participants had in the laundry subtasks seems to echo these findings that the PASS performance measure seems to pick up cognitive and/or fine motor difficulties that the participants may be experiencing.

To understand these findings at the task level, one can turn to the neuropsychological literature on executive functioning. It suggests that the specific cognitive skill area that predicts IADL abilities is that of executive functioning (Boyle et al., 2003). Executive functioning is a term used to describe a group of cognitive functions that are believed to be primarily mediated by the frontal lobe and controls and orchestrates lower level cognitive processes. Executive functions are the "problem-solving processes that are invoked when tasks are non automatic and novel . . . they are the decision-making and planning processes that are invoked at the outset of a task and in the face of a novel challenge" (Singer & Bashir, 1999).

When faced with a novel task, a person with executive dysfunction may have trouble executing, planning and carrying out tasks in addition to having trouble detecting errors that they may have made (Katz & Hartman-Maeir, 1997). Ready, Ott, Grace and Cahn-Weiner (2003) found that declines in executive functions are evident very early in

the course of cognitive decline, even before impairments in self-reported ADL and IADL are evident. Perhaps this type of subtle cognitive impairment is being picked up by this PASS performance measure, before individuals themselves are aware of their difficulties since much of the tasks they perform on a day-to-day basis are automatic tasks.

The finding that IADL tasks were the ones that separate the home care users from the non-users is consistent with a study by Shapiro (1986) who found that difficulty coping with IADL was one of the best predictors of subsequent home care use. Shapiro's study did include ADL as a separate variable, which was less able to predict future home care use.

Although the idea of performance measures being superior at predicting future needs has been discussed, there is a paucity of literature to support this hypothesis in its application to home care use. This hypothesis has only been tested using mortality as the outcome. Angel, Ostir, Frisco and Markides (2000) looked specifically at mobility in older adults and found that a performance measure was more predictive of mortality. Despite a person's report of their ability to perform a walking task, it was their actual inability to attempt or complete the walk that related to their mortality within a two year period. Reuben and colleagues (2004) combined a self-report measure with a performance measure of impairment and found that this combined measure was better at predicting future functional decline or mortality for those people who reported being capable of functional tasks than either the performance measure or the self-report measure alone. In the current study, the performance and self-report measures were modeled together to see if this would result in a stronger predictive model, but it did not. This could be because Reuben and colleagues used a much more precise scale and had 12

different categories for the combined performance and self-report measures. This study is a first step in validating the notion that performance measures are most predictive of future home care needs.

Interestingly, the two control variables (health beliefs and nationality) that were included in the final modeling of the second research question have not been found to be predictive of home care use in previous literature (Hall & Coyte, 2001). In the case of health beliefs, the lack of previous findings is simply because this variable was not included in the reviewed studies. For nationality, the studies that found no link between nationality and home care were conducted in Ontario and the United States. The cultural make-up of the sample used in this study would be unique, especially since the Ontario sample included people as young as 18 years of age and rural residents. It could be that older Manitobans of non-native cultures either have cultural traditions and beliefs that preclude them from seeking home care services or that this population has particular difficulties with access to the home care program.

The four predictors that were expected to be related to home care use based on previous literature (age, sex, income, self-rated health) were not predictive in this study (Evashwick et al., 1984; Hall & Coyte, 2001; Manheim et al., 1995; Shapiro, 1986). As was mentioned in the discussion for the cross-sectional piece, one explanation is the low power for this study. Another explanation is that this sample was unique in its advanced age. The lack of association found between age and home care use could be due to the small age range in this sample. The lack of association between self-rated health and home care use could be due to response shift as mentioned in the discussion for the cross-sectional question. An explanation for the lack of association between income and home

care use may be that this age group/generation is less likely to seek private health care services and more likely to seek help from government agencies, or use informal services from friends and family, despite income level.

More research is needed on this topic, however the results of this study suggest that program planners who want to evaluate the future home care needs of a community should seriously consider the inclusion of a performance measure into the needs assessment process. It is difficult to include this type of measure since it is labour intensive, but may be important in improving the accuracy of home care need projections.

In terms of relevance to clinicians, these findings support the need for clinicians to complete functional assessments using performance measures. Although more research is needed on this topic, it appears that performance assessments tap into a more subtle level of functioning and a higher level of detail than is gleaned from self-report measures alone. Using a performance measure may be a way for clinicians to determine which clients should be targeted for more intensive preventative intervention and programming in order to promote maintenance of activities of daily living and decrease immediate future home care needs.

Linking Question #1 and #2

The results of this study contribute to the body of literature reporting that self-report and performance measures are not concordant and that they measure different constructs (Angel, Ostir, Frisco, & Markides, 2000). This study is also consistent with literature reporting that older persons tend to be "optimistic" in their view of their ability to function. Older adults often report being capable of performing certain functional tasks yet when asked to perform these tasks, are unable to do so (Angel et al., 2000).

Studies that report low concordance between functional status measures cite older persons as not understanding self-report questions as they were intended as one reason for this discordance. Keller, Kovar, Jobe and Branch (1993) provide examples of older adults who thought that using special aids was synonymous with getting help from another person, and examples where participants "forgot" about assistance that they receive from other people to perform IADL tasks. In addition, it seems that concordance between self-report and performance measures is lower for IADL tasks, which was primarily the task type that separated the home care users from non-users in this study (Jette, 1994; Kaufert et al., 1979).

The correlation analyses between the functional status measures seemed to suggest that the two self-report measures were concordant, however after regression analyses were performed, it appeared that the self-report of capacity measure was potentially superior to the self-report of behavior measure in identifying home care users. This reinforces that self-report measures should not be used interchangeably for clinical and research purposes, and that further research is required on this topic (Jenkins & Laditka, 2003).

This study highlights that it is important to remember the goal for using a functional status measure and that a measure be chosen according to the context and purpose of the situation, rather than the same measures being used for all clients in all situations.

Comments on Methodological Strategies Employed

The Andersen-Newman Framework for Health Services Utilization (1973) was chosen to assist with the methodological approach of this study. The model was found to

be helpful as the *Individual Determinants* component allowed a full exploration of individual variables that could potentially influence home care use. The cross-sectional component of this study was consistent with previous literature that uses the Andersen-Newman framework for exploration of home care use. Specifically, the Need factors were the most important for identifying home care users and the Predisposing and Enabling variables were also able to predict home care use but to a lesser degree (Calsyn & Winter, 2000; Chappell, 1994). This was especially evident in the modeling for Question #1 as the self-report of capacity variable is a Need variable. For the longitudinal modeling, the final model included predisposing (health beliefs and nationality) and need factors (performance measure of function). The Andersen-Newman framework would suggest that the Need, Predisposing and Enabling factors combined would best identify home care users but this analysis was not possible in this study due to the fact that the number of control variables that could be explored was limited by sample size.

This study was limited in its ability to apply the Andersen-Newman framework as is suggested in the literature. Calsyn and Winter (2000) suggest that the use of interaction terms may improve the Andersen-Newman framework's ability to explain which individuals are in need of health utilization services. Sample size limitations did not allow for this type of investigation here, but would be an important consideration for future studies. For example, Calsyn and Winter found that people who report needing help with functional status tasks and live alone are more likely to require formal home care assistance than people who report requiring assistance with functional status tasks and live with another person.

It has also been suggested that it is important to model the Predisposing, Enabling and Need components in blocks with Need components being entered first in order to remain true to the Andersen-Newman framework. This is because the model purports that:

> Predisposing, enabling and need measures were hypothesized to influence the use of health care services in a hierarchical order. Need factors were considered to be most closely associated with utilization, assuming that most families would only use health care services if they were experiencing health problems. (Doupe, 2004, p. 21).

Modeling in blocks was not completed for this study due to the limited number of variables that could be entered into each logistic regression model.

The nature of this study did not lend itself to the use of the Andersen-Newman framework outside of the use of the Individual Determinants of Health and their resulting influence on health services utilization. The Societal Determinants and Health Services System components of the model were not explored since the primary interest in this study was comparing functional status measures, thereby looking in depth into one individual determinant of health services utilization. Factors of Societal Determinants such as increased availability of health technology that can be used in the home setting, and societal norms in the care of older adults, as well as components of the Health Services System such as volume and distribution of physician, nursing, therapist and preventative programming, and the access and structure of the home care system can all influence an individual's home care use However, these concepts fall outside the scope

of this particular study and would be interesting concepts to explore further in future studies.

In this study, functional status and its relationship with home care was examined using two different methodological approaches: a cross-sectional approach and a longitudinal approach. The approaches yielded different results as has already been discussed. Longitudinal cohort studies (the design used for Question #2), are often seen as superior to cross-sectional studies as temporality can be established and this allows an understanding of whether the "exposure" preceded the "disease" or not (Young, 2005). In this particular study, the goal was not to establish causal relationships between the "exposure" and the "disease"; the goal was rather to gain a fuller understanding of the relationships between different types of measurement of the "exposure" (functional status) and the "disease" (home care use). The understanding of these relationships is important for clinicians who routinely perform functional status assessments and are recommending home care services. Clinicians need to be thinking about the patient's current as well as future needs, and this is why the two different methodologies are relevant.

Knol, Haken and Kempen (2003) conducted a study specifically to examine the differences in findings between a cross-sectional approach and a longitudinal approach when investigating the relationships between home care predictors and home care use . The results were similar to this current study's results in that the findings for the cross-sectional and the longitudinal components were different. Of particular interest is that their self-reported measures of ADL and IADL identified home care users in the cross-sectional model but then did not predict home care use in the subsequent two years in the

longitudinal model, which echoes the findings of this current study. Knol and colleagues did not include a performance measure, but found chronic medical morbidity, age and feelings of mastery were important longitudinally. This draws some parallels with the current study that indicates that the number of health conditions and health beliefs appear to be related to future home care use.

Limitations

As is true with all studies, this study has several limitations that need to be highlighted. First, the small sample size presented several challenges for statistical analyses. For one, only a limited number of variables were used in the logistic regression analyses. If the sample size were adequate, it would have been ideal to compare the three functional status measures directly in a multivariate model for answering Research Question #1. As well, it would have been ideal to include variables from all three dimensions of the Andersen-Newman framework (predisposing, enabling and need) as all three categories have been found to be predictive of home care utilization in the literature (Hall & Coyte, 2001). In addition, only a select number of control variables were included in the analysis for two reasons: a) due to the nature of secondary analysis, only those variables available from the 2001 AIM interview schedule could be used and b) the primary purpose of the study was to examine the relationship between functional status and home care, and not to find all the potential predictors of home care utilization. There may be other variables that were not included in this study that could augment or confound the ability of functional status measures to predict home care utilization. Finally, it would have been ideal to apply a multiple testing correction to the p value.

However, with the use of a more stringent p value, findings would be minimal and thus a p value of less than 0.05 was maintained for analyses.

The AIM participants in this subsample were more independent than was originally anticipated, which made investigation at the individual functional status task level difficult. This also indicates that the results from this subsample cannot be generalized to the AIM sample as a whole or to older community-dwelling adults as a whole. This high level of independence was a function of the inclusion and exclusion criteria for the PASS subsample in order to ensure the participants' safety and to ensure that they would have the capacity to complete the performance assessment. Expanding this sample in the future to make it more similar to the Manitoba population as a whole would likely require increased resources but is possible. For example, occupational therapists or physiotherapists could administer the PASS portion of the assessment rather than laypeople. This would allow the inclusion of participants with more severe physical and cognitive impairments since physical and occupational therapists have training to use discretion and safety precautions when assessing individuals with impairments, thereby reducing the risk of injury to the participants. Another important point regarding the generalization of the results of this study is that this study is based only on community-dwelling older adults, and that these findings would not apply to older adults who are hospitalized. Clinicians working in hospitals would need to become familiar with the body of literature focusing specifically on the use of functional status measures with hospitalized older adults.

This study was unable to ascertain major events during the follow-up period (between the time a participant was interviewed and the time they were enrolled into

home care). Therefore, it is quite possible that major events such as the death of a spouse or a move to a different environment could have been responsible for the admission to the home care program rather than the person's functional status alone.

This study assumes that a person's use of home care is synonymous with a person's need to have home care. This could potentially be untrue, for example, if a person's health or functional status improves and their home care services are not re-assessed.

Another caution is that for some of the performance tasks there were high rates of refusal. The highest refusal rates of the nine performance tasks that were administered in the 2001 AIM interview were 8.7% for laundry, 7.2% for paying bills and 4.3% for shopping. High refusal rates for performance tasks was also found by Myers, Holliday, Harvey and Hutchison (1993).

The method of administration of the performance measure in this study may have decreased the possible concordance between the performance and self-report tasks. For example, administering the performance measure first has been shown to increase the correlation between the two measurement methods (Daltroy, Larson Eaton, Philips, & Liang, 1999) and this was not done in the 2001 AIM interview as the priority was to complete the standard interview before initiating the PASS supplement. One possible explanation for why the participants rated themselves so highly on the self-report measures in comparison to the performance measure is as reported in Reuben, Valle, Hays and Siu (1995): older persons tend to rate their abilities higher in a face- to-face interview than in a paper-based questionnaire format.

Kempen and Suumeijer (1991) highlight that it is important that the dependent variable be clear enough that its "purpose" is understood. For the case of home care services, it could be argued that home nursing services, personal care services and homemaking services, although all services that are offered in the home, all have different purposes and thus should be considered individually rather than collapsed together in a summary score. Diwan, Berger, and Manns (1997) demonstrated in their study of 270 Medicaid elders that the predictors of service type use are different depending on the service. Using specific home care services as the dependent variables was explored but was not possible for this study with the data available. The data was not specific enough in its identification of the service types being received by each individual and as mentioned in the methods section, when a client is registered in one program and then transferred to another, it is frequently not captured (Roos, Mitchell, et al., 2001).

As mentioned in the methods section, a weakness that has been reported in the home care data is inconsistencies in the closing of home care cases. Cases tend to be left open when no services are being provided to the client. This would affect this study in the cross-sectional analysis if the individuals who were listed as receiving home care at the time of the 2001 interview were not actually receiving services, resulting in an overestimation of home care users at the time of the 2001 interview.

During the time period of this study, the Winnipeg Regional Health Authority Home Care Program was in the process of implementing the Minimum Data Set for Home Care (MDS-HC tool). The MDS-HC tool ensures that all case coordinators assess the same areas of an individual's social, functional, cognitive and medical status. The

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implications of the implementation of this tool on this study are unknown. For example, it is unknown if the implementation of this tool resulted in an increase or decrease in the enrolment of persons into the Winnipeg home care program.

Future Directions

This section summarizes future potential research directions which may or may not have already been highlighted in this document. An evident research opportunity is to replicate this study with a larger and more diverse community-dwelling population in order to validate the results of this study and increase the ability to generalize the results. A larger sample size would allow for increased methodological adherence to the Andersen-Newman Framework of Health Services Utilization (1973) methodologically such as including more control variables, including interaction terms and modeling the predisposing, enabling and need variables hierarchically. The generation of a larger sample size would also facilitate looking more specifically at functional status measures at an individual task level. Originally it was hoped that the dataset used in this study would allow for the development of a list of functional status tasks that together best predict home care use in the future. This information would be important for clinicians in improving efficiency. It could also be helpful to planners as being able to include one or two performance tasks in addition to self-report questions in a needs assessment is more realistic from a resource perspective than using an entire performance battery.

Another opportunity is to increase understanding of the relationships between functional status measures and other types of health services such as community support programs and personal care home use.

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This study has strengthened support for more research to be done on the relationships between performance measures, executive functioning and IADL activities. How are these three concepts related? Is an IADL performance measure really a valuable tool for evaluating early executive dysfunction?

The finding that home care users and non users did not differ in their independence according to the performance measure in cross-sectional analyses raises questions for further study. Are those who are receiving home care simply those that believe they are unable to perform functional status tasks, or are there actual differences in ability to perform tasks between the home care uses and non users that were simply not picked up in this study? And since this study was not able to account for informal care, are those who are not receiving home care but performing poorly on performance measures receiving informal care instead?

The exploration of control variables in the second research question brings to light some results that do not coincide with previous literature. This study suggests that the relationships between the variables health beliefs and nationality with home care use in Manitoba could be explored further.

Finally, this study could be expanded in scope according the Andersen-Newman framework to include variables that represent the accessibility and distribution of various community services as control variables. Variables that may be particularly related to this topic are the accessibility and availability of home care services, occupational and physical therapists and family physicians.

Chapter 9: Conclusion

The focus of this study was to compare different types of functional status measures in their ability to identify and predict home care use in Manitoba community-dwelling older adults. This study was a first look at the relationship between formal home care use and functional status measures and was unique in its examination of an in-depth performance measure and correlated self-report measures. Although this research can only be considered exploratory due to sample size limitations and the lack of ability to generalize the results to the larger community as a whole, it is important nonetheless in that it provides direction for future study on this topic and that it adds to this particular body of literature.

The findings of the study were that the self-report of capacity measure appeared best able to differentiate between home care users and non users cross-sectionally. In particular, it appears that home care users report being unable to perform laundry, manage medications and manage financial matters. In contrast, a performance measure was best at predicting future home care needs, perhaps because they are more sensitive to changes in functional status, particularly in the area of executive functioning. In particular, those who used home care in the follow-up period had difficulty with the paying bills, shopping and laundry performance tasks.

This study has strengthened the argument that self-report and performance measures address different constructs. This finding is important for researchers, clinicians and planners as it emphasizes that the type of functional status measure needs to be carefully considered when choosing, using and reading about functional status measures.

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APPENDIX 1: LETTERS OF APPROVAL FROM THE HEALTH RESEARCH ETHICS BOARD (UNIVERSITY OF MANITOBA) AND HEALTH INFORMATION PRIVACY COMMITTEE (MANITOBA HEALTH)

BANNATYNE CAMPUS
Research Ethics Boards

P126-770 Bannatyne Avenue
Winnipeg, Manitoba
Canada   R3E 0W3
Tel: (204) 789-3255
Fax: (204) 789-3414

APPROVAL FORM

Principal Investigator: Ms. Cara Brown
Supervisor: Dr. Marcia Finlayson

Protocol Reference Number: H2005:195
Date of REB Meeting: September 26, 2005
Date of Approval: September 26, 2005
Date of Expiry: September 26, 2006

Protocol Title: **"Predicting home care use: Are there differences across functional status measures?"**

The Health Research Ethics Board at the Bannatyne Campus, University of Manitoba, which is organized and operates according to Health Canada/ICH Good Clinical Practices, Tri-Council Policy Statement, and the applicable laws and regulations of Manitoba reviewed the above mentioned study at the REB meeting held on September 26, 2005. The membership of this Research Ethics Board complies with the membership requirements for Research Ethics Boards defined in Division 5 of the *Food and Drug Regulations*. The research was approved as submitted.

The following is/are approved for use:

- **Protocol (dated September 12, 2005)**

The approval is valid for one year from the date of the meeting at which it was reviewed. A study status report must be submitted annually and must accompany your request for re-approval. Any significant changes of the protocol and informed consent form should be reported to the Chair for consideration in advance of implementation of such changes. The REB must be notified regarding discontinuation or study closure.

This approval is for the ethics of human use only. For the logistics of performing the study, approval should be sought form the relevant institution, if required.

Sincerely yours.

Ken Brown, MD, MBA
Chair, Health Research Ethics Board
Bannatyne Campus

KB/bz

Please quote the above protocol reference number on all correspondence.
Inquiries should be directed to the REB Secretary
Telephone: (204) 789-3255/ Fax: (204) 789-3414

BANNATYNE CAMPUS
Research Ethics Boards

P126-770 Bannatyne Avenue
Winnipeg, Manitoba
Canada   R3E 0W3
Tel: (204) 789-3255
Fax: (204) 789-3414

APPROVAL FORM

Principal Investigator: Ms. C. Brown
Supervisor: Dr. Marcia Finlayson

Protocol Reference Number: H2005:195
Date of Approval: November 7, 2006

Protocol Title: "Predicting home care use: Are there differences across functional status measures?"

The following is/are approved for use:

- **Addendum to Protocol dated September 12, 2005**

The above was approved by Dr. John Arnett, Ph.D., C. Psych, Chair, Health Research Ethics Board, Bannatyne Campus, University of Manitoba on behalf of the committee per your letter dated November 3, 2006. The Research Ethics Board is organized and operates according to Health Canada/ICH Good Clinical Practices, Tri-Council Policy Statement, and the applicable laws and regulations of Manitoba. The membership of this Research Ethics Board complies with the membership requirements for Research Ethics Boards defined in Division 5 of the *Food and Drug Regulations.*

A study status report must be submitted annually and must accompany your request for re-approval. Any significant changes of the protocol and informed consent form should be reported to the Chair for consideration in advance of implementation of such changes. The REB must be notified regarding discontinuation or study closure.

This approval is for the ethics of human use only. For the logistics of performing the study, approval must be sought from the relevant institution, if required.

Sincerely yours,

John Arnett, Ph.D. C. Psych.
Chair, Health Research Ethics Board
Bannatyne Campus

Please quote the above protocol reference number on all correspondence.
Inquiries should be directed to the REB Secretary   Telephone: (204) 789-3255 / Fax: (204) 789-3414

www.umanitoba.ca/faculties/medicine/research/ethics

Manitoba 🐃

Health
Health Information Privacy Committee
4045 - 300 Carlton Street
Winnipeg MB R3B 3M9
Phone: (204) 786-7204
FAX: (204) 944-1911

December 18, 2006

File No. 2005/2006 - 18

Cara Brown

Winnipeg, MB

Dear Ms Brown:

Re: Predicting Home Care Use: Are there differences across functional status measures

Thank you for providing the requested information. This project is now *approved*.

Any significant changes to the proposed study design should be reported to the Chair for consideration in advance of their implementation.

If you have any questions or concerns, please do not hesitate to contact Marc Silva at 786-7204.

Yours truly,

Dr R. Walker
Chair

Please quote the file number on all correspondence

cc: L. Barre

Manitoba
spirited energy

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APPENDIX 2: CONSENT FORMS

UNIVERSITY
OF MANITOBA | Faculty of Medicine

Aging in Manitoba, Thirty Years Later: 2001

Aging in Manitoba Study
Dept. of Community Health Sciences
S-110, 750 Bannatyne Avenue
Winnipeg, Manitoba
Canada   R3E 0W3
Telephone (204) 789-3831
or   (204) 975-7732
Fax (204) 789-3905
aim@umanitoba.ca

I have read this consent form. I have had the opportunity to discuss this research study with Betty Havens or her staff. I have had my questions answered by them in language I understand. As a long time participant it the Aging in Manitoba studies, I have had the benefits of my participation explained to me. I understand that I will be given a copy of this consent form after signing it. I understand that my participation in this study is voluntary and that I may choose to withdraw at any time. I freely agree to participate in this research study.

I authorize the researchers to use those parts of my personal health information as may be necessary for the purposes of carrying out this study. I also authorize the Canadian Institute for Health Research and Manitoba Health as sponsors and the University of Manitoba Faculty of Medicine Research Ethics Board to review that personal health information for audit purposes. I understand that the appropriate safeguards will be taken to ensure the confidentiality of information regarding my personal identity.

By signing this consent form, I have not waived any of the legal rights that I have as a participant in a research study.

Participant printed name: _____

Legal guardian's signature_____   Date_____

Legal guardian's printed name:_____

I, the undersigned, attest that the information in the Participant Information and Consent Form was accurately explained to and apparently understood by the participant or the participant's legally acceptable representative and that consent to participate in this study was freely given by the participant or the participant's legally acceptable representative.

Witness signature_____   Date_____

Witness printed name:_____
I, the undersigned, have fully explained the relevant details of this research study to the participant named above and believe that the participant has understood and has knowingly given their consent.

Printed Name:_____   Date_____

Signature:_____

Role in the Study:_____

APPENDIX 3: DETAILS OF VARIABLES CHOSEN FOR ANALYSIS FROM 2001 AGING IN MANITOBA LONGITUDINAL SURVEY

Table 1: Control Variables

Variable	Question from 2001 AIM survey	Original response categories	Coding for Analyses and Rationale if Appropriate
Age	Age in years at time of 2001 interview calculated by AIM staff	Continuous in years	Continuous: Years
Sex	Sex as determined by AIM staff	M or F	0 = Male 1 = Female
Current marital status	What is your current marital status?	1. Single 2. Married 3. Widowed 4. Divorced/Sep arated	0 = Single, Widowed, Divorced/Separated 1 = Married *Variable collapsed due to small cell counts.
Lives alone?	How many adults live in this household with you?	Number of adults household	0 = Yes, lives alone 1 = Lives with 1 or more other persons * Variable collapsed due to small cell counts.
Education	How many years of grades did you complete in school?	Number of years	Continuous: Number of years of education

Variable	Question from 2001 AIM survey	Original response categories	Coding for Analyses and Rationale if Appropriate
Nationality	What nationality descent do you consider yourself?	1)Canadian 2)USA or Western Hemisphere 3)British (Isles) England 4)French 5)German 6)Norwegian/Danish/Swedish/Icelandic 7)Dutch/Belgian 8)Polish 9)Russian/Ukrainian 10)Other European-Middle East (Italian/Spanish/Portuguese/Greek/Slavic etc.) 11)Asia/Oceanic (Chinese/Japanese/Polynesian/East Indian etc.) 12)Native Indian or Eskimo	0 = Founding country (Canada, British Isles, French) 1 = Other (German, Scandanavian, Dutch/Belgian, Polish, Russian, Other European *Variable collapsed due to small cell counts.
Heath Beliefs	Do you seem to get the kinds of illnesses that doctors can't do much for?	1. Agree 2. Neutral 3. Disagree	0 = Disagree 1 = Agree or neutral *Variable collapsed due to small cell counts.

Variable	Question from 2001 AIM survey	Original response categories	Coding for Analyses and Rationale if Appropriate
Income	Using the categories on this card, tell me the number that corresponds to the income range that is closest to your total personal income before deductions for the last year.	1)Less than $5000 2)5000 – $9,999 3)$10,000 – $14,999 4)$15,000 - $19,999 5) $20,000 – $24,999 6) $25,000 – $29,999 7) $30,000 – $39,999 8)$40,000 and over	0 = Less than $20,000 1 = $20,000 or more *Variable collapsed due to small cell counts. Cut-off as close to 2001 poverty line as possible (Canadian Council on Social Development, 2002).
Social support	Life Space Index (Social Isolation): Includes questions of number of relatives seen in a month, how often see neighbours, number of friends seen in a month, number service people seen in a week.	Total life space index score based on the count of contacts in a month which is converted to a score on an index from 1 to 5.	0 = Lifespace score 1, 2, 3 1 = Lifespace score 4 or 5 *Variable collapsed due to small cell counts.
Access to family doctor	Do you have a regular doctor or clinic which you use for your health needs?	Yes or No	0 = No 1 = Yes
Need			
Self perceived health	How is your general health?	1)Excellent 2) Good 3)Fair 4)Poor 5)Bad	0 = Good or excellent 1 = Fair, bad or poor *Variable collapsed due to small cell counts.

Variable	Question from 2001 AIM survey	Original response categories	Coding for Analyses and Rationale if Appropriate
Number of health conditions	Number of health conditions C281 to C303: C281:Heart and circulation problems (hardening of the arteries, heart trouble) C282: High blood pressure (hypertension) C283: Have had a heart attack C284: Have had a stroke C285: Anaemia or other blood diseases C286: Arthritis or rheumatism (joints, back or orthopaedic) C287: Palsy (Parkinson's disease) C288: Alzheimer's disease or other dementias C289: Eye trouble not relieved by glasses (cataracts, glaucoma) C290: Ear trouble (hearing loss) C291: Dental problems (teeth need care, dentures don't fit) C293: Chest problems (asthma, emphysema, T.B., breathing problems) C294: Stomach trouble (including upper and lower gastro-intestinal problems) C295: Incontinence, that is, trouble controlling your bladder C296: Trouble controlling your bowels C297: Kidney trouble (including bladder troubles) C298: Diabetes C299: Foot trouble C300: Skin problems C301: Nerve trouble (including all mental illness or emotional problems) C302: Cancer, any variety (may have been mentioned above)	0) No 1) Yes For each condition. The number of yes' are totaled for the *total number of health conditions* score.	Continuous: Count of conditions

Variable	Question from 2001 AIM survey	Original response categories	Coding for Analyses and Rationale if Appropriate
Past home care use	Home care service such as a homemaker in the previous year?	1) No 2) Yes 3) Felt needed service but did not have. M) missing	0 = No 1 = Yes
Past nursing service use	Nursing service in the previous year?	1) No 2) Yes 3) Felt needed service but did not have. M) Missing	0 = No 1 = Yes
Depression	CES-D Scale	Score 0 - 10	0 = CES-D score 10 or less 1 = CES-D score over 10 (indicative of depression)
Cognitive status	MSQ 10	Score 0 to 10	0 = MSQ score of 9 or 10 1 = MSQ score of 8 or less *Cut off score chosen to allow for adequate cell counts.

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