

**THE OLDEST-OLD SURVIVORS OF THE
AGING IN MANITOBA LONGITUDINAL STUDY: PATTERNS AND
PREDICTORS OF FORMAL LONG TERM CARE USE**

Marcia Lynn Ptosnick Finlayson

A Thesis Submitted to the Faculty of Graduate Studies in
Partial Fulfilment of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

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STUDY: PATTERNS AND PREDICTORS OF FORMAL LONG TERM CARE USE**

BY

MARCIA LYNN PTOSNICK FINLAYSON

**A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University
of Manitoba in partial fulfillment of the requirements of the degree**

of

Doctor of Philosophy

Marcia Lynn Ptosnick Finlayson©1999

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DEDICATION

My parents taught me that learning is fun and exciting, my husband encouraged me to pursue my education, and my advisor has guided and coached me through a challenging project.

This work is dedicated to each of them - Mom, Dad, Greg, and Betty.

ABSTRACT

The oldest-old (85+) are the fastest growing age group in Canada and the largest group of formal long term care service users, yet little is known about the patterns of formal long term care use among this group, or the changes that lead to the utilization of these services over time. Using data from the Aging in Manitoba Longitudinal Study (AIM), the current work describes patterns of formal long term care use among those AIM participants who were born in 1911 or earlier and who had complete interview data from the 1983, 1990 and 1996 study waves (N=616). The work describes changes in health and functioning and the physical environment that are associated with these patterns and their endpoints. The Evans and Stoddard (1994) population health framework guided the secondary analysis, and the fifteen in-depth, qualitative interviews that were completed with randomly selected members of the larger sample.

Findings indicated eleven patterns of formal long term care service use. Thirty-eight percent of the sample did not use any formal long term care at any of the three cross-sectional periods under consideration. Patterns and endpoints varied by sex, by region of residence, and by the direction and extent to which changes in health and functioning occurred over the thirteen year period. Changes in the physical environment were not associated with particular patterns of formal long term care service use. The qualitative data enhanced the quantitative findings, and identified gaps in the available secondary data.

The primary messages emanating from this work are that: (1) the majority of the oldest-old are able to continue to live in their own homes without the assistance of formal long term care, (2) different factors lead to the use of home care than lead to the use of

nursing home care, (3) the Evans and Stoddard (1994) population health framework provides a useful organizational tool for this type of research, and (4) qualitative and quantitative data together provide a richer understanding of the factors that lead to the use of formal long term care among people who survive past the age of 85.

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CHAPTER 1: INTRODUCTION

A number of important and inter-related issues face older adults in Canada, as well as the health care providers, program developers and policy makers whose work focusses on providing services and care to this population. Together, three of these issues provide the rationale and background for this study. The first of these issues is the current demographic projections for Canada's older population. It has been suggested that over 22% of Canada's population will be over 65 years of age by the year 2031, and that people over 85 will make up almost 4% of the total population (Minister of Industry, 1997). These projections mean that increasing numbers of Canadians will be long-term survivors, that is, the "the oldest-old" (Suzman, Willis & Manton, 1992).

While this demographic shift may be considered relatively benign in and of itself, it becomes of increasing concern when one realizes that these long-term survivors are the largest users of formal long term care services (Havens, 1996). Formal long term care is care that is provided over a sustained period of time by trained caregivers such as health and social service professionals, para-professionals and nonprofessionals, and by volunteers working for organized health and social service agencies and programs (e.g., Meals on Wheels) (Havens 1996). Formal long term care is provided through nursing homes and home care to individuals with physical, mental or social disabilities and limitations (Havens, 1996; Shapiro, 1995). Formal long term care is a second issue of concern in this dissertation.

Although the proportion of the provincial health care budget spent on formal long term care in Manitoba is relatively small, the growth of the older population is occurring simultaneously with dramatic changes in the way that health is conceptualized, and the

way that health care is being delivered (National Forum on Health, 1997). Changes are being driven by funding cuts, shifts in government funding priorities from institutional care to community-based care, increasing knowledge about the determinants of health, and by a shift towards population-based planning for health and health care delivery (Manitoba Health, 1992; National Forum on Health, 1997).

Together, these important and inter-related issues (i.e., shift in the age structure, the disproportionate use of formal long term care services by the oldest-old, and the changes in the health care delivery system) have created a great need to understand what leads people to use formal long term care services, if they live to be over 85 years of age. Currently, little information is available to facilitate health-related planning for the oldest-old since relatively little is known about this population.

Over the past 10 to 20 years, researchers have disseminated important information that has enabled planners and policy makers to distinguish people who will die from those who will survive (e.g., Berkman & Syme, 1979; Berkman, 1988; Dantas, Toupadake, Tzonou & Kasviki-Charvati, 1996; Roos & Havens, 1991; Schoenbach, Kaplan, Fredman & Kleinbaum, 1986; Shahtahmasebi, Davies & Wenger, 1992; Stokes & Lindsay, 1996), thereby allowing health care services to be adjusted. Nevertheless, there is an urgent and growing need to understand what it is like to be a long-term survivor, what changes people experience as they become the oldest-old, and what changes and factors influence the need for, and use of, formal long term care services among people who live past the age of 85. Furthermore, there is a clear need to understand why some people use formal long term care services while others do not. In addition, there is a need to understand why, among formal long term care service users,

some people use home care while others receive institutional long term care. Information in all of these areas will increase the likelihood that appropriate decisions about health-related programs and policies for older people can be made.

The current body of literature on predictors of formal long term care service use shows that many factors contribute to a person's need for formal long term care services, whether home care or institutional care. Nevertheless, previous studies are primarily cross-sectional in nature, have a tendency to focus on frail sub-populations, address some predictors (e.g., social environment, health care use) at the exclusion of others (e.g., physical environment, prosperity), and include very small samples of the oldest-old.

The cross-sectional focus of previous research means that the changes that have preceded the use of formal long term care services, and the factors associated with these changes, have been addressed minimally in the existing literature. Furthermore, no published study has explicitly used a population-health framework, such as the Evans and Stoddard (1994) population health framework, as a means of organizing the factors leading to formal long term care utilization. Instead, the Andersen-Newman model of health care utilization (Andersen & Newman, 1973) has dominated this body of research for the past 20 to 25 years. As most jurisdictions are making the shift to population-health planning, there is a need for population based research on formal long term care utilization in order to encourage new ideas and conceptualizations.

In addition, little published research addresses the perspectives of the oldest-old themselves and the factors that they see as contributing to their changing need for formal long term care services. While these individual perspectives may appear to be at odds with a population-health framework, these perspectives may provide insight into the ways

to disseminate knowledge and to communicate the importance and direction of long term care policy to both the public and to practitioners in the field.

To address these identified program and policy needs, and to address the gaps in the literature, this research identifies the factors and changes that characterize and differentiate three groups of the oldest-old over a 13 year period in terms of their use of formal long term care services. The research uses quantitative and qualitative perspectives for both breadth and depth of understanding. The specific research questions addressed by this study are:

Research Questions

1. Are there common patterns in the use of formal long term care that lead people 85 and over to experience one of the following outcomes at the conclusion of 13 years:
 - a) remain independent in their own homes without formal long term care?
 - b) require some formal long term care to remain in their own homes? or
 - c) require institutional long term care?
2. What are the differences in the proportions of men and women, and of urban versus rural dwellers who experience particular utilization patterns?
3. What changes in health and functioning and the physical environment over three points in time (i.e., 1983, 1990, 1996) are associated with the utilization patterns in the use of formal long term care by elderly individuals who, after age 85:
 - a) remain independent in their own homes without formal long term care?
 - b) require some formal long term care to remain in their own homes? or
 - c) require institutional long term care?
4. What changes in health and functioning and the physical environment between 1983 and 1990 (e.g., improvement, stability, decline) differentiate the people over 85 (the whole sample, men and women, urban and rural dwellers), who in 1996:
 - a) were living independently in their own homes without formal long term care?
 - b) required some formal long term care to remain in their own homes? or
 - c) required institutional long term care?

5. How do the qualitative explanations of the oldest-old enhance quantitative findings regarding utilization patterns in the use of formal long term care and associated factors?
6. What are the implications of the study findings for clinical practice and eldercare policy (e.g., health and social services) particularly with respect to reducing health inequalities among the oldest-old?

Summary

Since the oldest-old are the largest group of formal long term care service users, understanding the changes that lead them to use (or not use) these services, and the factors associated with these changes, would be of great benefit to health care and social service professionals, program developers and policy makers. Having this knowledge would enable the people in these constituencies to develop programs and policies that target, and perhaps reduce, the likelihood of formal long term care use among some of the oldest-old, now and into the future.

While other researchers have studied formal long term care utilization, this work will make a unique contribution to the existing knowledge in this field because of its longitudinal perspective, its focus on people over 85, its use of both quantitative and qualitative research methods, and its explicit use of a population health framework to organize the analytic process. To make this contribution, this dissertation includes the following chapters and content:

- *Chapter 2: Guiding Conceptual Framework* - presents the Evans and Stoddard (1994) population health framework that was used to organize this research;
- *Chapter 3: Literature Review* - summarizes and integrates previous literature on formal long term care use among older people, with a focus on research addressing the role of health and functioning and/or the physical environment in predicting formal long term care use;

- *Chapter 4: Methods* - describes the overall design of the study including sampling, instrumentation and analysis, and ethical considerations for both the quantitative and the qualitative aspects of the study;
- *Chapter 5: Who are the Survivors?* - describes the sample used for this study, their socio-demographic, health and functioning, and physical environment characteristics and changes since 1983. This chapter presents the findings from research questions 1 and 2;
- *Chapter 6: Changes in Health and Functioning and the Physical Environment over Three Points in Time and Patterns of Formal Long Term Care Use* - presents the findings from research question 3, and embeds some of the qualitative reflections of the people interviewed for the study;
- *Chapter 7: What Changes Between 1983 And 1990 in Health And Functioning And The Physical Environment Differentiate 1996 Outcomes?*- presents the findings from research question 4, and embeds some of the qualitative reflections of the people interviewed for the study;
- *Chapter 8: Making the Final Links* - discusses how the qualitative findings enhance the quantitative findings, and discusses the implications of the study findings for future research, clinical practice and policy;
- *Chapter 9: Conclusions* - presents concluding statements and points to the specific highlights of the study.

CHAPTER 2: GUIDING CONCEPTUAL FRAMEWORK

Conceptual models serve many purposes during the research process. They facilitate the organization of existing knowledge, guide the selection of relevant concepts and constructs for study, and direct the identification of hypotheses. Conceptual models provide the researcher with structures to explain and predict the phenomenon under study (Portney & Watkins, 1993).

Because this study focuses on older people, their use of formal long term care services over time, and the changes and factors associated with this utilization, a number of potential conceptual frameworks could have been used. Given the focus on people over 85, there was the potential to use an age or aging related conceptual framework. With the focus on utilization, a framework focussed on health care utilization was also a possibility. In fact, the Andersen-Newman model of health care utilization (Andersen & Newman, 1973) is the most widely adopted conceptual framework in this area of research (e.g., Chappell, 1994; Grabbe, Demi, et al., 1995; Penning, 1995) and would have been a defensible choice to guide this work.

Instead, the population health framework presented by Evans and Stoddard (1994) was selected, since, according to previous work in the area of formal long term care service use, people need and use formal long term care because they are limited in their abilities to perform everyday activities (e.g., Branch & Jette, 1982; Shapiro, 1986; Shapiro & Tate, 1988). These limitations stem from inadequate supports in the social and physical environments (e.g., Chappell & Blandford, 1991; Newman, Struyk, Wright & Rice, 1990), functional limitations (e.g., Coughlin, McBride, Perozek & Liu, 1992; Coulton & Frost, 1982; Foley, Ostfeld, et al., 1992), disease (e.g., Liu, Coughlin &

McBride, 1991; Tsuji, Whalen & Finucane, 1995), inadequate financial resources (e.g., Johnson & Wolinsky, 1996; Vicente, Wiley & Carrington, 1979) and poor self-rated health (e.g., Chappell, 1985; Shapiro, 1986). In other words, their health, defined in the broadest sense (i.e., a resource for everyday living (Epp, 1986)), is compromised.

Using a population health framework to guide the investigation of formal long term care use permits an exploration of health, the factor that initially leads people to need and use long term care services. In addition, a population health framework enables an exploration of formal long term care as both a process and an outcome of aging and health experiences. This perspective is consistent with descriptions of the long term care continuum (e.g., Havens, 1995) and, within long term care research, the use of formal long term care service utilization as an outcome together with more traditional epidemiological outcomes, such as morbidity and mortality (e.g., Manton & Soldo, 1992; Merrill & Mor, 1993; Montgomery, Kirshen & Roos, 1988; Steinbach, 1992).

In addition, the use of a population health framework addresses the calls in the literature to use conceptual perspectives other than the Andersen-Newman model of health care utilization in order to expand and enhance understanding of formal long term care by conceptualizing it in a new and different way. The work of Branch and Ku (1989), Chappell (1994) and others suggest that a population health framework has the potential of making major contributions to this area of research since it explicitly includes broader factors (e.g., policy and economic variables) and their *interaction with* individual, family and community variables.

Advantages of a Population Health Framework

Population health addresses groups of people and the factors that determine their health (Hamilton & Bhatti, 1996). As a result, a population health framework attempts to identify health inequalities. Health inequalities, or health heterogeneities more generally, are those systematic differences in aggregate measures of health status that occur between or among population groups (Hertzman, Frank & Evans, 1994). Systematic differences reflect characteristics that can be used to define or describe population groups (e.g., social class, sex, race, geography, disease status), and that are consistently associated with differences in aggregate health status measures (Hertzman et al., 1994). Aggregate measures of health status typically include measures such as life expectancy, mortality rates, injury rates and disease prevalence rates (Hennekens & Buring, 1987; Last, 1988). Being able to identify these systematic differences provides the opportunity to develop programs and policies to reduce, minimize or eliminate the factors that create inequalities in health.

With this background, it appears that there are four primary advantages to using a population health framework to understand formal long term care service use among people who become the oldest-old in a study using both quantitative and qualitative research methods. First, the use of a population health framework encourages one to pay attention to social networks, social interactions and culture, and to genetic characteristics, psychological variables, and organizational factors. In other words, this framework allows one to attend to factors that the Andersen-Newman model has been criticized for dealing with insufficiently (Andersen, 1995). While these additional factors do not make

the Evans and Stoddard (1994) framework superior, the mere presence of these components brings the possibility of their influence into conscious awareness.

Second, the use of a population health framework couches formal long term care use (or non-use) as a specific and measurable health outcome among the oldest-old. This outcome is more meaningful for exploring health differences among the oldest-old since other more traditional outcomes have questionable relevance to this population (e.g., premature mortality, potential years of life lost) or display relatively low degrees of variability because of the developmental stage of people who have survived past the age of 85 (e.g., disability days, job satisfaction). Framing formal long term care use as a health outcome encourages the use of measures such as rates, types and amounts of use, and enables comparisons of these measures across sub-populations of the oldest-old to explore inequalities (e.g., men and women, urban and rural dwellers).

The third advantage to using a population health framework is that through the use of such a perspective, one can shift the discussion of formal long term care use to the level of health inequalities, explore systematic differences in service use, and begin to hypothesize about the sources or pathways of these differences between and across population sub-groups. Potential pathways of systematic differences are challenging within the context of the Anderson-Newman model of health care utilization because the primary components of the model (i.e., predisposing, enabling, need) were intended originally to explain the factors that lead individuals to utilize health services.

While this intent has increased awareness of the various factors that can influence an individual's use of formal long term care services, it has not, overall, lent itself to making fundamental changes that reduce people's need for and use of formal long term

care. To make these changes, it is necessary to develop knowledge regarding the sources and pathways of systematic differences. This knowledge could enable and facilitate the development of programs and policies at the level of primary and secondary prevention, and target individuals at a time in their lives well before they are concerned about needing to use formal long term care services as they continue to age. By using the Evans and Stoddard (1994) framework to organize and guide this study, the initial steps towards this end can be made.

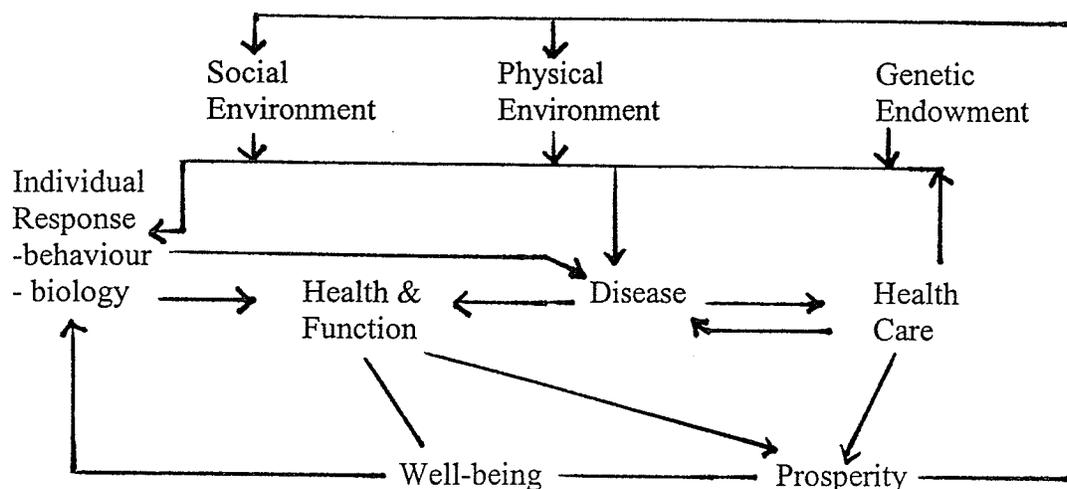
Finally, because of the combination of methods in this work, the framework used to guide the study needed to facilitate the organization of a quantitative analysis and at the same time provide meaningful categories that could be used to organize qualitative interviews with people over the age of 85. The advantage of a population health framework is that it is detailed enough to provide guidance for quantitative analysis, but also adequately broad to be able to be used as meaningful discussion topics with people over 85.

The Evans and Stoddard (1994) Population Health Framework

The framework presented below is described by its authors as a “comprehensive and flexible framework” that provides “meaningful categories in which to insert various sorts of evidence that are now emerging as to the diverse determinants of health” (Evans and Stoddard, 1994, p.32). As an analytic framework, it highlights “the ways in which different types of factors and forces can interact to bear on different conceptualizations of health” (Evans and Stoddard, 1994, p.32). Each of the components of this framework is seen as having its own internal structure. As a result, components are not viewed as being captured by single variables, but rather by the multiple variables making up this

internal structure. Insight into these internal structures is provided in subsequent chapters in the book in which this framework is published, *Why are some people healthy and others not?* (Evans, Barer & Marmor, 1994). Descriptions of each of the framework components are provided in the following paragraphs.

Figure 2.1: Evans and Stoddard (1994) Population Health Framework



Source: Evans and Stoddard (1994)

Within this framework, *health and function* address how individuals and populations experience illness, disease or stress in terms of their ability to perform every day activities (Evans & Stoddard, 1994). Every day activities can be categorized as including self-care (e.g., bathing, dressing), productivity (e.g., paid work, volunteering, home maintenance) and leisure (e.g., active or passive recreation) (Canadian Association of Occupational Therapists, 1997). Self-care activities are often referred to as activities-of-daily-living (ADL) (Katz, Ford, Moskowitz, Jackson & Jaffe, 1963), while

productivity activities are often referred to as instrumental activities-of-daily-living (IADL) (Lawton & Brody, 1969).

Prosperity is a macro-economic concept that captures the performance of the economy as a whole, and the health implications of various macro-economic decisions (Evans & Stoddard, 1994). At an individual level, Hertzman et al. (1994) talk about prosperity as contributing to the heterogeneities in health outcomes, and in this context, they focus on socio-economic gradients based on measures of income and economic security (e.g., annual income, savings, investments).

The *physical environment* within the Evans and Stoddard (1994) framework is also viewed as a source of heterogeneity, but is poorly defined and conceptualized beyond this point. In other literature, the environment refers to that which is outside of the individual, and it includes cultural, social, physical and institutional elements (Canadian Association of Occupational Therapists, 1997; Law, 1991). The physical environment refers to built and natural environments including buildings, roads, modes of transportation, technology and assistive devices, weather, and gardens, parks and green spaces (Canadian Association of Occupational Therapists, 1997; Law, 1991).

Health care refers to the health care system and the use, availability and accessibility of a range of medically-related services such as hospitals, physicians, long term care, diagnostics, pharmaceuticals, etc. (Evans & Stoddard, 1994).

Disease reflects medical diagnoses, illness, injuries, and their respective etiologies, as well as the way that disease is defined within society. Variables that measure aspects of the disease component of the model include diagnoses of specific

diseases, prevalence of symptoms, incidence of particular injuries, etc. (Evans & Stoddard, 1994).

The *social environment* captures “all aspects of social organization that might affect health status” (Hertzman et al., 1994, p.78-79). Examples of variables that measure aspects of the social environment include social support, social networks, social isolation, family relationships, friendships, etc. (Corin, 1994; Hertzman et al., 1994).

Well-being captures the concepts of quality of life and life satisfaction, and therefore scales or measures that address these concepts can be used to address this component of the framework (Evans & Stoddard, 1994).

Individual response, both biological and behavioural, is intended to capture factors related to lifestyle, personal choices, health habits and responses to stress (Evans & Stoddard, 1994). Therefore, scales and indices measuring level of physical activity, coping strategies used and stress responses can be used to measure this component.

Genetic endowment refers to unmodifiable characteristics and susceptibilities with which individuals are born. Examples of measures of genetic endowment include sex, age, family history of particular conditions, etc. (Baird, 1994; Evans & Stoddard, 1994).

Through the use of this framework, the three outcomes of interest within this study (i.e., remaining independently at home without formal long term care, requiring some formal long term care to remain at home, or requiring institutional long term care) are conceptualized as being health outcomes (refer to discussion on pages 9 and 10). Therefore, the focus of this study is on exploring systematic differences in these

outcomes based on changes over time in the components of health and functioning, the physical environment, and prosperity.

The Evans and Stoddard (1994) population health framework emphasizes the relationships among components, and points to the breadth and depth of factors that can influence health outcomes. While the factors encompassed by the components of genetic endowment, the social environment, individual responses, disease, well-being and health care are recognized as probable contributors to the outcomes of interest, and potentially antecedent to changes in the three components that are the focus of this study (i.e., health and functioning, physical environment, prosperity), they are not the focus of this work.

Summary

This study is about aging, health and formal long term care service use. Therefore, it needs to be guided by a conceptual framework that can capture these primary components, as well as recognize a broader range of factors that are known to influence and interact with them. The population health framework by Evans and Stoddard (1994) was selected because it meets these requirements. In addition, the use of this perspective has the potential to contribute new and unique information to the literature on formal long term care utilization. The use of this perspective may identify areas (i.e., model components) that have not been well studied in the field, raise new questions that have not been previously considered, or suggest areas in which program or policy changes may be particularly useful. The Evans and Stoddard (1994) framework guided the organization of the literature review (Chapter 3), as well as the development of hypotheses (Chapter 3) and refinement of the research questions (Chapter 4).

CHAPTER 3: LITERATURE REVIEW

As stated previously, this study focuses on people over 85 years of age, their use of formal long term care services over time, and the changes and factors associated with this utilization. In response to this focus, this literature review is divided into three sections. The first section describes the oldest-old, their historical experiences and population characteristics. To bring life to some of the historical data, a few short reflections have been embedded in this section of the review from people who were interviewed for this study.

The second section provides descriptions and definitions for formal long term care, and describes the development and change of formal long term care services in Manitoba. This latter information provides some context for responding to the final research question, which asks about the implications of the study findings for clinical practice and eldercare policy.

The final section of this chapter summarizes current knowledge on the risk factors and predictors of formal long term care service use. Risk factors and predictors of service use are considered for home care as well as institutional care, and are organized and discussed using the Evans and Stoddard (1994) population health framework. An additional aspect of this discussion is a summary of the methodological similarities, differences and gaps within this body of research. The chapter closes with a list of the study hypotheses that stem from the research questions, the guiding conceptual framework, and the review of the literature.

Who are the Oldest-Old?

A Historical Perspective

In 1881, people aged 85 and over made up less than 0.1% of the population of Manitoba, and only 5.0% of those 65+ (Dominion Bureau of Statistics, 1927). These figures have grown so dramatically that, in a little more than a century, 1.4% of Manitobans were over 85 and they made up almost 10% of the total 65+ population in this province (Norland, 1994). Since the turn of the century women have consistently made up the largest proportion of the oldest-old in Canada. According to the 1991 census, 70% of the oldest-old are women, and as a result, the ratio of women to men in this age group is approximately 4 to 1 (Norland, 1994). Data from the 1996 census show that these figures have remained relatively stable (Minister of Industry, 1997).

People who were 85 years and older in 1996 (the most recent follow-up for the Aging in Manitoba Longitudinal Study) were born in 1911 or before. The oldest of the oldest-old (95+) were in their formative years during the First World War and raised their children in the prosperous 1920's. The younger members of this cohort (85 to 90 years) would have raised their families during the Great Depression, and may have had children serve in World War II. The oldest-old are the grandparents of the baby-boomers.

The oldest-old have seen tremendous changes over the course of their lives not only in technology but also in terms of the roles of women and the structure of the family. They have witnessed increased rates of marriage during the 1940's and 1950's, and the increased rates of divorce starting in the 1970's. They have witnessed low, then markedly increased, and then decreased, birth rates (Gee, 1980, 1986, 1990; Statistics Canada, 1990, 1995). The roles of women in society have changed dramatically over the course

of the lives of the oldest-old. In 1891, only 12% of women were employed outside of the home, but by the early 1920's, this rate had risen to 20% (Armour & Staton, 1990). In 1994, approximately 52% of all women over the age of 15 were working outside of their homes (Statistics Canada, 1995).

In terms of health and health care, the oldest-old have witnessed decreases in deaths from childbirth and complications of childbirth, decreases in deaths from childhood diseases, and increases in the accessibility to health care in general (Government of Manitoba, 1931; Government of Manitoba, 1939; Government of Manitoba, 1959). The oldest-old of Manitoba have survived the 1904 typhoid epidemic, the flu epidemic of 1917-18, the tuberculosis outbreaks of the early 1920's, and the polio epidemic of the early 1950's (Pettigew, 1983; Steward, 1992). They survived their own childhood illnesses without penicillin, and raised their children without the benefit of this antibiotic (Sneader, 1985).

It hit our family [flu epidemic]. My mother was sick. Everybody in my family was sick except my dad.....I can remember my brother having it, my brother Fred....I remember him sitting up in bed playing the violin. He was getting better. My sister Patty and I shared a room and I can remember her moaning, moaning so much, and so they were giving her so much attention.....I'd be 9 years old. I was, I can remember getting up and going and sitting on the, we had the pot you know then. And getting off the pot and it was all blood. And I thought, scared me and I thought, I wonder what that is but I didn't tell anybody and I got back into bed....I guess I pretty near died.....I can remember putting my hand out over the quilts and it being cold.....That's about all I can remember about that. [Reflection of Helen, age 89]

Today's oldest-old were already in their late 50's and early 60's when national hospital insurance was instituted (1959), and were retired or nearly retired when Medicare came into being (1969), and when nursing homes became insured (1973) and home care (1974-75) publicly available in Manitoba (Chappell, 1980; Chappell, 1995; Shapiro,

1988; Taylor, 1987). In other words, for the majority of their lives, the experience of the oldest-old in terms of health care was either not to access care when it was needed, or alternatively, to pay for services with cash or other commodities. The growth of prepaid health insurance only occurred during the middle of their working lives, that is, in the late 1940's and early 1950's (Taylor, 1987).

....of course we didn't have general health care when I was young. My dad, he worked on the railroad, and then he would go out.....'Look, I'll repair the sidewalk or such' and get a few extra dollars that way. That's the way we muddled along. I guess you'd call it muddling. Well, when I say about the health care services, we just had to pay for a doctor when he came out to take care. When mother died, for that very same reason he said well we didn't have money to pay for a doctor.... [Reflection of Sam, age 88]

While a means-tested old age benefit has been in existence for much of their lives (1927), the oldest-old were unable to benefit from introduction of Unemployment Insurance (1956) and the Canada Pension Plan (1966) (Chappell, 1980) until they were well into or nearing the end of their working lives. In terms of the Canada Pension Plan, this means that many of the oldest-old could not contribute to CPP and therefore do not currently have this source of income. Therefore, many of the oldest-old receive partial or the full Guaranteed Income Supplement (GIS) benefits, in addition to Old Age Security (OAS). The Old Age Security benefit, which is not means-tested, came into being in the mid 1950's (Taylor, 1987).

.... my second brother, he come home and he says "Here" he says "sign this, sign this" he says. She [mother] says "what's that?" He says "This is your application for the Old Age Pension". This is in 1926....So, oh, a couple of months later he comes out, she gets the mail and says "Here this come in the mail today, what's this supposed to be?" So he says "Oh, that's your first Old Age Pension check." She says " Oh, what am I supposed to do with that?" Well he says, "You sign it, and I'll take it to the bank and get you the money and bring it back to you. There

is \$26.00 there.".....She gets this \$26.00, now what she did with it I don't know, she certainly could do with it, but as far as that was, it was money, mana from heaven. So a month later another check comes. So she says "Look!", she says "the government has made a mistake, they've sent me another check!" So he says "No" he says, "That's what they are going to do for you, you're going to get a check every month now for as long as you live." "Oh" she says, "Isn't that nice to know" (Laughs) It was really wonderful. [Reflection of Jack, age 94]

Socio-Demographic and Health Characteristics

The oldest-old of today are embedded in this historical background, and their various life experiences have contributed to incredible heterogeneity. While up to one-third of the oldest-old are institutionalized, those living in the community tend to live in apartments rather than single family homes (Havens & Finlayson, 1997), and tend to aggregate in urban communities (Clayton, Dudley, Patterson & Lawhorn, 1994; Havens & Finlayson, 1997). Oldest-old women are more likely than men to be living alone and renting their accommodation (Havens & Finlayson, 1997). This finding is due in large part to the fact that more oldest-old men are married (50%) compared to the oldest-old women (10%) (Barer, 1994; Taeuber & Rosenwaike, 1992). Seventy-nine percent of oldest-old women are widowed and unlikely to remarry (Norland, 1994).

Although the oldest-old are not likely to be married, they tend to have strong family and friend networks. Between 44% (Johnson & Barer, 1997) and 69% (Silverstein & Wu, 1997) of the oldest-old report at least weekly in-person contact with their children. If one includes contact by phone, this proportion increases to almost 85% (Kovar & Stone, 1992). Furthermore, there tends to be great stability in the amount of contact between the oldest-old and their children over time (Field, 1996; Field & Minkler, 1988). Just over one-quarter of the oldest-old in Canada report that they have at least one family

member with whom they feel close and seventy-five percent report that they are very satisfied with their family contacts (Havens & Finlayson, 1997).

In addition to family members, the majority of the oldest-old who continue to live in the community retain active friendship networks. Eighty-five percent of the community-dwelling oldest-old in Canada report that they have at least one friend to whom they feel close, and almost 20% report having five or more close friends (Havens & Finlayson, 1997). Up to 81% of the oldest-old have at least weekly in-person contact with their friends (Silverstein & Wu, 1997). Like contacts with family members, the amount of contact and involvement with good friends tends to remain stable as people live past the age of 85 (Field, 1996; Field & Minkler, 1988), even though their friendship networks may be decreasing in numerical size and be challenged by disability and relocation (Johnson & Barer, 1992, 1997). Even after the age of 85, individuals are making new friends their own age (Johnson & Barer, 1997).

The importance of family and friendship networks becomes apparent when considering the informal supports provided to the oldest-old by family and friends. Forty-two percent of oldest-old Canadians living in the community report receiving instrumental assistance from a daughter, while 34.4% report receiving help from a son. Twenty-eight percent report receiving instrumental help from a friend or neighbour (Havens & Finlayson, 1997). The most common activities for which the oldest-old receive instrumental assistance include heavy housework, shopping, getting around outside and yardwork (Centre on Aging, 1996; Havens & Finlayson, 1997; Manton & Soldo, 1992).

Although the oldest-old tend to have positive social environments, the physical environments they inhabit tend to be restricted, even if they are living in the community (Johnson & Barer, 1997; Suzman et al., 1992). This restriction is partially due to low rates of driving (Marshall, McMullin, Ballantyne, Daciuk & Wigdor, 1991) and, for some, high rates of assistive device use (e.g., walking or dressing aids) (Gitlin, Schemm, Landsberg & Burgh, 1996). Only 21.9% of community dwelling oldest-old in Canada report having a valid driver's license, with women being significantly less likely than men to have a license (Havens & Finlayson, 1997).

As well, the oldest-old use more assistive devices relative to younger seniors (Gitlin et al., 1996), although their prevalence of use varies from 1% to nearly 50% depending on the activity being considered and whether the device is being used alone or in combination with personal assistance (Manton & Soldo, 1992). Within the home itself, between 25% and 40% of the oldest-old report having home modifications such as bathroom modifications, street level entrances and handrails to facilitate their independence (Havens & Finlayson, 1997).

As a group, the oldest-old appear to have been better able to adapt to environmental changes and cope with stress compared to their cohort peers who have not survived (Berkman, 1988). Those within this population who are in good functional health have been shown to be consistent users of positive health practices over a 20 year period (Camacho, Strawbridge, Cohen & Kaplan, 1993). In addition, their longevity has been shown to be associated with higher work satisfaction (Cohen, Tell & Wallack, 1981), higher life satisfaction and higher reported happiness compared to their non-surviving cohort peers (Busse, 1985). About 75% of the oldest-old feel that they are as

active or more active than their same-age peers and about two-thirds feel that activity makes a big difference to their health (Havens & Finlayson, 1997).

Even though the oldest-old are typically portrayed as frail and sick (Stahl & Rupp-Feller, 1990), they are an extremely heterogeneous population in terms of disease prevalence rates, and health and functional status. According to data from the Manitoba Study of Health and Aging, the most common self-reported conditions among Manitoba's oldest-old include arthritis (63.9%), hearing loss (53.8%), eye trouble not relieved by glasses (52.1%), foot or ankle troubles (43.8%), memory problems (40.2%), and heart or circulation problems (35.8%) (Centre on Aging, 1996). These conditions and rates are similar to those reported by others (Barrow, 1996; Ebly, Hogan & Fung, 1996; Manton & Soldo, 1992). Although these rates appear high, it is important to remember, for example, that less than half of the oldest-old report problems with memory or with their heart or circulation.

Conditions such as Alzheimer's disease, some forms of arthritis, osteoporosis and depression are associated with substantial morbidity and disability among the oldest-old (Evans, 1988; Pitt, 1986; Riggs & Melton, 1988; Rodnan & Schumacher, 1983; White, Cartwright, Cornoni-Huntley & Brock, 1986). In fact, hip fractures (often related to osteoporosis), dementia and arthritis are associated with the greatest disability in terms of ADL and IADL limitations among the older women in general (Ensrud, Nevitt, et al., 1994), as well as the oldest-old specifically (Manton & Soldo, 1992). The prevalence rate for dementia among the oldest-old in Canada has been estimated at 35% (Canadian Study of Health and Aging, 1994). The hip fracture incidence estimate for oldest-old women in the USA is 20% (Melton, Wahner, Richelson & Riggs, 1986). Osteoarthritis,

the most common form of arthritis, is considered to be nearly universal in prevalence for people over 65, both male and female (Rodnan & Schumacher, 1983; White et al., 1986).

Even with these rates, many of the oldest-old report no impairments. According to Zarit and colleagues (Zarit, Johansson & Berg, 1993; Zarit, Johansson & Malmberg, 1995), the proportions of the oldest-old who report no impairments vary from 26% (no IADL impairment) to 76% (no sensory impairment). Among those oldest-old with impairments, the prevalence for severe impairment varies from 12% among the community dwelling oldest-old to approximately 67% among those who are institutionalized (Camacho et al., 1993; Centre on Aging, 1996). Overall, only one-quarter of oldest-old men and one-third of oldest-old women live in institutional settings (Centre on Aging, 1996; Norland, 1994). Among the oldest-old as a group, 55% experience multiple disabilities, while 23% experience either mild or no disability, and 17% experience IADL deficits only (Zarit et al., 1993).

In terms of specific ADL tasks, data from the Manitoba Study of Health and Aging show that the most challenging activities for the oldest-old include going up and down stairs, taking a shower or bath, and walking. For these activities, 50.3%, 37.2% and 17.4% of the oldest-old, respectively, reported that they required assistance to complete these activities (Centre on Aging, 1996). For IADL, help is most required for doing yardwork and gardening (68.1%), doing heavy housework (50.3%), shopping for groceries (44.4%), going out of doors in any weather (44.3%), and handling long term finances (36.0%) (Centre on Aging, 1996).

These activities and proportions are similar to those reported by Verbrugge (1989), using data from the 1994 National Health Interview Survey in the United States,

and by Havens & Finlayson (1997), in a report using data from the 1991 Survey of Ageing and Independence in Canada (Minister of Supply and Services, 1993). Oldest-old women report greater levels of disability with specific ADL and IADL tasks, as well as greater levels of disability overall (Arber & Ginn, 1993; Verbrugge, 1989; Victor, 1989, 1991).

In terms of perceived health status, or self-rated health, the majority of the oldest-old rate their health positively (Arber & Ginn, 1993; Centre on Aging, 1996; Denning, Chi, et al., 1998; Ebly et al., 1996; Havens & Finlayson, 1997; Verbrugge, 1989). Using a five point scale that included the categories "very good", "pretty good", "not too good", "poor" and "very poor", Ebly et al. (1996) found that 76.8% of community-dwelling people over 85 years of age rated their health as very or pretty good. Similar findings, using the same scale, are reported by the Centre on Aging (1996). With a three point scale that included the categories "good", "bad" and "something in between", Thorslund and Lundberg (1994) found that only 41.6% of oldest-old women rated their health as "good" compared to 65% of their male cohort peers. While these rates are lower and appear anomalous relative to the previously noted rates, the Thorslund and Lundberg study included oldest-old persons living in the community as well as those living in hospitals, nursing homes and other care environments.

Summary

In summary, individuals who have survived past the age of 85 have experienced a diverse range of historical events, policy developments, and social and personal changes. While they have characteristics that distinguish them from younger cohorts of older people (e.g., more people who are widowed, more people in institutional settings), they

are a very heterogeneous population that is continuing to grow in absolute and relative size. Overall, the majority of the oldest-old are community dwelling, widowed women who are living in an apartment within an urban environment.

Definitions of Formal Long Term Care

Clair (1990) defines long term care as "the sustained delivery by formal or informal caregivers of medical and social support to persons with impaired social functional capacities" (p.93). Moody (1994) suggests that "long term care is the support given to individuals suffering from chronic illness or disability that limits their ability to live independently" (p.20). According to Havens (1995) and Havens and Kyle (1993), long term care includes informal support and care, community services, home care, adult day care, respite services, and institutional services such as nursing homes, chronic care hospitals and long-term rehabilitation hospitals.

While most users of long term care are elderly, these services are also provided to adults with physical and mental disabilities, to children and adolescents with multiple disabilities, and to the terminally ill of all ages (Havens, 1996; Moody, 1994). Long term care services are provided by both formal and informal caregivers (Havens, 1996). The description of long term care by Shapiro (Shapiro, 1995) is relatively consistent with that of Havens (1995, 1996). Shapiro's description of long term care is less specific, and includes only home care, adult day care, respite care and facility care as part of the long term care system. In addition to these services, Havens (1995, 1996) also includes informal care, chronic care hospitals or long-term rehabilitation facilities in her definition.

While long term care includes both formal and informal sources of care, *formal long term care* refers to care that is provided over a sustained period of time by trained caregivers such as health and social service professionals, para-professionals and nonprofessionals, and volunteers working for organized health and social service agencies and programs (e.g., Meals on Wheels) (Havens & Kyle, 1993). Nursing homes and home care are the primary examples of formal long term care that are addressed in the literature related to predictors of long term care use (Clair, 1990; Havens, 1996; Shapiro, 1995), and can be viewed as part of a continuum of care that is provided from care in the community to care in institutions (Havens, 1995). In terms of the objectives of this study, institutional long term care refers to nursing homes and formal long term care provided in the community refers to home care.

Definitions of Home Care:

The services that make up home care vary across jurisdictions, payment mechanisms and studies. Among the home care studies reviewed, ten different home care services were discussed, as summarized in Chart 3.1. From this summary, it appears that health care aides or personal care assistants, home makers, and nurses are the most consistent aspects of home care programs. It is interesting to note that two of the four studies that included meal preparation and therapy services as part of home care were each based on the Manitoba home care system (Chappell, 1985; Penning, 1995; Shapiro, 1986; Shapiro & Tate, 1997). In addition, two of the studies citing medical supplies and equipment, and all of the studies citing day hospital programmes and respite, are based on the Manitoba system.

Chart 3.1: Summary of Home Care Services

Type of Service	Citation
Health care aides or personal care assistants	Chappell, 1985; Greenberg & Ginn, 1979; Hanley & Wiener, 1991; Kemper, 1992; McAuley & Arling, 1984; Penning, 1995; Shapiro & Tate, 1997; Soldo, 1985; Wan, 1987
Home makers	Chappell, 1985; Grabbe et al., 1995; Hanley & Wiener, 1991; Kemper, 1992; McAuley & Arling, 1984; Penning, 1995; Shapiro & Tate, 1997; Shapiro, 1986
Nursing care	Grabbe et al., 1995; Greenberg & Ginn, 1979; Hanley & Wiener, 1991; Penning, 1995; Shapiro & Tate, 1997; Shapiro, 1986; Soldo, 1985
Meal-on-wheels or other meal preparation assistance	Chappell, 1985; Hanley & Wiener, 1991; McAuley & Arling, 1984; Penning, 1995
Therapy services	Penning, 1995; Shapiro & Tate, 1997; Shapiro, 1986; Soldo, 1985; Wan, 1987
Day hospital programmes or other respite	Penning, 1995; Shapiro & Tate, 1997; Shapiro, 1986
Medical supplies and equipment	Chappell, 1985; Shapiro, 1986
Mental health services, telephone assurance	Wan, 1987
Personal companions	Soldo, 1985
Skilled and unskilled helpers	Coughlin et al., 1992

Definition of Nursing Homes:

Despite the numerous studies on the predictors of nursing home use (see below), and the number of books and book chapters that discuss nursing homes in some way (e.g., Binstock et al., 1996; Kane, 1996; Kosloski et al., 1990; Pynoos & Liebig, 1995; Doty, 1992), it is difficult to find an explicit definition about what constitutes a nursing home and what services are provided in these facilities (Jackson, 1985).

From the literature, it is clear that nursing homes are institutional, residential facilities that provide care, but beyond these structural characteristics, definitions are ambiguous (Jackson, 1985). It is important to note that nursing homes are, in some jurisdictions, also referred to as personal care homes, skilled nursing facilities, intermediate care facilities, homes for the aged, old age homes, rest homes, and domiciliary care facilities (Doty, 1992).

Kane (1996) describes a nursing home as "...the offspring of the almshouse and the boarding house, and the step-child of the hospital" (p.145), while (Doty, 1992) distinguishes between medically-oriented and non-medically oriented facilities. The descriptions of a nursing home by Van Vliet (1995) and by Lundin and Turner (1995) appear to be most like what is implicitly understood by other authors. These two sources describe nursing homes as residential facilities for people who are no longer able to care for themselves and now require constant care or supervision. They are facilities in which a resident frequently has their own bedroom with a separate toilet and washing facility, although in some nursing homes, bedrooms, washing and toileting facilities are shared among two to four people. Common space for dining, entertaining, activities, etc. is typical in most nursing homes. Full board and meals are provided, and meals are typically served in the common area at set times.

In terms of other services, Van Vliet (1995) describes nursing homes as also providing "observation and diagnosis; rehabilitation; long-term treatment; crisis treatment; and interval, terminal, and extramural care" (p.96). It is expected that these additional services vary greatly across jurisdictions depending on the extent of staffing, access to consultants, sources of funding, availability of suitable space (e.g., for therapy

programs) and the overall philosophy of the facility. Provision of rehabilitation services (e.g., occupational therapy, physical therapy, speech language pathology) offers a good example of a service that would vary as a result of some or all of these factors.

Formal Long Term Care in Manitoba

Manitoba's Continuing Care Program provides formal long term care services to the residents of the province (Shapiro, 1986). The Continuing Care Program operates a single-entry system that provides a continuum of care in which the users of the system "can move from one health care locus to another, more appropriate place smoothly, quickly, and in accordance with their urgency of need" (Shapiro, 1993, p.1409). The term "single-entry" reflects the fact that access to all of the services within Manitoba's formal long term care system (e.g., home care, nursing home care, respite, adult day care, etc.) is coordinated through the same program (i.e., Continuing Care) and the same assessment process (Havens, 1990; Shapiro, 1993).

A person requiring formal long term care services in Manitoba can self-refer, or be referred by a family member or a health or social services worker (Havens, 1990; Shapiro, 1986; Shapiro, 1993). Based on the referral, a provincially-employed Continuing Care Case Coordinator (usually a nurse or social worker) will conduct an assessment to determine the individual's need for formal long term care services. While the assessment is typically conducted in the person's home, it can also be conducted in a hospital if that is where the individual is currently located (Havens, 1990; Shapiro, 1993)

The core components of the assessment of need address health status, cognitive status, functional limitations, medical conditions, social supports, and the physical environment (Shapiro, 1993). The nurse or social worker who is completing the

assessment can request supplementary assessments by an occupational or physical therapist, a pharmacist, or any other health or social service provider who is able to contribute additional information to the process (B. Havens, personal communication, June 29, 1998). Focus is placed on the individual's ability to care for him/herself safely and the ability of the individual's informal support system to provide the care necessary to maintain the individual safely in the community (Shapiro, 1993).

Based on the results of the assessment, the Continuing Care Case Coordinator can recommend the initiation of home care services, admission to a nursing home, the provision of respite services, and/or an admission to an adult day care programme. It is the ability of the Case Coordinator to recommend and facilitate this range of services that creates the "single-entry" system. As well, the Case Coordinator can refer the individual to other community support services that are not directly part of the provincial formal long term care system, but nevertheless support and supplement public services such as "Meals-On-Wheels." This further extends the "single-entry" system and expands the continuum of services (B. Havens, personal communication, June 29, 1998). Once an individual has been assessed for long term care services, periodic reassessments occur. As a result, services can be modified, extended or discontinued by the Case Coordinator without having to refer the individual to another agency or program (e.g., from home care to nursing home) (Shapiro, 1993).

Home Care in Manitoba:

In Manitoba, home care refers to services provided in the home by professionals, para-professionals and volunteers that enable an individual to remain at home for as long as possible. Although Manitoba has both public and private home care services,

generally speaking, reference to home care in this province refers to the public system that is coordinated through the Continuing Care Program of Manitoba Health (see above). The provincial home care program was initiated in Manitoba over the years 1974 and 1975 as one of the universally provided health care services (i.e., there is no charge to the individual) available in the province (Shapiro, 1988). Since the beginning of the program, the provision of government home care services has been based on an assessment of need that is completed by a Continuing Care Case Coordinator, usually a nurse or social worker, as previously described.

Currently, the services provided through the home care program range from assistance with light housekeeping, laundry and meal-preparation, to assistance with personal hygiene, dressing and medication management, to the provision of respite services for informal caregivers (Manitoba Council on Aging, 1998). In addition, professional services from registered nurses, occupational therapists and physical therapists are also available through the home care program (Shapiro, 1993).

While the actual range of services provided by home care has not changed dramatically since its inception, there has been a shift away from providing some clients with only instrumental activities-of-daily-living services (e.g., laundry, light housekeeping, meal preparation) to requiring that clients must have needs in basic personal care activities in order to receive home care services (N. Kristjanson, personal communication, June 25, 1998). In other words, clients who only require instrumental assistance, but no personal assistance, are generally no longer considered to need home care services given the expansion of services in the community (B. Havens, personal communication, June 29, 1998). This shift has been viewed by members of the public

and by families of home care clients as a change in home care policy (Weber, 1992). In reality, the shift was the result of consistently applying, rather than changing, the existing home care policy (B. Meiklejohn, July 9, 1998).

Home care clients are currently eligible for approximately \$2200 per month of home care services, which equates to about 50 hours of care, depending on the services and staffing that are being provided (B. Kyle, personal communication, July 27, 1998). While this amount of service has varied over the years, it has always been tied to the cost of providing care. Except in emergency or exceptional circumstances, the cost of home care services are not to exceed the cost of maintaining the same individual at an equivalent level of care in either a hospital or a nursing home (Shapiro, 1986).

Earlier in the home care program, assistive technology was also available at no charge through the home care equipment pool. This aspect of the home care program provided home care recipients with items such as walkers, canes, toilet overarm bars, raised toilet seats, grab-bars, hospital beds, etc. upon the recommendation of an occupational therapist, physiotherapist, physician or Continuing Care Case Coordinator. The home care equipment pool was significantly reduced in the early 1990's, and only the larger equipment items (e.g., hospital beds, commodes) continue to be available through the equipment pool. After this change, home care clients who required smaller items such as walkers, toilet overarm bars, grab-bars, etc. were required to either buy or rent these items (N. Kristjanson, personal communication, June 24, 1998).

The change in the home care equipment pool was primarily the result of a changing marketplace. When the home care program was initiated in the mid-1970's, medical equipment was not available in the general marketplace or, if it was, the costs for

an individual were prohibitive. As a result, the home care program provided the equipment pool as one of its basic services. By the late 1980's and early 1990's, medical equipment stores were becoming more widely available and accessible in Manitoba. These businesses offered a larger range of medical equipment than the equipment pool, and prices were becoming more affordable. This addition to the market place was the primary reason that the equipment pool was reduced (B. Havens, personal communication, June 29, 1998).

Although there is no maximum number of years that a home care client can utilize the services, the Continuing Care Case Coordinators regularly review client needs, and reorganize, change or discontinue services. The most common reasons for the discontinuation of home care services are that the services are no longer required (41% of discharges), death of the client (22%), admission to hospital (10%), and personal care home¹ placement (13%) (Lamont, 1998). As of June 1, 1996, there were 12,058 home care clients aged 65 years and over in Manitoba, representing approximately 8% of the older adult population (Manitoba Health, 1998a).

In late 1995 and early 1996 there was a move by the provincial Department of Health to privatize home care, even though there was substantial resistance in the community, professional groups and home care employees to this change (Davis et al., 1996; Krueger, 1996a; Krueger, 1996b; Samyn, 1996). The fundamental position of the government was that privatizing the system would save money and provide more

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In the province of Manitoba, nursing homes are generally referred to as personal care homes. As a result, these two terms are used interchangeably throughout the research report.

comprehensive care (Krueger, 1996c). The controversy over home care privatization culminated in a one-month strike by home care workers that lasted from mid-April to mid-May 1996 (Krueger & MacIntosh, 1996; Paul & Bray, 1996). In response, only a limited portion of the provincial home care program was privatized in the spring of 1996. Upon evaluation of this move in late 1997, the plan to privatize home care was reversed and the provincial home care program was fully reinstated (Krueger, 1997).

Nursing Homes in Manitoba:

According to two Manitoba researchers (Shapiro & Tate, 1985; Shapiro & Tate, 1988), nursing homes in this province refer to skilled nursing or intermediate care facilities that provide insured, residential services. Unlike home care services, there is a per diem charge for nursing home care in this province. Per diem rates were a flat rate of \$4.50 per day when nursing homes were initially insured in 1973 (Shapiro & Webster, 1984), and have slowly increased over time as a result of cost-of-living increases and growth in Old Age Security and Guaranteed Income Supplement payments over time (E. Shapiro, personal communication, July 29, 1998).

By the late 1980's, per diem rates were just over \$21.00 per day. This rate was tied to the amount of dollars a person on OAS and GIS would have left over for discretionary spending at the end of the month, after paying the per diem (E. Shapiro, personal communication, July 29, 1998). In the early 1990's, the per diem system was changed from a flat rate to a sliding scale based on the resident's income. As of August 1, 1996, the minimum per diem rate was \$24.60 and the maximum was \$57.00 (Manitoba Health, 1998b).

For the per diem, the resident receives accommodations, meals, and laundry and linen (Centre on Aging, 1996). Medical services, such as personal care, physician services and nursing care, are provided through the “insured” aspect of Manitoba’s universal health care system (B.Havens, personal communication, July 9, 1998). Entry into a nursing home in Manitoba is based on an assessment of need that is completed by a government-employed nurse or social worker, as described earlier in this chapter.

Once the assessment is completed, the nurse or social worker makes a recommendation about the need for the individual to be admitted into a nursing home. If the need exists, a recommendation is also made about the urgency of that need and the level of care that the individual would require (Shapiro, 1993). The assessment is presented at a provincial panel consisting of at least a physician, a nurse and a social worker. This second-opinion panel either upholds the recommendation, requests additional assessments, or modifies the recommendation (e.g., agrees with the need for care, but disagrees with the level of care required) (Shapiro, 1993).

This process is referred to as “panelling”, and once an individual is accepted for admission to a nursing home as a result of the process, the individual is considered to be “panelled” and is placed on a waiting list for the next available bed in one of his/her three facilities of choice. A person can be panelled from either the community or from hospital, but their location when they are panelled will influence their degree of urgency and their priority status on the waiting list. People who are panelled from a hospital are rarely, if ever, discharged back to the community to await entry into a nursing home.

Nursing homes in Manitoba provide four levels of care that reflect the individual’s degree of dependency on nursing staff time (Chart 3.2).

Chart 3.2: Levels of Care Provided by Manitoba Nursing Homes

Level of Care	Degree of Dependence on Nursing Staff
One	Minimal dependence for at least one of the following activities: bathing and dressing, feeding, treatments, ambulation, elimination and support, supervision
Two	Partial dependence for at least one of the following activities: bathing and dressing, feeding, treatments, ambulation, elimination and support, supervision
Three	Maximum dependence for two or three of the following activities: bathing and dressing, feeding, treatments, ambulation, elimination and support, supervision <i>OR</i> Maximum dependence for support and/or supervision and moderate dependence for at least two other activities
Four	Maximum dependence for four or more of the following activities: bathing and dressing, feeding, treatments, ambulation, elimination and support, supervision

Source: Centre on Aging (1996)

While, in theory, nursing homes in Manitoba provide all four levels of care, in current practice it is uncommon for people to be panelled at Level one or two care. When the nursing home panelling system was formalized in Manitoba in 1973, there were very few community alternatives available for people who exhibited minimal dependence (B. Havens, personal communication, June 29, 1998). The provincial home care system was not yet available and very few seniors' housing complexes included any supportive services to people who needed minimal assistance to remain in the community. As a result, there were entire nursing homes that provided only Level one care during the early years of the system (B. Havens, personal communication, June 29, 1998).

Over time, through the development of the provincial home care program, the Support Services to Seniors Program² and numerous supportive seniors' housing complexes, it was possible for people with minimal to moderate care needs to be maintained in the community. Therefore, the demands on existing nursing homes shifted as more and more higher level (i.e., three and four) accommodations were required. Nursing homes modified their environments, staffing and focus in response to these shifting needs. These modifications decreased the number of Level one and two beds available in the overall system (B. Havens, personal communication, June 29, 1998).

As of March 31, 1997 there were 120 nursing homes in the province providing a total of 8953 licensed personal care beds. Thirty-five homes, with 4925 beds, were located in Winnipeg and the remaining 85 homes, with 4028 beds were located in other areas of the province (Manitoba Health, 1998b). In addition to providing residential care, these nursing homes also offered short-term respite services to families providing care to dependent relatives. During the 1996/97 fiscal year, 751 people used these respite services for a total of 1058 admissions and 16,757 days of care (Manitoba Health, 1998b). Seventy-three nursing homes also provide adult day care programs for older adults living in the community. To some extent, locating respite services and adult day care programs within nursing homes blurs the line between home care and nursing

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The Support Services to Seniors Program was initiated in the early 1980's (Havens and Kyle, 1993). It provides funding to community groups to develop support services for local seniors. Services provided vary according to local need and include, but are not exclusive to, meals programs, transportation services, home maintenance services, friendly visiting, etc. (Manitoba Council on Aging, 1998).

homes, contributes to the overall continuum of care, and provides some insight into the ambiguity of some definitions of nursing homes in general.

Predictors of Formal Long Term Care Service Use

Thus far, this literature review has described the oldest-old and defined and described formal long term care, in general, and specific to Manitoba. The final piece of this review discusses and critiques the existing literature on the factors that predict formal long term care service use among older people. To date, there are no published studies that look exclusively at people who survive past the age of 85, and the factors that predict formal long term care use for this group. Therefore, out of necessity, this review considers predictors of formal long term care use among older adults in general. When specific information regarding the oldest-old is available because of a researcher's analytic strategy (e.g., stratified by age groups), thereby providing some insight into the formal long term care use of this sub-population, these studies or findings will be highlighted.

For organizational purposes, this section has been divided into two parts. The first part discusses predictors of home care use, and the second part discusses predictors of nursing home use. Within each of these discussions, a summary of the methodologies used in the cited studies is also presented. For both home care use and nursing home use, the predictive factors are organized using the Evans and Stoddard (1994) framework. Because of the large amount of information included in this review, charts have been used extensively as a way of reducing the presence of lengthy and distracting strings of citations (i.e., five or more) within the text. It is also important to note that some of the studies cited in this review considered short-term use of formal long-term care, while

others considered long-term use of formal long term care. Regardless of the length of use, the focus of the review was on factors *leading to use* of formal long term care. In situations where researchers presented findings for both short-term use and long-term use, the findings specific to long-term use are reported here as these findings were considered more relevant to the current study and the Manitoba formal long term care system in general.

Studies on Home Care Use:

Fifteen studies considering factors associated with home care use were included in this review (Chart 3.3). In only two of these studies (Coulton & Frost, 1982; Shapiro, 1986) were the predictor variables measured before the outcome (home care use) was measured. In all of the other studies, the independent and dependent variables were measured simultaneously (i.e., cross-sectional studies). For nine of the fifteen studies, community dwelling elderly persons made up the sample, while the remaining studies were based on samples of disabled elderly persons, people with dementia or elderly people who had died in the previous year (Chart 3.3). The predominant analytic approach used in these studies is some form of regression (e.g., multiple, logistic, LISREL, path analysis).

While all of the studies cited in Chart 3.3 investigated the factors associated with home care use, other issues considered include the amount or number of services received (Kemper, 1992; Wan, 1987), the types of assistance received through home care (Hawranik, 1997; McAuley & Arling, 1984), the relationship between the receipt of home care and informal sources of care (Chappell & Blandford, 1991; Hawranik, 1997; Kemper, 1992; McAuley & Arling, 1984; Penning, 1995), the cost of the services

provided (Shapiro & Tate, 1997) and the relationship between the receipt of home care and other services (e.g., mental health, medical care) (Coulton & Frost, 1982). While these other aspects of home care use are important, they are not of immediate relevance to the current investigation and therefore are not discussed in this review.

Chart 3.3: Studies Included in Review of Home Care Use

<u>Citation</u>	<u>Focus of Sample</u>
Chappell and Blanford, 1991	Community-dwelling elderly
Chappell, 1985	Community-dwelling elderly
Coughlin et al., 1992	Disabled elderly
Coulton and Frost, 1979	Community-dwelling elderly
Grabbe et al., 1995	People who had died in previous year
Hanley and Weiner, 1991	Disabled elderly
Hawranik, 1997	Community-dwelling elderly
Johnson and Wolinsky, 1992	Community-dwelling elderly
Kemper, 1992	Disabled elderly
McAuley and Arling, 1984	Community-dwelling elderly
Penning, 1995	People with dementia
Shapiro and Tate, 1997	Community-dwelling elderly
Shapiro, 1986	Community-dwelling elderly
Soldo, 1985	Community-dwelling elderly
Wan, 1987	Disabled elderly

Chart 3.4 summarizes the factors or variables that have been used as potential predictors of home care use across the studies reviewed. The categories on this Chart correspond to the nine components of the Evans and Stoddard (1994) model. From this summary, it can be seen that a wide variety of predictors have been considered in previous work. All of the fifteen studies included at least one measure of health and functioning and of the social environment. The next most common components considered are genetic endowment (14 of 15 studies), disease (12 of 15), health care (9 of

15), individual responses (10 of 15), prosperity (9 of 15), the physical environment (3 of 15) and well-being (2 of 15).

Chart 3.4: Summary of Previously Studied Home Care Predictors (Number of Studies in Which the Factor Was Predictive per the Number of Studies in Which the Factor Was Included) by the Components of the Evans and Stoddard Framework (1994)

<p style="text-align: center;"><u>HEALTH AND FUNCTIONING</u></p> <ul style="list-style-type: none"> • ADL limitations (13/13) • IADL limitations (6/6) • Self-rated health (2/3) • Level of disability or impairment (2/2) 	<p style="text-align: center;"><u>PHYSICAL ENVIRONMENT</u></p> <ul style="list-style-type: none"> • Length of time in community (1/2) • Living in an apartment (1/1) 	<p style="text-align: center;"><u>PROSPERITY</u></p> <ul style="list-style-type: none"> • Income (4/8) • Health insurance (2/4) • Home equity (0/2) • Asset income (0/2)
<p style="text-align: center;"><u>HEALTH CARE</u></p> <ul style="list-style-type: none"> • Urban vs rural area (6/9) • Previous nursing home or hospital stay (4/5) • Medication costs (1/1) • Perceived service need (1/1) • Home medical treatment (1/1) • # of annual physician visits (1/1) • # of services received (1/1) • Need for medical care (1/1) • Community size (0/1) • # nursing home beds/1000 elderly (0/1) • # home health visits/ 1000 users (0/1) • Case management (0/1) 	<p style="text-align: center;"><u>DISEASE</u></p> <ul style="list-style-type: none"> • Poor cognitive status (4/9) • More health problems (2/3) • Neurological disease (1/1) • Incontinence (1 /1) • Dementia - Inappropriate Behaviour (1/1) • Dementia - Needs supervision (0/1) • Vision (0/1) • Hearing (0/1) • Depression (0/1) 	<p style="text-align: center;"><u>SOCIAL ENVIRONMENT</u></p> <ul style="list-style-type: none"> • Household size (9/9) • # of informal helpers (5/5) • Marital status (3/5) • Fewer relatives (1/2) • Contact with relatives (1/2) • # of children (1/2) • Low satisfaction - social contacts (1/1) • Social isolation index (1/1) • # of neighbours (0/1) • # of friends (0/1) • Caregiver work status (0/1) • Level of caregiver burden (0/2) • Social resources index (0/1)
<p style="text-align: center;"><u>WELL-BEING</u></p> <ul style="list-style-type: none"> • Psychic distress(0/1) • Mental health (0/1) 	<p style="text-align: center;"><u>GENETIC ENDOWMENT</u></p> <ul style="list-style-type: none"> • Being female (5/11) • Older age (8/11) • Ethnicity or race (1/6) 	<p style="text-align: center;"><u>INDIVIDUAL RESPONSES</u></p> <ul style="list-style-type: none"> • Education (3/7) • Amount of physical activity (1/1) • Religion (0/1)

Within the health and functioning component, as Chart 3.4 shows, ADL and IADL limitations or other measures of disability are consistently associated with use of home care. The greater the extent of limitation, the greater is the likelihood of home care use. The most common way of measuring ADL and IADL within this body of literature is through the use of single item indicators that are summed and then dichotomized for analysis (e.g., Chappell & Blandford, 1991; Hanley & Weiner, 1991; Shapiro, 1986; Soldo, 1985). The most common dichotomy used is no limitations versus one or more limitations. Alternative measurement strategies include, for example, the use of an ordinal scale that reflects need for assistance for single items (e.g., Grabbe et al., 1995), and the counts of the number of difficulties from single item indicators (e.g., Kemper, 1992; McAuley & Arling, 1984; Penning, 1995).

Self-rated health is the only variable within the health and functioning component that displays some discrepant findings. Poorer self-rated health predicted home care use in two studies (Chappell, 1985; Shapiro, 1986), but it was not predictive in one other (Chappell & Blandford, 1991). While the health and functioning variables are consistent in their ability to predict home care use, Chart 3.4 also shows that the range of factors that have been considered within this component is relatively small compared to some other components of the Evans and Stoddard (1994) framework.

Urban versus rural living or community size was included in ten studies as a proxy for density of available services (Chart 3.5), and therefore corresponds to the health care component of the Evans and Stoddard (1994) framework. Additional factors that have been studied in relation to the health care component include prior hospital or nursing home stays (Chart 3.5), number of available institutional beds (Coughlin et al.,

1992), and number of physician visits (Wan, 1987). Prior health care system use is a relatively consistent predictor of home care use.

Chart 3.5: Studies Including Variables to Capture Community Size And/or Prior Nursing Home or Hospital Stays

Community size as proxy for density of services:

Coughlin et al., 1992
Grabbe et al., 1995
Hanley & Wiener, 1991
Hawranik, 1997
Johnson & Wolinsky, 1996
Kemper, 1992
McAuley & Arling, 1984
Penning, 1995
Shapiro, 1986
Soldo, 1985

Prior nursing home or hospital stays:

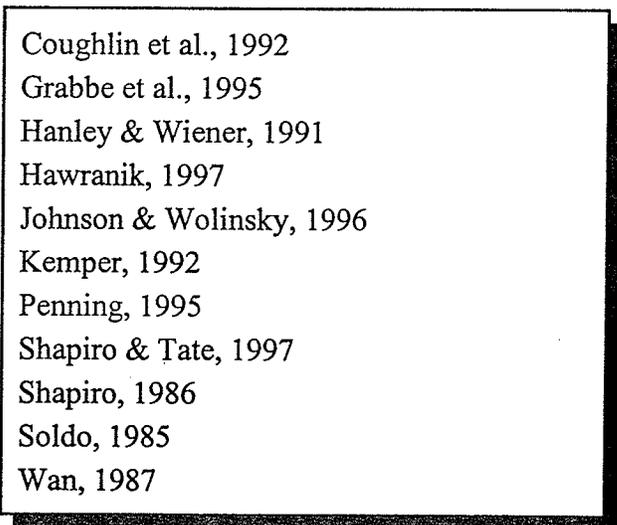
Coughlin et al., 1992
Hanley & Wiener, 1991
Johnson & Wolinsky, 1996
Kemper, 1992
McAuley & Arling, 1984

Self-reported health problems or number of chronic conditions fit under the disease component of the Evans and Stoddard (1994) model. While this factor was only reported in three studies (Chappell, 1985; Chappell & Blandford, 1991; Grabbe et al., 1995), greater numbers of health problems were predictive in two of them (Chappell, 1985; Grabbe et al., 1995).

Since the majority of researchers include cognitive status as a proxy for dementia, this factor can also be categorized in the disease component of the Evans and Stoddard (1994) framework. In eleven studies (Chart 3.6), a measure of cognitive status was

included as a potential predictor of home care use (note: includes one study that used inappropriate behaviour as a measure - Kemper, 1992). As a predictor of home care use, the results for cognitive impairment are inconsistent. This inconsistency is best illustrated through the work of Kemper (1992) who used two measures of cognitive impairment; one measure predicted home care use (inappropriate behaviour), while the other did not (score on a cognitive test). Given that most tests of cognitive impairment include a full range of cognitive abilities (Strub & Black, 1985), it may be that specific cognitive abilities or specific behaviours related to dementia are associated with home care use, rather than global cognitive status (Hawranik, 1997).

Chart 3.6: Studies Including Cognitive Status as a Predictor of Home Care Use



Coughlin et al., 1992
Grabbe et al., 1995
Hanley & Wiener, 1991
Hawranik, 1997
Johnson & Wolinsky, 1996
Kemper, 1992
Penning, 1995
Shapiro & Tate, 1997
Shapiro, 1986
Soldo, 1985
Wan, 1987

In terms of other variables that could be included in the disease component of the Evans and Stoddard (1994) framework, few others have been considered in the home care literature. It appears that dementia is the disease of primary interest in this body of literature.

Previously studied factors that fit into the social environment component of the framework include household size (including living alone), and number or type of informal helpers (including number of daughters, sons, neighbours, marital status, etc) (See Chart 3.7). Although there are some minor discrepancies in the findings across studies, overall it appears that people who have numerically fewer members in their social network are at greater risk of using formal home care services than people with a larger social network. The discrepancies which exist in the findings reviewed appear to be largely the result of measurement differences, i.e., measuring social networks versus social support (Bowling, 1991).

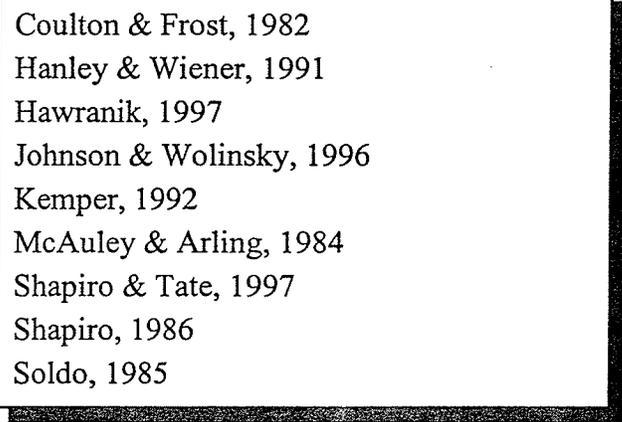
Chart 3.7: Studies Including Variables Capturing Household Size And/or Number and Type of Informal Helpers

Household size (including living alone)	
Chappell, 1985	Penning, 1995
Chappell & Blandford, 1991	Shapiro & Tate, 1997
Coughlin et al., 1992	Soldo, 1985
Grabbe et al., 1995	Wan, 1987
Hawranik, 1997	
Number or type of informal helpers (including number of daughters, sons, neighbours, marital status)	
Chappell, 1985	Hawranik, 1997
Chappell & Blandford, 1991	Johnson & Wolinsky, 1996
Coughlin et al., 1992	Kemper, 1992
Grabbe et al., 1995	Penning, 1995
Hanley & Wiener, 1991	

Variables that fit into the prosperity component of the Evans and Stoddard (1994) framework are included in nine studies (Chart 3.8), and include factors such as poverty status, source of income, income amount, home equity, and Medicaid eligibility. The results are inconsistent and may be reflecting differences in service organization more

than anything else. How home care services are organized in the region of study contributes to how the prosperity component can be viewed (e.g., personal or social predictor). In a universally insured system, income variables may be capturing long term health inequalities by socioeconomic status (i.e., prosperity as a social predictor), whereas in a private-pay system, income variables are likely reflecting one's ability to afford services (i.e., prosperity as a personal predictor).

Chart 3.8: Studies Including at Least One Measure of Prosperity



Coulton & Frost, 1982
Hanley & Wiener, 1991
Hawranik, 1997
Johnson & Wolinsky, 1996
Kemper, 1992
McAuley & Arling, 1984
Shapiro & Tate, 1997
Shapiro, 1986
Soldo, 1985

Variables reflecting the physical environment, well-being, individual responses and genetic endowment are the least studied in terms of predicting home care use. The only physical environment factors that have been considered in previous home care research are living in an apartment (Chappell, 1985) and length of time living in the community or stability of residence (Kemper, 1992; Shapiro, 1986). Given the increasing knowledge about the value of universal design and assistive technologies in enabling the independence of older people and people with disabilities (Christenson, 1990; Law, 1991; Lawton, 1986; Rowles & Ohta, 1983), this gap in the literature is striking.

Measures of well-being are also notably restricted in this body of literature. Concepts such as quality of life and life satisfaction are a part of the component of well-being according to Evans and Stoddard (1994). Only two studies included what could be considered measures of well-being - psychic distress (Coulton & Frost, 1982) and mental health (McAuley & Arling, 1984). Neither measure predicted home care use.

The component of individual responses is intended to capture factors related to lifestyle, personal choices and health habits (Hertzman et al., 1994). Factors such as physical activity, education and religion could be included in this component, and are the only variables included in the fourteen studies that appear to fit into the individual response component of the model. Their ability to predict home care use is mixed.

The remaining factors that are included in studies of home care predictors include age, sex and race. Given the unmodifiability of these factors, it appears that they are most appropriately categorized under the genetic endowment category of the Evans and Stoddard (1994) framework. While this categorization is not entirely consistent with Baird's (1994) focus on genetically determined disease, these three factors do not fit clearly into any of the other categories of the framework and are determined by a person's genetic make-up.

The extensive feedback loops in the Evans and Stoddard framework could be viewed as having been explored in four studies (Grabbe et al., 1995; Hawranik, 1997; Penning, 1995; Soldo, 1985). Each of these studies included interaction terms in their multi-variate analyses. Consistent with the general observations regarding which framework components are the most studied, the most common interaction terms that are explored occur between the social environment and the health and functioning

components. For example, in three of the four studies (not Hawranik, 1997), interactions between ADL limitations and some measure of the social environment (e.g., household size) were explored. In each study, more activity limitations together with a less supportive social environment increased the likelihood of using home care services. Interactions between age (i.e., genetic endowment component) and the social environment have also been explored (Penning, 1995), as well as between the social environment and disease (Hawranik, 1997). In the former study, older age together with a less supportive social environment also increased the likelihood of using home care services, but in the latter study no unique effect was found.

In summary, the existing literature on predictors of home care use has focussed on the social environment, and on health and functioning, and to a lesser extent, on disease, health care, and prosperity. The primary gaps in the literature, when organized within a population health framework, include the physical environment, individual responses, well-being, and genetic endowment. Interactions between the variables are also infrequent in this body of literature.

Studies on Nursing Home Use:

Twenty-three studies considering predictors of nursing home use were included in this review (Chart 3.9). Among these studies, twenty-two predicted nursing home use by measuring predictor (independent) variables at some baseline point and by measuring the outcome variable (nursing home use) at some later point. Only one study was based on data in which the predictor variables and nursing home use were measured simultaneously (Young, Forbes & Hirdes, 1994). The time periods between baseline and follow-up for these studies ranged from one year (Coughlin, McBride & Liu, 1990;

Greene & Ondrich, 1990; Kosloski & Montgomery, 1995) to twenty years (Palmore, 1976) (mean = 4 years, mode = 2 years).

Chart 3.9: Studies Included in Review of Nursing Home Use

Branch and Jette, 1982	Liu et al., 1991 *
Branch and Ku, 1989	Newman et al., 1990
Cohen et al., 1986	Palmore, 1976
Coughlin et al., 1990	Severson, Smith, et al., 1994 *
Foley et al., 1992	Shapiro and Tate, 1988
Ford et al., 1991	Shapiro and Tate, 1985
Freedman et al., 1994	Shapiro and Webster, 1984
Greene and Ondrich, 1990 *	Steinbach, 1992
Kemper and Murtaugh, 1991	Temkin-Greener and Meiners, 1995 *
Kosloski and Montgomery, 1995	Tsuji et al., 1995 *
Liu, McBride & Coughlin, 1994 *	Vincente et al., 1979
	Young et al., 1994

* Studies using event history analysis

Almost all of the studies included in this review, twenty-one of twenty-three, included at least one measure of genetic endowment (e.g., age, sex, race). The next most common components considered were the social environment (20 of 23 studies), health and functioning (17 of 23), prosperity (16 of 23), health care (13 of 23), disease (13 of 23), individual responses (9 of 23), well-being (4 of 23) and the physical environment (4 of 23).

Among the twenty-two studies that have a temporal perspective, four of them measured the outcome at more than one subsequent time (Branch & Ku, 1989; Severson et al., 1994; Shapiro & Tate, 1985; Shapiro & Tate, 1988). However, the predictor

variables for each of these four studies were measured only at the baseline. None of the studies included in this review considered whether changes in the independent variables over two or more times were associated with nursing home use at some later time.

Logistic regression was the primary analytic method used in studies of predictors of nursing home use. Various forms of event history analysis (e.g., survival analysis, proportional hazards regression) have also been used, but with far less frequency (See Chart 3.9). Some authors (Cohen et al., 1986; Coughlin et al., 1990) who did not use event history analysis comment on the usefulness of these analytic methods but indicate their inability to utilize these techniques because of the inadequacy of their data (i.e., do not have exact date of nursing home entry). Other analytic techniques used include transition probabilities (Branch & Ku, 1989), cumulative proportions (Shapiro & Webster, 1984) and general descriptive statistics (Palmore, 1976).

When considering predictors of nursing home use within the organizational structure of the Evans and Stoddard framework (1994), it is apparent that the studies as listed on Chart 3.10 have been more inclusive in terms of the range of variables considered compared to the studies of home care use, discussed in the previous section of this chapter. While the social environment component is still heavily represented in these twenty-three studies, consideration of health and functioning variables is more diverse. For example, variables such as being confined to bed and ability to walk independently are added to the traditional measures of ADL and IADL limitations (Cohen et al., 1986). Both variables predict nursing home entry. As well, one sees specific mobility measures (in addition to ability to walk independently), such as the use of ambulation aides (Branch

& Jette, 1982; Cohen et al., 1986). Again, this more specific measure, relative to ADL or IADL indices, predicts nursing home use.

Like the findings of the home care literature, ADL and IADL limitations are fairly consistent predictors of nursing home use. Also like the home care literature, the measures of ADL and IADL used in the nursing home literature are typically counts of single item indicators that have been dichotomized for analysis (e.g., Greene & Ondrich, 1990; Steinbach, 1992). Summative measures of the number of ADL or IADL limitations are also observed (Severson et al., 1994), as well as single item indicators and categorical indicators (e.g., one or two limitations, three or four limitations, etc.) (Coughlin et al., 1990). Regardless of how ADL and IADL are measured and used in analysis, they are robust predictors of nursing home use.

The variables measuring the health care component are more numerous in the nursing home literature as well. Factors that have been tested and have fairly consistently shown their ability to predict nursing home use include the use of respite services (Kosloski & Montgomery, 1995), the use of home care visits (Liu et al., 1991; Liu et al., 1994; Newman et al., 1990), and prior hospital use or nursing home use (Chart 3.11).

Among these health care component variables, previous nursing home use, a recent hospitalization, and a greater nursing home bed supply were fairly consistent predictors of nursing home use. The first two of these variables may be capturing what Coughlin et al. (1990) refer to as a "ping-pong pattern of patient transfers between hospitals and nursing homes" (p.630). Greater nursing home bed supplies provide the opportunity for nursing home use, and therefore contribute to predicting nursing home use.

Chart 3.10: Summary of Previously Studied Nursing Home Predictors (Number of Studies in Which the Factor Was Predictive per the Number of Studies in Which the Factor Was Included) by the Components of the Evans and Stoddard Framework (1994)

<u>HEALTH AND FUNCTIONING</u>	<u>PHYSICAL ENVIRONMENT</u>	<u>PROSPERITY</u>
<ul style="list-style-type: none"> • ADL limitations (8/9) • Self-rated health (4/6) • IADL limitations (3/3) • Functional disability/status (1/3) • Ambulation aide (2/2) • Ability to walk independently (1/1) • Bed ridden (1/1) • Assistance with eating (0/1) • Assistance with toileting (0/1) • Unmet instrumental needs (0/1) 	<ul style="list-style-type: none"> • Type of housing (1/1) • Geographic region (0/1) • Neighbourhood grocery store (0/1) • Neighbourhood pharmacy (0/1) • Climate (0/1) • Length of time in community (0/1) • Length of time in current home (0/1) • Poor hygiene of house (0/1) • Size of home (0/1) • Home modifications (0/1) • Toilet convenient to bedroom (0/1) 	<ul style="list-style-type: none"> • Income (6/7) • Payment source for service (2/6) • Home ownership (4/5) • Poverty (1/1) • Level of assets (0/1)
<u>HEALTH CARE</u>	<u>DISEASE</u>	<u>SOCIAL ENVIRONMENT</u>
<ul style="list-style-type: none"> • Previous nursing home admission (6/6) • Nursing home bed supply (4/5) • Previous use of home care (3/4) • Previous hospitalization (3/5) • Extensive health care utilization (1/1) • Use of respite services (1/1) • # of physician visits (1/1) • Urban versus rural (0/1) • Arguments with professionals (0/1) 	<ul style="list-style-type: none"> • Cognitive impairment (15/15) • Neurological disease or stroke (4/5) • Lung disease or smoker (3/4) • # of health conditions (2/3) • Visual deficit (1/3) • Cancer (1/3) • Hearing acuity (1/2) • Fracture (1/2) • Heart condition (1/2) • IV tubes (1/1) • Bowel incontinence (1/1) • Diabetes (1/1) • Catheter (0/1) 	<ul style="list-style-type: none"> • Marital status (8/13) • Household size (9/11) • # of informal caregiving hours received (1/2) • Social network size (1/1) • Social network composition (1/1) • Social activities (1/1) • # of living children (1/1) • Frequency of contact with relatives (1/1) • Proximity of family (0/1) • # of informal caregivers (0/1) • Caregiver burden (0/1) • Arguments with family (0/1)
<u>WELL-BEING</u>	<u>GENETIC ENDOWMENT</u>	<u>INDIVIDUAL RESPONSES</u>
<ul style="list-style-type: none"> • Morale (0/1) • Psychological distress (0/1) • Life satisfaction (0/1) 	<ul style="list-style-type: none"> • Being female (7/12) • Older age (11/11) • Race (9/10) 	<ul style="list-style-type: none"> • Education (1/7) • Willingness to enter a nursing home (0/1) • Reason for moving to present household (0/1)

Chart 3.11: Studies in Which a Measure of Prior Use of Nursing Home and/or a Hospital Stay Predicted Nursing Home Use

Branch & Ku, 1989
Coughlin et al., 1990
Foley et al., 1992
Liu et al., 1991
Liu et al., 1994
Shapiro & Tate, 1985
Shapiro & Tate, 1988
Temkin-Greener & Meiners, 1995

Variables that can be categorized under the disease component of the model are also more numerous in the literature on nursing home use than in the home care literature. Within this component, variables capturing cognitive impairment, lung disease, neurological conditions and the number of health conditions were almost universally predictive of nursing home use among the studies that included them (Chart 3.12). Although variables capturing the use of intravenous tubes (Greene & Ondrich, 1990), bowel incontinence and diabetes (Tsuji et al., 1995) were included in only one study each, all three variables predicted nursing home use.

Chart 3.12: Disease Component Variables That Are Consistently Predictive of Nursing Home Use

Variable	Studies in which variable was predictive
Cognitive impairment	Branch & Jette, 1982; Coughlin et al., 1990; Foley et al., 1992; Ford et al., 1991; Greene & Ondrich, 1990; Kosloski & Montgomery, 1995; Liu et al., 1991; Liu et al., 1994; Newman et al., 1990; Severson et al., 1994; Shapiro & Tate, 1985; Shapiro & Tate, 1988; Temkin-Greener & Meiners, 1995; Tsuji et al., 1995; Young et al., 1994
Lung disease	Coughlin et al., 1990; Liu et al., 1991; Liu et al., 1994
Number of Health Conditions	Vicente et al., 1979; Young et al., 1994
Neurological conditions	Coughlin et al., 1990; Liu et al., 1991; Liu et al., 1994 Temkin-Greener & Meiners, 1995

Within the physical environment component, the range of variables is much more diverse relative to the range found in the home care literature. In fact, six times as many physical environment variables have been explored within the nursing home literature compared to the home care literature. As a result, it appears that among the researchers who see the physical environment as a potential contributor to one's need for institutionalization, the breadth of potentially important variables is more diverse.

The variables considered within the physical environment component include factors as diverse as the climate (Newman et al., 1990), home modifications (Newman et al., 1990) and type of housing (Shapiro & Tate, 1985; Shapiro & Tate, 1988). Even with this diversity, only the living in seniors' housing variable was found to predict entry into a nursing home (Shapiro & Tate, 1985). Nevertheless, if formal long term care is viewed

appropriately as a continuum of care, then investigating the physical environment at one end of the continuum but not at the other end, as in the current literature, does not facilitate understanding how the physical environment contributes to changes or patterns in the use of formal long term care over time.

Among the other components of the Evans and Stoddard (1994) framework, some researchers have also considered well-being issues (e.g., life satisfaction (Greene & Ondrich, 1990)), and individual responses (e.g., willingness to enter a nursing home (Branch & Jette, 1982)) in studies of nursing home predictors. Similar to the findings in the home care literature, the well-being variables used in the nursing home literature have been unable to predict utilization. Among the individual response variables, none have been able to consistently predict nursing home entry.

Variables that correspond to the genetic endowment and prosperity components of the Evans and Stoddard (1994) framework are essentially the same as those used in the home care literature. In terms of the genetic endowment variables, race and older age were found to be predictive in a greater proportion of nursing home studies compared to home care studies. Among the studies that included race and found this variable to be predictive, people who were white were more likely to use a nursing home (Chart 3.13).

Chart 3.13: Studies in Which Being White Predicted Nursing Home Use

Coughlin et al., 1990
Greene & Ondrich, 1990
Kemper et al., 1997
Liu et al., 1991
Liu et al., 1994
Newman et al., 1990
Palmore, 1982
Temkin-Greener & Meiners, 1995
Vicente et al., 1979

Among the measures of prosperity used in the studies on nursing home use, income is predictive in six of seven studies, although the direction of the prediction is inconsistent. For Branch and Ku (1989), Foley et al. (1992), Vicente et al. (1979), people with less income were more likely to use a nursing home. Similarly, Lui et al. (1991) found that people who were poorer were more likely to have longer stays in a nursing home than people who had more income. The latter group were more likely to have shorter stays. In comparison, Palmore (1976) and Ford et al. (1991) found that people with higher incomes were more likely to use a nursing home than people with lower incomes. A number of factors may be contributing to these differences, for example, cost of care, source of payment for care, and the overall organization of care services. As a result, it appears that income is an important factor to consider when predicting nursing home use, but other factors need to be considered to hypothesize the direction of the influence.

It also appears that many researchers who study predictors of nursing home entry see nursing home use being multi-factorial. This is evidenced by a greater proportion of studies including interaction terms in analyses (Chart 3.14)

Chart 3.14: Studies That Included Interaction Terms in Their Analyses

Branch & Ku, 1989
Cohen et al., 1986
Coughlin et al., 1990
Newman et al., 1990
Shapiro & Tate, 1985
Shapiro & Tate, 1988
Young, et al. 1994

Within these studies, interactions that considered the social environment in combination with health and functioning (e.g., living arrangements X ADL limitations as in Shapiro and Tate, 1985), or in combination with genetic endowment (e.g., living arrangements X age as in Cohen et al., 1986) appear to be the most frequent. Interactions between the social and physical environments (e.g., type of caregiver and type of residence) were also included (Newman et al., 1990; Shapiro & Tate, 1985; Shapiro & Tate, 1988). The use of interaction terms in these analyses emphasizes that it is a constellation of factors that leads to nursing home use. The work of Shapiro and Tate (1988) is the most striking in this regard.

Within this paper, Shapiro and Tate (1988) present tables of data showing the probability of nursing home entry based on various combinations of six different dichotomous predictor variables - age, spouse at home, recent hospitalization, living in retirement housing, one or more ADL problems and mental problems. In the table for people over 85 years of age, Shapiro and Tate (1988) showed that someone who did not have a spouse at home, had a recent hospitalization, was living in retirement housing, had more than one ADL problem and had mental problems, had a 62% probability of entering a nursing home over a seven-year period. In comparison, a cohort peer who had a spouse

at home, had not been in the hospital recently, was not living in retirement housing, did not have ADL problems, and did not have mental problems had only a 4% probability of entering a nursing home.

In summary, researchers studying the predictors of nursing home entry appear to have been more inclusive in their selection of variables, at least when conceptualized according to the Evans and Stoddard (1994) framework, compared to researchers studying home care use. Variables fitting into the components of the genetic endowment, social environment and health and functioning are dominant, but all other components have at least some representation. While some knowledge exists regarding the components of well-being, individual responses and the physical environment, the limitations of previous studies appear to fall primarily in these areas.

Changes in Formal Long Term Care Use Over Time:

None of the studies included in this review looked at the transitions or changes in predictor variables that might lead to the use of formal long term care. This gap in the literature is due to the predominately cross-sectional nature of the home care research and the predominate use of two data points for the nursing home research. Nevertheless, there are a few studies that provide some insight into changes, transitions or patterns in the use of formal long term care itself .

The work of Branch and Ku (1989) is one example of a study that sought to identify transition probabilities and that also provides some insight into the transition patterns of community-dwelling elderly. In this study, the authors analysed the probability of making a transition to one of five outcomes (independent, 1 ADL limitation, 2+ ADL limitations, nursing home, death) from baseline to three subsequent

times using the Cochran-Mantel-Haenszel analysis of variance statistic for stratified analysis. Among women aged 80+ at baseline who were independent in ADL's, the researchers found that 68.8% continued to be independent at 1.25 years, 28.2% continued to be independent at 6 years, and 7.6% continued to be independent at 10 years. Results also showed that between baseline and year 10, 12.4% of this same group made the transition into a nursing home. The transition pattern for men 80+ is similar, although the proportion of men remaining independent shows a steeper decline than that for women.

In terms of the studies included in this review, the work of Branch and Ku (1989) is unique in that it illustrates transitions leading to the use of a nursing home, and it also shows the proportions of older people who remain stable in their level of independence over time (i.e., experience no change). Stability in level of independence was associated with the baseline characteristics of younger age, better functional status, no hospital admissions in the previous year, being married, better self-rated health, better education and higher socioeconomic status.

The only other study that captures changes, transitions or patterns of formal long term care use over time is that of (Tennstedt, Harrow & Crawford, 1996). The purpose of this study was to look at the changes in patterns of care over time and the physical and social factors that were associated with these patterns. The patterns of interest that are relevant to the current study include the initiation of formal long term care (defined as home health aide, nurse, homemaker, meal preparation, transportation service, financial management assistance, case management). The authors used longitudinal data from a seven year study (four data points) of a representative sample of disabled older people who were divided into four groups. These groups were people who used only informal

care, people who used only formal care, people who used both informal and formal care but mostly informal care, and people who used both informal and formal care but mostly formal care.

The results of this study showed that between T_1 and T_2 , 17.2% people changed from using mostly informal care to mostly formal care. The rates of change between T_2 and T_3 , and T_3 and T_4 were 12.5% and 11.7% respectively. In comparison, for those people with informal care at T_1 , 33.3% initiated formal services by T_2 . Between T_2 and T_3 , 35.8% initiated formal services, and 38.5% initiated formal services between the last two periods. Therefore, over time, more people were initiating the use of formal long term care services. The predictors of these changes were an increase in disability level, a change to co-reside with the primary caregiver and a change to living alone.

Summary and Gaps in the Literature on Predictors of Formal Long Term Care Use:

The existing literature on predictors has considered the relationship between the use of formal long term care and variables that capture aspects of health and functioning and the physical environment, the primary areas of concern addressed in the research questions for the current study. Nevertheless, it is apparent that gaps in knowledge do exist. Currently it is unclear whether changes in these characteristics over time are associated with the use of particular aspects of formal long term care (i.e., no use, home care, nursing home), or whether there are particular pathways of changes that lead to the use of formal long term care.

While the studies cited in this review have been relatively consistent in their demonstration that health and functioning is associated with the use of formal long term care, the range of potential health and functioning variables has been primarily limited to

indices of ADL and IADL that have been dichotomized for the analytic purposes. Furthermore, how changes in health and functioning over time are associated with changes in the use of formal long term care is unclear, particularly among people whose status improves or is unstable over time. Finally, the use of ADL or IADL indices or of single activities does not identify whether difficulties with particular clusters or constellations of activities are more likely to lead to the use of formal long term care than others. For example, is a person who experiences more declines in his/her ability to complete ADL activities more likely to use formal long term care than someone who experiences a similar number of declines in his/her ability to complete IADL? This type of knowledge would be beneficial to rehabilitation professionals (e.g., occupational therapy, physiotherapy) as well as policy makers. For rehabilitation professionals, this knowledge would make it easier to develop programs for older people that are specifically targeted to retain or develop of skills and abilities within these constellations or clusters. Examples of activity clusters of particular interest to these disciplines include self-care, productivity, leisure and mobility (American Occupational Therapy Association, 1995; Canadian Association of Occupational Therapists, 1997). For policy makers, this knowledge would assist them to target resources to programs that foster the retention of skills and abilities within these constellations or clusters. Finally, for the older adults themselves, and their family members, this knowledge would help them to identify when to seek prevention or maintenance services.

Variables reflecting the physical environment have been studied minimally according to the literature on formal long term care use, particularly with respect to home care. Among those variables that have been considered, few have predicted the use of

formal long term care services. Given the continuing push to maintain older people in the community and allow them to age-in-place, it is especially important to continue to explore the relationship between the physical environment and the use of formal long term care services.

In terms of the other components of the Evans and Stoddard (1994) framework, questions are raised about the potential relationships among these variables. The inconsistency with which some of the variables predict the use of formal long term care (e.g., education, marital status) suggests that they may be confounders in the relationship between health and functioning and formal long term care use, or they may be mediating this relationship. Alternatively, these variables may be part of a pathway that leads to changes in health and functioning which then lead to the use of formal long term care. A final explanation for these inconsistent findings is that they are spurious, particularly among those studies that included large number of variables (e.g., probability of finding something significant increased as a result of including numerous variables). Therefore, the results from previous studies suggest that these points must be kept in mind during the analytic process.

Research Questions and Corresponding Hypotheses

Based on the research questions presented in the introduction, the Evans and Stoddard (1994) framework presented in Chapter 2, the preceding review of the literature and the professional experience of the author, the following hypotheses were developed for this study (Chart 3.15). It is important to note that there are no hypotheses associated with research questions five and six because of their focus on process and implications.

Chart 3.15: Research Questions and Corresponding Hypotheses

Research Question	Corresponding Hypotheses
<p>1) Are there common patterns of formal long term care use that lead people 85 and over to experience one of the following outcomes at the conclusion of 13 years:</p> <p>a) remain independently in their own homes without formal long term care? b) require some formal long term care to remain in their own homes? or c) require institutional long term care?</p>	<ul style="list-style-type: none"> ◆ The most common pattern of formal long term care use among people who remain at home without formal long term care in 1996 will be one of stability (i.e., home in 1983, home in 1990 and home in 1996). ◆ The most common pattern of formal long term care use among people who live in an institution in 1996 will be one of steady decline over time (i.e., home in 1983, home care in 1990 and institutionalized in 1996). ◆ There will be no single pattern of formal long term care use that can be designated as most common among people who remain at home with the assistance of home care in 1996.
<p>2) What are the differences in the proportions of men and women, and of urban versus rural dwellers who experience particular patterns of formal long term care use?</p>	<ul style="list-style-type: none"> ◆ Women will be more likely than men to experience patterns of formal long term care use that result in institutionalization at the end of thirteen years. ◆ Married men will be the least likely to experience patterns of formal long term care use that result in the use of formal long term care at the end of thirteen years. ◆ Urban dwellers will be more likely than rural dwellers to experience patterns of formal long term care use that result in the use of formal long term care in the home at the end of thirteen years.

Research Questions, cont'd	Corresponding Hypotheses, cont'd
<p>3) What changes in health and functioning and the physical environment over three points in time (i.e., 1983, 1990, 1996) are associated with the patterns of formal long term care use by elderly individuals who, after age 85:</p> <p>a) remain independently in their own homes without formal long term care? b) require some formal long term care to remain in their own homes? or c) require institutional long term care?</p>	<ul style="list-style-type: none"> ◆ Steady declines in health and functioning over time will be associated with patterns of formal long term care use that result in the use of formal long term care, either in the home or in an institution. ◆ Steady improvement in health and functioning over time will be associated with patterns of formal long term care use that result in no use of formal long term care at the end of thirteen years. ◆ Changes in the physical environment which offer greater support to an older individual (e.g., addition of stair rails, move into seniors' housing) will be associated with patterns of formal long term care use that result in the use of formal long term care in the home at the end of thirteen years. ◆ Stability in the physical environment together with declines in health and functioning over time will be associated with patterns of formal long term care use that result in the use of formal long term care, either in the home or in an institution. ◆ Stability in the physical environment together with improvement or stability in health and functioning over time will be associated with patterns of formal long term care use that result in no use of formal long term care.
<p>4) What changes in health and functioning and the physical environment between 1983 and 1990 (e.g., improvement, stability, decline) differentiate the people over 85 (the whole sample, men and women, urban and rural dwellers), who in 1996:</p> <p>a) were living independently in their own homes without formal long term care? b) required some formal long term care to remain in their own homes? or c) required institutional long term care?</p>	<ul style="list-style-type: none"> ◆ Changes between 1983 and 1990 in health and functioning will differentiate the three groups of people in the 1996 whole sample with people experiencing declines being more likely to use formal long term care. ◆ Changes between 1983 and 1990 in the physical environment will differentiate the three groups of people in the 1996 whole sample with people experiencing more supportive environments being more likely to use formal long term care in the home. ◆ Changes between 1983 and 1990 in both health and functioning and the physical environment will differentiate the outcome experiences of men and women, or urban and rural dwellers in 1996.

CHAPTER 4: METHODS

This study utilized a multi-method approach that included a secondary analysis of a longitudinal sub-sample of participants who participated in the 1983, 1990 and 1996 waves of the Aging in Manitoba Longitudinal Study (AIM), and a series of taped, open-ended, in-depth interviews with selected members of this sub-sample. The methods chapter is divided into three primary sections. The first section provides an overview of the methods of the Aging in Manitoba Longitudinal Study (AIM), the data base from which the sub-sample was selected for this study. This description provides the background information necessary to evaluate and interpret the analyses completed with the existing data.

The second section focusses on describing the methods used in the quantitative component of the study. Through the chi-squared tests, analysis-of-variance and logistic regression models, it was determined whether changes in health and functioning and changes in the physical environment had a unique influence on the outcomes under consideration (i.e., home without home care, home with home care, nursing home care). The section describes how the quantitative data were prepared for the analyses, how formal long term care patterns of service use were defined and associated variables created, and what specific steps were taken to address research questions one through four and their associated hypotheses.

The third section of the chapter focusses on the methods used in the qualitative component of the study. Taped, open-ended interviews were conducted with AIM participants who were born in 1911 or before and who met specific inclusion criteria. Analyses of the qualitative data focussed on issues related to health and functioning, the

role of the physical environment, perspectives on the use or non-use of formal long term care, and on personal explanations for longevity. The section describes the categorizing and coding of the interview data, and the way that the AIM survey data were used together with the qualitative data.

Aging in Manitoba Longitudinal Study

Background and General Design

The Aging in Manitoba (AIM) Longitudinal Study was initiated in 1970 as the “Study of Needs of the Elderly and of Resources Available to Meet Need” by the Division of Research, Planning and Program Development of Manitoba’s Department of Health and Social Services (Division of Research, 1973). The initial purpose of the AIM study was to develop a data base regarding the needs and priorities of older people in Manitoba to enable development of “deliberate, appropriate, comprehensive and decentralized planning of health and social services throughout the province” for this population (Division of Research, 1973).

The AIM study is a population-based, longitudinal panel study that includes three panels of participants and five waves of interviews (Hall & Havens, 1997). The first cross-section of AIM participants started the study in 1971, with the second and third cross-sections added to the study in 1976 and 1983 (Hall & Havens, 1997). In addition to adding a third cross-section of participants to the study in 1983, the surviving 1971 and 1976 participants were re-interviewed. Follow-up interviews were conducted with all participants who were alive and could be relocated in 1990 and again in 1996.

For all three cross-sections of participants, participants were randomly selected from the computerized records of Manitoba’s universal health insurance system using an

age and gender stratified area-probability sampling technique (Department of Health, 1990). These samples have been shown to compare favourably to both Manitoba's older population and to the older population of Canada as a whole (Chipperfield, Havens & Doig, 1997; Department of Health, 1990; Hall & Havens, 1997).

During each interview wave participants provided written consent to be interviewed and to allow access to their health services data from Manitoba Health (Hall & Havens, 1997). In addition, the consent form included a question for the participant to indicate if s/he was willing to be recontacted for follow-up interviews. The rate of non-response in each of the follow-up years has ranged from 4.6% in 1983 to 5.2% in 1996 (Hall & Havens, 1997). The majority of non-response was due to refusal to participate rather than the inability of the study team to locate an individual. Details regarding the study teams and their training have been described by Hall and Havens (1997).

All of the interview waves of AIM collected data in the areas of demographics, social networks and supports, leisure activities, activities of daily living, instrumental activities of daily living, use of services, income and expenses, chronic illnesses, etc. The survey instrument itself is comprised of nine "Scales of Needs for the Elderly Population" which have been described in detail elsewhere (Department of Health, 1990; Division of Research, 1973). The original testing of the full AIM interview guide demonstrated short-term test-retest reliabilities ranging from 0.83 to 0.96, odd-even split-half reliabilities ranging from 0.89 to 0.92, and first-half-to-last-half reliabilities ranging from 0.83 to 0.91 (Havens, 1984).

Variables of Interest to the Current Study

In terms of the variables of specific interest to this dissertation research, the majority were developed specifically for the AIM studies. The basic activities of daily living, instrumental activities of daily living and disability indicators included in the AIM were based primarily on the work of Shanas, Townsend, et al. (1968) (i.e., Index of Living Skills, Index of Disability). The development of the AIM measures were also influenced by the work of Katz et al. (1963) and of Lawton and Brody (1969). Although the *activities* addressed through the AIM ADL and IADL indicators are the same or similar to these previous instruments, additional items were added and new response scales were developed to reflect the purpose of the AIM study and its focus on both community-dwelling and institutionalized older adults.

The content validity of the AIM measures were addressed by using the literature, involving older adults and professionals in the development process, and through pilot testing of the instrument. In addition, work to determine the construct validity and reliability of the ADL and IADL indicators has also been pursued. Chappell (1981) demonstrated that the nine IADL indicators capture two separate but related constructs, one reflecting lighter IADL tasks (e.g., light housework, meal preparation, laundry) and one reflecting heavy IADL tasks (e.g., heavy housework, yardwork, household repairs). These two dimensions were discovered through the use of correlation matrices, factor analyses and internal consistency coefficients. The homogeneity of the constructs (i.e., internal consistency) varied according to whether the sample under consideration was community dwelling, living in subsidized seniors' housing, or living in an institution. As expected, homogeneity was lower among the groups receiving some form of assistance

(i.e., supported housing). Both IADL constructs were found to be valid when correlated with sex, mental health status, time spent in hospital over the past year, time spent at home due to illness in the past year, general life satisfaction, self-rated health and age.

Chappell (1981) also looked at the reliability and validity of the fourteen ADL measures of the AIM. She found that all items were highly correlated, especially among the community-dwelling sample ($r=0.84$ to 0.99). The internal consistency coefficient is reported to be 0.85 . High correlations in the expected directions with sex, mental health status, time spent in hospital over the past year, time spent at home due to illness in the past year, general life satisfaction, self-rated health and age, supported construct validity among these indicators as well (Chappell, 1981).

Given that stable cross-sectional measures will reduce the error in measuring change over time in the current study (Allen & Yen, 1979; Nunnally & Berstein, 1994), the test-retest reliability of the AIM measures is important for this work. Chappell (1981) did not report on the test-retest reliability of the ADL or IADL indicators used in the AIM although, as already noted, the overall AIM interview guide reported short-term test-retest reliabilities ranging from 0.83 to 0.96 (Havens, 1984).

Among similar measures to the AIM, the test-retest reliability of the fifteen item Barthel Index (a measure of ADL) has been reported as 0.89 among a group of severely disabled adults (Granger, Albrecht & Hamilton, 1979, as cited in McDowell & Newell, 1996), while the test-retest reliability of the limitations in physical activities scale of a mailed version of the SF-36 has been reported as 0.85 among adults with an average age of 76 years . Among measures that capture both ADL and IADL, the two week test-retest reliability of the Health Assessment Questionnaire among people with arthritis has been

reported as 0.87 (Fries & Spitz, 1990, as cited in McDowell & Newell, 1996). Test-retest reliabilities (kappa reliability coefficients) for the interviewer-administered version of the Predicting Health Needs of Seniors Survey (van Ineveld, 1998) ranged from 0.39 for needing help to prepare meals to 0.82 for needing help to walk inside. The overall kappa score for this survey is reported as 0.92. These citations lend support to the stability of ADL and IADL measures over short periods of time, and suggest that change measures developed from the AIM data should be able to detect real changes in the members of the sample over time.

Quantitative Methods

Sample Selection

Population:

The population of interest in the current study was people living in Manitoba who survived past 85 years of age.

Sample:

All surviving Aging in Manitoba (AIM) Longitudinal study participants who were born in 1911 or earlier, and who had interview data from 1983 (panel or cross-section), 1990 and 1996 comprised the quantitative sample for this study. Inclusion criteria were having a birth year in 1911 or earlier, being alive during the 1996 interviews, and having complete interview records in the data base for the years 1983, 1990 and 1996. Six hundred and sixteen AIM participants met these criteria.

These individuals were divided into three groups to address the research objectives. These three groups included people who were living independently in their own homes at the time of the 1996 interview, people who required some formal

assistance to remain in their own homes at the time of the 1996 interview, and people who required institutional care at the time of the 1996 interview. The specific definitions for these three groups are provided in Chart 4.1:

Chart 4.1: Definitions for Three Study Groups

Group 1 - Home: *People who lived at home without the use of formal long term care were defined as participants who:*

- a. lived in a whole house, self-contained suite, or a suite in seniors' housing; and
- b. owned or rented their accommodation; and
- c. did not have an open home care file at any time during the 12 month period prior to the 1996 interviews (i.e., July 1995 to July 1996).

Group 2 - Home Care: *People who required some formal assistance to remain in their own homes at the time of the 1996 interview were defined as participants who:*

- a. lived in a whole house, self-contained suite, a suite in seniors' housing, or in a board and room facility; and
- b. owned or rented their accommodation; and
- c. had an open home care file at any time during the 12 month period prior to the 1996 interviews (i.e., July 1995 to July 1996).

Group 3 - Personal Care Home: *People who required institutional care at the time of the 1996 interview were defined as participants who:*

- a. lived in a personal care home at the time of the 1996 interview; and
- b. did not own or rent their accommodation; and
- c. may or may not have had an open home care file in the 12 month period prior to the 1996 interviews (i.e., July 1995 to July 1996).

Selection of Variables for Current Study:

The AIM study included variables on a wide range of topics. To select the variables for use in the current study, the interview guides from 1983, 1990 and 1996 were reviewed and all questions that appeared in all three interview guides were identified. These identified questions were categorized and fit into one of the nine

components of the Evans and Stoddard (1994) population health framework. A table summarizing the identified variables and their corresponding components can be found in Appendix 1.

Preparing the Data

Before addressing any of the research questions, the data were prepared using the statistical package SPSS for Windows®, Version 6.1.3 (SPSS, 1995) (referred to herein as “SPSS”). The initial step in this preparation was recoding variables that differed in their response categories between years to ensure comparability across study waves. Frequency distributions for all variables in the study were then reviewed to identify variables with missing data in excess of 8%, either due to proxy responses, skip patterns or non-response. These variables are identified in Appendix 1.

The selection of the 8% cut-off for missing data was based on the size of the sample and the concern that using a higher cut-off value would compromise analytic power. With a sample size of 616 individuals, analyses using the full sample have an 80% power to detect differences between groups with odds ratios equal to or greater than 1.3 when the probability of the event in question is equal to 25%. Analyses with sub-groups as small as 275 individuals have an 80% power to detect differences with odds ratios equal to or greater than 1.4 when the probability of the event in question is equal to 50% (Hsieh, 1989).

To minimize missing data, five strategies were used. These strategies included using administrative data rather than survey data, including proxy values as legitimate values, developing a strategy to impute the missing values, leaving the variable in the analysis with missing data in excess of 8% or removing the variable from all analysis.

The strategies that were applied to the variables with greater than 8% missing data are outlined in Appendix 1.

Capturing Change Over Time

In order to address the research questions and test the hypotheses, three primary aspects of change had to be captured for this study: change in the use of formal long term care (i.e., patterns of care), change in health and functioning, and change in the physical environment. Measures of change can reflect change versus no change, direction of change, or direction and magnitude of change (Menard, 1991).

To capture change between and across waves of the study, the concatenation function ("CONCAT") in SPSS was used. This function concatenates the values of a series of variables across study years (e.g., dressing in 1983, dressing in 1990, dressing in 1996). The process allows the researcher to create a new, multi-category, nominal variable that retains the individual values of each of the variables that is used to create it. An example of this process is presented in Appendix 2.

Using concatenation, measures of change were developed specifically for this study. These measures captured the existence and direction of change for each one of the primary independent variables (i.e., 56 health and functioning variables; 8 physical environment variables), as well as for the variables used to adjust for the other components of the Evans and Stoddard framework (e.g., variables from the social environment, health care, etc. components - see Appendix 1). Concatenation was also used to identify the patterns of formal long term care use experienced by members of the sample. Capturing changes in this way is consistent with the change measures presented

by Wolinsky (1997) at the Gerontological Society of America Meetings in Cincinnati, Ohio.

Patterns of Formal Long Term Care Service Use

For the purposes of this study, a pattern of service use was defined on the basis of the services used by an individual at three separate cross-sectional periods: July 1982-July 1983, July 1989-July 1990, and July 1995-July 1996. These periods were chosen because they correspond to the reference period for the AIM survey questions on home care use (i.e., in the past year). As a result, the patterns of use do not include the total time periods between these cross-sections.

Three types of use were defined for each of these periods using a combination of the administrative data on home care use available in the AIM data base and the variable for type of housing at the time of the interview. The basic definitions used to define the 1996 outcomes (Chart 4.1) were also used to define an individual's status in 1983 and 1990 by simply changing the reference dates. Using these definitions, four new variables were created specifically for this study.

The first three variables (status in 1983, status in 1990, status in 1996) were nominal variables, each with three possible categories: 0 = home without home care, 1 = home with home care, 2 = personal care home. The fourth variable (status pattern), also a nominal variable, was created using the concatenation function of SPSS.

Patterns of Change in Health and Functioning

Among the 56 health and functioning variables used for this study, 25 of them were nominal in nature while 31 variables were dichotomous. Among the nominal variables, each one had five potential responses, plus the potential for missing data. The

dichotomous variables also had the potential to be coded as missing. As a result, the change variables produced through concatenation, specifically for the 1983 to 1996 changes, produced numerous patterns of change³. In order to cope effectively with these patterns of change during the analysis process, two strategies were employed. For the changes between 1983 and 1990, the concatenation procedure was used and then the resulting change variables were collapsed. For the changes across all three study waves (1983 to 1996), the original response categories were collapsed, and then these values were concatenated. Both of these strategies are described in detail below.

Change Between 1983 and 1990: Patterns of change between 1983 and 1990 among the ADL, IADL, self-rated health and walking out-doors measures were collapsed so that each of the individual measures were identified as either having remained stable in a positive state, stable in a negative state, declined, improved or change unknown⁴. The observed physical difficulties change measures were also collapsed to yield similar categories. The collapsing of the leisure participation variables resulted in the following

3

For example, because the variable for dressing had six potential responses in each year (5 responses plus the potential to have missing data), the three wave change variable for dressing could have values such as 111 (independent in each wave), 112 (independent in 1983 and 1990, help from someone in the house in 1996), 113 (independent in 1983 and 1990, help from someone outside the house in 1996), up to and including 555 (staff all three waves).

4

It is important to remember that the response categories for the AIM measures reflect the degree of assistance that a person requires to complete a given activity. The responses are scaled so that "1" means the least assistance (i.e., independent) while "5" means the most assistance (i.e., dependent). Therefore, a change from being independent to requiring any type of assistance was considered a decline, and a change from requiring some type of assistance to requiring less assistance, or being independent, was considered an improvement.

categories: stable participant, stable non-participant, became a participant, stopped participating, and change unknown. The decisions to collapse the data in these ways were made in consultation with B. Tate of the Biostatistical Consulting Unit, Department of Community Health Sciences.

Using these collapsed variables, a total number of health and functioning declines was calculated for each member of the sample in order to address research question four and its corresponding hypotheses. In addition, the number of declines for each of the areas within health and functioning (e.g., ADL, IADL) was also calculated.

Changes Over Three Waves: As already noted, the original response categories for the health and functioning variables were collapsed, and then these values were concatenated to capture changes across all three study waves (1983 to 1996). The six response categories for each one of the fourteen ADL and the nine IADL variables were collapsed into four categories for each year of the study (i.e., 1983, 1990, 1996). The codes for 1 (independent with activity) and for 9 (missing or proxy) were left as is, while codes 2 (someone in the house helps) and 3 (someone outside of the house helps) were collapsed and called “informal care”. Codes 4 (service helps) and 5 (staff help) were collapsed and called “formal care”. These categories (i.e., informal care, formal care) are consistent with the descriptions of Clair (1990), Havens (1995, 1996), Shapiro (1995) and others.

The response categories were not collapsed for observed physical difficulties, leisure participation, or ability to walk out-of-doors. The excellent and good categories of self-rated health were collapsed, but the remaining categories (i.e., fair, poor and bad) remained unchanged. Using these data (original for some variables and collapsed for

ADL, IADL, self-rated health), and then applying the CONCAT function, changes over the three waves of the study were captured.

From the resulting change variables, remaining stable in a positive state for the ADL and IADL meant being independent for all three waves. For self-rated health, remaining stable and positive meant reporting excellent or good self-rated health for all three waves. Among the leisure activities, both consistent participation in a particular activity OR consistent non-participation were considered to demonstrate positive stability. This decision was made because some of the leisure activities are ones that would be of little interest to particular individuals, therefore to say that non-participation is negative, or not stable, could not be defended. Remaining stable in a positive state for walking out-of-doors was defined as being able to walk 1+ miles for all three waves. Not having an observed physical difficulty for all three waves was considered stable.

Based on the foregoing, the definitions required to address research question three and its corresponding hypotheses, were developed. These definitions included steady declines in health and functioning (1983 to 1996), and steady improvements in health and functioning (1983 to 1996). In addition, it was necessary to identify people who had predominately declined during this time period, and distinguish them from people who had been predominately stable or improving, and people who had experienced predominately idiosyncratic patterns of health and functioning over the three study waves. These latter definitions were necessary to test the hypotheses that addressed the interaction between health and functioning and the physical environment in predicting the use of formal long term care in 1996.

The challenge of developing the definitions for “steady improvement” and “steady decline” was that the presence and direction of change that people experienced across the 56 health and functioning variables was not consistent, that is, a member of the sample could experience improvement across ten of the indicators, but simultaneously experience decline in ten others. In addition, any one of stability, improvement or decline could occur between 1983 and 1990, followed by any other one of stability, improvement or decline between 1990 and 1996.

No attempt was made to weight the importance of the various measures of health and functioning in order to cope with these challenges, even though this process is slowly becoming popular in the gerontological and health status measurement literature (Andresen, Rothenberg, & Zimmer, 1997; McDowell & Newell, 1996). The rationale for not weighting is based on the fact that such a process would be dependent on statistical procedures or existing literature rather than on what activities older adults themselves see as being the most important and meaningful changes (Reuben, 1995). To dismiss the participants’ perspectives on important and meaningful changes is inconsistent with this investigator’s professional and conceptual background and practice (Canadian Association of Occupational Therapists, 1997).

As a result, a steady improvement for the purpose of the study meant that a person improved between 1983 and 1990 and then remained stable or, alternatively, remained stable between 1983 and 1990 and then improved between 1990 and 1996. Within this definition, changes that were considered as “improved” were identified as outlined in Chart 4.2.

Chart 4.2: Definitions Used for “Improved” Among the Health and Functioning Variables for Research Question Three

Improved in ADL or IADL	
◇	change from using formal help to using informal help or being independent
◇	change from using informal help to being independent
Improved in Self-Rated Health	
◇	change from fair health to good/excellent health
◇	change from poor health to fair or good/excellent health
◇	change from bad health to poor, fair or good/excellent health
Improved in Walking Out-Of-Doors	
◇	change from not being able to walk outdoors to walking 10 yards, 100 yards, 1/4 mile, or 1+ miles
◇	change from walking 10 yards to walking 100 yards, 1/4 mile, or 1+ miles
◇	change from walking 100 yards to a 1/4 mile, or 1+ miles
◇	change from walking 1/4 mile to 1+ miles
Improved in Leisure Participation	
◇	change from not participating to participating
Improved in Observed Physical Difficulties	
◇	change from having difficulty to not having difficulty

A decline within the context of the “steady decline” definition meant that the person declined between 1983 and 1990 and then remained stable or, alternatively, remained stable between 1983 and 1990 and then declined between 1990 and 1996. The changes that constituted a decline within this definition can be found in Chart 4.3. These definitions formed the basis for the development of the remainder of the definitions needed for research question three and its corresponding hypotheses.

Chart 4.3: Definitions Used for “Decline” Among the Health and Functioning Variables for Research Question Three

Decline in ADL or IADL	
◇	change from being independent to using informal help or using formal help
◇	change from using informal help to using formal help
Decline in Self-Rated Health	
◇	change from good/excellent health to fair, poor or bad health
◇	change from fair health to poor or bad health
◇	change from poor health to bad health
Decline in Walking Outside	
◇	change from walking 1+ miles to walking 1/4 mile, 100 yards, 10 yards, or being unable to walk outside
◇	change from walking 1/4 mile to walking 100 yards, 10 yards, or being unable to walk outside
◇	change from walking 100 yards to walking 10 yards, or being unable to walk outside
◇	change from walking 10 yard to not being able to walk outside
Decline in Leisure Participation	
◇	change from participating to not participating
Decline in Observed Physical Difficulties	
◇	change from not having difficulty to having difficulty

In the end, “steady improvement in health and functioning” was operationalized as a nominal variable with four categories of improvement - no improvements, one improvement, two improvements, and three or more improvements. The operationalization of “steady decline” was similar, but was contingent on experiencing

declines in 50% or more of the variables in a category ⁵. Therefore, the categories of the steady decline variable ended up being: no categories experienced declines in 50% or more of the variables; one category had declines in 50% or more of the variables; two categories had declines in 50% or more of the variables; and three or more categories had declines in 50% or more of the variables.

While these definitions of steady improvement and steady decline met the needs for the first two hypotheses related to research question three, they were less adequate for the two hypotheses that addressed the combination of a stable physical environment together with a change in health and functioning (refer to Chart 3.15). For these hypotheses, it was preferable to have a single variable with three mutually exclusive categories that distinguished the following groups: people who experienced idiosyncratic patterns of health and functioning change; people who were predominately declining over time; and people who were predominately stable or improving over time. Having mutually exclusive categories for these hypotheses provided a better test of the potential impact of the health and functioning/physical environment interaction on formal long term care use.

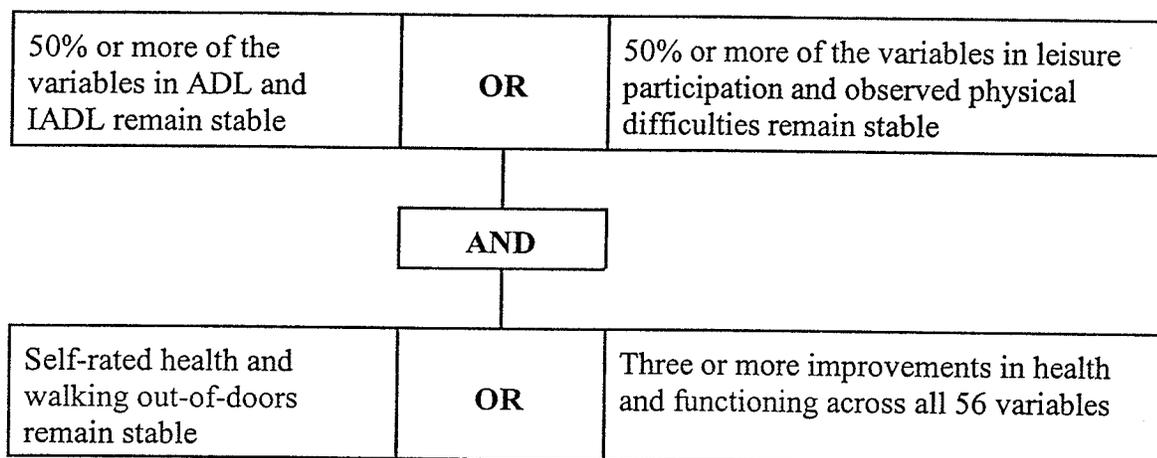
Once again, because people experienced changes unevenly across the various measures of health and functioning, the process of developing these definitions was iterative and utilized both univariate analysis and cross-tabulations to achieve the greatest differentiation among three groups of people.

⁵

The categories of health and functioning included ADL, IADL, observed physical difficulties, leisure participation, self-rated health and ability to walk out-of-doors.

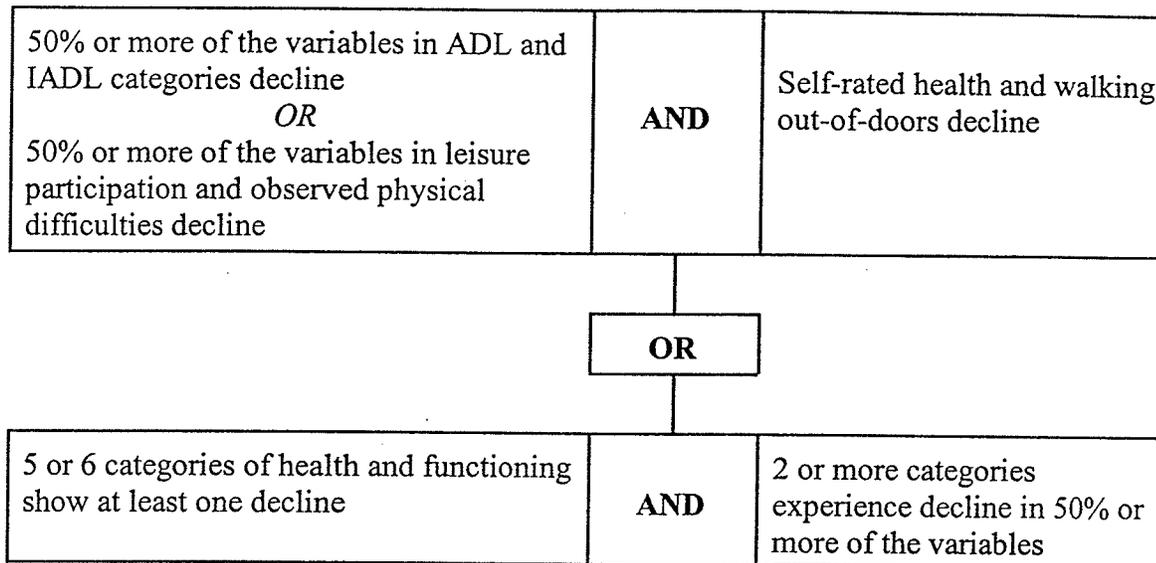
Therefore, people considered to be predominately stable or improving over time in their health and functioning were defined as depicted in Figure 4.1. Two-hundred and thirty-eight people (38.6%) in the sample were “predominately stable or improving” using this definition. Of interest is the fact that this proportion corresponds closely to the proportion of individuals who did not use any formal long term care services over the course of the study period.

Figure 4.1: Graphical Representation of the Definition of Predominately Stable or Improving over the 3 Waves of the Study



People considered to be “predominately declining” in terms of their health and functioning over the course of the study were defined as depicted in Figure 4.2. Three hundred and forty people (55.2%) in the sample were “predominately declining” using this definition.

Figure 4.2: Graphical Representation of the Definition of Predominately Declining over the 3 Waves of the Study



The remaining individuals were defined as “idiosyncratic” in their patterns of health and functioning change over time. These individuals experienced a mix of stability, improvement and decline both within individual variables, as well as over the categories of health and functioning during the course of the study. Many of the people who were defined as having “predominately idiosyncratic” patterns had missing data in one or more of the years for a number of the health and functioning variables.

To confirm the robustness of this definition, and the resulting three category variable (e.g., idiosyncratic, predominately declining, predominately stable or improving), a series of statistical tests were completed prior to continuing the analysis. ANOVA was used to ensure that people who were defined as being “predominately stable or improving” had a significantly greater number of total improvements in health and functioning compared to people defined as being “predominately declining” or

“idiosyncratic” ($F=49.66$, $df=2$, $p<0.000$). ANOVA was also used to ensure that people who were defined as being “predominately declining” had a significantly greater number of total declines in health and functioning compared to the other two groups ($F=283.80$, $df=2$, $p<0.000$).

In addition, the new three category variable (named “changhf3”), was regressed on each of the three outcomes of interest (i.e., home care versus personal care home, home versus personal care home, home versus home care). These analyses were conducted to ensure that the variable (and hence, the definitions) was adequately sensitive, and could distinguish the outcome experiences (unadjusted) of the study participants. The odds ratios resulting from these analyses were reviewed to ensure that they demonstrated expected relationships to each other (e.g., it was expected that people who were “predominately declining” would be more likely to use formal long term care than people who were “predominately stable or improving”). All of these analyses supported the definitions for “predominately stable or improving,” “predominately declining” and “idiosyncratic patterns” as described in the preceding paragraphs.

Patterns of Change in the Physical Environment

In terms of the physical environment, three definitions were required to address the study questions and hypotheses: change to a more supportive environment over two waves (1983 to 1990), change to a more supportive environment over three waves (1983 to 1996), and stability in the physical environment (1983 to 1996).

Changes to a more supportive environment between 1983 and 1990 were operationalized through two separate, continuous variables. The first variable, “Supenvir,” provided a count of the number of physical environment variable changes

that occurred between 1983 and 1990 that provided more support to a participant. The range of possible values for this variable was 0 to 4. For this variable, the components of a more supportive environment were defined as:

- being stable with maximum support, stable with some support, or having an increase in support between 1983 and 1990 in terms of the presence of railings on the stairs inside the house or the presence of railings on the stairs outside the house;
- being stable with maximum support, stable with some support, or having an increase in support between 1983 and 1990 in terms of the presence of grab-bars in the bathroom; and
- experiencing a move to more supportive housing between 1983 and 1990.

The second variable, "Supenvir2," also provided a count of the number of physical environment variable changes that occurred between 1983 and 1990 that provided more support to a participant, but this second variable was more restrictive in how a more supportive environment was defined. The range of possible values for this variable was still 0 to 4. For this variable, the components of a more supportive environment were defined as moving to more supportive housing between 1983 and 1990, and experiencing an increase in support during this same time in terms of the presence of railings on the stairs inside the house or the presence of railings on the stairs outside the house, and the presence of grab-bars in the bathroom.

Since moves to more supportive housing between 1983 and 1990 included moves to a personal care home, a series of cross-tabulations were completed to ensure that a

tautology had not been created through these definitions that would adversely effect the analyses.

Changes to a more supportive environment over three waves was operationalized as meaning that an older individual experienced increased support in at least two of the following four physical environment variables: type of housing, grab-bars in the bathroom, railings on the inside stairs and railings on the outside stairs. In addition, at least one of the remaining physical environment variables indicated increased support - room to oneself, condition of dwelling, need for repairs, and problems with transportation. The specific changes for each of these variables that were operationally defined as offering greater support are outlined in Chart 4.4.

Chart 4.4: Definitions of Physical Environment Changes Leading to a More Supportive Environment

Type of Housing	
◇	move from a house to an apartment, seniors' apartment, board and room, or PCH
◇	move from an apartment to a seniors' apartment, board and room, or PCH
◇	move from a seniors' apartment or a board and room to a PCH
Grab-bars	
◇	change from no grab-bars to any grab-bars
◇	change from toilet bars only to bars at toilet and tub/shower
◇	change from tub/shower bars only to bars at toilet and tub/shower
Stair railings (inside or outside)	
◇	change from no railings to any railings
◇	change from no railings to no stairs
◇	change from partial railings to full railings
◇	change from partial railings to no stairs
Transportation	
◇	change from having problems to having no problems
Condition of dwelling	
◇	change from satisfactory to good
◇	change from not satisfactory to good or satisfactory
Need for household repairs	
◇	change from needing major repairs to needing minor repairs or regular maintenance only
◇	change from needing minor repairs to regular maintenance only
Room for self	
◇	change from not having a room for self to having one

Using these definitions, each individual in the study was defined as either changing to a more supportive environment over the course of the study, or not changing to a more supportive environment. To ensure that including residential moves, particularly moves into a personal care home across the three waves of the study, did not create a tautology for this definition and the associated analyses, a series of cross-tabulations were

completed to ensure that some people from all of the three outcome groups had had the experience of changing to a more supportive environment.

The final definition developed for research question three was for a stable physical environment. This concept was defined as experiencing no residential moves as well as having stability (i.e., no changes) in at least three of the other physical environment variables (e.g., grab-bars, railings, repairs, etc.).

Statistical Methods for Research Questions 1-4

Analysis for Questions 1 and 2:

Research questions one and two focussed on patterns of formal long term care use and whether any differences existed in the experience of these patterns between men and women, and between urban versus rural dwellers. To address these questions, a frequency distribution was run for the variable capturing the pattern of formal long term care use (described above in *Patterns of Formal Long Term Care Service Use*) with the patterns listed in descending order of frequency. The patterns of service use were then separated, identifying those patterns that resulted in each of the three outcomes of interest (i.e., home without home care in 1996, home with home care in 1996, and personal care home in 1996). Using the definition of "most common pattern" from the research proposal (i.e., one that exceeds all others by 15%), the first three study hypotheses were addressed by simply calculating whether or not a particular pattern of service use exceeded all other for that outcome by at least 15%.

To determine if the experience of these patterns differed between men and women, and between urban and rural dwellers, four additional frequency distributions were run for the patterns of service use variable using the filter function of SPSS. Prior

to completing the distributions for the urban and rural dwellers, the variable "region" was collapsed into a dichotomous variable, separating people living in Winnipeg from those people not living in Winnipeg because of the distribution of the sample.

A series of dichotomous variables were then created based on the pattern of service use variable in order to separate each of the patterns of service use from the others. As examples, the dichotomous variable "H-H-H" separated the pattern home - home - home from all other patterns, alternatively, the dichotomous variable "H-HC-PCH" separated the pattern home - home care - personal care home from all other patterns. Using these new dichotomous variables as outcomes in a logistic regression model, two models were run against each outcome. The first model included only the pattern of service use as an independent variable. The second model included the pattern of service use as well as the variables for age in 1990 (≤ 84 , 85+) and sex.

To test the specific hypotheses concerning the differences between men and women, and between urban and rural dwellers, two additional variables were created that combined the patterns of service use that had the same 1996 outcome. These variables were "Endpch" for those patterns ending in personal care home residence in 1996, and "Endhc" for those patterns ending in the receipt of home care in 1996. Logistic regression analyses were applied to test the hypotheses, first using the unadjusted model (i.e., pattern variable) and then the adjusted model (i.e., age, sex, region).

Methods for Question 3

Research question three inquired about whether patterns of change in health and functioning and the physical environment over the three waves of the study were associated with patterns of formal long term care use. The hypotheses associated with

this question were tested using a chi-squared test since the associations under consideration used nominal variables (e.g., dichotomous outcome, nominal variables capturing steady declines or improvements over time).

The remaining hypotheses corresponding to research question three addressed the associations between stability in the physical environment and changes in health and functioning over time. These hypotheses were tested by generating a variable that captured the interaction between changes in the physical environment (two levels - stable or unstable) and changes in health and functioning over time (three levels - predominately stable or improving, predominately idiosyncratic changes, predominately declining). This interaction variable had six categories and was regressed on "Endcare" (i.e., home without care (0) versus any care (1)) using logistic regression. People who experienced a stable physical environment together with stability or improvement in health and functioning were used as the reference or indicator category.

Methods for Question 4

Research question four focussed on whether changes in health and functioning and the physical environment between 1983 and 1990 could differentiate the members of the sample by their 1996 outcomes. The hypotheses corresponding to this question are that people who decline in health and functioning between 1983 and 1990 will be more likely to use formal long term care (i.e., any care); that people experiencing more supportive environments will be more likely to use formal long term care in the home; and that changes in health and functioning and the physical environment will differentiate the outcome experiences of men and women, and urban and rural dwellers.

To begin to answer this question and test these hypotheses, the initial step was to develop a series of dichotomous outcomes for 1996 that corresponded to the wording of these hypotheses and provided the most comprehensive perspective on the outcome possibilities. These outcome pairs included home without home care versus personal care home, home without home care versus home with home care, and home with home care versus personal care home.

The second step was to use these outcomes and the 1983 to 1990 change variables, previously described, in a series of cross-tabulations, one series for each framework component (e.g., health care, physical environment, health and functioning). Each series of cross-tabulation tables was reviewed to determine if any cells had zero values indicating that a particular change from 1983 to 1990 was associated 100% with a particular outcome ⁶.

After reviewing each series of cross-tabulations and identifying all instances of zero values, three filter variables were created for each of the dichotomous outcomes. See Appendix 3 for a detailed description of these filters. One filter variable identified the health and functioning characteristics with zero values, one filter variable identified the control characteristics (e.g., genetic endowment variables, social environment variables, etc.) with zero values, and one filter variable identified all characteristics with

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It is important to remember that this sample is a group of survivors, and that they had already experienced the changes and the outcomes. Therefore, for this study, among the members of this sample, it is correct to say that a particular change was 100% associated with a particular outcome if a cell in these cross-tabulations had a "0". Of course, this statement may not apply to all people who experience this change or necessarily, to another group of survivors.

zero values. By using these filters during the modelling process, described below, it was possible to remove those individuals who could be defined through one or more specific characteristics from an analysis, thereby focussing only on those individuals who could not be defined. Had the people with these characteristics not been removed, there would have been problems in the estimation of the models because the probability of the outcome for these people would equal one (Tennstedt et al., 1996).

After creating the dichotomous outcome variables and the filter variables, the modelling process began using logistic regression. This process was divided into two distinct parts, one that tested whether changes in health and functioning could differentiate people's 1996 outcomes, and the other that tested whether changes in the physical environment could differentiate the 1996 outcomes. The specific details of the modelling process are outlined below. For a detailed example, refer to Appendix 4.

Step 1: Model all of the variables within each of the framework components against the dichotomous outcome of interest. These within-component models defined the control variables for use in Step 4 of the modelling process;

Step 2: Model the primary independent variable (e.g., total declines in health and functioning, more supportive environment), unadjusted for age or sex, against the outcome of interest;

Step 3: Model the primary independent variable, adjusted for age, sex and region, against the outcome of interest; and

Step 4: Model the primary independent variable, controlling for all of the other framework components (see Step 1, above).

These four basic steps were used to answer Question 4, and moved the analysis from the simplest available model (Step 2) to the most complex model (Step 4). The concept of control variables (Step 1) created an interesting challenge in this research since these variables (e.g., changes in the social environment, changes in health care) may actually have been antecedent to the variables being tested (e.g., changes in health and functioning). Unfortunately, the issue of temporality among these variables cannot be determined with the data available to this project (i.e., three separate interview periods rather than continuous data). For example, did the change in marital status occur before or after the change in health and functioning? Since this information was unknown for the current project, controlling for significant variables from the other components of the Evans and Stoddard (1994) framework was deemed the most appropriate analytic strategy.

The limitation of this approach was that relationships and pathways of changes among the components of the model were not illuminated, and real relationships between changes in health and functioning and the physical environment, and the use of formal long term care, could have been masked or minimized (i.e., chance of a Type II error may be greater). However, not to include these control variables in the analytic process would contradict the existing literature (see *Chapter 3 - Literature Review*), and would be difficult to defend within this field of study.

The specific details outlining how these four steps were used for the health and functioning analysis and the physical environment analysis are provided in the following two sections of this chapter.

Analytic Strategy for Health and Functioning Changes

The health and functioning component included variables that capture abilities in activities-of-daily-living, abilities in instrumental-activities-of-daily-living, participation in leisure activities, physical difficulties observed by the interviewer, self-rated health, and the ability to walk out-of-doors. To test whether declines in health and functioning would result in the use of formal long term care, three separate approaches were developed (Chart 4.5).

Chart 4.5: Approaches Used to Test the Relationship Between Declines in Health and Functioning and the 1996 Outcomes

Approach #1: Measure health and functioning declines using a summary measure of declines across all 56 variables.

Approach #2: Measure health and functioning declines using summary measures of declines in ADL, IADL, Observed Physical Difficulties, and Leisure Participation.

Approach #3: Measure health and functioning declines using each of the 56 variables separately within this component.

The first approach was to create a measure of total health and functioning decline, "Hlthdecl". This continuous measure provided a count of the total number of health and functioning declines that were experienced by each person in the sample between 1983 and 1990. The range of possible values for this variable was 0 to 40. While it is recognized that this summative approach is not state-of-the-art in terms of the measurement of health status (c.f., McDowell & Newell, 1996), it is the most commonly used and accepted approach in this area of inquiry. In addition, it avoids ranking activities or functions, and thereby placing judgements on the importance or meaning of

these activities or functions on behalf the members of the sample (Canadian Association of Occupational Therapists, 1997; Reuben, 1995).

The second approach was to disaggregate the components of health and functioning, and to create four separate measures to capture aspects of decline. These four continuous variables provided counts of the number in declines each of the following areas: ADL, IADL, observed physical difficulties, and leisure participation. The range of possible values for these four variables were 0 to 14 (ADL), 0 to 9 (IADL), 0 to 6 (observed difficulties), and 0 to 13 (leisure participation). Within this second approach to capturing health and functioning declines, the variables for self-rated health and walking out-of-doors were not used since they did not clearly fit into any of these four categories. Instead, these variables were included in the final stage of the modelling process together with the variables from the other components.

The third approach to capturing health and functioning declines was to consider each of the variables in this component individually, and not to summarize or aggregate declines in any way. This approach provided the most detailed information on the changes between 1983 and 1990 and identified the specific declines within health and functioning that were the most important in terms of differentiating among 1996 outcomes.

Once the measures of health and functioning decline were constructed, the four general modelling steps described previously were followed for approaches one and two. Because of the number of variables in the third approach (i.e., individual health and functioning variables), only cross-tabulations were completed, and only those changes

that were 100% associated with a particular outcome were considered due to the high risk of Type I error.

Analytic Strategy for the Physical Environment Changes

Using the two measures of a change to a more supportive environment (e.g., “supenvir” and “supenvr2”), a total of six logistic regression models (three for each variable) were used to test the hypotheses that changes between 1983 and 1990 in the physical environment will differentiate the three groups of people in the 1996 whole sample with people experiencing more supportive environments being more likely to use formal long term care in the home.

The first models used only the measure of a change to a more supportive environment as a covariate. The second models controlled for age, sex and region, while the third models controlled for the other eight framework components (i.e., health and functioning, prosperity, well-being, social environment, genetic endowment, individual responses, disease and health care). For the third models, the filter variables were used to ensure that those individuals whose status could be defined based on one of the other variables were removed from the analysis. Use of the filter variable ensures that parameter estimates were not effected by having cells with zero values (Tennstedt et al., 1996).

Summary of Quantitative Component Methods

The quantitative component of this study involved a secondary analysis of existing data from the Aging in Manitoba Longitudinal Study. A sub-sample of AIM participants who were born in 1911 or before, and who had complete interview records for the 1983, 1990 and 1996 waves of the AIM study were used for this analysis.

Variables that were contained in all three waves of the AIM study were identified and categorized into one of the nine components of the Evans and Stoddard (1994) population health framework. Using both the survey responses regarding type of housing and the administrative data on home care utilization, patterns of formal long term care use were developed for each individual in the sub-sample and were used as the outcome variable. In addition, variables capturing change over time were developed for use as independent variables. A combination of chi-squared tests and logistic regression models were used to address the quantitative research questions, numbers one to four, and their corresponding hypotheses.

Qualitative Component

Qualitative Sample Selection

Population:

The population of interest for the qualitative component of the study was people who had survived past 85 years of age and who lived in Manitoba.

Sample:

The sample for the qualitative interviews was selected from the quantitative data set for this study and therefore participants met all of the inclusion criteria for the quantitative component of this study. Additional inclusion criteria for the qualitative interviews were that a person was to have experienced one of the two most common patterns of service use identified through research question one (i.e., home without care in all three waves, or home without care in 1983 and 1990, receiving home care in 1996); s/he must have agreed during the 1996 wave of the AIM interviews to be recontacted; s/he must have scored a 7 or above on the 1996 mental status questionnaire; s/he must

have been interviewed in English during the 1996 interviews; and s/he must live within 3 hours driving distance of Winnipeg. Excluded from the qualitative sample were people who were identified by the 1996 interviewer as being hostile to some questions or hostile in general, as having inadequate or unsatisfactory comprehension of questions, or as having a hearing impairment that interfered with the interview process. Based on these inclusion and exclusion criteria, a total of 176 participants were eligible for the qualitative interviews.

The unique identifier for these 176 participants, together with their pattern of service use, were provided to the AIM Programmer/Analyst. The Programmer/Analyst matched the unique identifiers to the AIM identification numbers, and produced a list of names and addresses for potential interviewees, sorted by pattern of service use. Only the list of names and addresses, together with the pattern of service use, were returned to ensure that neither the unique identifiers or the AIM identification numbers were linked to the names and addresses of the individuals on the list.

After obtaining this list, names and addresses were sorted by community and by pattern of service use. For those communities outside of Winnipeg, addresses that were in the region surrounding the given community were also included. Because financial considerations restricted the amount of travelling that could be done in rural areas, this sorting process identified areas where a number of potential interviews might be obtained in a relatively short period of time, thereby reducing travel time and resulting costs.

Once the names and addresses of potential interviewees were sorted, names were randomly selected to identify those individuals to whom letters of invitation would be sent. For the Winnipeg groups, systematic random sampling was done using a 1 in 8

selection with a random start for the home-home-home pattern of service use group, and a 1 in 5 selection with a random start for the home-home-home care pattern of service use group. For the southern Manitoba group, all potential interviewees were contacted, regardless of their pattern of service use. For the Brandon group, the only male in the group of potential interviewees was purposefully selected and three of the remaining eligible women were randomly selected using simple random sampling.

A total of 28 people were invited to participate in a qualitative interview. Of these 28 individuals, 8 had died in the past year (28.5%). Of the remaining 20 individuals, one was unable to participate due to illness and one was unable to provide consent to be interviewed. In the end, 18 people were left as potential and eligible respondents for the qualitative interviews. Of this group, only 3 individuals refused to participate. As a result, the response rate for the qualitative interviews was 83.3%⁷. Table 4.1 provides a summary of the contacts by region, by pattern of service use, and by result of contact.

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The response rate was calculated by dividing the number of people who agreed to be interviewed (15) by the number of people who were able to participate (18).

Table 4.1: Summary of Results of Contacts for Qualitative Interviews, by Region and Pattern of Service Use

	# of Letters Sent	Unable to Participate		Able to Participate	
		# Deaths	# Ineligible	# Refused	# Interviews
Winnipeg					
Home-Home-Home	7	1	0	2	4
Home-Home-HC	7	2	1	0	4
Southern Manitoba					
Home-Home-Home	6	4	0	0	2
Home-Home-HC	4	1	1	0	2
Brandon					
Home-Home-Home	4	0	0	1	3
Home-Home-HC	0	0	0	0	0
TOTALS	28	8	2	3	15
RATES	N/A	28.5% of 28	7% of 28	16.6% of 18	83.3% of 18

Qualitative Interview Guide

Open-ended, in-depth interviews guided by a list of general topics provided the data for the qualitative component of this study. The primary objective of the qualitative interviews was to enhance and illuminate the findings of the secondary analysis. In order to meet this objective, it was necessary to allow respondents to share their ideas, opinions and stories about their longevity and the reasons they felt that they needed to use or not use formal long term care services over time. Through the qualitative interviews, it was possible to obtain the insider's perspective, and to allow unexpected issues and themes to

emerge (Kirby & McKenna, 1989; Marshall & Rossman, 1989; Sandelowski, 1991; Whyte, 1984).

Although the qualitative interviews were initially conceptualized as being semi-structured, it became evident after only two interviews that the interview guide was stifling the interview process. In order to obtain richer data, the interview shifted to an open-ended format that was guided by a list of topics, and included three specific questions for each respondent to answer. The list of topics for the interviews and the three key questions are provided in Appendix 5. The list of topics was generated to provide insight into the respondent's life history, major life events, and to cover each of the areas from the Evans and Stoddard (1994) population health framework.

All of the interviews covered information on family, work, education, and marital histories, as well as on the individual's living arrangements and residential moves over the course of their lives. Probes focussed on gathering information about the nature of people's work (e.g., degree of physical or cognitive demands, health risks), any patterns of family longevity (e.g., age of death for parents and siblings), and the nature of family and marital relationships (e.g., good, bad, stressful).

In addition, time was spent talking about friends and leisure activities, both currently and in the past. Probes focussed on the extent of a person's social network and connectedness, involvement with the community, and the way that social and leisure activities had changed over the years. The types and characteristics of leisure activities were also discussed (e.g., exercise, social, mentally challenging).

Health status and use of health care services over the individual's life were additional topics of discussion during the interview. People were asked to self-rate their

current health, and to reflect on any major health changes over the past few years. Histories of major illnesses and experiences with health care services were discussed. Specific probes inquired about remembrances of the 1918 flu epidemic, and about having various infectious diseases as a child, such as rheumatic and scarlet fever. Stories and remembrances of health care in Manitoba prior to National Hospital Insurance (1957) and Medicare (1967) were also discussed in many of the interviews.

Near the end of the interview, respondents were asked to comment on what they thought had contributed to their health and longevity, and for those people who used services, what factors they thought lead them to use these services. Attempts were made to ask respondents who did not use services about the factors they thought lead to their non-use of services, but this question was one to which people had difficulty responding. Probes based on the Evans and Stoddard (1994) population health framework guided this discussion to ensure that all potential health determinants were addressed.

As a way of wrapping up the interviews, respondents were asked whether they had a particular philosophy of life, or a motto that they lived by, as well as what advice they would give to a 20 year old about how to live a long and healthy life.

Analysis and Data Management

All interviews were tape recorded, and analysis occurred throughout the data collection phase by taking fieldnotes and expanding them as soon after the interview as possible. Of interest is the fact that nine of the fifteen people interviewed requested and were given copies of the interview tapes and/or transcripts to share with their family members. These requests were typically based on the personal history narratives that the interviews contained and that family members probably did not know.

Interviews were transcribed in full by a skilled medical transcriptionist.

Transcripts were reviewed for accuracy and margin notes were made directly on the transcripts to track two analytic elements. The first element was recurring issues or themes raised during the interview that captured concepts not included in the secondary analysis. One example of this element was how people talked about worrying, whether they were “worriers”, and how they thought this characteristic influenced their health and longevity.

The second element was the nine components of the Evans and Stoddard (1994) framework (e.g., physical environment, social environment, disease, etc.). The components were tracked through the interviews to identify emerging issues. These issues were integrated into the following interviews to test ideas and develop conceptualizations about factors that contribute to health, longevity and the use of formal long term care services from the perspectives of the respondents themselves. An example of an emerging issue was the role of a person’s early social environment, particularly the role of their up-bringing, in their longevity.

The qualitative data were more formally analysed at the completion of all of the interviews using FolioViews® 4.11 for Windows (Folio Corporation, 1997), an “integrated software for viewing, searching, annotating, and editing information in infobase format” (Folio Corporation, 1997, p.3). FolioViews® includes a number of features of particular value to the qualitative researcher, such as the ability to highlight and label sections of text, and to apply “post-it” memos within the text. FolioViews® produces a word list of all of the words contained in a file, and through the use of this list, the researcher can search and retrieve words and phrases, and then view these words and

phrases and the text which surrounds them in the interview transcript. Advanced searches will search the text, plus post-it memos, and can accommodate boolean and thesaurus searches.

Through the use of the word list and the advanced search feature of FolioViews[®], the interview transcripts were searched for quotes that related to each of the components of the Evans and Stoddard (1994) framework. Particular emphasis was placed on reviewing quotes that either supported or refuted the findings of the secondary analysis, or that contributed an added dimension to the quantitative findings. In addition to searching for quotes related to the framework components, searches were also conducted to look for the issues and themes raised during the interview that captured concepts not included in the secondary analysis. These quotes were reviewed with a specific focus on how this information identified the limitations of the secondary analysis, and on the data on which it was based (i.e., were there important issues raised by people that were not captured in the AIM interviews?).

Given that the intent of the qualitative interviews was to supplement the quantitative findings and to explore how they could enhance the quantitative findings, the quotes found through the searches were grouped together by common theme and stored in a word processing file under headings such as “physical environment enhances health”, “social environment contributes to longevity”, “words of wisdom”, etc. When the quantitative findings were being prepared, this word processing file was reviewed and quotes were selected to embed in the quantitative findings. The selection of quotes to embed was based on the clarity of ideas expressed by the interviewee, the length of the quote, the extent to which the quote required the surrounding discussion to make it

understandable, and the extent to which the quote provided additional insight into the quantitative findings. This insight could either be pointing out the applicability of the findings, or alternatively, their limitations in terms of applicability.

Summary of Qualitative Component Methods

The qualitative component of this study involved completing open-ended, in-depth interviews with fifteen members of the study sample. These individuals met all of the inclusion criteria for the quantitative component of this study and met the additional criteria for the qualitative component. Individuals who agreed to participate in this aspect of the study were interviewed in their own homes using an open-ended interview guided by a series of topics corresponding the components of the Evans and Stoddard (1994) framework and perspectives on the use of formal long term care. Interviews were taped and fully transcribed. Transcripts were imported into FolioViews® 4.11, a text manager with extensive search and retrieve capabilities. Interviews were analysed for two major elements - narrative relating to the components of the Evans and Stoddard (1994) framework, and narrative illustrating issues and themes not evident in the quantitative analysis.

Ethical Considerations

This study was approved by the Committee on the Use of Human Subjects in Research, Faculty of Medicine, University of Manitoba. In addition, B. Havens, the Principal Investigator of the Aging in Manitoba Longitudinal Study approved the use of the AIM data based on the study design, including ethical safeguards, methods and objectives.

During each wave of the AIM study a written consent was obtained from participants that included consent to have their data used for ongoing studies relating to aging and aging issues. All individuals included in the sub-set for this study were assigned a unique identifier that is different from their AIM identification number. The AIM Programmer/Analyst is the only individual who is able to connect the sub-set for this study and the full AIM data set.

For the qualitative interviews, the initial letters of invitation to participate provided the objectives of the study in clear language, and identified the approximate time commitment that would be required if a person chose to participate. Upon the initial telephone contact, a verbal explanation of the study was provided and potential participants were given an opportunity to ask questions about the study. People who agreed to participate were then provided with a Study Information Sheet (Appendix 6) at the time of the interview, and its content was reviewed. All participants signed a consent form, and for those participants who wished, two forms were signed so that they could retain one for their records (Appendix 7).

For the reporting of the qualitative findings for this study, first name pseudonyms were used and any potentially identifying features (e.g., names of communities, names of family members) have been altered in order to protect the anonymity and confidentiality of the people who participated in the qualitative interviews.

Implementation and Chronology of the Study

The proposal for this research was initiated in the spring of 1997, and was approved by the Advisory Committee in August of 1997. Full ethics approval was received in September of 1997, and the AIM data were obtained at that time. Data

preparation and initial analysis occurred between September and December 1997. Qualitative interviews were conducted between mid-January and early April 1998. Interviews in Winnipeg were conducted in January and February, interviews in southern Manitoba were conducted in March, and interviews in Brandon were conducted in early April. Simultaneous with the conduct of the interviews, more in-depth quantitative analysis was being conducted. The majority of the qualitative analysis occurred at the end of that process. The preparation of the research report was initiated in late April of 1998, and continued until early August 1998.

Conclusion

This study utilized a multi-method approach that included a secondary analysis of a longitudinal sub-sample of older persons who participated in the 1983, 1990 and 1996 waves of the Aging in Manitoba Longitudinal Study (AIM), and a series of taped, open-ended, in-depth interviews with selected members of this sub-sample. The methods chapter has provided an overview of the Aging in Manitoba Longitudinal Study (AIM), as well as in-depth methods descriptions for both the quantitative and qualitative components of the current study. These descriptions have outlined the process of data preparation (secondary analysis) and data collection (qualitative interviews), as well as data analyses. Within the section on data preparation, operational definitions were provided for all aspects of the research questions and corresponding hypotheses, including the construction of variables to capture patterns of formal long term care, and the changes among the other variables used in the study. The chapter ended with a discussion of the ethical safeguards employed during the study, and a summary of the overall implementation and chronology of the study.

CHAPTER 5: WHO ARE THE SURVIVORS?

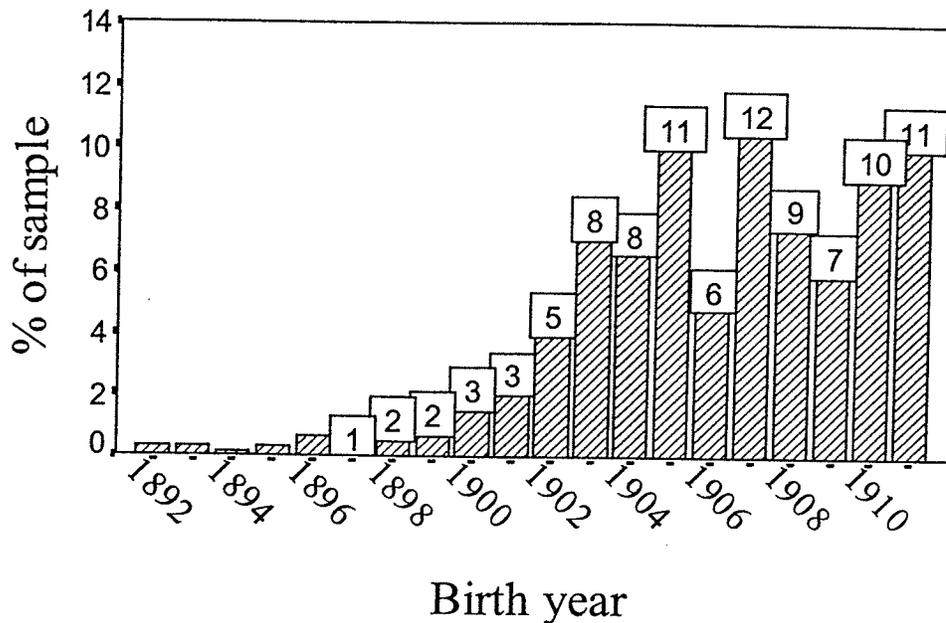
One of the unique aspects of this study is its longitudinal perspective on people who have survived to be over 85 years of age. The primary focus of the research is on the changes people experienced over three points in time, and how these changes are associated with their 1996 formal long term care outcomes. In order to place these changes and associations into a broader context, it is critical to understand who the survivors are and their characteristics as a group. The purpose of this chapter is to provide this description and an overall context for the remainder of the findings and discussion.

The chapter is divided into four sections. The first section presents descriptive data on the social and demographic characteristics of the sample, and places the survivors in the broader context of the AIM participants since 1983. The second and third sections describe changes in health and functioning and in the physical environments of the members of the sample from 1983 to 1996. Throughout these sections, segments from the qualitative interviews are included to illuminate aspects of the quantitative information. The final section of this chapter presents the findings regarding the patterns of formal long term care experienced by the members of the sample.

Social and Demographic Characteristics of the Sample

Among the 616 people who met the criteria for the quantitative component of the study, birth years ranged from 1892 to 1911 (Figure 5.1).

Figure 5.1: Distribution of Sample by Birth Year

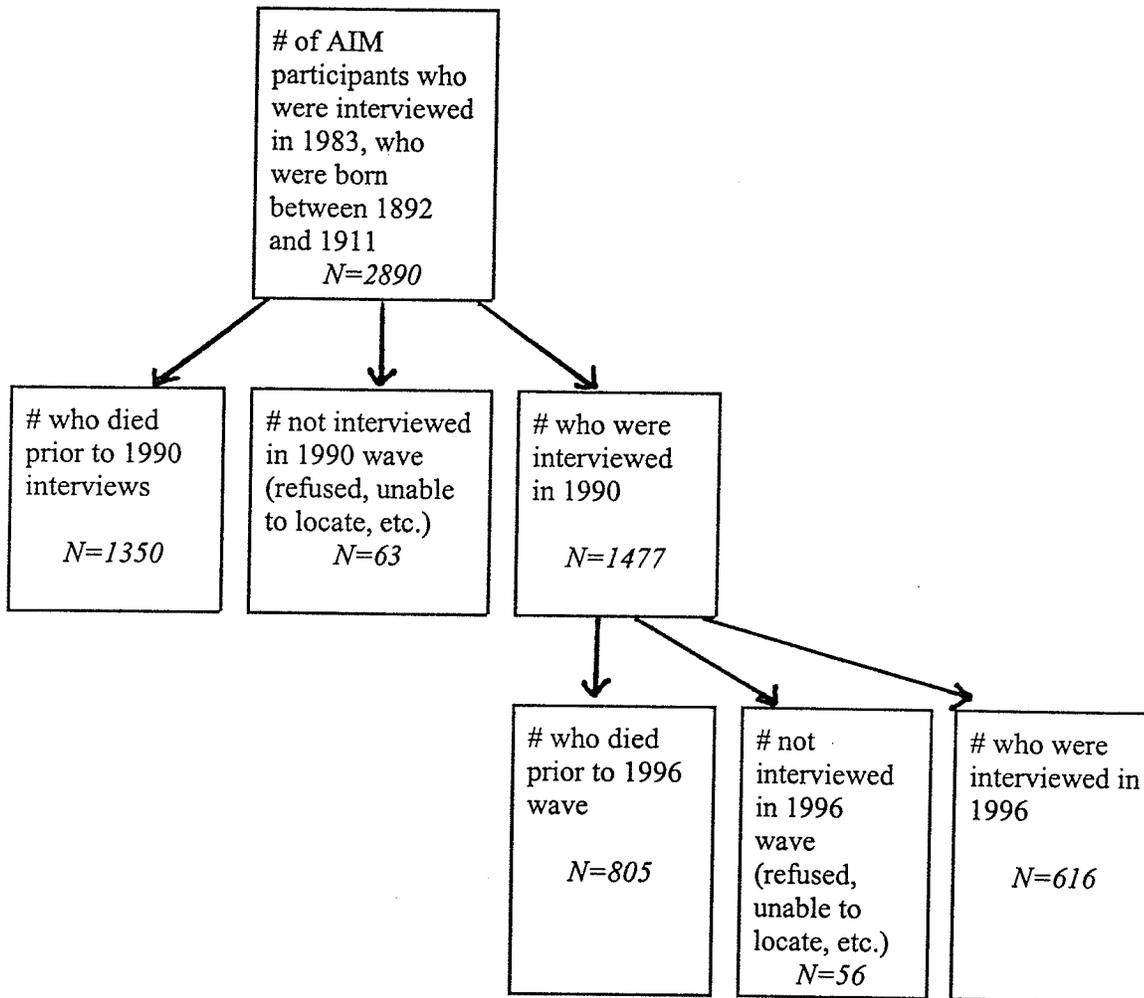


The average age of members of this sample in 1996 was 90 years 2 months (sd=3 years 10 months), with the 192 men being slightly younger (\bar{x} = 89 years 6 months) than the 424 women (\bar{x} = 90 years 5 months) ($t=-3.15$, $p<0.002$). No significant age differences were found between people who were living in Winnipeg in 1996 compared to people living outside of Winnipeg.

The 616 people making up this sample represent just over 21% of the people who were born between 1892 and 1911 and who were interviewed in the 1983 wave of the Aging in Manitoba Study. Seventy-five percent of the cohort who could have potentially been included in this sample had died prior to the 1996 wave of interviews. An additional 119 people (4%) were lost to the sample because they could not be interviewed in 1990 or 1996, either because they refused, were away too long, were too

sick, could not be located, or were lost to follow-up. These 119 people can also be viewed as 16% of eligible survivors. Figure 5.2 summarizes how the 616 survivors fit into the larger context of the group of Aging in Manitoba study participants born between 1892 and 1911 who could have potentially been part of this study.

Figure 5.2: Context of the AIM Oldest-Old Survivors



The basic social and demographic characteristics of the survivor group during each of the three interview waves is provided on Table 5.1. One hundred and ninety two members of the sample were men (31%), and 424 (69%) were women. Over time, there has been a decrease in the proportion who are married, an increase in the proportion of people who are widowed, and an increase in people living alone. The data presented in this Table show the expected trends for a group whose members survive to be over 85 years of age, and the distribution of the various characteristics are similar to other Manitoba data sources (Centre on Aging, 1996).

Table 5.1: Basic Social and Demographic Characteristics of the Survivors at Each Study Wave

	1983 wave	1990 wave	1996 wave
Average age	77 yrs, 2 mths	84 yrs, 2 mths	90 yrs, 2 mths
Marital Status			
Married	47.6%	33.4%	23.1%
Widowed	42.7%	55.8%	66.1%
Other	9.7%	10.8%	10.8%
Household size			
Lives alone	41.2%	52.3%	67.4%
With one other person	49.8%	38.5%	26.0%
With two other people	6.5%	4.9%	3.4%
With three or more people	2.5%	4.3%	3.2%

Health and Functioning Characteristics of the Sample

Since health and functioning changes are a major focus of this study, it is important to describe the status of the sample with respect to these characteristics. As already noted, 56 variables make up the health and functioning component addressing activities-of-daily living (14 variables), instrumental activities-of-daily-living (9

variables), physical difficulties observed by the interviewer (10 variables), and leisure participation (21 variables). Two other variables included in the health and functioning component, but not categorized, include self-rated health and the ability to walk out-of-doors.

Over the three interview waves, the number of individual ADL and IADL that people were able to complete without the help of another person decreased slightly over time. The mean number of ADLs the members of the sample were able to perform without assistance in 1983 was 13.5 (sd=1.4), and this figure dropped to 9.02 (sd=4.0) by 1996. Among IADLs, the mean number that could be performed independently changed from 6.92 (sd=1.84) in 1983 to 2.88 (sd=2.67) in 1996. These findings are consistent with the work of Atchley and Scala (1998) and of Branch, Katz, Kniepmann and Papsidero (1984). The latter group of authors found that among older adults who were initially independent in the community, 88% of them sustained their independence over a 15 month period, and 65% retained their independence over a six year period.

The data presented on Table 5.2 show a slow but steady decline in self-rated health and ability to walk out-of-doors between 1983 and 1996. The direction of change in ability to walk out of doors is consistent with another study that followed older people aged 75+ for six years (Dening et al., 1998), although this same study found that self-rated health improved over time. This difference may be a function of differences in sample selection. Whereas the current study was a population-based sample, the work by Dening et al. (1998) was based on a sample of people from six general medical practices. As a result, this latter group may have had a bias towards improvement as a result of the medical treatment they received.

Table 5.2: Descriptive Findings Regarding the Health and Functioning Variables for the Total Sample, by Interview Wave

	1983 Wave	1990 Wave	1996 Wave
Self-rated health			
Excellent	14.4%	14.3%	5.3%
Good	54.5%	48.5%	53.1%
Fair	26.3%	30.1%	33.1%
Poor	4.1%	6.7%	8.0%
Bad	0.7%	0.4%	0.5%
Ability to Walk out-of-doors			
1 mile or more	54.9%	37.4%	10.3%
1/4 mile	28.3%	27.5%	16.6%
100 yards	10.4%	17.5%	20.5%
10 yards	3.7%	9.7%	20.9%
Not able to walk out-of-doors	2.6%	7.9%	31.7%

Considering the patterns of change in health and functioning over the three waves of the study, Tables 5.3 to 5.7 display the results of the concatenation procedure described in Chapter 4. Using the data from the third columns of Tables 5.3 through 5.7, the means and standard deviations for the average number of patterns produced by concatenation, prior to collapsing the response categories, were: $\bar{x} = 32$ ($sd=17$) for the ADL variables (Table 5.3), $\bar{x} = 60$ patterns ($sd=26$) for the IADL variables (Table 5.4), $\bar{x} = 19$ patterns ($sd=4$) for the observed physical difficulties variables (Table 5.5), and $\bar{x} = 13$ patterns ($sd=1$) for the leisure participation variables (Table 5.6).

The results presented in Table 5.3 show that ability to eat on one's own is the ADL that displays the least variability and most independence over time, both in terms of the proportion of people who retain independent performance, but also in terms of the number of patterns of change seen over the entire sample. Using the toilet and getting in and out of bed also show a relatively low degree of variation (i.e., 15 patterns each), but

fewer people are able to retain their independence in these activities over time. The most demanding ADLs (e.g., the bottom rows of the table) show the most variation with the smallest proportion retaining independence, and with the greatest number of patterns of change in the data. As noted by Peggy, below, continuing to be able to move around on her own does not necessarily mean she is satisfied with the way in which she gets around:

I'm still able to get around on my two feet. I see other people my age, they are in wheelchairs or walking with two canes instead of one. I'm quite happy I'm able to get around as I am now. I'm sort of disappointed that I haven't improved any. [I want to be] able to walk better. Walk straighter I should say....Here I am bent over half the time. I try. (Reflection from Peggy, age 95)

Table 5.3: Descriptive Findings on Patterns of Change in ADL Variables

ADL variables (n=14)	Number and % of sample independent for all 3 waves	Total # of patterns	# of patterns with <= 5 people
Eating	540, 87.7%	15	11
Getting around the house	478, 77.6%	17	11
Using the toilet	470, 76.3%	15	11
Watching TV, listening to the radio	470, 76.3%	16	10
Getting in and out of bed	462, 75.0%	15	8
Using the telephone	421, 68.3%	28	20
Dressing and putting shoes on	417, 67.7%	21	15
Taking medications or treatment	388, 63.0%	26	18
Going out of doors in good weather	351, 57.0%	35	28
Washing, bathing or grooming	320, 51.9%	36	26
Going up and down stairs	300, 48.7%	50	41
Nursing care	286, 46.4%	44	31
Going out of doors in any weather	215, 34.9%	68	64
Cutting your toenails	211, 34.2%	57	44

Table 5.4 presents the findings on patterns of change among the IADL variables. It is interesting to note for the activity with the least variability (making tea or coffee) only 58.1% of the sample were able to retain their independence across all three waves of the study. Between 40 and 45% of the sample were able to retain independence for the activities of light housekeeping, meal preparation and managing financial matters. The most difficult activities to retain independence included doing heavy housework, shovelling and yardwork, and doing household repairs. For these latter three activities, the number of patterns observed in the data is striking ($\Rightarrow 83$) and suggests that people are quite resourceful in terms of getting these activities accomplished (i.e., to get this number of patterns, a number of different approaches were being used across the study waves).

This resourcefulness is illustrated by Catherine:

Every other Monday I have Home Care that comes and cleans in my house. [She] dusts and washes my kitchen floor and vacuum cleans and goes around my rugs and dusts and that. Does my bathrooms, yes, very good. I have a special lady that comes every Friday that does my laundry. And then I have a lady that comes tomorrow to give me a bath. She comes every week...Well, the only thing I need is for somebody to help me bath because I can't get up out of the bathtub, otherwise I can use my stove and do everything else. I get Meals on Wheels during the day, except Friday...They come and I keep the big meal for the night time cause I have a little oven there and I stick it in my fridge in the meantime and then I put it in the oven and heat it up for night time and then I make my own lunch and my own breakfast (Explanation from Catherine, age 90).

Table 5.4: Descriptive Findings on Patterns of Change in IADL Variables

IADL variables (n=9)	Number and % of sample independent for all 3 waves	Total # of patterns	# of patterns with <= 5 people
Making a cup of tea or coffee	358, 58.1%	24	19
Doing light housework	273, 44.3%	36	29
Preparing a hot meal	251, 40.7%	34	23
Managing financial matters	251, 40.7%	53	42
Shopping	192, 31.1%	65	51
Laundry	176, 28.6%	59	43
Doing heavy housework	78, 12.7%	83	60
Shovelling and yardwork	41, 6.7%	95	66
Major household repairs	18, 2.9%	95	64

Table 5.5 displays the findings for the physical difficulties observed by the AIM interviewer. The second column presents the number and proportion of the sample members who were not observed to have difficulties in any of the study waves (i.e., free of a particular observable physical difficulty). As the data show, sensory (i.e., hearing, vision) and mobility (i.e., walking, using a walking aide) were the categories in which difficulties were most likely observed by the interviewer at one or more times during the course of the study. People were the least likely to have observed difficulties related to coughing or to speech.

Table 5.5: Descriptive Findings on Patterns of Change in Observed Physical Difficulties Variables

Observed Physical Difficulties Variables (n=10)	Number and % of sample without difficulty for all 3 waves	Total # of patterns	# of patterns with <= 5 people
Coughs continually	456, 74.0%	14	7
Speech problems	444, 72.1%	17	9
Other physical abnormalities	438, 71.1%	18	10
Shortness of breath	427, 69.3%	16	8
Crippled hands or legs	386, 62.7%	19	10
Wheelchair	380, 61.7%	19	11
Visual impairment	301, 48.9%	23	10
Use cane, crutches or walker	289, 46.9%	25	24
Walking difficulties	230, 37.3%	23	9
Hearing impairment	188, 30.5%	23	8

Table 5.6 presents the data relating to changes in leisure participation over time. The most consistently participated in activities are listening to the radio or watching TV, followed by telephone conversations with family or friends, and then going for a walk, shop or drive. Eight of the 21 activities presented in Table 5.6 show very low consistent participation over time. Participating in mass activities (e.g., bingo, community club), travelling, doing hobbies, doing volunteer work, participating in a service, fraternal or legion organization, going to multi-aged social recreational groups, working for pay, and engaging in politically related activities are the least likely to have consistent participation among the people included in this study.

Table 5.6: Descriptive Findings on Patterns of Change in Leisure Participation Variables

Leisure Participation Variables (n=21)	Number and % of sample who participated for all 3 waves	Total # of patterns	# of patterns with <= 5 people
Radio or TV	464, 75.3%	14	6
Telephone conversation with family	347, 56.3%	14	6
Walk, shop or drive	334, 54.2%	13	8
Visiting family	328, 53.2%	14	6
Visiting friends	306, 49.7%	15	7
Reading or writing	304, 49.4%	12	5
Light housework or gardening	291, 47.2%	13	8
Church-related activities	140, 22.7%	15	7
Handwork hobbies	80, 13.0%	14	6
Heavy housework or yardwork	51, 8.3%	15	9
Music, art or theatre	34, 5.5%	14	5
Sports or games	33, 5.4%	14	6
Seniors' groups	32, 5.2%	14	5
Mass activities (e.g., bingo)	19, 3.1%	13	4
Travel	19, 3.1%	14	6
Collecting hobbies	14, 2.3%	13	8
Volunteer work	7, 1.1%	12	4
Service, fraternal or legion organizations	6, 1.0%	11	4
Multi-aged social recreational groups	3, 0.5%	12	4
Work	2, 0.3%	11	7
Politically related activities	0, 0.0%	10	7

Comments and reflections from Liam and Helen illustrate the consistency with which some of the oldest-old have participated in various leisure pursuits over time:

Well this morning I did, ah, just get me that one piece of paper on that writing thing. There. I do about 3 to 4 miles a day on my bicycle. I have a card here. I keep track of how far I go and how long it takes me. I do it for 15 minutes. I've been training myself for the last 35 years at least. This is a film of what I used to do every day...You know how to skip with a rope? I do a hundred every morning and 100 every time before I go to bed. Thirty odd years anyway at least and before I played soccer for 40 years...I had my picture taken, I didn't know it was being taken. But I was training the soccer team a little soccer team on the school grounds down on the highway and they took my picture. I was 83 then (Reflections from Liam, age 92).

I liked to sew, so I learned, I never took any lessons but by trial and error I did a lot. I do all my own sewing and bought a sewing machine and I paid for it with the sewing I did for other people...I've still got it...it's a real dandy machine...I've got a skirt for my daughter-in-law on the go now. It is pretty near finished. I do quite a lot of sewing yet...[I made a] long skirt for my other daughter in Winnipeg... And I made my daughter-in-law...a nice short jacket with black and white check with black pockets on it...She's a payroll clerk...she wears this stuff and they all say, oh here she comes again with another lovely suit. And she says, yes and it was my 88 year old mother-in-law that made it. (Reflections from Helen, age 88)

A total of 90 patterns were observed in the data for self-rated health, and from these patterns it was determined that 123 people (20.0%) in the sample rated their health as excellent or good across all three waves of the study. Sixty-one of the patterns in self-rated health were experienced by five or fewer people. Some examples of these idiosyncratic patterns include: excellent in 1983, fair in 1990, poor in 1996 (n=4); excellent in 1983 and 1990, fair in 1996 (n=2); and good in 1983, fair in 1990, bad in 1996 (n=1).

[My health is] Perfect. Apart from walking. No, I won't say perfect, because perfect you can do everything. I'm just happy to be how I am (Liam, age 92).

A total of 86 patterns were observed in the data for the ability to walk out-of-doors. Across the three waves of the study, only 41 people (6.7%) reported being able to walk for 1+ miles or more at each time. Of these 86 patterns, 53 were experienced by

five or fewer people. Some examples of these idiosyncratic patterns include: 1 mile or more in 1983, 10 yards in 1990, not able to walk out of doors in 1996 (n=5); and 100 yards in 1983 and 1990, 10 yards in 1996 (n=2).

I used to like to go walking through the pastures and the hills....go look for flowers and what have you. It is a nice way of spending a day. [I still go but] Not as much since I hurt my knee because it was a little bit hard to get around. I walk a smaller area now.... (Peggy, age 95)

Physical Environment Characteristics of the Sample

The variables capturing the physical environment for this study included type of housing, condition of dwelling (interviewer rated), need for household repairs, problems with transportation, and the presence of a room for oneself, of grab-bars in the bathroom, of railings on the inside stairs and of railings on the outside stairs. Since each of these variables has a different set of possible responses, each will be described individually rather than presented in table format.

In terms of changes in the physical environments of the sample over the three study waves, the primary changes can be observed in type of housing (Table 5.7). A major change that occurred was people moving out of houses and into seniors' apartments or personal care homes. There has been a slow but steady increase in the proportion of people living in Winnipeg, and this finding may be a reflection of people moving to obtain support from family members or to access seniors' apartments or personal care home services.

Other interesting findings in Table 5.7 include the stable proportion of people living in age integrated apartments. Additional observations regarding housing are two-fold. First, the major jump in the proportion of people living in seniors' apartments

occurs between the first and second waves of the study, that is, before the average person in the sample has become the oldest-old. Second, the major jump in the proportion of people living in a personal care home occurs between the second and third waves, that is, after the average person in the sample is over 85 years of age.

Table 5.7: Changes in the Basic Physical Environment Characteristics of the Members of the Sample, 1983 to 1996

	1983 Wave	1990 Wave	1996 Wave
Type of Housing			
House	73.2%	56.8%	34.9%
Age Segregated Apt	10.9%	21.4%	21.6%
Age Integrated Apt	13.5%	13.5%	13.5%
Personal Care Home	1.2%	6.5%	30.0%
Other	1.2%	1.8%	0.0%
Region			
Winnipeg	32.8%	34.6%	36.9%
Not Winnipeg	67.2%	65.4%	63.1%

Considering the patterns of change produced by concatenating the physical environment variables over the three waves of the study, it was found that the majority of the sample continued to live in a house at each study wave (n=205, 33.3%).

It's just that I like my own place and, well, you don't owe nobody and you don't, you own your own house and why, why move into to one of them generally crowded places, you know and then you're not your own boss then either are ya?.... Well one thing, you don't have to, you know, I don't know how to put it. You know, well you don't have to listen to somebody else, you, you're your own boss and you, what ever you figure to do you can do it, eh [when you're in your own house] (Thoughts from Tom, age 88).

The second and third most common patterns observed across the three waves of the study were living in a house in 1983 and 1990 and living in a personal care home in 1996

(n=66, 11.0%), and living in a house in 1983 and 1990 and living in a seniors' apartment in 1996 (n=47, 8.0%). Overall, two hundred and fifty six members of the sample had patterns indicating stable residence between 1983 and 1996. Two hundred and seventy one members of the sample had patterns indicating one move between 1983 and 1996. The remaining 89 people had patterns indicating two moves during the course of the study.

There was little change observed in the ratings provided by interviewers for the condition of people's dwellings over the three study waves, as well as in the availability of a room for oneself. Problems with transportation increased slightly, but overall a very small proportion of the sample identified transportation problems over the years. Three point six percent of people reported problems with transportation in 1983, 5.5% in 1990 and 7.1% in 1996. Although there was some movement of sample members across the regions of the province during the course of the study, there was a strong tendency towards people remaining in the same region through all three study waves.

Two areas that showed evidence of change over the course of the study were presence of grab-bars and stair-rails. The presence of grab-bars around both the toilet and the tub/shower increased from 18.7% in 1983, to 28.9% in 1990, to 42.7% in 1996. The presence of railings on inside stairs, and the presence of railings on outside stairs, showed a similar pattern with an increased proportion of people reporting these environmental aids between 1983 and 1996. Besides actual need for support, these findings may also be the result of two other factors. First, people who moved into a seniors' apartment or a personal care home would have probably acquired grab-bars and railings by virtue of the move that was made. Second, since the beginning of the study,

items like grab-bars have become more commonly available in the market place at a reasonable price. Therefore, part of this increase may be a reflection of changes in market circumstances.

For the condition of the respondent's dwelling, interviewers recorded one of four responses: good, satisfactory, not satisfactory or missing. The missing response was used when the interviewer did not see the dwelling, for example, when the interview was conducted at a location other than the older person's home. Over the course of the study, 364 members of the sample (59.1%) had the condition of their dwelling rated as good in all three waves. In total, 36 patterns were observed in the data, but 18 of these patterns were the result of having a missing response in one or two of the interview waves. None of the members of the sample had been recorded as having a dwelling that was not satisfactory in each of the three waves. Four hundred and eighty two (78.2%) respondents had either a good rating for the dwelling, or some combination of good and satisfactory for all three study waves.

The interviewer ratings for the condition of the respondent's dwelling correspond closely to the respondent's opinions on the need for repairs in their home. There were four response categories from which the respondent could select an answer. These included: only regular maintenance is required, minor repairs are required, major repairs are required, or don't know. Almost 50% of the sample (n=307) stated that their home needed only regular maintenance during all three interviews. Thirty-nine other patterns were observed in the data. Combinations of regular maintenance and minor repairs were seen in seven patterns, and reported by 159 people (26.0% of the sample). Only two people reported that their home needed major repairs during each of the three interviews.

Ninety-one percent of the sample (n=559) reported that they had a room where they could be by themselves when they wished during all three interviews. Only eight patterns were observed in the data for this variable. Just over 5% of the sample stated that they had a room where they could be by themselves in 1983 and 1990 but not in 1996, and almost 2% of the sample had such a room in 1983 and 1996 but not in 1990.

The coding for the variable capturing information about the railings on the stairs outside the house had five choices: no stairs, stairs with full railings on both sides, stairs with partial railings on both sides, stairs with a full railing on one side, or stairs with no railings. In total, 98 patterns were observed in the data with the most common one being no outside stairs in 1983, 1990 and 1996 (n=78, 12.6%). Of the people with stairs, 69 of them had at least some type of railing on their outside stairs during each interview (13 patterns). Five people (1.0%) had no railings at the point that any of the interviews were done, and 58 people (9.4%) had no railings on their outside stairs during two of the three interview periods.

The coding for the variable addressing railings on the inside stairs was the same as described for the outside stairs, and 80 patterns were observed in the data across the three study waves. The most frequent pattern was to have a full railing on one side of the stairs for all three periods (n=76, 12.3%). Seventy-three respondents had no inside stairs during all three periods (11.9%). Fifty-nine people (9.6%) had some type of railing (full or partial) during each of the interviews (11 patterns). Seven people (1.1%) reported having inside stairs with no railings all three times. Twenty-two people (3.6%) reported having inside stairs with no railings at two of three interviews (10 patterns).

In terms of grab-bars in the bathroom, a similar scenario was found. The most frequent pattern observed in the data was to have no grab-bars of any kind in the bathroom for all three interviews (n=87, 14.0%), or to have no grab-bars of any kind during two of the three interviews (n=188, 30.5%). Among this latter group, 161 people did not have any grab-bars in 1983 and 1990, but had acquired them for the tub, shower and/or the toilet by 1996. In total, 53 patterns were observed in the data. Having a grab-bar at the tub/shower and the toilet for all three waves was the fourth most common pattern and was experienced by 45 people (7.3%). Ninety-five people (15.4%) had some combination of grab-bars at all three points in the study (14 patterns).

The final physical environment variable used for this study is problems with transportation. A respondent was asked if they had any difficulties, and the potential response categories included yes, no or missing. Twelve patterns were observed in the data, and five of these patterns (n=24, 3.9%) reflected missing data in one period. The most common pattern was having no transportation problems in all three periods (n=510, 81.3%). The next most common pattern was having no transportation difficulties in 1983 or 1990, but having difficulties in 1996 (n=38, 6.2%). None of the respondents reported having difficulties with transportation in all three waves.

Patterns of Formal Long Term Care

One of the major objectives of this study was to look at patterns of formal long term care that lead the members of the sample to one of the three outcomes of interest in 1996: home without home care, home with home care, or living in a personal care home. As described in Chapter 4, these patterns were determined by defining what service was being used at each cross-section (i.e., home without home care, home with home care,

personal care home) and then combining this information using the concatenation function to form a pattern of service use. As a result, the patterns described below and throughout the remainder of the document do not address the service use of the members of the sample *in between* the three interview waves. The focus of this section of the research report is addressing the research questions and hypotheses provided on Table 5.8.

Table 5.8: Research Questions and Hypotheses of Concern in Chapter 5:

Research Question	Corresponding Hypotheses
<p>1) Are there common patterns of formal long term care use that lead people 85 and over to experience one of the following outcomes at the conclusion of 13 years:</p> <p>a) remain independently in their own homes without formal long term care?</p> <p>b) require some formal long term care to remain in their own homes? or</p> <p>c) require institutional long term care?</p>	<ul style="list-style-type: none"> ◆ The most common pattern of formal long term care use among people who remain at home without formal long term care in 1996 will be one of stability (i.e., home in 1983, home in 1990 and home in 1996). ◆ The most common pattern of formal long term care use among people who live in an institution in 1996 will be one of steady decline over time (i.e., home in 1983, home care in 1990 and institutionalized in 1996). ◆ There will be no single pattern of formal long term care use that can be designated as most common among people who remain at home with the assistance of home care in 1996.
<p>2) What are the differences in the proportions of men and women, and of urban versus rural dwellers who experience particular patterns of formal long term care use?</p>	<ul style="list-style-type: none"> ◆ Women will be more likely than men to experience patterns of formal long term care use that result in institutionalization at the end of thirteen years. ◆ Married men will be the least likely to experience patterns of formal long term care use that result in the use of formal long term care at the end of thirteen years. ◆ Urban dwellers will be more likely than rural dwellers to experience patterns of formal long term care use that result in the use of formal long term care in the home at the end of thirteen years.

There were only two patterns observed in the data that led people to remain independently in their own homes without formal long term care at the conclusion of 13 years. In total, 241 people were living in their own homes without formal long term care in 1996. The predominant pattern, was that of being at home without care in 1983, at home without care in 1990 and at home without care in 1996. Two hundred and thirty five people, or 38.1% of the sample, experienced this pattern. The only other pattern for this outcome (i.e., home without home care in 1996) was experienced by six people in the study (1.0%). This pattern was being at home without care in 1983, using home care in 1990 and being at home without care in 1996.

For the purpose of this study, a “most common pattern” was defined as one that exceeded all others for that outcome by at least 15%. As a result, the hypothesis that the most common pattern of service use for people who remain at home without formal long term care in 1996 will be one of stability (i.e., home in 1983, home in 1990 and home in 1996) is accepted (Table 5.9).

Table 5.9: Frequency Distribution for People Who Were Living in Their Own Homes Without Formal Long Term Care in 1996, by Pattern of Service Use

	Home without Home Care in 1996 (n=241)
Pattern of service use	
Home - Home - Home	235 (97.5%)
Home - Home Care - Home	6 (2.5%)

There were three patterns observed in the data that led people to require some formal long term care to remain in their own homes at the conclusion of 13 years. In total, 190 people were living in their own homes with the assistance of home care in

1996. The predominant pattern was being at home without formal long term care during the first two periods, and then using home care in the third period. Just over 20% of the sample (n=126) experienced this pattern.

The second most frequently experienced pattern leading to the use of home care in 1996 was being at home in the first period, and using home care in both the second and third periods. Just over 8% of the sample (n=52) experienced this pattern. The final pattern that led people to require home care in 1996 was using home care in all three periods, with 12 people (6.3%) experiencing this pattern. As a result, the hypothesis that there will be no single pattern of service use that can be designated as most common among people who remain at home with the assistance of home care in 1996 (i.e., a null hypothesis) is rejected. In fact, there is a most common pattern (home, home, home care) ($\chi^2 = 106.22, df=2, p < 0.0000$) (Table 5.10).

Table 5.10: Frequency Distribution for People Who Were Living in Their Own Homes with Home Care in 1996, by Pattern of Service Use

	Home without Home Care in 1996 (n=190)
Pattern of service use	
Home - Home - Home Care	126 (66.3%)
Home - Home Care - Home Care	52 (27.4%)
Home Care in all 3 periods	12 (6.3%)

Six patterns led a total of 185 people to require institutional long term care at the conclusion of 13 years. The most frequently observed of these patterns was being at home in 1983 and in 1990, and the being in a personal care home in 1996 (n=79, 12.8%). The second most frequently observed pattern was steady decline over time, represented

by being at home in 1983, using home care in 1990, and being in a personal care home in 1996 (n=64, 10.4%). An additional 4.2% of the sample (n=26) experienced the pattern of being at home in 1983, and then being in a personal care home for both of the remaining two periods. The remaining three patterns leading people to require institutional long term care at the conclusion of 13 years were using home care in 1983 and 1990, followed by being in a personal care home in 1996 (n=3, 0.5%); using home care in 1983, followed by being in a personal care home in 1990 and 1996 (n=5, 0.8%), and being in a personal care home for all three periods (n=8, 1.3%).

As previously noted, a “most common pattern” was defined for this study as one that exceeded all others for that outcome by at least 15%. As a result, the hypothesis that the most common pattern of service use for people who live in an institution in 1996 will be steady decline over time (i.e., home in 1983, home care in 1990 and institutionalized in 1996) is rejected. In fact, the most common pattern is home, home, personal care home and it exceeds the hypothesized most common pattern by 8.1% (Table 5.11).

Table 5.11: Frequency Distribution for People Who Were Living in Personal Care Homes (PCH) in 1996, by Pattern of Service Use

	Living in a PCH in 1996 (n=185)
Pattern of service use	
Home - Home - PCH	79 (42.7%)
Home - Home Care - PCH	64 (34.6%)
Home - PCH - PCH	26 (14.1%)
Home Care - Home Care - PCH	3 (1.6%)
Home Care - PCH - PCH	5 (2.7%)
PCH in all 3 periods	8 (4.3%)

In total, 11 patterns of formal long term care service use (or non-use) were observed among the study participants. Looking first at the differences in the proportions of men and women who experience each of these patterns, Table 5.12 presents frequency distributions by sex. Of particular importance is the finding that no men experienced three of these patterns: home - home care - home, home care - home care - pch, and home care - pch - pch. For all patterns ending in pch, the pattern is experienced by greater proportions of women than of men.

Table 5.12: Frequency Distributions for Patterns of Service Use, by Sex

Pattern	Men	Women
home - home - home	100 (52.1%)	135 (31.8%)
home - home - home care	47 (24.5%)	79 (18.6%)
home - home - pch	22 (11.5%)	57 (13.4%)
home - home care - pch	8 (4.2%)	56 (13.2%)
home - home care - home care	8 (4.2%)	44 (10.4%)
home - pch - pch	3 (1.6%)	23 (5.4%)
home care - home care - home care	2 (1.0%)	10 (2.4%)
pch - pch - pch	2 (1.0%)	6 (1.4%)
home - home care - home	0 (0.0%)	6 (1.4%)
home care - home care - pch	0 (0.0%)	3 (0.7%)
home care - pch - pch	0 (0.0%)	5 (1.2%)
TOTAL	192 (100%)	424 (100%)

Table 5.13 presents the results of logistic regression analyses for each of the patterns of service use by sex (unadjusted for age), and by sex after adjusting for age. As

the results show, only three of the five patterns show significant differences by sex after adjusting for age. For each of these three patterns, women are at the disadvantage (i.e., more likely to need formal long term care).

Table 5.13: Unadjusted and Adjusted Odds Ratios for Probability of Experiencing a Pattern of Service Use, by Sex

Pattern of service use (<i>pattern coded as 1, alternatives coded as 0</i>)	Unadjusted Odds Ratios with Confidence Limits and P values	Odds Ratios Adjusted for Age in 1996 with Confidence Limits and P values
home - home - home Men Women	1.00 0.43 (0.30-0.61) p < 0.000	1.00 0.48 (0.33-0.69) p < 0.0001
home - home - HC Men Women	1.00 0.71 (0.47-1.06) NS	1.00 0.74 (0.49-01.13) NS
home - home - PCH Men Women	1.00 1.20 (0.71-2.03) NS	1.00 1.06 (0.62-1.81) NS
home - HC - HC Men Women	1.00 2.66 (1.23-5.77) p < 0.01	1.00 2.43 (1.12-5.30) p < 0.03
home - HC - PCH Men Women	1.00 3.50 (1.63-7.50) p < 0.001	1.00 3.01 (1.39-6.51) p < 0.01
home - PCH - PCH Men Women	1.00 3.61 (1.07-12.19) p < 0.04	1.00 3.16 (0.93-10.76) NS
HC - HC - HC Men Women	1.00 2.29 (0.50-10.57) NS	1.00 1.87 (0.40-8.77) NS
PCH - PCH - PCH Men Women	1.00 1.36 (0.27-6.82) NS	1.00 0.85 (0.16-4.55) NS

There were two hypotheses relating to men and women and their experiences with the patterns of service use observed in this study. The first hypothesis was that women would be more likely than men to experience patterns of service use that result in institutionalization at the end of thirteen years. As shown on Table 5.14, this hypothesis was accepted, even after adjusting for age.

Table 5.14: Likelihood of Experiencing a Pattern of Service Use Resulting in Institutionalization, by Sex, and by Sex Adjusted for Age

	Unadjusted OR with CL and P values	OR Adjusted for Age in 1996 with CL and P values
Pattern ending in PCH (1)		
Men	1.00	1.00
Women	2.33 (1.54-3.54) p< 0.0001	2.02 (1.30-3.14) p< 0.002

The second hypothesis was that married men would be the least likely to experience patterns of service use that result in the use of formal long term care at the end of thirteen years. Based on the proportions alone, Table 5.15 shows that this hypothesis can be supported.

Table 5.15: Proportion of Participants Experiencing a Pattern Ending in Formal Long Term Care, by Sex and Marital Status

Ending in Care?	Married Men	Married Women	Not-Married Men	Not-Married Women
Yes - ending in care	36.2%	67.6%	62.1%	66.7%
No - ending at home	63.8%	32.4%	37.9%	33.3%
Total (N=616)	100% (n=105)	100% (n=37)	100% (n=87)	100% (n=387)

A chi-squared test using the general contingency table above showed that there are significant differences among these four groups in terms of their likelihood of experiencing a pattern that resulted in formal long term care at the end of 13 years ($\chi^2 = 32.35$, $df=3$, $p < 0.000$). A supplementary 2x2 chi-squared test was done (marital status by ending in care), stratified by sex, to assist in interpreting the results of the general contingency table results. This test showed that for women, marital status is not significantly associated with experiencing a pattern ending in care in 1996 ($\chi^2 = 0.01$, $df=1$, NS).

In comparison, for men, marital status is significantly associated with experiencing a pattern ending in care in 1996 ($\chi^2 = 12.90$, $df=1$, $p < 0.0003$), with the odds of ending in care being 2.89 times greater for not-married men compared to married men (C.L. = 1.60-5.19). Returning to the hypothesis - that married men would be the least likely to experience pattern of service uses that result in the use of formal long term care at the end of thirteen years - the results of a logistic regression support it, whether or not adjustment for age occurs (Table 5.16).

Table 5.16: Odds Ratios and Confidence Limits for the Likelihood of Experiencing a Pattern Ending in Formal Long Term Care (0 = at Home, 1 = Formal Care)

Independent Variable	Unadjusted OR with CL and p values	OR Adjusted for Age in 1996 with CL and p values
Marital status x sex interaction		
Married men	1.00	1.00
Married women	3.67 (1.66-8.13) $p < 0.001$	5.37 (2.32-12.41) $p < 0.0001$
Not-married men	2.89 (1.60-5.19) $p < 0.0004$	2.25 (1.20-4.22) $p < 0.01$
Not-married women	3.53 (2.25-5.53) $p < 0.0000$	2.62 (1.62-4.24) $p < 0.0001$

The second part of question two inquires about the differences between urban and rural dwellers in terms of their experiences with particular patterns of service use.

Because of the structure of the available data (i.e., region versus city), urban dwellers were defined as living in the Winnipeg region and rural dwellers were defined as living in a region other than Winnipeg. Table 5.17 shows that there are few differences in the experiences of urban and rural dwellers in terms of patterns of formal long term care use, and Table 5.18 confirms that these differences are not significant except for the pattern home - home care - home care. People living in Winnipeg are almost two times more likely to experience this pattern compared to people not living in Winnipeg, even after adjusting for age and sex.

Table 5.17: Frequency Distributions for Patterns of Service Use, by Region

Pattern	Winnipeg	Non-Winnipeg
home - home - home	76 (33.5%)	159 (40.9%)
home - home - home care	49 (21.6%)	77 (19.8%)
home - home - pch	28 (12.3%)	51 (13.1%)
home - home care - home care	28 (12.3%)	24 (6.2%)
home - home care - pch	23 (10.1%)	41 (10.5%)
home - pch - pch	11 (4.8%)	15 (3.9%)
pch - pch - pch	2 (0.9%)	6 (1.5%)
home care - home care - home care	5 (2.2%)	7 (1.8%)
home - home care - home	2 (0.9%)	4 (1.0%)
home care - home care - pch	2 (0.9%)	1 (0.3%)
home care - pch - pch	1 (0.4%)	4 (1.0%)
TOTAL	227 (100%)	389 (100%)

Table 5.18: Unadjusted and Adjusted Odds Ratios for Probability of Experiencing a Pattern of Service Use, by Region

Pattern of service use (<i>pattern coded as 1, alternatives coded as 0</i>)	Unadjusted OR with CL and P values	OR Adjusted for Sex and for Age in 1996 with CL and P values
home - home - home Not Winnipeg Winnipeg	1.00 0.73 (0.52-1.02) NS	1.00 0.84 (0.58-1.21) NS
home - home - HC Not Winnipeg Winnipeg	1.00 1.12 (0.75-1.67) NS	1.00 1.18 (0.78-1.77) NS
home - home - PCH Not Winnipeg Winnipeg	1.00 0.93 (0.57-1.53) NS	1.00 0.87 (0.53-1.44) NS
home - HC - HC Not Winnipeg Winnipeg	1.00 2.14 (1.21-3.79) p <0.01	1.00 1.99 (1.12-3.55) p <0.02
home - HC - PCH Not Winnipeg Winnipeg	1.00 0.96 (0.56-1.64) NS	1.00 0.84 (0.48-1.46) NS
home - PCH - PCH Not Winnipeg Winnipeg	1.00 1.27 (0.57-2.81) NS	1.00 1.15 (0.51-2.56) NS
HC - HC - HC Not Winnipeg Winnipeg	1.00 1.23 (0.39-3.92) NS	1.00 1.11 (0.34-3.57) NS
PCH - PCH - PCH Not Winnipeg Winnipeg	1.00 0.57 (0.11-2.84) NS	1.00 0.47 (0.09-2.45) NS

In terms of hypotheses, only one was proposed relating to urban versus rural dwellers. The hypothesis was that urban dwellers would be more likely than rural dwellers to experience patterns of service use that result in the use of formal long term care in the home at the end of thirteen years. A chi-squared analysis does support this

hypothesis (Table 5.19), with $\chi^2 = 4.65$, $df=1$, $p < 0.03$. As Table 5.20 shows, people living in Winnipeg are almost 1.5 times more likely to experience a pattern ending in home care than their peers living outside of the city, even after adjusting for age and sex.

Table 5.19: Chi-squared Test for Association Between Urban Versus Rural and Having a Pattern of Service Use Ending in Home Care

	Winnipeg		Non-Winnipeg		Total
	Observed	Expected	Observed	Expected	
Pattern ending in HC	82	70	108	120	n = 190
Pattern not ending in HC	145	157	281	269	n = 426
Total	n = 227		n = 389		N = 616

Table 5.20: Unadjusted and Adjusted Odds Ratios for Probability of Experiencing a Pattern Ending in Home Care, by Region

Pattern of service use (<i>pattern coded as 1, alternatives coded as 0</i>)	Unadjusted OR with CL and P values	OR Adjusted for Sex and for Age in 1996 with CL and P values
Pattern ending in home care		
Not Winnipeg	1.00	1.00
Winnipeg	1.47 (1.04-2.09) $p < 0.03$	1.46 (1.03-2.08) $p < 0.03$

Summary

This chapter has provided a series of descriptions of the people who were included in the study sample. The socio-demographic, health and functioning, and physical environment characteristics of the sample have been provided across the three study waves. This information shows that, over time, the trends among members of this sample are to become widowed, to move into more supportive housing (i.e., seniors'

apartments or personal care homes), to have fewer ADL and IADL that they can do independently, and to decrease their number of leisure activities. Although these trends do not apply to all members of the sample, they do provide a general understanding of the overall direction of change experienced by this group of survivors.

In addition, this chapter has addressed research questions 1 and 2, and the hypotheses related to these two questions. The findings show that the most common pattern that leads people to remain at home without home care in 1996 is one that includes being at home without home care in both 1983 and 1990. Being at home without home care in both 1983 and 1990 is also the precursor to the most common pattern that leads to being at home with home care in 1996, as well as the most common pattern that leads to living in a personal care home in 1996.

It was observed that, after adjusting for age, women were less likely than men to experience the pattern "home-home-home," and women were more likely than men to experience the patterns "home-home care-home care" or "home-home care-personal care home." Overall, women were at least two times more likely than men to experience a pattern that ended in personal care home in 1996. Marital status did not influence the likelihood of women receiving care in 1996, but being married had a protective influence for men. Comparing the experiences of Winnipeg and non-Winnipeg residents, it was found that people in Winnipeg were more likely to experience the "home-home care-home care" pattern than their non-Winnipeg peers.

In summary, the findings presented in this chapter have resulted in two thirds of the hypotheses addressed in this chapter being accepted (Table 5.21):

Table 5.21: Summary of the Hypotheses and Hypotheses Testing Results Presented in Chapter 5

Hypothesis	Result
The most common utilization pattern for people who remain at home without formal long term care in 1996 will be one of stability (i.e., home in 1983, home in 1990 and home in 1996)	ACCEPTED
The most common utilization pattern for people who live in an institution in 1996 will be one of steady decline over time (i.e., home in 1983, home care in 1990 and institutionalized in 1996)	REJECTED
There will be no single utilization pattern that can be designated as most common among people who remain at home with the assistance of home care in 1996	REJECTED
Women will be more likely than men to experience utilization patterns that result in institutionalization at the end of thirteen years	ACCEPTED
Married men will be the least likely to experience utilization patterns that result in the use of formal long term care at the end of thirteen years	ACCEPTED
Urban dwellers will be more likely than rural dwellers to experience utilization patterns that result in the use of formal long term care in the home at the end of thirteen years	ACCEPTED

**CHAPTER 6: CHANGES IN HEALTH AND FUNCTIONING AND THE
PHYSICAL ENVIRONMENT OVER THREE POINTS IN TIME
AND PATTERNS OF FORMAL LONG TERM CARE USE**

The descriptive findings presented in Chapter 5 provide the context for addressing the relationship between patterns of change in health and functioning and the physical environment and the use of formal long term care among members of the sample. The specific research question and hypotheses of concern in this chapter are provided in Table 6.1.

Table 6.1: Research Question and Hypotheses of Concern in Chapter 6:

Research Question	Corresponding Hypotheses
<p>What changes in health and functioning and the physical environment over three points in time (i.e., 1983, 1990, 1996) are associated with the patterns of formal long term care use by elderly individuals who, after age 85:</p> <p>a) remain independently in their own homes without formal long term care? b) require some formal long term care to remain in their own homes? or c) require institutional long term care?</p>	<ul style="list-style-type: none"> ◆ Steady declines in health and functioning over time will be associated with patterns of formal long term care use that result in the use of formal long term care, either in the home or in an institution ◆ Steady improvement in health and functioning over time will be associated with patterns of formal long term care use that result in no use of formal long term care at the end of thirteen years. ◆ Changes in the physical environment which offer greater support to an older individual (e.g., addition of stair rails, move into seniors' housing) will be associated with patterns of formal long term care use that result in the use of formal long term care in the home at the end of thirteen years. ◆ Stability in the physical environment together with declines in health and functioning over time will be associated with patterns of formal long term care use that result in the use of formal long term care, either in the home or in an institution. ◆ Stability in the physical environment together with improvement or stability in health and functioning over time will be associated with patterns of formal long term care use that result in no use of formal long term care.

To address this question, and its related hypotheses, this chapter is divided into four major sections. The first three sections correspond to the first three hypotheses

presented in Table 6.1. The fourth section corresponds to the fourth and fifth hypotheses presented on this table.

Associations between Improvement in Health and Functioning Over Time and Formal Long Term Care Use

The hypothesis of interest for this section of the chapter is: Steady improvement in health and functioning over time will be associated with formal long term care patterns that result in no use of formal long term care (i.e., home without home care) at the end of thirteen years.

As noted in *Chapter 4 - Methods*, "steady improvement" was defined as a categorical variable that included the categories - no improvements, one improvement, two improvements, and three or more improvements. As a result, a chi-squared test was used to compare people who were at home without home care in 1996 to people who were using formal long term care in 1996 in terms of steady improvement in health and functioning. Chart 6.1 presents the results of this test.

Chart 6.1: Chi-squared Test Comparing Categories of Steady Health and Functioning Improvements Between People at Home Without Home Care in 1996 and People Who Were Using Care in 1996

STEADIM3 steadim2 collapsed by ENDCARE patterns ending in care vs else

Page 1 of 1

Count Exp Val	ENDCARE		Row Total
	ending at home	ending in care	
	.00	1.00	
STEADIM3			
.00 no improvements	44 53.6	93 83.4	137 22.2%
1.00 one improvement	63 61.4	94 95.6	157 25.5%
2.00 two improvements	48 57.5	99 89.5	147 23.9%
3.00 3+ improvements	86 68.5	89 106.5	175 28.4%
Column Total	241 39.1%	375 60.9%	616 100.0%

Chi-Square	Value	DF	Significance
Pearson	12.85062	3	.00497
Likelihood Ratio	12.81601	3	.00505
Linear-by-Linear Association	6.69700	1	.00966

Minimum Expected Frequency - 53.599

Number of Missing Observations: 0

The results of this test are highly significant ($p < 0.005$) and a review of the observed and expected values in the table show that people who were at home without home care in 1996 were more likely to have experienced improvements in health and functioning over time relative to people who were using care in 1996. People who had experienced no improvements were more likely to be using care in 1996. Using this test, the hypothesis

was accepted, i.e., steady improvements in health and functioning over time are associated with formal long term care patterns that result in no use of formal long term care (i.e., home without home care) at the end of thirteen years.

Associations between Declines in Health and Functioning Over Time and Formal Long Term Care Use

The hypothesis of interest for this section of the chapter is: Steady declines in health and functioning over time will be associated with patterns of formal long term care use that result in the use of care, either in the home or in an institution.

As noted in *Chapter 4 - Methods*, "steady declines" was defined to mean that a person had experienced declines in at least 50% of the variables in 3 or more categories of health and functioning. One hundred and eighty-five people met this criteria. To test the hypothesis, a chi-squared test was used (Chart 6.2).

Chart 6.2: Chi-squared Test Comparing the Number of Categories of Health and Functioning That Have 50% or More Declines Between People at Home Without Home Care in 1996 to People Who Were Using Care in 1996

STDECLI2 stdeclin collapsed by ENDCARE patterns ending in care vs else

Page 1 of 1

Count Exp Val	ENDCARE		Row Total
	ending at home	ending in care	
	.00	1.00	
STDECLI2	-----+		
.00 no categories	56 40.3	47 62.7	103 16.7%
1.00 1 category	102 66.9	69 104.1	171 27.8%
2.00 2 categories	66 61.4	91 95.6	157 25.5%
3.00 3+ categories	17 72.4	168 112.6	185 30.0%
Column Total	241 39.1%	375 60.9%	616 100.0%

Chi-Square	Value	DF	Significance
Pearson	110.46213	3	.00000
Likelihood Ratio	124.72409	3	.00000
Linear-by-Linear Association	87.93581	1	.00000

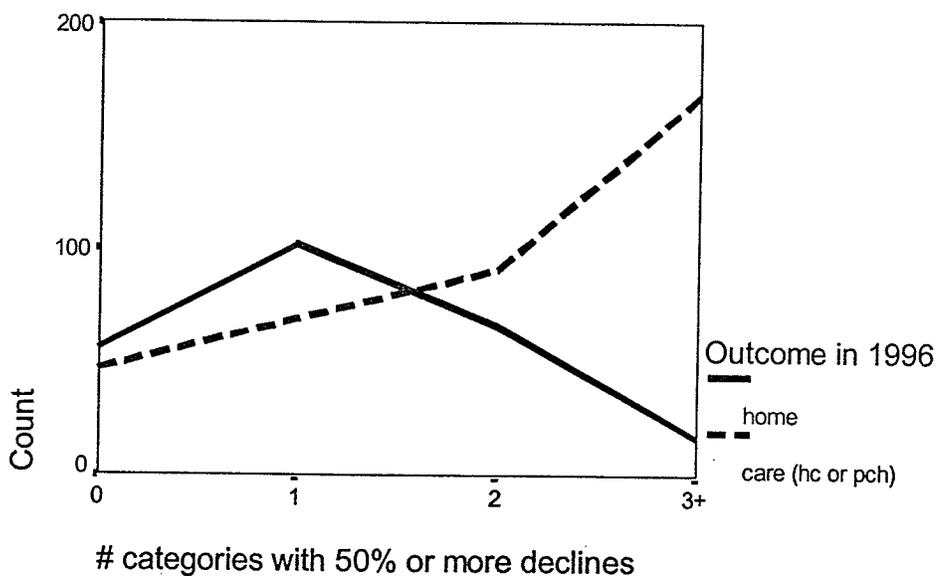
Minimum Expected Frequency - 40.297
Number of missing observations - 0

The results of this test are highly significant ($\chi^2=124.72$, $df=3$, $p<0.0000$; Cramer's $v = 0.42$, $p<0.0000$) and that the differences in the observed and expected values move in the hypothesized direction, that is, people who were receiving care in 1996 are more likely to have experienced 50% or more declines in more categories of health and functioning than people who were at home without home care in 1996. In addition, people who were at home without home care in 1996 were more likely to have

none or only one category of health and functioning in which they experienced 50% or more declines compared to people who were receiving care in 1996. This difference is particularly apparent visually (Figure 6.1).

Based on the results of this test, the hypothesis of concern here (i.e., steady declines in health and functioning over time will be associated with transition patterns that result in the use of formal long term care, either in the home or in an institution) is accepted.

Figure 6.1: Line Graph Comparing the Number of Categories of Experienced Health and Functioning Declines by Home in 1996 Versus Care in 1996



Since the results of the chi-squared test were so highly significant for this hypothesis, two additional analyses were completed to see if steady declines in health and functioning over time could distinguish across the three outcomes (i.e., formal long term care patterns ending at home, ending with home care, and ending in a nursing home), as well as between patterns ending in home care and patterns ending in nursing home, rather

than simply the two outcomes (i.e., home without care, any care) as stated in the hypothesis. Since these two analyses are supplementary, the accepted χ^2 level was increased to 0.025 (i.e., 0.05 divided by two supplementary tests).

To initiate the supplementary analyses, two line graphs were created to see if any differences in the total number of health and functioning declines could be observed across the three outcome groups (Figure 6.2) and if any differences in the number of categories (i.e., ADL, IADL, leisure, etc) of health and functioning showing 50% or more declines could be observed across these groups (Figure 6.3).

Figure 6.2: Line Graph of Total Health and Functioning Declines Across Three Outcome Groups

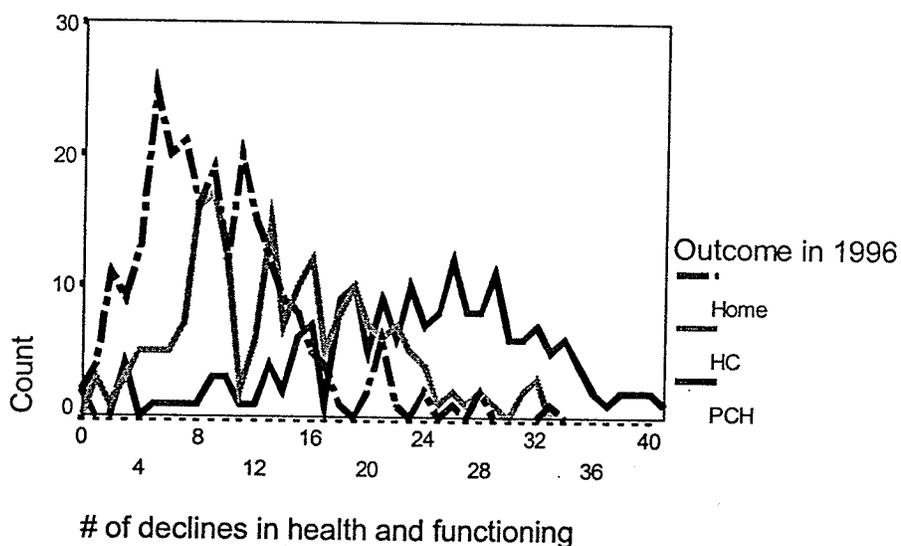
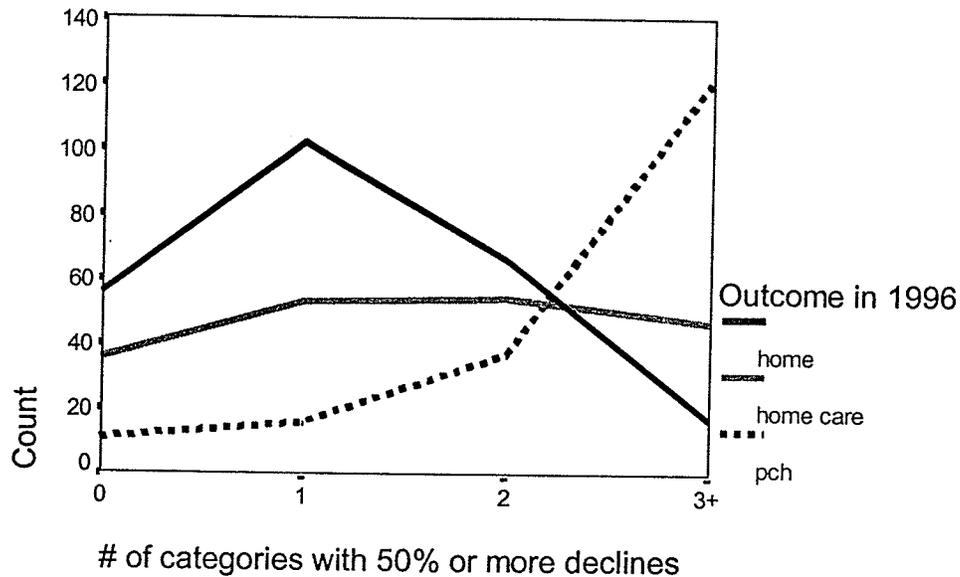


Figure 6.3: Line Graph of Number of Categories of Health and Functioning Showing 50% or More Declines Across Three Outcome Groups



These graphs suggest that the number of health and functioning declines, whether considered as a continuous variable (i.e., total declines) or by the number of categories showing 50% or more decline, can distinguish the three outcome groups. An analysis-of-variance using total health and functioning declines (Chart 6.3) and using the number of categories of health and functioning with 50% or more declines (Chart 6.4) support this finding.

Chart 6.3: ANOVA Results for Total Health and Functioning Declines over Time by the Three Outcomes

Variable STEADDECL # of steady declines in h & f
 By Variable ENDDHOME ending at home vs hc

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	21405.9495	10702.9747	224.3127	.0000
Within Groups	613	29249.0099	47.7145		
Total	615	50654.9594			

Multiple Range Tests: Tukey-HSD test with significance level .050

The difference between two means is significant if
 $MEAN(J) - MEAN(I) \geq 4.8844 * RANGE * \sqrt{1/N(I) + 1/N(J)}$
 with the following value(s) for RANGE: 3.33

(*) Indicates significant differences which are shown in the lower triangle

Mean	ENDDHOME	1	2	3
9.2739	Grp 1			
14.0263	Grp 2	*		
23.4865	Grp 3	* *		

Chart 6.4: ANOVA Results for Number of Categories of Health and Functioning Declines over Time by the Three Outcomes

Variable STDECLI2 stdeclin collapsed
 By Variable ENDDHOME ending at home vs hc

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	170.4479	85.2240	97.1574	.0000
Within Groups	613	537.7079	.8772		
Total	615	708.1558			

Multiple Range Tests: Tukey-HSD test with significance level .050

The difference between two means is significant if
 $MEAN(J) - MEAN(I) \geq .6623 * RANGE * \sqrt{1/N(I) + 1/N(J)}$
 with the following value(s) for RANGE: 3.33

(*) Indicates significant differences which are shown in the lower triangle

Mean	ENDDHOME	
1.1826	Grp 1	
1.5895	Grp 2	*
2.4486	Grp 3	* *

Both of the ANOVA tests presented above are statistically significant with $p < 0.0000$ and $p < 0.0000$, respectively. Furthermore, the results of Tukey's tests in both of these analyses show that each of the three outcome groups can be distinguished from the other two groups using either of these measures of health and functioning decline over time. Therefore, through the use of these two supplementary analyses, it has been determined that health and functioning declines over time are associated with formal long term care patterns over time. Patterns of change in health and functioning that show

decline can distinguish patterns of formal long term care ending at home, from those ending with home care, from those ending in personal care home at the end of thirteen years.

Associations Between More Supportive Environments Over Time and Formal Long Term Care Use

The hypothesis of interest for this section of the chapter is: Changes in the physical environment over time which offer greater support to an older individual (e.g., addition of stair rails, move into seniors' housing) will be associated with patterns of formal long term care use that result in the use of home care at the end of thirteen years.

For this hypothesis, as noted in *Chapter 4 - Methods*, a more supportive environment means that at least two of the following four variables indicated increased support over the three waves of the study - type of housing (e.g, move to seniors' housing), grab-bars in the bathroom (e.g., addition of grab-bars), railings on the inside stairs and railings on the outside stairs (e.g., addition of railings). In addition, at least one of the remaining physical environment variables indicated increased support - room to oneself (e.g., obtained), condition of dwelling (e.g., improved), need for repairs (e.g., less need of repairs), and problems with transportation (e.g., problems gone).

Using this definition, one hundred people in the sample experienced changes in their physical environment which offered greater support to them. To look at whether there is an association between a more supportive environment and patterns of formal long term care, a χ^2 test was used (Chart 6.5). The results show a significant association in the expected direction, that is, people who experienced a formal long term care pattern

that ended in care in 1996 were more likely to have also experienced changes in their physical environments that are consistent with increasing levels of support.

Chart 6.5: Chi-squared Results for More Supportive Physical Environment by Home Without Care Versus Any Care

Page 1 of 1

Count Exp Val	ENDCARE		Row Total
	ending at home	ending in care	
	.00	1.00	
ENVNSUP3			
.00	219	297	516
not a more suppo	201.9	314.1	83.8%
1.00	22	78	100
more supportive	39.1	60.9	16.2%
Column Total	241 39.1%	375 60.9%	616 100.0%

Chi-Square	Value	DF	Significance
Pearson	14.69681	1	.00013
Continuity Correction	13.85105	1	.00020
Likelihood Ratio	15.70015	1	.00007
Linear-by-Linear Association	14.67295	1	.00013

Minimum Expected Frequency - 39.123

Number of Missing Observations: 0

To determine if a more supportive environment could also distinguish across all three outcomes (i.e., between home and home care; and between home care and personal care home), two supplementary chi-squared tests were completed and the acceptable significance level was increased to $p < 0.025$. The results of the first test show that changes leading to a more supportive environment over time cannot distinguish people who experienced a formal long term care pattern ending in home without care from those

people who experienced a pattern ending at home with care when using the increased significance level ($\chi^2 = 3.80$, $df = 1$, $p < 0.05$).

In contrast, the results of the second test show that changes leading to a more supportive environment over time can distinguish between people who experienced a formal long term care pattern ending at home with home care from those people who experienced a pattern ending in a nursing home ($\chi^2 = 7.25$, $df = 1$, $p < 0.007$). Between these two groups, people who were using home care in 1996 are less likely to have experienced changes leading to a more supportive environment. This finding is not surprising given the way that a more supportive environment was defined, even though cross-tabulations between the outcome "just care" (i.e., home care versus personal care home) and the supportive environment variables show no evidence of a tautology (i.e., all cells in the matrix contain cases).

As a result of the findings presented in this section, the hypothesis being addressed is rejected. That is, the data do not support the statement that changes in the physical environment over time which offer greater support to an older individual are associated with patterns of formal long term care use that result in the use of home care at the end of thirteen years.

Instead, changes in the physical environment over time which offer greater support are associated with patterns ending in any formal long term care (i.e., these changes can distinguish non-users from users), and they are associated with patterns that result in nursing home placement (i.e., these changes can distinguish home care users from nursing home residents). These findings raise questions about the role and timing of home modifications and supportive environments. In particular, these findings raise

questions about whether people are waiting too long to complete home modifications for the changes to be helpful, and what changes are required at what time to contribute to disability postponement (i.e., allow people to stay at home a bit longer).

Associations between Stable Physical Environments, Changes in Health and Functioning and Formal Long Term Care Use

There are two hypotheses of interest in this section. The first is: Stability in the physical environment together with declines in health and functioning over time will be associated with transition patterns that result in the use of formal long term care, either in the home or in an institution. The second is: Stability in the physical environment together with improvement or stability in health and functioning over time will be associated with transition patterns that result in no use of formal long term care.

Given the similarity of these hypotheses, they were tested simultaneously by using an interaction variable that used two levels of the physical environment (stable, unstable) and three levels of change in health and functioning (predominately stable or improving, predominately idiosyncratic, predominately declining). The resulting variable has six categories. People who experienced a stable physical environment together with stability or improvement in health and functioning were used as the reference category.

To address the hypotheses in question, this interaction variable was regressed on "endcare" (i.e., home without care (0) versus any care (1)) using logistic regression. The results of the analysis (Table 6.2) show that people in the reference category were the most likely to experience a pattern of formal long term care ending at home without care in 1996, while the people experiencing unstable environments together with declines in

health and functioning were the most likely to experience a pattern of formal long term care ending in care in 1996.

Table 6.2: Odds Ratios, Confidence Limits and Probabilities for Ending in Care When Regressing “Hypth10b” Against “Endcare”

“Hypth10b” Variable Categories	Odds Ratios	Confidence Limits	Probability of Ending in Care
stable environment, “predominately stable” health and functioning (n=132)	1.00	-	29.5%
stable environment, “predominately idiosyncratic” health and functioning (n=12)	7.15	1.84 - 27.85	75.0%
stable environment, “predominately declining” health and functioning (n=100)	1.95	1.13 - 3.36	45.0%
unstable environment, “predominately stable” health and functioning (n=106)	2.05	1.20 - 3.50	46.2%
unstable environment, “predominately idiosyncratic” health and functioning (n=26)	7.95	2.97 - 21.31	76.9%
unstable environment, “predominately declining” health and functioning (n=24)	18.81	10.88 - 32.54	88.8%

Of interest in the findings of Table 6.2 is the results for people who experienced predominately idiosyncratic patterns of change in health and functioning over the course of the study. Next to the people who experienced unstable physical environments together with declines in health and functioning, the groups of people experiencing idiosyncratic health and functioning patterns had the highest probability of ending in care in 1996. In addition, there is very little difference between the two groups of people with idiosyncratic patterns (i.e., stable versus unstable environments) in terms of their probability of experiencing a pattern of formal long term care that ended in care.

These findings have a number of possible explanations. The three major explanations include the possibility of measurement error between waves of the study for these individuals, definitions of “predominately stable” and “predominately declining” that are inadequately sensitive, or it may be that continuous changes in health and functioning (i.e., idiosyncratic patterns) simply place a person at relatively high risk for using care over time. Finally, the sample size for the idiosyncratic groups are very small, and therefore these data need to be considered with caution because of their wide confidence intervals.

As a result of the findings in Table 6.2, the hypothesis that stability in the physical environment together with declines in health and functioning over time will be associated with patterns of formal long term care use that result in the use of care (home care or personal care) is accepted. In addition, the hypothesis that stability in the physical environment together with improvement or stability in health and functioning over time will be associated with patterns of formal long term care that result in no use of care (home without home care) care is also accepted.

Conclusion

This chapter has considered how the patterns of responses for the health and functioning and physical environment variables among members of the sample across 1983, 1990 and 1996 are associated with the patterns of formal long term care use observed among the respondents. The chapter focussed on addressing the question: What changes in health and functioning and the physical environment over three points in time (i.e., 1983, 1990, 1996) are associated with the patterns of formal long term care use? Table 6.3 provides a summary of the hypotheses and the results of testing them.

Table 6.3: Summary of the Hypotheses and Hypotheses Testing Results Presented in Chapter 6

Hypothesis	Result
Steady declines in health and functioning over time will be associated with transition patterns that result in the use of formal long term care, either in the home or in an institution	ACCEPTED
Steady improvement in health and functioning over time will be associated with transition patterns that result in no use of formal long term care at the end of thirteen years.	ACCEPTED
Changes in the physical environment which offer greater support to an older individual (e.g., addition of stair rails, move into seniors' housing) will be associated with transition patterns that result in the use of formal long term care in the home at the end of thirteen years	REJECTED
Stability in the physical environment together with declines in health and functioning over time will be associated with transition patterns that result in the use of formal long term care, either in the home or in an institution.	ACCEPTED
Stability in the physical environment together with improvement or stability in health and functioning over time will be associated with transition patterns that result in no use of formal long term care.	ACCEPTED

**CHAPTER 7: WHAT CHANGES BETWEEN 1983
AND 1990 IN HEALTH AND FUNCTIONING AND THE PHYSICAL
ENVIRONMENT DIFFERENTIATE 1996 OUTCOMES?**

Of the 616 oldest-old AIM survivors who participated in the 1983, 1990 and 1996 waves of the study, 241 were living in their own homes without the assistance of home care in 1996. Of the remaining 375 participants, 190 were living at home with the assistance of home care, and the other 185 were living in a personal care home. This chapter reports the findings and tests the hypotheses provided in Table 7.1.

Table 7.1: Research Question and Hypotheses of Concern in Chapter 7:

Research Questions	Corresponding Hypotheses
<p>4) What changes in health and functioning and the physical environment between 1983 and 1990 (e.g., improvement, stability, decline) differentiate the people over 85 (the whole sample, men and women, urban and rural dwellers), who in 1996:</p> <p>a) were living independently in their own homes without formal long term care? b) required some formal long term care to remain in their own homes? or c) required institutional long term care?</p>	<p>◆ Changes between 1983 and 1990 in health and functioning will differentiate the three groups of people in the 1996 whole sample with people experiencing declines being more likely to use formal long term care.</p> <p>◆ Changes between 1983 and 1990 in the physical environment will differentiate the three groups of people in the 1996 whole sample with people experiencing more supportive environments being more likely to use formal long term care in the home.</p> <p>◆ Changes between 1983 and 1990 in both health and functioning and the physical environment will differentiate the outcome experiences of men and women, or urban and rural dwellers in 1996.</p>

The first section of the chapter addresses the health and functioning aspects of the question and hypotheses, while the second section addresses the physical environment aspects. This chapter also addresses whether changes in health and functioning or the physical environment can distinguish the experiences of the people who belong to each of the following four sub-groups: men, women, urban dwellers, and rural dwellers.

The Relationship between Formal Long Term Care Use in 1996 and Changes in Health and Functioning Between 1983 and 1990

As previously noted, the health and functioning component encompasses 56 measures including ADL, IADL, leisure participation, physical difficulties observed by the interviewer, self-rated health and ability to walk out-of-doors. Variables measuring change between 1983 and 1990 among these measures considered whether an individual remained stable in an independent or positive state, remained stable in a dependent or negative state, declined or improved. As described in the Chapter 4, the changes between 1983 and 1990 in health and functioning, and their relationship with the 1996 outcomes, were considered using three different approaches - total declines, declines in the categories of health and functioning, and declines across the 56 individual measures.

Approach #1: Relationship between Total Declines in Health and Functioning and 1996 Outcomes

Three pairs of dichotomous outcomes were created to look at whether and how changes between 1983 and 1990 are able to differentiate people by their 1996 outcomes (i.e., home without home care versus home with home care; home without home care versus personal care home; home with home care versus personal care home). By using logistic regression models, it is possible to show how a one unit change in an independent variable (in this case, health and functioning declines) influences the probability of experiencing one outcome versus another (e.g., being at home without home care versus being in a personal care home) (Hassard, 1993). The variables used to adjust for the other components of the Evans and Stoddard (1994) framework (i.e., the final column in each Tables 7.2 to 7.4) for each of these outcomes is provided in Appendix 8.

Health and functioning declines between 1983 and 1990 is a highly significant factor in differentiating people who were at home without home care in 1996 from people who were at home with home care in 1996 (outcome "Endhome", Table 7.2), unless all of the Evans and Stoddard (1994) components are considered. In the unadjusted model (column 1), health and functioning declines are highly significant. With 20 declines, a person's probability of using home care in 1996 is 94%. The second column of Table 7.2 shows that the influence of the health and functioning declines variable drops slightly after adjusting for age, sex and region, but remains highly significant ($p < 0.000$). After controlling for these three variables, a person with 20 declines still has a 92% chance of using home care in 1996. Neither sex nor region demonstrate a unique influence on the outcome.

In the final column of Table 7.2, it can be seen that adjusting for all of the Evans and Stoddard (1994) components reduces the unique influence of the health and functioning declines variable considerably. In addition, because of the use of the Evans and Stoddard (1994) framework, this finding also raises the question of whether the variables in the model actually form some type of pathway that cannot be specified because of the available data. Perhaps these other changes were antecedent to changes in health and functioning, and are therefore reducing the effect of the latter variable in this model.

Studies that look at the predictors of health and functioning, for example, the work of Boulton, Kane, Louis, Boulton and McCaffery (1994), suggest that acquiring a condition such as a heart problem can lead to declines in health and functioning. As a result, if this disease variable occurred antecedent to the declines in health and

functioning, it could explain the reduction of influence of health and functioning in Model 3. While the temporality of these changes cannot be determined with the data available, this potential explanation for the reduction in influence of the health and functioning variable would be consistent with the Evans and Stoddard (1994) framework.

Changes in residence (social environment component) and changing from not using home care to using home care (health care component) are likely changes that happened simultaneously with declines in health and functioning. These potential explanations for the Model 3 findings are supported by the work of Boaz (1994) and Camacho et al. (1993). Given this previous work, it is expected that these variables all represent unique contributions to differentiating these outcomes.

The odds ratios associated with a decline in current income adequacy between 1983 and 1990 (OR = 7.43), and with living in the community for less than 2 years (OR = 6.41), and with a move from being at home without home care in 1983 to using home care in 1990 (OR = 10.29), are noteworthy. It is also interesting that the unique influence of age increases in the third model, relative to the model presented in column 2, even though more variables are included in the final model.

Table 7.2: Results of Logistic Regressions Exploring the Influence of Total Health and Functioning Declines on the Odds and the Probability of Being at Home Versus Using Home Care 1996 (Home=0, Home Care=1)

	Model 1: Unadjusted (N=431)	Model 2: Adjusted for Age, Sex and Region (N=431)	Model 3: Adjusted for All Components (N=358)
Model constant	-1.388	-1.512	-1.638
<i>b</i> value (significance level) for Total Health & Functioning Declines	0.205 (p<0.000)	0.195 (p<0.000)	0.086 (p<0.0434)
odds of outcome designated as (1) for unit change * equalling -			
0	0.25	0.22	0.19
10	1.94	1.55	0.46
20	15.06	10.89	1.08
30	116.98	76.55	2.56
40	908.69	538.08	6.04
probability of outcome designated as (1) for unit change * equalling-			
0	0.20	0.18	0.16
10	0.66	0.61	0.31
20	0.94	0.92	0.52
30	0.99	0.99	0.72
40	1.00	1.00	0.86
Age in 1990 (85+)	-	1.72 (1.12 - 2.65)	2.01 (1.18 - 3.42)
Sex (Female)	-	NS	NS
Region (Not in Wpg)	-	NS	NS
Social Environment			
In community 3-5 years	-	-	4.21 (1.44 - 12.28)
In community 0-2 years	-	-	6.41 (1.17 - 35.21)
Prosperity Component ('83 to '90) Decline in Current Income Adequacy	-	-	7.43 (1.38 - 39.98)
Disease Component ('83 to '90) Acquired Heart Problem	-	-	4.35 (2.06 - 9.16)
Health Care Home in '83, HC in '90	-	-	10.29 (3.68 - 28.77)
Proportion of Cases Correctly Classified in this model....	64.27%	65.66%	72.07%
<i>Filters Used</i>	<i>None</i>	<i>None</i>	<i>Filthome</i>

The results of Table 7.2, and the outcome “Endhome” support the hypothesis: *“Changes between 1983 and 1990 in health and functioning will differentiate the three groups of people in the 1996 whole sample with people experiencing declines being more likely to use formal long term care”*. Findings presented in Table 7.2 show that health and functioning declines can differentiate people who, in 1996, remained living in their own homes without home care from those people who remained in their own homes with home care, even after controlling for other population health determinants.

The findings for the outcome “Nothcpt” (home without home care versus personal care home), are presented in Table 7.3. The results from the three models presented here show how, when comparing no receipt of formal long term care to the most extreme form of formal long term care (i.e., personal care home), declines in health and functioning remain highly significant, even after adjusting for all of the other population health determinants.

Table 7.3: Results of Logistic Regressions Exploring the Influence of Total Health and Functioning Declines on the Odds and the Probability of Being at Home Without Home Care Versus Being in a Personal Care Home 1996 (Home=0, PCH=1)

	Model 1: Unadjusted (N=426)	Model 2: Adjusted for Age, Sex and Region (N=426)	Model 3: Adjusted for All Components (N=277)
Model Constant	-2.158	-3.488	-3.57
<i>b</i> value (significance level) for Total Health & Functioning Declines	0.287 (p<0.000)	0.270 (p<0.000)	0.223 (p<0.000)
odds of outcome designated as (1) for unit change * equalling -			
0	0.12	0.03	0.03
10	2.04	0.45	0.27
20	35.95	6.77	2.52
30	633.97	100.69	23.86
40	11181.32	1498.17	225.45
probability of outcome designated as (1) for unit change * equalling -			
0	0.10	0.03	0.03
10	0.67	0.31	0.21
20	0.97	0.87	0.72
30	1.00	0.99	0.96
40	1.00	1.00	1.00
Age in 1990 (85+)	-	7.43 (4.46 - 12.38)	6.93 (3.40 - 14.12)
Sex (Female)	-	1.87 (1.08 - 3.26)	NS
Region (Not in Wpg)	-	NS	NS
Social Environment ('83 to '90) In community 3-5 yrs	-	-	6.06 (1.36 - 26.92)
Health Care ('83 to '90) Home in '83 to HC in '90	-	-	32.21 (8.51 - 122.00)
Proportion of Cases Correctly Classified in this model....	72.30%	80.05%	81.59%
<i>Filters Used</i>	<i>None</i>	<i>None</i>	<i>Filthc</i>

Even after adjusting for all of the Evans and Stoddard components, a person experiencing 20 declines had a 72% chance of being in a personal care home in 1996. Compared to the previously discussed outcome (i.e., "Endhome"), the variable for health and functioning declines retains its significance level throughout all three of the models used (i.e., unadjusted, adjusted for age, sex and region, and fully adjusted). These findings further support the hypothesis that *"Changes between 1983 and 1990 in health and functioning will differentiate the three groups of people in the 1996 whole sample with people experiencing declines being more likely to use formal long term care"*.

Table 7.4 presents the findings for the outcome "Justcare" (home care versus personal care home). What is striking about this Table is how the unique influence of health and functioning declines becomes insignificant after other population health determinants are considered (column 3), and how variables that have not entered into the models for the previous outcomes are significant here. These variables are marital status (from the social environment) and general life satisfaction (from the well-being component). While other social environment variables have appeared in the models for the previously discussed outcomes, well-being variables have not. This finding suggests that the determination of what type of formal long term care a person receives (i.e., home care or personal care home) is more complex, and takes into account the health of the whole person.

An alternative explanation for this finding is that the variables in the model actually form some type of pathway that cannot be specified because of the available data. In terms of the marital status, it is likely mediating the influence of declines in health and functioning, therefore reducing and ultimately overpowering this variable in

the model. This potential explanation is consistent with the work of Roos and Havens (1991) and Freedman et al.(1994).

Another potential explanation may be that the independent variable is under-specified. It may be that declines in health and functioning could differentiate these two groups if the extent, duration or severity of these declines were captured. Alternatively, people who are living in the community with the assistance of home care may simply be just as frail as people living in nursing homes. The investigator's clinical experience would suggest that both of these explanations are working in tandem.

Table 7.4: Results of Logistic Regressions Exploring the Influence of Total Health and Functioning Declines on the Odds and the Probability of Using Home Care Versus Being in a Personal Care Home 1996 (Home Care=0, Pch=1)

	Model 1: Unadjusted (N=375)	Model 2: Adjusted for Age, Sex and Region (N=375)	Model 3: Adjusted for All Components (N=284)
Model Constant	-0.9	-1.616	-1.346
<i>b</i> value (significance level) for Total Health & Functioning Declines	0.101 (p<0.000)	0.098 (p<0.000)	NS
odds of outcome designated as (1) for unit change * equalling -			
0	0.41	0.20	-
10	1.12	0.53	-
20	3.06	1.41	-
30	8.41	3.76	-
40	23.10	10.01	-
probability of outcome designated as (1) for unit change * equalling -			
0	0.29	0.17	-
10	0.53	0.35	-
20	0.75	0.59	-
30	0.89	0.79	-
40	0.96	0.91	-
Age in 1990 (85+)	-	3.59 (2.25 - 5.73)	3.38 (1.96 - 5.81)
Sex (Female)	-	NS	NS
Region (Not in Wpg)	-	NS	NS
Well-being Component ('83 to '90) Decline in General Satisfaction	-	-	4.09 (1.67 - 10.00)
Social Environment ('83 to '90) Remained Married	-	-	0.34 (0.15 - 0.77)
Proportion of Cases Correctly Classified in this model....	59.73%	66.40%	68.31%
<i>Filters Used</i>	<i>None</i>	<i>None</i>	<i>Filtjust</i>

An additional point of interest from Table 7.4 is that a smaller proportion of cases can be correctly classified from these models compared to the models of the previous outcomes. For example, the fully adjusted model in Table 7.4 (column 3) can only correctly classify 68.31% of cases whereas the fully adjusted models from Tables 7.2 and 7.3 correctly classify between 72.07% to 81.59% of cases. This finding further supports the suggestion that determining what type of formal long term care a survivor receives is probably more complex than determining if they will receive formal long term care.

Unlike the findings for the outcomes "Endhome" and "Nothcpt", the findings from the outcome "Justcare" do not fully support the hypothesis that declines in health and functioning between 1983 and 1990 can differentiate people by their 1996 outcome experience. It may be that health and functioning declines increase a person's risk of receiving formal long term care, but once that risk exists other factors from a person's social environment and overall well-being are what determines his/her ability to remain living in the community with assistance or to require relocation to a personal care home.

In summary, it appears that the knowledge of the total number of health and functioning declines experienced between 1983 and 1990 by oldest-old AIM participants who survived to 1996, usually provides adequate information to determine formal long term care outcomes in 1996. Where this information alone is inadequate is when trying to differentiate people receiving home care and people living in a personal care home.

Furthermore, if attempting to differentiate people living at home without home care from people living at home with home care, the results suggest that consideration needs to be given to balancing Type 1 versus Type 2 error. While the results were significant for this analysis, a p value of <0.04 may be inadequate in some situations, for

example, if a policy decision was being made solely on this knowledge rather than using it together with corroborating evidence.

Approach #2: Relationship Between Declines in the Specific Aspects of Health and Functioning and the 1996 Outcomes

Rather than considering health and functioning as one single component, the second approach to addressing Question 4 was to develop a summary of the number of declines for each of the specific aspects captured in this component, that is, ADL, IADL, leisure and observed physical difficulties. This approach is similar to other work that has been completed in the field (see Charts 3.4 and 3.10), but contributes additional information through the inclusion of declines in leisure and observed physical difficulties. Because the original survey instrument included self-rated health and walking out-of-doors as single item indicators (i.e., not part of a scale), they were left as single item variables for this analysis.

The process used to complete the analysis using these disaggregated measures of health and functioning declines was the same as that used for the total health and functioning declines. In other words, for each of the three dichotomous outcomes, three models were run - the first model used the declines variables unadjusted against the outcome, the second model adjusted for age, sex and region, and the third model adjusted for all of the other Evans and Stoddard (1994) components. Tables 7.5 to 7.7 present the results of these analyses. Once again, the variables that were used to control for these other components (third columns) are provided in Appendix 8.

To reduce the length of Tables 7.5 to 7.7, the odds and probabilities associated with particular unit changes in the independent variables are not included. This

information is provided in the text. For those readers who wish to confirm the information provided in the text, the model constants are provided in the Tables.

Table 7.5 presents the findings for the outcome "Endhome" (home versus home care). The most fascinating aspect of this Table is the fact that the first two models, the unadjusted model and the model adjusted for age, sex and region, are identical. ADL, IADL and the ability to walk out-of-doors all are independently associated with the likelihood of using home care in 1996. With only seven ADL declines between 1983 and 1990, a person has a 97% probability of using home care in 1996. The probabilities associated with IADL declines are less dramatic, but still high - a person with five IADL declines has a 46% probability of using home care in 1996.

Another interesting observation from the results of the first two columns of Table 7.5 is that *anything but* being stable at 1+ miles in the ability to walk out-of-doors between 1983 and 1990 increases a person's odds of using home care in 1996. Yet when the model is fully adjusted (column 3), only an improvement in the ability to walk out-of-doors increases one's odds and probability of using home care. Since this finding seems somewhat counterintuitive, the original change variable that was constructed for walking out-of-doors, before it was collapsed, was explored. This exploration showed that 49% of people who *improved* between 1983 and 1990 had been very restricted in their ability to walk outside in 1983 (i.e., 100 yards or less), and that overall, they represented 46% of the people who were very restricted at baseline. Although it cannot be fully determined, the data suggest that these individuals were somehow more frail, even though they improved, than those people who declined or remained stable between 1983 and 1990.

Although ADL and IADL declines are highly significant in models 1 and 2 in Table 7.5, they fail to retain their unique influence on the outcome once all of the framework components are controlled (column 3). One of the interesting findings from the final model is that five of the remaining eight components (i.e., genetic endowment, social environment, disease, health care and prosperity) all have a unique influence on the outcome, and that, for the most part, a decline or a negative change is what drives this influence. It is also interesting to note that age becomes an important variable, as does self-rated health. This model points to the complexity of formal long term care use, and understanding why some people use services and others do not. These findings suggest that exploration of the relationships and pathways between the components of the model may be particularly informative.

In terms of supporting the hypothesis: "*Changes between 1983 and 1990 in health and functioning will differentiate the three groups of people in the 1996 whole sample with people experiencing declines being more likely to use formal long term care*", the findings in Table 7.5 raise the question of comprehensive measurement of the construct of health and functioning. If one is satisfied that self-rated health and the ability to walk out-of-doors can adequately capture the construct of health and functioning, the hypothesis would be accepted. But, Evans and Stoddard (1994) explicitly state that the components of their framework are to be viewed as containing many variables and as having a rich internal structure. On this basis, and with only two of the health and functioning variables showing a unique relationship with the outcome, the results presented in Table 7.5 mean rejection of the hypothesis as it is currently stated.

Table 7.5: Results of Logistic Regressions Exploring the Influence of Types of Health and Functioning Declines on the Likelihood of Being at Home Without Home Care Versus Being at Home with Home Care in 1996 (Home=0, Home Care=1)

	Model 1: Unadjusted (N=399)	Model 2: Adjusted for Age, Sex and Region (N=399)	Model 3: Adjusted for All Components (N = 340)
Model Constant	-1.264	-1.264	-1.784
ADL declines - <i>b</i> value (significance level)	0.697 (p<0.001)	0.697 (p<0.001)	NS
IADL declines - <i>b</i> value (significance level)	0.220 (p<0.02)	0.220 (p<0.02)	NS
Obs. Difficulties Declines - <i>b</i> value (significance. level)	NS	NS	NS
Leisure Declines - <i>b</i> value (significance. level)	NS	NS	NS
Self-rated Health ('83 to '90) Stable- Fair, Poor or Bad	NS	NS	2.90 (1.31 - 6.42)
Ability to Walk out of Doors Stable at 1+ miles	1.00	1.00	1.00
Stable at other distance	2.14 (1.03 - 4.46)	2.14 (1.03 - 4.46)	0.85 (0.33 - 2.18)
Decline	2.39 (1.42 - 4.05)	2.39 (1.42 - 4.05)	1.77 (0.94 - 3.32)
Improve	2.66 (1.41 - 5.03)	2.66 (1.41 - 5.03)	2.20 (1.01 - 4.82)
Age in 1990 (85+)	-	NS	2.16 (1.20 - 3.87)
Sex (Female)	-	NS	NS
Region (Not Winnipeg)	-	NS	NS
Social Environment ('83-'90) In community 3-5 years	-	-	3.77 (1.23 - 11.58)
Prosperity ('83 to 90) Decline in Current Income Adequacy	-	-	5.94 (1.05 - 33.59)
Disease Component ('83-'90) Acquired Heart problems	-	-	4.27 (1.92 - 9.50)
Health Care Component Home in '83, HC in '90			12.60 (3.66 - 43.33)
Proportion of Cases Correctly Classified with this model...	66.42%	66.42%	74.71%

Table 7.6 presents the findings for the outcome "Justcare" (home care versus personal care home). Three findings are particularly striking in this Table. The first is that none of the health and functioning variables are found in the model that adjusts for all of the framework components (column 3). The second is that, relative to the previous Table, the p values are not as strong in columns 1 and 2 for the variables ADL declines and IADL declines. Finally, it is striking that change in formal long term care status between 1983 and 1990 (health care component) is not significant in this model. Although this finding could be an artifact of using the filter variable ("filtjust"), running the model without the filter variable does not support this hypothesis. Therefore, the finding seems to point to the complexity of determining *what type* of formal long term care a person will receive relative to determining *if* a person will receive care.

Within Table 7.6, it is also interesting to note that the odds ratio and confidence limits for the age variable remain relatively stable between models 2 and 3 (columns 2 and 3) suggesting that age is a particularly important factor in distinguishing what type of formal long term care a survivor received in 1996. Overall, these models are able to correctly classify the following proportions of people: 59.32% (model 1), 66.67% (model 2) and 67.87% (model 3). These proportions show very little difference compared to the proportion of people correctly classified for this outcome when total declines in health and functioning is used as a dependent variable (Table 7.4).

In terms of the hypothesis, it is clearly rejected if one uses the model that controls for all of the framework components (column 3). If one uses models 2 or 3 (columns 2 or 3), then the issue of construct definition arises again, and one needs to return to the statements by Evans and Stoddard (1994) that the components of their framework are to

be viewed as containing many variables and as having a rich internal structure. Once again, on this basis, the results presented in Table 7.6 mean rejection of the hypothesis as it is currently stated.

Table 7.6: Results of Logistic Regressions Exploring the Influence of Types of Health and Functioning Declines on the Likelihood of Using Home Care Versus Being in a Personal Care Home in 1996 (HC=0, PCH=1)

	Model 1: Unadjusted (N=354)	Model 2: Adjusted for Age, Sex and Region (N=354)	Model 3: Adjusted for All Components (N = 277)
Model Constant	-0.56	-1.25	-1.18
ADL declines - <i>b</i> value (significance level)	0.15 (p<0.03)	0.15 (p<0.03)	NS
IADL declines - <i>b</i> value (significance level)	0.16 (p<0.02)	0.14 (p<0.04)	NS
Obs. Difficulties Declines - <i>b</i> value (significance level)	NS	NS	NS
Leisure Declines - <i>b</i> value (significance level)	NS	NS	NS
Self-rated Health ('83 to '90)	NS	NS	NS
Ability to Walk out of Doors	NS	NS	NS
Age in 1990 (85+)	-	3.47 (2.18 - 5.52)	3.32 (1.93 - 5.72)
Sex (Female)	-	NS	NS
Region (Not Winnipeg)	-	NS	NS
Well-being ('83 to '90) Decline in General Life Satisfaction	-	-	4.13 (1.71 - 9.97)
Social Environment ('83 to '90) Remained Married	-	-	0.37 (0.16 - 0.84)
Health Care Component Home in '83, HC in '90	-	-	NS
Proportion of cases correctly classified with this model...	59.325	66.67%	67.87%

Table 7.7 is the final model in this series and presents the findings for the outcome "Nothcpt" (home versus personal care home). What is surprising about the findings in this Table is the fact that, despite being the most extreme comparison (i.e., no formal long term care versus the most extreme form of formal long term care) of all of the health and functioning variables, it is only the observed physical difficulties variable that appears to have a unique effect on the outcome in model 3 (column 3).

What appears to be driving the final model (column 3) is prior use of formal long term care services (health care component), and this finding is not surprising given Manitoba's single-entry system for formal long term care. The role of the social environment, specifically being in the community for a relatively short length of time, is very important. Overall, these models correctly classify 75.19% (model 1), 81.27% (model2), and 80.52% (model 3).

Whether the hypothesis under consideration, "*Changes between 1983 and 1990 in health and functioning will differentiate the three groups of people in the 1996 whole sample with people experiencing declines being more likely to use formal long term care*", is accepted or rejected depends on whether one is satisfied conceptually that one or two concepts (e.g., ADL, self-rated health) within the construct "health and functioning" can provide an adequate and valid measure of the construct. If one believes that one or two concepts can capture the construct, then the hypothesis is accepted. Based on the Evans and Stoddard (1994) framework, as already noted, the hypothesis is rejected.

Table 7.7: Results of Logistic Regressions Exploring the Influence of Types of Health and Functioning Declines on the Likelihood of Being at Home Without Home Care Versus Being in a Personal Care Home in 1996 (H=0, PCH=1)

	Model 1: Unadjusted (N=395)	Model 2: Adjusted for Age, Sex and Region (N=395)	Model 3: Adjusted for All Components (N = 267)
Model Constant	-2.04	-3.33	-3.14
ADL declines - <i>b</i> value (significance level)	0.497 (p<0.01)	0.373 (p<0.02)	NS
IADL declines - <i>b</i> value (significance level)	0.327 (p<0.0003)	0.298 (p<0.002)	NS
Obs. Difficulties Declines - <i>b</i> value (significance. level)	0.361 (p<0.01)	0.311 (p<0.05)	0.372 (p<0.05)
Leisure Declines - <i>b</i> value (significance. level)	NS	0.165 (p< 0.032)	NS
Self-rated Health ('83 to '90)	NS	NS	NS
Ability to Walk out of Doors			NS
Stable at 1+ miles	1.00	1.00	
Stable at other distance	3.74 (1.71 - 8.20)	2.96 (1.25 - 6.98)	
Decline	3.07 (1.67 - 5.62)	3.16 (1.62 - 6.18)	
Improve	2.14 (0.97 - 4.70)	2.22 (0.94 - 5.24)	
Age in 1990 (85+)	-	6.57 (3.84- 11.26)	6.20 (3.04 -12.65)
Sex (Female)	-	NS	NS
Region (Not Winnipeg)	-	NS	NS
Social Environment (1990)			
In community 3 to 5 years	-	-	7.44 (1.52-36.33)
In community 0 to 2 years	-	-	7.00 (0.99- 49.34)
Health Care Component			
Home in '83, HC in '90	-	-	27.22 (6.98-106.15)
Proportion of cases correctly classified with this model...	75.19%	81.27%	80.52%

Approach #3: Relationship between Declines in Specific Health and Functioning Variables and the 1996 Outcomes

The third and final approach used to address Question 4 investigated whether declines in any of the 56 health and functioning variables could differentiate people by their 1996 outcome experience. Answering this question involved completing bivariate analyses between each of the 56 variables and each of the outcome variables, therefore, 168 chi-squared analyses were completed in total. Because of the very large number of analyses, and the increasing risk of a Type 1 error, only those chi-squared tables that included zero values in one or more cells were defined as being capable of differentiating the 1996 outcomes.

Outcome: "Endhome"

Eighteen of the health and functioning variables capturing change between 1983 and 1990 were able to differentiate whether a person would be at home without home care in 1996 or whether a person would be at home with home care in 1996.

Of these 18 variables, eight variables made this differentiation as a result of a decline between 1983 and 1990. Two of these variables were in declines based on interviewer observations - difficulty talking and use of a wheelchair. If an interviewer did not observe a person having difficulties talking in 1983, but did observe these difficulties in 1990, the result was being at home without home care in 1996. If an interviewer did not observe a person using a wheelchair in 1983, but did observe the use of a wheelchair in 1990, the result was being at home with home care in 1996.

For the other six declines, all of the people who experienced them were using home care in 1996. These declines were in a person's ability to: do nursing care, use the

toilet, take medications or treatments, get in and out of bed, get around the house, and dress and put on shoes.

Outcome: "Justcare"

In total, fourteen variables were able to distinguish the 1996 home care users from the personal care home dwellers. Yet, only three of these fourteen variables made the distinction based on a decline between 1983 and 1990. All of the people who experienced a decline in their ability to feed themselves or to watch television or listen to the radio between 1983 and 1990 were living in a personal care home in 1996. In addition, if a person was not having difficulties talking in 1983 (as observed by the interviewer), but was having difficulties in 1990, their outcome in 1996 was personal care home.

Outcome: "Nothcpt"

This outcome looks at people at home without home care in 1996 compared to people who were living in a personal care home in 1996. Nineteen variables were able to distinguish these two groups, with eight of the nineteen making the distinction by virtue of a decline between 1983 and 1990.

For people who experienced a decline in their ability in any of the following activities between 1983 and 1990, their outcome was personal care home in 1996: getting around the house, watching television or listening to the radio, getting in and out of bed, doing nursing care, taking medications or treatments, feeding themselves, and dressing and putting on shoes. In addition, if the interviewer did not observe a person using a wheelchair in 1983, but observed that same person using a wheelchair in 1990, the outcome was personal care home in 1996.

Summary of Relationship between Declines in Specific Health and Functioning Variables and 1996 Outcomes

The bivariate results just presented demonstrate that declines in particular health and functioning variables between 1983 and 1990 are capable of defining a person's 1996 outcome. Chart 7.1 summarizes these findings and shows that, although many changes will lead a survivor to use formal long term care, only two changes can distinguish whether the care will be provided at home or in a personal care home.

Chart 7.1: Summary of the Relationship Between Single Health and Functioning Change Variables (1983 to 1990) and the 1996 Outcomes

If a person experienced a decline in ANY one of the following variables between 1983 and 1990, the result was receipt of formal long term care in 1996 (home care or personal care home):

- getting around the house,
- getting in and out of bed,
- dressing and putting on shoes,
- feeding oneself,
- taking medications or treatments,
- using the toilet,
- doing nursing care,
- watching the television or listening to the radio,
- using a wheelchair.

But, if the decline included either one of the following two variables, then the result was personal care home rather than home care in 1996:

- feeding oneself,
- watching the television or listening to the radio.

Can Total Declines in Health and Functioning Differentiate the 1996 Outcomes of Four Sub-Groups in the Sample?

One of the hypotheses linked to Question 4 proposed that declines in health and functioning would be able to differentiate the outcome experiences of men and women, and of urban and rural dwellers. To address this hypothesis, four sub-analyses were completed, one for each of these groups within the sample (i.e., men, women, urban dwellers, rural dwellers).

Unlike the analyses completed for the whole sample, these four sub-analyses looked only at total health and functioning declines and not at declines in the various aspects of health and functioning (e.g., ADL, IADL, etc). In addition, the adjusted models presented for the four sub-analyses adjusted for only age and sex (for urban and rural analyses), or for only age and region (for the analyses by sex) rather than all of the components of the Evans and Stoddard (1994) framework. These two analytic differences reflect a decreased "N", and the inability to retain adequate statistical power for the more detailed analyses, as presented for the whole sample (See Chapter 4).

Women

As Table 7.8 shows, total health and functioning declines is able to differentiate the 1996 outcomes of women for all of the outcome pairs used in this study. Furthermore, total health and functioning declines can differentiate the 1996 outcomes of women for all of the outcome pairs, even after adjusting for age in 1990 and for region (i.e., urban versus rural) in 1996. For all of the analyses presented in the Table, the size of the p values is striking and all remain highly significant even after adjustment. An additional observation of interest in these findings is the fact that the beta value remains

the same for both models of the “Endhome” and “Justcare” outcomes (i.e., there is no difference after adjustment). The results presented in Table 7.8 support the hypothesis that declines in health and functioning will differentiate the outcome experiences of women.

Table 7.8: Influence of Total Health and Functioning Declines (b Values) on 1996 Outcomes, Adjusted and Unadjusted Models, for Women Only

	Unique Influence of Total Health and Functioning Declines: Unadjusted Model	Unique Influence of Total Health and Functioning Declines: Adjusted Model
Endhome (Home=0, HC=1) N=274	0.214 (p<0.0000)	0.214 (p<0.0000)
Just Care (HC=0, PCH=1) N=283	0.096 (p<0.0000)	0.096 (p<0.0000)
Nothcpt (Home=0, PCH=1) N=291	0.284 (p<0.0000)	0.268 (p<0.0000)

Men

As Table 7.9 shows, total health and functioning declines is also able to differentiate the 1996 outcomes of men for all of the outcome pairs used in this study. Furthermore, total health and functioning declines can differentiate the 1996 outcomes of men for all of the outcome pairs, even after adjusting for age in 1990 and for region (i.e., urban versus rural) in 1996. Unlike the analyses shown for women (Table 7.8), the analyses for men show p values that are less dramatic as well as more variable across the various outcomes. Whereas for the women’s analyses, the p values did not vary after

adjusting for age and region, the p values for men appear more likely to drop after adjustment. In fact, for the outcome “Justcare”, the unique influence of total health and functioning declines is close to being not significant after adjustment. The results presented in Table 7.9 support the hypothesis that declines in health and functioning will differentiate the outcome experiences of men, although not as strongly as for women.

Table 7.9: Influence of Total Health and Functioning Declines (b Values) on 1996 Outcomes, Adjusted and Unadjusted Models, for Men Only

	Unique Influence of Total Health and Functioning Declines: Unadjusted Model	Unique Influence of Total Health and Functioning Declines: Adjusted Model
Endhome (Home=0, HC=1) N=157	0.167 (p<0.004)	0.157 (p<0.01)
Just Care (HC=0, PCH=1) N=92	0.100 (p<0.03)	0.095 (P<0.04)
Nothcpt (Home=0, PCH=1) N=135	0.250 (p<0.0001)	0.278 (p<0.0003)

Urban Dwellers

The analyses for urban dwellers includes only those individuals living in the City of Winnipeg in 1996. As Table 7.10 shows, total health and functioning declines is able to differentiate the 1996 outcomes of the urban dwellers for all of the outcome pairs used in this study. Furthermore, total health and functioning declines can differentiate the 1996 outcomes of urban dwellers for all of the outcome pairs, even after adjusting for age in 1990 and for sex. Similar to the analyses shown for men (Table 7.9), the analyses for

urban dwellers is the least dramatic for the outcome “Justcare” (home care versus personal care home). For the other outcomes, the beta and p values vary only slightly, and remain highly significant, even after adjustment. The results presented in Table 7.10 support the hypothesis that declines in health and functioning will differentiate the outcome experiences of urban dwellers.

Table 7.10: Influence of Total Health and Functioning Declines (b Values) on 1996 Outcomes, Adjusted and Unadjusted Models, for Urban Dwellers Only

	Unique Influence of Total Health and Functioning Declines: Unadjusted Model	Unique Influence of Total Health and Functioning Declines: Adjusted Model
Endhome (Home=0, HC=1) N=160	0.221 (p<0.0000)	0.221 (p<0.0000)
Just Care (HC=0, PCH=1) N=149	0.088 (p<0.001)	0.070 (p<0.02)
Nothcpt (Home=0, PCH=1) N=145	0.288 (p<0.0000)	0.281 (p<0.0000)

Rural Dwellers

Table 7.11 presents the analyses for the unique influence of health and functioning declines on each of the outcome variables, unadjusted and then adjusted for age and sex. It can be seen that total health and functioning declines can differentiate the 1996 outcomes of people living outside of Winnipeg for all of the outcome pairs used in this study. Furthermore, total health and functioning declines can differentiate the 1996 outcomes of people outside of Winnipeg for all of the outcome pairs, even after adjusting

for age in 1990 and for sex. Unlike the urban dwellers analyses, the analyses presented below remain highly significant across all of the models presented, including the model "Justcare" (home care versus personal care home). Another interesting observation stemming from the results in Table 7.11 is the fact that the beta values change very little between the unadjusted and adjusted models. The results presented in Table 7.11 support the hypothesis that declines in health and functioning will differentiate the outcome experiences of rural dwellers.

Table 7.11: Influence of Total Health and Functioning Declines (b Values) on 1996 Outcomes, Adjusted and Unadjusted Models, for Rural Dwellers Only

	Unique Influence of Total Health and Functioning Declines: Unadjusted Model	Unique Influence of Total Health and Functioning Declines: Adjusted Model
Endhome (Home=0, HC=1) N=271	0.188 (p<0.0000)	0.165 (p<0.0002)
Just Care (HC=0, PCH=1) N=226	0.121 (p<0.0000)	0.121 (p<0.0000)
Nothcpt (Home=0, PCH=1) N=281	0.285 (p<0.0000)	0.282 (p<0.0000)

Summary of Health and Functioning Section

This section has presented a series of analyses that addressed the health and functioning part of the question - can changes between 1983 and 1990 in health and functioning and in the physical environment differentiate the people by their 1996 outcome experience? Analyses explored whether declines in health and functioning

could differentiate the outcome experiences of the members of the sample using three different approaches. The first approach used a summary measure of total health and functioning declines as the independent variable of interest. Using this measure, it was found that health and functioning declines could differentiate the outcome experiences of the members of the sample when using two of the three outcomes (i.e., home versus home care, or home versus personal care home), even after all components of the Evans and Stoddard (1994) framework were controlled. This measure could not differentiate the outcome experiences if home care and personal care home made up the outcome pair.

The second approach used measures of decline within the different categories of the health and functioning component - ADL, IADL, leisure participation, observed physical difficulties, ability to walk out-of-doors, and self-rated health. The third approach looked at each of the 56 variables against each of the outcome measures in a bivariate analysis. All of these analyses showed a much more complex set of relationships and a fair degree of variability in the results across the three outcome measures. Based on the Evans and Stoddard (1994) framework, the results of approaches two and three would not support the hypothesis given that the definition of declines in health and functioning used within these approaches do not capture the rich internal structure of the component. Nevertheless, these analyses clearly demonstrate how the definition and measurement of a construct can greatly influence the results of a study (i.e., whether or not a hypothesis is accepted or rejected).

In addition to presenting the findings of these three approaches, this section on health and functioning also presented findings that demonstrated that total declines in health and functioning could differentiate the outcome experiences of the four sub-groups

within the whole sample - men, women, urban dwellers and rural dwellers. The results showed that across all three outcomes, within each sub-group, total health and functioning declines could differentiate the outcome experiences.

Overall, the findings of this section show that total health and functioning declines between 1983 and 1990 can partially differentiate the 1996 outcome experiences of the members of the sample and that the most difficult outcomes to distinguish are between home care and personal care home. Because of the conceptual framework guiding this study, the findings also demonstrate that the total health and functioning declines measure is a better approach in terms of distinguishing the outcomes because it is more comprehensive in terms of the "rich internal structure" of the health and functioning component.

The Relationship between Formal Long Term Care Use in 1996 and Changes in the Physical Environment Between 1983 and 1990

As noted in *Chapter 4 - Methods*, the physical environment component encompasses eight single-item indicators. Of interest in this section is whether changes to a more supportive physical environment between 1983 and 1990 can differentiate the people who experienced the three outcomes of interest in 1996 (i.e., home without home care, home with home care, personal care home). Two operational definitions of a more supportive environment were used to test the hypothesis, with the second definition being more restrictive than the first. Both definitions were operationalized as nominal variables that captured whether a person had experienced no changes to a more supportive environment, one change, two changes, or three or four changes.

With each definition, three logistic regression models were completed for each of three outcomes to test the first hypothesis. The first model regressed the more supportive environment variable only against the outcome, the second model regressed this variable against the outcome controlling for age, sex and region, and the third model regressed the more supportive environment variable against the outcome controlling for all of the other Evans and Stoddard (1994) components. For this final model, filters were applied during the analysis to remove those respondents whose status could be defined by one of the other available variables. Therefore, for example, during the analysis for the “endhome” outcome (i.e., home in 1996 versus home care in 1996), the filter “endhome\$” was applied (Appendix 3).

Does a Change to a More Supportive Environment Increase the Odds of Being at Home with Home Care in 1996?

As described in Chapter 4, three pairs of dichotomous outcomes were created to look at whether and how changes between 1983 and 1990 are able to differentiate people by their 1996 outcomes. Because the hypothesis of interest in this section focuses on the outcome of home with home care in 1996, the outcome “nothcpt” (home versus personal care home) was not used in these analyses.

Table 7.12 shows that the less restrictive definition of a more supportive environment (“supenvir”) was unable to distinguish people at home in 1996 from people at home with home care in 1996 even before any other variables were added into the model. As a result of this finding, further analyses were not completed for this outcome. Based on this result, and the use of the less restrictive definition of change to a more

supportive environment, it was determined that people who experience this change are not more likely to be using home care in 1996.

Table 7.12: Results of Logistic Regressions Exploring the Influence of "Supenvir" on the Odds and the Probability of Being at Home Versus Using Home Care in 1996 (Home=0, Home Care=1)

	Model 1: Unadjusted (N=484)
Model Constant	-0.638
Change to a More Supportive Environment	
No changes	
1 change	1.64 (NS)
2 changes	1.54 (NS)
3 or 4 changes	1.99 (NS)
Proportion of Cases Correctly Classified in this model....	56.12%

Table 7.13 presents the same analysis, this time using the more restrictive definition of a change to a more supportive environment. Using this definition, people who experience a single change to a more supportive environment between 1983 and 1990 are at a 1.81 greater risk for using home care in 1996 than people who experience no changes to a more supportive environment. Of interest is the finding that more than one change to a more supportive environment *does not* differentiate people who were at home without home care in 1996 from people who were using home care in 1996.

After adjusting for age, sex and region (Model 2), a single change to a more supportive environment continues to differentiate the two groups, although the risk associated with this variable drops slightly (1.81 to 1.76). After controlling for all of the Evans and Stoddard (1994) components (Model 3), a change to a more supportive environment between 1983 to 1990 no longer retains a unique influence on the outcome.

Of interest is the finding that *none* of the individual variables from the health and functioning component entered this third model. This finding is probably an artifact of the filtering process which removed all of those individuals for whom their formal long term care status could be defined from one other change variable.

Table 7.13: Results of Logistic Regressions Exploring the Influence of "Supenvr2" on the Odds and the Probability of Being at Home Versus Using Home Care in 1996 (Home=0, Home Care=1)

	Model 1: Unadjusted (N=484)	Model 2: Adjusted for Age, Sex and Region (N=484)	Model 3: Adjusted for All Components (N=315)
Model Constant	-0.53	-0.78	-1.37
Change to a More Supportive Environment (restrictive definition)			
No changes	1.00	1.00	1.00
1 change	1.81 (1.19 - 2.75)	1.76 (1.14 - 2.71)	1.66 (NS)
2 changes	1.38 (NS)	1.32 (NS)	1.66 (NS)
3 or 4 changes	1.70 (NS)	1.55 (NS)	1.25 (NS)
Age in 1990 (85+)	-	2.05 (1.35 - 3.10)	NS
Sex (Female)	-	0.66 (0.44 - 0.98)	NS
Region (Not in Wpg)	-	1.57 (1.04 - 2.38)	NS
Prosperity Decline in Adequacy of Current Income	-	-	5.43 (1.01 - 29.27)
Disease Component ('83 to '90)			
Foot Problems Improved	-	-	2.79 (1.20 - 6.48)
Acquired Heart Problem	-	-	3.66 (1.71 - 7.84)
Health Care Home in '83, HC in '90	-	-	12.44 (4.06 - 38.16)
Proportion of Cases Correctly Classified in this model....	57.08%	62.18%	72.06%

Tables 7.14 and 7.15 present the results of the analyses that regressed “supenvir” (less restrictive definition) against “justcare” (home care versus personal care) (Table 7.14), and that regressed “supenvr2” (more restrictive definition) against “justcare” (Table 7.15). Regardless of the definition that is used for a change to a more supportive environment, neither of the unadjusted models can differentiate the people who were at home with home care in 1996 from the people who were living in a nursing home in 1996.

Table 7.14: Results of Logistic Regressions Exploring the Influence of “Supenvir” on the Odds and the Probability of Using Home Care Versus Being in a Personal Care Home in 1996 (Home Care=0, Personal Care=1)

	Model 1: Unadjusted (N=375)
Model Constant	0.13
Change to a More Supportive Environment (less restrictive definition)	
No changes	1.00
1 change	0.85 (NS)
2 changes	0.88 (NS)
3 or 4 changes	0.57 (NS)
Proportion of Cases Correctly Classified in this model....	51.73%

Table 7.15: Results of Logistic Regressions Exploring the Influence of “Supenvr2” on the Odds and the Probability of Using Home Care Versus Being in a Personal Care Home in 1996 (Home Care=0, Personal Care=1)

	Model 1: Unadjusted (N=375)
Model Constant	-0.03
Change to a More Supportive Environment (more restrictive definition)	
No changes	1.00
1 change	0.92 (NS)
2 changes	1.23 (NS)
3 or 4 changes	1.20 (NS)
Proportion of Cases Correctly Classified in this model....	52.27%

As a result of the findings presented in Tables 7.12 to 7.15, the hypothesis being tested is rejected. That is, a change to a more supportive environment between 1983 and 1990 *does not* mean people are more likely to be at home with home care in 1996. Although the more restrictive definition can distinguish people who were at home with home care in 1996 from people who were at home without home care in 1996, it can only make this distinction if no other factors are considered, or if only age, sex and region are considered. Once variables from all of the components of the Evans and Stoddard (1994) framework are considered, a change to a more supportive environment no longer shows a unique influence on the outcome. Furthermore, regardless of the definition used for a more supportive environment, people who are at home with home care in 1996 cannot be differentiated from people who are living in a personal care home in 1996.

Can Changes in the Physical Environment Differentiate the 1996 Outcomes of Four Sub-Groups in the Sample?

One of the hypotheses linked to research Question 4 proposed that changes in the physical environment would be able to differentiate the outcome experiences of men and women, and of urban and rural dwellers. To address this hypothesis, four sub-analyses were completed, one for each of these groups within the sample (i.e., men, women, urban dwellers, rural dwellers).

Unlike the analyses completed for the whole sample, these four sub-analyses used only the more restrictive definition of a change to a more supportive physical environment. In addition, the adjusted models presented for the four sub-analyses are adjusted for only age and sex (for urban and rural analyses), or for only age and region (for the analyses by sex) rather than all of the components of the Evans and Stoddard (1994) framework. These two analytic differences reflect a decreased "N", and the inability to retain adequate statistical power for the more detailed analyses, as presented for the whole sample.

Women

As Table 7.16 shows, changes in the physical environment are able to differentiate the 1996 outcomes of women for two of the outcome pairs used in this study, after adjusting for age and region (i.e., urban versus rural). Of interest in these findings is that the differentiation occurs only for the category of one change in the physical environment, and that all of the confidence intervals come very close to 1. In other words, although having one change in the physical environment can distinguish between

two different outcome pairs, this ability is very close to being insignificant. Having two or more changes cannot distinguish between the groups for any of the outcome pairs.

Changes in the physical environment cannot differentiate between people who are at home with home care in 1996 from people who are in a personal care home. The results presented in Table 7.16 partially support the hypothesis that change in the physical environment will differentiate the outcome experiences of women.

Table 7.16: Influence of Changes to a More Supportive Environment ("Supenvr2") on 1996 Outcomes, Unadjusted and Adjusted Models, for Women Only

Outcome Pairs	Levels of Change in "Supenvr2"	OR for "Supenvr2": Unadjusted Model	OR for "Supenvr2": Adjusted Model
Endhome (Home=0, HC=1) N=274	No changes	1.00	1.00
	1 change	1.79 (1.06 - 3.04)	1.75 (1.03 - 2.97)
	2 changes	1.13 (NS)	1.13 (NS)
	3 or 4 changes	1.74 (NS)	1.66 (NS)
Just Care (HC=0, PCH=1) N=283	No changes	1.00	1.00
	1 change	0.88 (NS)	0.87 (NS)
	2 changes	1.28 (NS)	1.30 (NS)
	3 or 4 changes	1.05 (NS)	0.97 (NS)
Nothcpt (Home=0, PCH=1) N=291	No changes	1.00	1.00
	1 change	1.59 (NS)	1.88 (1.04 - 3.40)
	2 changes	1.43 (NS)	1.78 (NS)
	3 or 4 changes	1.83 (NS)	1.78 (NS)

Men

The findings presented in Table 7.17 show that changes in the physical environment cannot distinguish between any of the outcome pairs, regardless of whether the models are adjusted or unadjusted. Based on these findings, the hypothesis that changes in the physical environment will be able to differentiate the outcome experiences of men is rejected.

Table 7.17: Influence of Changes to a More Supportive Environment (“Supenvr2”) on 1996 Outcomes, Unadjusted and Adjusted Models, for Men Only

Outcome Pairs	Levels of Change in “Supenvr2”	OR for “Supenvr2”: Unadjusted Model	OR for “Supenvr2”: Adjusted Model
Endhome (Home=0, HC=1) N=157	No changes	1.00	1.00
	1 change	1.71 (NS)	1.83 (NS)
	2 changes	1.92 (NS)	1.51 (NS)
	3 or 4 changes	1.17 (NS)	1.65 (NS)
Just Care (HC=0, PCH=1) N=92	No changes	1.00	1.00
	1 change	0.96 (NS)	1.10 (NS)
	2 changes	1.10 (NS)	1.22 (NS)
	3 or 4 changes	1.64 (NS)	1.28 (NS)
Nothcpt (Home=0, PCH=1) N=135	No changes	1.00	1.00
	1 change	1.64 (NS)	2.10 (NS)
	2 changes	2.10 (NS)	2.54 (NS)
	3 or 4 changes	1.92 (NS)	2.50 (NS)

Urban Dwellers

Table 7.18 presents the findings for the models that explored the ability of changes in the physical environment to differentiate the outcome experiences of people living in Winnipeg. As the results show, after adjusting for age and sex, changes in the physical environment can differentiate across all of the outcome pairs. Of particular interest in these findings is that one change can differentiate people who were at home without home care from people who were using home care in 1996, while two changes can differentiate people who were at home without home care from people who were living in a personal care home in 1996.

Based on the findings presented in Table 7.18, the hypothesis that changes in the physical environment can differentiate the outcome experiences of people living in urban areas is accepted.

Table 7.18: Influence of Changes to a More Supportive Environment (“Supenvr2”) on 1996 Outcomes, Unadjusted and Adjusted Models, for Urban Dwellers Only

Outcome Pairs	Levels of Change in “Supenvr2”	OR for “Supenvr2”: Unadjusted Model	OR for “Supenvr2”: Adjusted Model
Endhome (Home=0, HC=1) N=160	No changes	1.00	1.00
	1 change	2.05 (1.02-4.12)	2.03 (1.01-4.11)
	2 changes	0.69 (NS)	0.70 (NS)
	3 or 4 changes	0.90 (NS)	0.93 (NS)
Just Care (HC=0, PCH=1) N=149	No changes	1.00	1.00
	1 change	0.62 (NS)	0.58 (NS)
	2 changes	2.45 (NS)	3.36 (1.10-10.31)
	3 or 4 changes	0.78 (NS)	0.51 (NS)
Nothcpt (Home=0, PCH=1) N=145	No changes	1.00	1.00
	1 change	1.27 (NS)	1.36 (NS)
	2 changes	1.68 (NS)	3.04 (1.06-8.71)
	3 or 4 changes	0.69 (NS)	0.55 (NS)

Rural Dwellers

The findings presented in Table 7.19 show that changes in the physical environment are unable to distinguish the outcome experiences of rural dwellers for the outcome “justcare” and “endhome”. These changes can distinguish between people who are at home without home care in 1996 from people who are living in a personal care home. For this outcome pair, having one change in the physical environment is associated with the formal long term care outcome. As a result of the findings presented in this Table, the hypothesis that changes in the physical environment can differentiate the outcome experiences of people living in rural areas is partially accepted.

Table 7.19: Influence of Changes to a More Supportive Environment (“Supenvr2”) on 1996 Outcomes, Unadjusted and Adjusted Models, for Rural Dwellers Only

Outcome Pairs	Levels of Change in “Supenvr2”	OR for “Supenvr2”: Unadjusted Model	OR for “Supenvr2”: Adjusted Model
Endhome (Home=0, HC=1) N=271	No changes	1.00	1.00
	1 change	1.64 (NS)	1.60 (NS)
	2 changes	2.07 (NS)	1.73 (NS)
	3 or 4 changes	3.11 (NS)	3.64 (NS)
Just Care (HC=0, PCH=1) N=226	No changes	1.00	1.00
	1 change	1.16 (NS)	1.18 (NS)
	2 changes	0.74 (NS)	0.68 (NS)
	3 or 4 changes	1.59 (NS)	1.56 (NS)
Nothcpt (Home=0, PCH=1) N=281	No changes	1.00	1.00
	1 change	1.91 (1.14 - 3.21)	2.29 (1.24 - 4.23)
	2 changes	1.54 (NS)	1.26 (NS)
	3 or 4 changes	4.94 (NS)	5.36 (NS)

Summary of the Physical Environment Section

This section has presented a series of analyses that addressed the physical environment part of the question - can changes between 1983 and 1990 in health and functioning and in the physical environment differentiate the people by their 1996 outcome experience? The presentation explored whether a change to a more supportive environment could differentiate the outcome experiences of the members of the sample using two different definitions of such a change. The first definition was less restrictive, and analyses using this definition were unable to differentiate the outcome experiences of the members of the sample. The more restrictive definition was able to differentiate people at home with home care in 1996 from people at home without home care in 1996,

provided that the models were not adjusted for other components of the Evans and Stoddard (1994) framework.

Using the more restrictive definition of a change to a more supportive environment, the outcome experiences of men could not be differentiated. For women, and for urban and rural dwellers, some differences were found, depending on the outcome being used.

Conclusion

This chapter presented the results of the analyses completed to address the question: Can changes between 1983 and 1990 in health and functioning and the physical environment differentiate the 1996 outcome experiences of the members of the sample? The answer to the question is that changes in health and functioning can differentiate the 1996 outcome experiences if a measure of total health and functioning declines is used and if one is trying to distinguish between the outcomes home versus home care, or home versus personal care home. While other measures of change in health and functioning provide interesting and useful results, they do not address the rich internal structure of the health and functioning component as a whole, and therefore do not differentiate the members of the sample based on their 1996 outcomes. The second part of the answer to this question is that changes in the physical environment cannot differentiate the 1996 outcome experiences, even when a more restrictive definition is used.

In summary, the findings presented in this chapter have resulted in the following hypotheses being accepted or rejected when using the measure of total health and functioning declines and the more restrictive definition of a change to a more supportive environment:

Table 7.20: Summary of Hypothesis Testing Results for Chapter 7

Hypothesis	Result
Changes between 1983 and 1990 in health and functioning will differentiate the three groups of people in the 1996 whole sample with people experiencing declines being more likely to use formal long term care	PARTIALLY ACCEPTED IF A MEASURE OF TOTAL DECLINES IS USED
Changes between 1983 and 1990 in the physical environment will differentiate the three groups of people in the 1996 whole sample with people experiencing more supportive environments being more likely to use formal long term care in the home.	REJECTED
Changes between 1983 and 1990 in health and functioning will differentiate the 1996 outcome experiences among people in each of the following sub-groups: Men Women Urban Dwellers Rural Dwellers	IF A MEASURE OF TOTAL DECLINES IS USED: ACCEPTED ACCEPTED ACCEPTED ACCEPTED
Changes between 1983 and 1990 in the physical environment will differentiate the 1996 outcome experiences among people in each of the following sub-groups: Men Women Urban Dwellers Rural Dwellers	REJECTED PARTIALLY ACCEPTED PARTIALLY ACCEPTED PARTIALLY ACCEPTED

CHAPTER 8: MAKING THE FINAL LINKS

The introductory chapter described how the on-going shift of the age structure, the disproportionate use of formal long term care services by the oldest-old, and the changes in the health care delivery system have created a need to understand what leads people to use formal long term care services, if they live to be over 85 years of age. Understanding these factors though may not equate with making practice, program or policy decisions that are palatable or valuable to older people, their caregivers, health care providers, or the general public. Therefore, listening to the thoughts and ideas of the oldest-old themselves about what has lead them to use or not use formal long term care services may provide insight into possible methods for knowledge dissemination, and the communication of long term care policy to both the public and to practitioners in the field.

It is these interwoven ideas - perspectives of the oldest-old and the implications of the study findings - that make up the content of this chapter as it addresses the final two research questions:

- How do the qualitative explanations of the oldest-old enhance quantitative findings regarding patterns of formal long term care use and associated factors?
- What are the implications of the study findings for clinical practice and eldercare policy particularly with respect to reducing health inequalities among the oldest-old?

The first section of the chapter summarizes the major findings from chapters five through seven, and relates these findings to the themes found in the qualitative interviews. Within this section, some of the limitations of the secondary analysis are

discussed, particularly with respect to the issues and themes raised in the interviews that were not captured in the AIM data. The second section of the chapter offers a commentary on the implications of the study findings, with particular emphasis on research. This discussion addresses the continued use of the Evans and Stoddard (1994) framework for studies on predictors of formal long term care, and presents some of the challenges and benefits of using this framework for the study. In addition, this section of the chapter addresses the implications of the study findings for clinical practice and eldercare policy.

Links between Qualitative and Quantitative Research Findings

As already noted, the overall intent of the qualitative interviews was to supplement the quantitative findings, as well as to explore how they enhanced the quantitative findings. To achieve this end, the analysis of the qualitative data focussed on issues related to health and functioning, the role of the physical environment, perspectives on the use or non-use of formal long term care, and on personal explanations for longevity.

Two analytic elements were pursued within this focus, with the first one looking for recurring issues or themes raised during the interview that captured concepts not included in the secondary analysis. The second element involved searching the transcripts for quotes, ideas and perspectives that related to the nine components of the Evans and Stoddard (1994) framework (e.g., physical environment, social environment, disease, etc). The remainder of this section of the chapter is divided into three subsections that summarize the major findings presented in chapters five through seven.

Major Findings - Chapter 5

The findings presented in Chapter 5 focussed on patterns of care use and the differences in these patterns between men and women, and between people living in urban and rural areas. As hypothesized, it was found that the most common pattern of care use among people who were at home without formal long term care in 1996 was one of stability, that is, they were at home without home care in 1983, 1990 and 1996.

Contrary to the hypothesis, it was found that the most common pattern of care use among people who were living in an institution in 1996 was not a pattern of steady decline over time (i.e., home in 1983, home care in 1990 and institutionalized in 1996). In addition, it was found that there was a most common pattern of care use among people who were living at home with the assistance of home care in 1996, again, contrary to what was hypothesized.

The qualitative data did not contribute to understanding the patterns of care per se, or about differences in the experience of particular patterns between men and women or between urban and rural dwellers. What these data did provide was a glimpse into people's explanations of why they needed to use or not use services to remain in the community, or alternatively, why some of their peers needed to be in a nursing home while they did not. The explanations were diverse, but the most frequent explanations revolved around personal health practices and financial security.

Personal Health Practices:

A number of the people interviewed talked about how personal health practices such as eating properly, not drinking alcohol, not smoking and staying active had contributed to their ability to remain at home without care, or alternatively, to be able to

stay at home with home care as opposed to needing to be in a nursing home. Although the benefits of personal health practices were not discussed by all the people who were interviewed, none of the individuals interviewed suggested that these factors *did not* play a role in a person's need for care.

Winnifred is 90 years old, has never been married, is living in a senior's apartment, and has never used home care services:

MF: "What have you done in your life that has allowed you to be here and not need any help?"

Winnifred: "Well, I sometimes think that I've kept healthy, I think of the people that have fallen and broken hips that didn't use cottage cheese and yogurt and things that you get the calcium."

MF: "So you ate right?"

Winnifred: "And I think that I've had, and the vitamins, Vitamin C, I've read, you don't get the benefit of calcium unless you have the Vitamin C that it enhances the good that the calcium does. And reading things like that about health."

Helen is 88 years old, is widowed, is living in an age-integrated apartment, and has only used home care services after a major surgery a few years back:

MF: "Can you think of anything else that potentially could be an explanation for why you've been able you know, be 88, still living on your own when other people your age are needing to live in a personal care home?"

Helen: "Not really. I've never smoked. Other than some wine, I don't drink. I like a glass of wine with my meal. But no, I try to eat healthfully. I think it's probably all because of my genes probably that I'm able to."

Paula is 86 years old, is widowed, is living in an age-integrated apartment, and receives home care but also pays for some additional cleaning services:

MF: "What things do you think have allowed you to remain living in your own home with the help that you have? Like some people wouldn't even be able to stay in their homes if they had help. So what has allowed you to stay here?"

Paula: "Oh well, I like doing it I guess. Now making my bed is the hardest thing I do. My son phoned me yesterday morning. "Mom where were you?" "In the back of the bed, and I can't get the walker in there and the phone's at the front." I have phones all over, I have that phone on the table here, I've got one over at the end of the chesterfield. The boys see to that. And I have one in my bedroom and I said to him, "Just give me time to get out from behind this bed." That's one of the hard jobs is making my bed. And I was having a real struggle with my income tax this year.....I hate filling out forms."

Catherine is 90 years old, is widowed, lives in a large house by herself, and has extensive home care services:

MF: "Do you have any stories or ideas or things that you'd like to share with me that you think would help me understand why some people your age can live alone while some people need so much care?"

Catherine: "Well, just, I don't know, just keep yourself occupied for one thing. I'm making squares. I haven't got one here but I knitted all those squares and I have another big ball of wool to do. And this here, the lady gave it to me and I'm going to crochet all around the outside for her little girl in black. It's a doll's cover and she wants me to crochet it all around the outside."

These series of quotes illustrate the most common explanations provided for the use or non-use of care throughout all of the interviews. As shown by the quotes from Winnifred and Helen, eating properly, not smoking and using alcohol responsibly were seen to have contributed to their lack of need for care. These explanations are consistent with the Evans and Stoddard (1994) framework component of individual responses. The quotes by Catherine and by Paula point more to the health and functioning component as they tend to focus on staying active and, as Paula says, "doing."

Finances:

Two of the people interviewed felt strongly that their financial security had made an important contribution to their ability to remain living at home without services, and

that this security was one of the factors that differentiated them from people who required care. Four others discussed financial security issues, and how financial security helped them stay at home. For these four people though, financial security was not seen as the primary factor differentiating them from others who required care. Unfortunately the two people who felt strongly about the role of financial security could not elaborate in detail on how or why financial security contributed to their ability to remain in the community:

Maude is 92 years old, is widowed, and is living in a seniors' apartment that is attached to a personal care home. She receives extensive support from the staff of the home:

MF: "Why are you able to be here and while there are people who are the same age as you are having to live in a personal care home?"

Maude: "Oh I don't know. Just that I figured out how to get my money and that. I think anybody could do that but apparently they don't."

Liam is 92 years old. He and his 85 year old wife live in a seniors' apartment. They receive no home care services:

MF: "Is there anything else that you think has allowed you to remain in your own home without any help?"

Liam: "Yes, there's several things. One of them is money, naturally. We didn't go bankrupt in the store because we quit before we got that."

While Maude and Liam thought that financial security, among other factors, enabled them to stay at home without services, some of the other people who were interviewed indicated that they had never really thought about the impact of financial security on a person's need for care. Alternatively, two others felt that money had nothing to do with the length of a person's life or their need for care.

Sam is an 88 year old widower who lives in a house with his 30-something grandson. He receives meals-on-wheels, and they pay a housekeeper to come in to clean and do laundry:

MF: "So you don't think that income or finances or financial security really have too much to do with living a long life or needing care?"

Sam: "Well, I say, look at my dad. He went to 96 on a \$25.00 a month pension. He, there was nothing wrong with his method of living."

Matthew is a 93 year old widower who lives alone in a seniors' apartment that provides extensive services to its tenants, including cleaning and three meals a day:

MF: "Some people think that if you have lots of money that you can live longer because you can buy everything that you need. Do you think that is true?"

Matthew: "That's not true."

MF: "How come?"

Matthew: "Because I gave, is life, is life you know. I would really have loved it if I had a friend right here with me, you see."

MF: "A friend right here would let you live longer?"

Matthew: "Yes."

Other explanations provided by the interviewees for needing to use or not use formal long term care services in old age included being free of disease, having a positive frame of mind, having a supportive family, not worrying, and having "good genes". It is interesting to note that together the various explanations provided during the interviews cover all of the components of the Evans and Stoddard (1994) framework, except the health care and the physical environment components.

Major Findings - Chapter 6

The findings presented in Chapter 6 addressed patterns of change in health and functioning, and in the physical environment over time, and how these changes were associated with patterns of formal long term care use. These results showed that steady declines in health and functioning over time lead to patterns of care ending in formal long term care in 1996, and that steady improvements in health and functioning were associated with patterns of care ending at home without home care in 1996. The results also showed that changes to a more supportive environment over time were not associated with patterns of care ending in home care, but rather these changes were associated with patterns of care ending in a personal care home.

Chapter 6 also showed that stability in the physical environment together with declines in health and functioning were associated with patterns of care ending in formal long term care in 1996, and that stability in the physical environment together with stability or improvement in health and functioning were associated with patterns of care ending at home without home care in 1996. Consistent with these quantitative findings, the qualitative findings showed that the majority of the respondents remained stable in their health and functioning, and in their physical environments over time. When asked about any changes they had experienced over the past year or so, many of the interviewees struggled for a response:

Tom is an 88 year old widower who lives alone in a house. He receives no home care services, although his daughter helps with the heavy housework and laundry:

MF: “Have you been someone who's always been healthy throughout your life?”

- Tom: "Pretty well, yeah. I never really was, what was it in '51 or '52. I had an operation for appendix. I had appendix out, that's the only thing I ever had very bad. Very bad this was. Being in the hospital."
- MF: "Have you had any changes at all in your life over the past year? Changes with your family, or the things that you like to spend your time doing? Any changes like that?"
- Tom: "Not really I don't think. Not really. Not in the last 3 or 4 years anyway."

Peggy is a 95 year old widow who lives with her daughter in the winter and alone on her farm in the summer. She does not use any formal long term care services:

- MF: "Now I interviewed you last time in 1996 when you were on the farm. I came to your house. What kinds of things have changed for you since then?"⁸
- Peggy: "I no longer try to live on the farm during the winter by myself...My daughter insisted I come over and stay with them here. For one thing, I lived half a mile off the main road and around my yard, the snow blew in so badly, as long as I could run my snow blower, I could open the road myself. And then, I don't know, shortly after that I wasn't able to drive anymore on account of my eye sight. So I was stuck there alone."
- MF: "Have you had other things that you would say are really major changes or events in the last few years?"
- Peggy: "I can't say."
- MF: "No major changes in your health or your leisure or your social circles or anything like that?"
- Peggy: "No not really."

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The author was one of the interviewers in the 1996 wave of the Aging in Manitoba Study. Among the people interviewed for the current study, Peggy, Sam and Katie had been interviewed by the author in 1996. All three of them remembered the author and the previous interview.

While some of the interviewees struggled to respond to questions about the changes they had been experiencing, others provided responses that indicated complex interactions between disease related changes, social environment changes and their health and functioning. Comments that related to changes in vision were commonly a part of these interactions. Overall, these qualitative responses pointed to the limitations of the secondary analysis and illustrated its reductionistic perspective on the associations between changes and patterns of formal long term care use.

Maude is a 92 year old widow who is living in a seniors' apartment that is attached to a personal care home. She receives extensive support from the staff of the home:

MF: "I'm curious now about some of the major changes that have happened in your life over the last couple years. A couple of things we've already talked about is that you had more problems with your vision and that you have just moved here."

Maude: "Well I had to move to [village]. I was there twice. I was up in the [name] apartments for a while but I didn't like it there so I moved back to [village]. I know my kids thought I did too much moving but I moved anyway...Oh, my eyes are getting worse, and I take heart pills...I can't walk much anymore so I, it's my old hip, right hip that's pretty near gone and so that's a brand new [wheel] chair. It was given to me, or loaned to me...I have to wheel myself. I go with my...[motions with her feet] and with my hands on the wheel but when, for supper now somebody always comes in and takes me down there."

Jack is a 92 year old widower who lives alone in a house. He receives minimal assistance from home care:

Jack: "Well, my eye sight is going, well it's practically gone. I've got about 25% eye sight left and my hearing isn't near as sharp as it should be. I have a little pain at the bottom of my back but other than that I think I am in exceptionally good health. A couple of times I have been down to the doctor, I haven't been to the doctor oh a couple of years now. But up until then he said I was the healthiest old man he had! (laughs)...[Those are] the only things that is bothering me now. I'm awfully conscious of my lack of eye sight when I go to eat. I'm sitting at the table eating, ah, the stuff

on the plate is there, I know it's there but as far picking it out its.. I'm just looking through a veil of tears all the time. The eyes are dribbling water.

MF: "Has your eye sight, has that affected your ability to manage around here on your own?"

Jack: "Ah, I don't think so, I've just slowed down. I've just to go slower, that's all. I have to go quite careful and I've got to a state like where I don't go out anymore. [Daughter] takes me out once in a while. We went down and got my hair cut the other day but other than that, why, I'm afraid to walk on the sidewalk... I can't see the, I have no depth perception. The snow drifts on the sidewalks, they are mountains as far as I'm concerned. Well, I've got to the stage where I don't do anything, shall we say. I know I should. Everybody tells me, oh, you want to get out and exercise. Well, it's just too much bother. (laughs)."

Comments in the interviews that explicitly linked the physical environment to health and functioning were relatively uncommon. The quotes that best illustrate these links have already been shared in Chapter 6, and therefore will not be repeated here. The lack of qualitative data linking these two components is likely due to two primary factors. The first, and probably most important, is the use of an open-ended qualitative interview. While the list of interview topics included the physical environment, and probes were used to capture this component, discussions that were initiated by this topic inevitably lead elsewhere. These tangents were often very fruitful, but it was frequently difficult to lead the conversation back to physical environment issues. Following the original semi-structured interview format may have eliminated some of this difficulty and produced more quantitative-qualitative links.

The second reason for the lack of qualitative data linking health and functioning and the physical environment may be the chronology of the study, and the fact that

interviews were conducted prior to all of the secondary analyses being completed. Because of this chronology, the interviewer may have been less sensitive to these links during the interview, and may not have followed up on threads of discussion that might have produced and illustrated interesting qualitative-quantitative links. Had the secondary analysis been completed prior to the interview process, it may have been possible to explore the links between the physical environment and health and functioning more effectively during the interviews because of heightened interviewer sensitivity.

Major Findings - Chapter 7

The findings presented in Chapter 7 focussed on how changes between 1983 and 1990 in health and functioning and the physical environment were associated with formal long term care use in 1996. Findings showed how total declines in health and functioning were able to distinguish among two of the three outcome pairs (home versus home care, home versus personal care home). Much of what has been presented in the previous two sections of this chapter also apply here.

The findings of Chapter 7 also demonstrated that changes between 1983 and 1990 to a more supportive physical environment were either not associated with the 1996 outcomes, or were associated only weakly. For men, changes in the physical environment were not able to differentiate their outcome experiences, while for women, urban dwellers and rural dwellers, changes to a more supportive physical environment could distinguish between some of the outcome pairs. In most of these situations though, the confidence limits associated with the physical environment changes came very close to one, indicating that the relationships were weak.

During the first few interviews completed for the study, people were asked about changes they had experienced ten to thirteen years prior and whether they thought these changes had had an impact on their current situation. Respondents were unable, in most cases, to identify changes from this temporal perspective. About midway through the fifteen interviews, this observation resulted in asking the respondents about major turning points in their lives, and whether these points had any relationship to their current situation, and use or non-use of care. As the conversation with Helen shows, below, these turning points were complex events that have an even more complex relationship to her current life experiences.

Helen is 88 years old, is widowed, is living in an age-integrated apartment, and has only used home care services after a major surgery a few years back:

MF: "So would you say that you've made particular decisions or choices over the course of your life that you think have contributed to you being able to live a long and healthy life? Kind of turning point events?"

Helen: "I think we probably, us having left the farm when we did maybe has helped us too. We left when my husband was 65 and I was 64. And a lot of people didn't...But we decided then that we wouldn't buy a house in [name of town] because it would take everything we had off the farm if we did. So we would invest our money and, from the farm, and get an apartment. Which we did and I still think it was the right decision because I said, well, the interest. The interest on your money more than pays your rent."

MF: "Especially at that time."

Helen: "Oh yes and you still had your money you know, I mean to say. So it really, I know I was, we were both getting pretty tired. We had a big garden...And I missed those things when we left but then, I didn't miss the work, I'll tell you...It wasn't hard to leave the farm with circumstances like that. I'm glad to get off of here and be rid of this you know. So I think probably that helped us with our health, leaving before we were overtired and overworked."

MF: "Are there other turning points that you can think of maybe when you were even younger, before you retired?"

Helen: "I think our decision was good when we moved up to [name of village]. In the first place we moved from a rented farm, a big farm, 3/4 section. It was a lot of work and we moved from there and bought a farm you see then in 1945. And then you felt, we worked hard there too, because the house was in bad shape. It was a good house, good building but it had been, they'd been rented and it had been abused and there was nice plaster walls and they's stuck nails in all along and hung calendars and everything. So a lot of work had to get that back and then we'd, as I say, we had the big garden so but we felt it was something we were doing for ourselves you know, it was ours. We enjoyed that. We had something of our own."

The statistical models in Chapter 7 show that many factors have an unique influence on the 1996 care outcomes people in the sample experienced. Like these statistical models, this section of Helen's interview shows how many factors contribute to her current situation. Within this text, she addresses the interaction between individual responses and health and functioning (the choice to leave the farm before becoming overtired), as well as the interaction between prosperity and the physical environment (buying a house versus renting an apartment using interest). She also links the physical environment and her sense of well-being in her discussion of her first home, and the work that she and her husband did to fix it up.

In comparing the links made by Helen to the findings presented in Model 3 of both Tables 7.5 and 7.7 (home versus home care; home versus personal care home), both the qualitative and quantitative data indicate that health and functioning changes distinguish people who use care from those people who do not. The quantitative data also found that age, length of time in the community, and prior use of home care could distinguish these two groups of people. In addition, acquiring heart problems and

experiencing a decline in income adequacy between 1983 and 1990 distinguished people who were receiving home care in 1996 from people who were at home without home care in 1996. The qualitative data do not support or refute these findings, but rather present additional possibilities, that is, the role of the physical environment and individual responses. It is interesting to note that with both the qualitative and quantitative data, all of the components of the Evans and Stoddard (1994) framework except well-being are seen as being able to distinguish formal long term care users from non-users.

The link evident in Helen's interview supports the complexity of the statistical models presented in Chapter 7, as does a section of Susan's interview, below. Like the text from Helen's interview, the text from Susan's interview links the physical environment and prosperity. Unfortunately for Susan and her husband, the losses associated with a fire on their farm meant that both of them had to continue working. Later in the interview, Susan suggested that this need to continue working had a negative, long-term impact on the health and functioning of both her husband and her.

Susan is 86 years old and lives alone in an age-integrated apartment. Her husband lives in a personal care home. She receives minimal home care assistance:

- MF: "Sometimes when people look back on their lives, they can identify an event or a series of events that led them to where they are now. Is there something that you can say has lead you to where you are now?"
- Susan: "Like good or bad?"
- MF: "Whatever."
- Susan: "I'd say the fire led us where we are. We would have kept the farm there and farmed. But when our implements went, we had to go."
- MF: "So that was a major turning point in your life?"

Susan: "In our lives yes. Because we had just bought the farm. There was a big house on there and then we had all, the shed was 100 feet long and everything was stored in there, there was 3/4 section. And we didn't have it paid for and we couldn't sell it for the price we paid for it, and all of a sudden it went with the fire. So he got a job and then we kept on working. I worked then for 16 years."

In addition to asking about turning points, and how these events had influenced their current situations, the respondents were also asked about whether they had a philosophy of life or a motto by which they lived. The responses received from these questions highlighted the limitations of the secondary analysis, and how these quantitative findings were unable to capture the fundamental essence of the people under study. Regardless of whether individual respondents used formal long term care services or not, their philosophies, mottos and perspectives on life had a profound influence on who they were, and how they lived their lives.

Sam is an 88 year old widower who lives in a house with his 30-something grandson. He receives meals-on-wheels, and they pay a housekeeper to come in to clean and do laundry:

MF: "Do you have a motto that you live by or a personal philosophy of life?"

Sam: "Oh well, I really think, like I, well some people believe that they came from a little spot that rolled on the earth and has got one finger and one toe, well I don't believe that. I can't see how that makes common sense to me...I think that the earth is given to man to enjoy. It was created. I'm positive it was created because there is so many beautiful things. I'm thinking of a little poem:

He makes the rose an object of His care
He guides the eagle through the pathless air
And if He does that
He can look after you and me."

MF: "That's a nice poem."

Sam: "That's the kind of thing I get through my mind. I think we are created. We are created beings. We didn't come from a spot rolling on the mud. At least I can't see it...Your thoughts, your daily thoughts is the first thing. That's how your life, you have a happy life with your thoughts, don't you? I don't think you could have a happier life if you didn't have thoughts that made you happy. At least I think that."

Liam is 92 years old. He and his 85 year old wife live in a seniors' apartment. They receive no home care services:

MF: "Now would you say that you have a personal philosophy of life?"

Liam: "Yes."

MF: "And what it is?"

Liam: "It's right in that book. Read it."

MF: "I can't and I won't. If you cross out the 't' you get I can and I won". That's your philosophy, I can and I won? That sounds like a good philosophy."

Liam: "If you say you can't do something you can't. If you say can, and you put your best effort forward, you will win, no matter what."

Catherine is 90 years old, is widowed, lives in a large house by herself, and has extensive home care services:

MF: "Now do you think you have personal philosophy about life?"

Catherine: "Nothing, just do what you want to do and go ahead and don't worry about nothing."

Tom is an 88 year old widower who lives alone in a house. He receives no home care services, although his daughter helps with the heavy housework and laundry:

MF: "Do you have a personal philosophy of living?"

Tom: "Not really. Live from day to day (laughs). I don't worry about nothing (laughs). I always had the idea, well, there are things that must happen, they're supposed to happen or something, however you put it, and you take life as it comes I guess. You don't try to

be something you're not, eh (laughs)...I never wanted what the other fella had. I was always satisfied with what I had myself.”

The sections from these six interviews highlight what the occupational therapists in Canada have called spirituality, that is, “a pervasive life force, manifestation of a higher self, source of will and self-determination, and a sense of meaning, purpose and connectedness that people experience in the context of their environment.” (Canadian Association of Occupational Therapists, 1997, p.182). Within the Canadian Model of Occupational Performance (Canadian Association of Occupational Therapists, 1997), spirituality is viewed as the central core or essence of the person and the guiding force that influences how people evolve as individuals. This conceptualization of spirituality is somewhat consistent with the way in which well-being is conceptualized in the Evans and Stoddard (1994) framework. It is this essence that emerges through these interview texts and is missing from the quantitative data and findings already presented.

It is interesting to note that with the quantitative findings presented in Chapter 7, and the qualitative data relating to turning point events and philosophies of life, that all of the components of the Evans and Stoddard (1994) framework can be seen as contributing to whether or not an older individual uses formal long term care if they survive to be over 85 years of age.

Summary:

This section of Chapter 8 has illustrated that there are connections between the quantitative findings from the secondary analysis, and the data collected through the qualitative interviews. The links that have been illustrated here show that the qualitative data do enhance the quantitative data, and they do so in three primary ways. First, the

qualitative data add richness and detail to the quantitative findings. This richness and detail puts a human face on the secondary analysis, and has the potential to make the quantitative data more accessible and meaningful to a wider audience. The addition of the qualitative data has the potential to enhance the accessibility of the research findings for people who are unfamiliar or uncomfortable with statistical analyses, for example, clinicians with only basic statistical knowledge.

Second, the qualitative data point to the reductionism of the quantitative findings, particularly with respect to the complex interactions of the various framework components. While the quantitative data indicate which factors have a unique association with a person's need for care, the qualitative data show how these factors weave together and evolve over time into the need for care. While interaction terms could have been used in the quantitative analysis, these terms tend to be difficult to interpret. In comparison, the qualitative data show the complex interactions in an accessible and more interpretable way.

Third, the qualitative data highlight the issues and concepts that are not identified as being statistically significant in the quantitative findings (e.g., individual responses), or alternatively, are not captured in the available quantitative data (e.g., spirituality or philosophy of life). As a result, the addition of the qualitative component supports Evans' and Stoddard's (1994) claim that the components of their model "are themselves categories, with a rich internal structure. Each box and label could be expanded to show its complex contents" (Evans and Stoddard, 1994, p.32).

Implications of the Study Findings

The overall purpose of this research has been to determine whether changes in health and functioning and the physical environment are associated with the use of formal long term care among people who are over 85 years of age. More specifically, this research explored whether changes in health and functioning and the physical environment over time could differentiate three groups of the oldest-old: people who lived in their homes without home care in 1996, people who lived in their homes with the assistance of home care in 1996, and people who lived in personal care homes in 1996. Both quantitative and qualitative findings showed that there are some changes that can differentiate these three groups, and the results have implications for research, practice and policy. Before addressing the specific implications of the study findings for each of these three areas, a summary of the specific changes that were found to differentiate the three outcome groups are provided in Table 8.1. This information provides a reference point for discussing the study's implications.

Table 8.1 - Summary of Changes, by the Components of the Evans and Stoddard (1994) Framework, That Differentiate the Outcome Pairs

	Home (0) versus Home Care (1) "Endhome"	Home (0) versus PCH (1) "Nothcpt"	Home Care (0) versus PCH (1) "Justcare"
Health and Functioning	<ul style="list-style-type: none"> • Total declines *Self-rated health stable but negative *Improve in ability to walk outside 	<ul style="list-style-type: none"> • Total declines *More physical difficulties observed 	
Physical Environment	<ul style="list-style-type: none"> ▲ One change to a more supportive environment between 1983 & 1990 		<ul style="list-style-type: none"> ▲ Change to a more supportive environment over time
Health Care	<ul style="list-style-type: none"> • * Home in 1983, Home care in 1990 	<ul style="list-style-type: none"> • * Home in 1983, Home care in 1990 	
Prosperity	<ul style="list-style-type: none"> * Decline in income adequacy 		
Disease	<ul style="list-style-type: none"> • * Acquired heart problems 		
Genetic Endowment	<ul style="list-style-type: none"> • * Over 85 in 1990 	<ul style="list-style-type: none"> • * Over 85 in 1990 	<ul style="list-style-type: none"> • * Over 85 in 1990
Individual Responses			
Social Environment	<ul style="list-style-type: none"> • In community 0 to 2 years *In community 3 to 5 years 	<ul style="list-style-type: none"> • In community 0 to 2 years * In community 3 to 5 years 	<ul style="list-style-type: none"> • * Remained married (protective)
Well-being			<ul style="list-style-type: none"> • * Decline in general satisfaction

- - significant in fully adjusted models testing whether changes between 1983 and 1990 predicted 1996 outcomes when total declines was the measure of health and functioning
- * - significant in fully adjusted models testing whether changes between 1983 and 1990 predicted 1996 outcomes when categories of health and functioning declines were used
- ▲ - significant in unadjusted analyses testing relationship between physical environment changes and 1996 outcomes

As Table 8.1 shows, total declines in health and functioning between 1983 and 1990 differentiates people who were at home without home care in 1996 from people receiving care in 1996, regardless of whether this care was being provided through home care or a personal care home. Total declines in health and functioning could not differentiate people using home care from people living in a personal care home. While these two groups of people experience similar numbers of declines over time (i.e., there is no significant difference), the finding provides no insight into the extent or severity of those declines. It may be that the individuals who experience more severe declines are the people who need to move to a personal care home. Initial post-hoc exploratory analysis suggests that this is probably the case, although further analysis through a follow-up study would be required in order to support this hypothesis with greater confidence.

When using categories of health and functioning (i.e., ADL, IADL, observed physical difficulties, leisure participation, self-rated health, ability to walk out-of-doors), declines in ADL, IADL and changes in leisure participation were unable to differentiate any of the outcome pairs. Observed physical difficulties differentiated people at home without home care in 1996 from people living in a personal care home in 1996, and changes in the ability to walk out-of-doors distinguished between people who were at home without home care from people who were at home with home care. Self-rated health distinguished people at home without home care in 1996 from people at home with home care in 1996. While the findings regarding ADL and IADL appear contrary to all other research in this area, it may be an artifact of including only survivors in the sample, or it may be an artifact of the filtering process used during the analysis. Alternative

explanations are that changes in ADL and IADL are being masked by other changes that are actually antecedent, but cannot be captured with the existing data. It may also be that the AIM measures have a ceiling effect, that is, they cannot capture subtle changes in ADL and IADL status at the upper end of the functional spectrum.

During the model building process presented in Chapter 7, it was discovered that specific changes lead 100% of the people who experienced them to a particular outcome. As a result, individuals who experienced these changes were removed from the analysis for the fully adjusted models (Model 3 on Tables 7.2 to 7.7) and only those individuals whose outcome status could not be determined by an existing change variable were included in the analysis. Although the filters only removed those individuals who experienced changes in the control variables that were associated 100% with the outcome under consideration (i.e., “filthc”, “filtjust”, “filthome”), considerable overlap existed between these filters and the filters that removed people who had health and functioning changes that were associated 100% with the outcome of interest (e.g., “homefilt”, “nthcfit”, “justfilt”).

As a result, the filtering process used for the fully adjusted models presented in Tables 7.2 to 7.7 removed the majority of individuals who experienced ADL and IADL changes that lead them to use formal long term care in 1996. By removing these individuals from the analysis, two observations can be made.

First, the process of this analysis actually strengthens previous research findings that abilities in ADL and IADL predict the use of formal long term care. Based on the findings of previous studies, one can say that abilities in ADL and IADL at one particular time predict formal long term care use (e.g., Branch & Jette, 1982; Coulton & Frost,

1982; Foley et al., 1992; Grabbe et al., 1995; Kemper, 1992; Shapiro & Tate, 1985; Shapiro & Tate, 1988). The current study adds to this knowledge by showing that among people who survive to be over 85, the experience of negative changes over time or the experience of remaining stable in a negative state over time, among specific ADL and IADL, predicts particular formal long term care outcomes with 100% probability.

The second observation is that by removing these individuals from the analysis it is possible to explore the factors that lead to formal long term care use among people who remained stable in their ADL or IADL, or who experienced other types of changes that were not 100% associated with the receipt of care in 1996. In other words, the filtering process provided a better understanding of other key factors, exclusive of changes in ADL and IADL, that lead to formal long term care use. This knowledge is important for providing a broader perspective on factors leading to formal long term care use.

Table 8.1 also shows that age is the only variable that is predictive across all of the outcome pairs. In all cases, the oldest members of the sample (born in 1905 or before) were at greater risk for formal long term care use than people born between 1906 and 1911. The length of time in the community was also an important predictor for differentiating people who did not require formal long term care from those people who did. In particular, being in the community less than five years resulted in a greater risk for formal long term care use, regardless of whether that use was in the home or in a personal care home.

Experiencing a change from not using home care in 1983 to using home care in 1990 was an important predictor for the use of formal long term care in 1996. It is interesting to note that the only outcome for which this change was not predictive was

“justcare” - home care versus personal care home. Additional points of note from Table 8.1 are that, besides age, a decline in general satisfaction and remaining married are the only variables that can differentiate people who were using home care in 1996 from people who were living in a personal care home in 1996 when all of the Evans and Stoddard (1994) framework components are considered.

Implications for Future Research

Compared to previous research on the factors associated with the use of formal long term care, this study is unique in four primary ways. First, this study used longitudinal cohort data that was originally collected from a representative sample of older Manitobans (Division of Research, 1973), looked at the changes this cohort experienced over time, and considered how these changes were associated with their use of formal long term care. Second, this study was guided by the Evans and Stoddard (1994) population health framework rather than the Andersen-Newman model of health care utilization (Andersen & Newman, 1973). This latter model is the most commonly used conceptual framework among studies exploring predictors of formal long term care use among older people (Chappell, 1994). The third factor making the current study unique is that it incorporated a qualitative component to enhance the secondary analysis, and to obtain an insider's view on the changes and experiences that have lead to the use or non-use of formal long term care. Finally, the current study is unique because it used three outcomes, comparing non-use of services (home) to use of services (home care or personal care), as well as comparing two types of formal long term care. These four unique features all have implications for future research, and the implications from each feature are expanded upon in the following paragraphs.

As noted in the literature review, the use of longitudinal data dominates studies of nursing home use, and two previous studies have taken a longitudinal perspective on home care use (Coulton & Frost, 1982; Shapiro, 1986). Although longitudinal data have been used in previous nursing home research, none of the studies reviewed used changes over time as a potential predictor for use of formal long term care. Instead, the temporal aspect of these studies was obtained by testing whether baseline measures were associated with outcomes at a later point.

While the current study could be faulted for the lengths of the follow-up periods (seven years and six years, respectively), changes over these periods showed important associations with the outcomes under consideration.

Finding that changes captured by concatenating responses across interview waves, and over relatively long follow-up periods, are associated with formal long term care use is particularly important for future research. Concatenation captures the existence and direction of change, and may have the potential to capture magnitude of change, depending on the measure being used (Wolinsky, 1997). Concatenation is a simple procedure in SPSS, and provides the researcher with a broad perspective on the amount of heterogeneity in the sample. Simply reviewing the number of patterns produced from the original concatenation procedure identified measurement problems and individual variables that required confirmation and possible correction during the data preparation phase of the current study.

For example, it is highly irregular in Manitoba for an individual who is admitted to a personal care home to be discharged back into the community. Therefore, when a three wave pattern for type of housing showed an individual with a pattern indicating that

she was living in a house in 1983, living in a personal care home in 1990 and living in a seniors' apartment in 1996, it was apparent that a data entry error was probable. After requesting that the AIM Programmer/Analyst check the original 1990 data, it was determined that the individual was living in a seniors' apartment in 1990, but that the building itself was attached to a personal care home. In other words, the 1990 interviewer had miscoded the respondent's type of housing. Without the concatenation procedure, it is unlikely that this error would have been found and corrected.

In addition to showing that concatenation can be used for capturing change over time, this study showed that longer follow-up periods can capture meaningful change, at least among a sample of long-term survivors. Numerous patterns of change were observed in the data, and these patterns of change demonstrated associations with the outcomes of interest. It has been suggested that follow-up periods need to be short (e.g., about two years) and equidistant in order to capture meaningful change in longitudinal research (e.g., Allison, 1984; Yamaguchi, 1991).

Although the longer follow-up periods may have worked for the current study because the members of the sample were robust (i.e., they lived past age 85), finding that longer follow-up periods can still produce useable change data is important. Researchers often must wait to complete follow-up studies because of changes in funding sources and organizational priorities, and short, equidistant follow-ups may not always be practical or possible. Yet, the findings of this study suggest that continuing to pursue follow-ups, even if they result in longer follow-up periods, may be worth serious consideration and may still produce useful knowledge.

The second unique feature of this study was its use of the Evans and Stoddard (1994) population health framework. The use of this framework has a number of implications for future research. First, by organizing the findings from the previous literature into the components of the Evans and Stoddard (1994) framework, it became apparent that there are important gaps in knowledge regarding the predictors of formal long term care, regardless of whether studies are cross-sectional or longitudinal in nature (Refer to Charts 3.4 and 3.10). Currently, very little is known about the role of the physical environment, individual responses, well-being, and genetic endowment on formal long term care use, regardless of the research design or sample population. Although a few variables that fit into these components have been considered in the past, overall these are not areas that have been widely considered in research on long term care outcomes.

While the current study has contributed some insight into the role of the physical environment, it is apparent that more work is required in this area. A better understanding of this component, and its internal structure, is needed in order to advance knowledge of its role in leading to formal long term care use. Even in the book in which the Evans and Stoddard (1994) framework is included, there is no chapter dedicated to discussing the physical environment. Clearer conceptualizations of the physical environment from a population health perspective are required to facilitate the development of hypotheses that could test whether changes and the timing of changes in this component can postpone or prevent the use of formal long term care. Issues such as access to neighbourhood resources, degree of neighbourhood safety, availability and use of appropriate home modifications, and proximity of transportation are all examples of

factors that need further exploration in terms of their fit with the physical environment component, and their association with the use of formal long term care.

While the purpose of this study was not to test the Evans and Stoddard (1994) framework, the completion of this work has demonstrated that additional development of the framework would be valuable to encourage its continued and consistent application. Currently, the literature on this framework provides only broad definitions and discussion about what concepts are captured in each component. Until more specific information is provided, it will be very difficult for researchers to be consistent in the use of this framework, whether as a general organizational tool or for more conceptual work and testing.

Using the Evans and Stoddard (1994) framework also raised important questions about how to capture constructs such as health and functioning, and about the difference between a statistically significant and parsimonious model, and the production of knowledge that can be used by clinicians and policy makers. The three approaches used in Chapter 7 to explore the relationship between health and functioning changes and 1996 outcomes illustrate this point. For example, in the home versus home care models (Tables 7.2 and 7.5), the predictive capacity of both fully adjusted models was just over 72% and 74%, respectively. The first model used a measure of total health and functioning declines while the second model used the six measures that captured the various categories within the health and functioning component (e.g., ADL, IADL). In addition, the third approach to the question looked at the relationship between the 56 individual health and functioning variables and the home versus home care outcome.

While the total declines model has greater parsimony than the categories model and the individual variables approach (i.e., the former is a single variable), it is the latter two approaches that have the greatest usefulness for non-researchers. For clinicians working with older people, the knowledge generated by these latter two approaches identify specific, narrow characteristics to observe. A measure of total declines is difficult to apply at the clinical level to identify a person or group of people at risk for formal long term care use. The same comment applies to policy makers given the potential to identify sub-populations who exhibit particular characteristics, and to develop targeted approaches to serve those groups.

Finally, using the Evans and Stoddard (1994) framework showed that formal long term care use can be conceptualized as a health outcome at a population level and this finding, in turn, supports the movement towards planning health services from a population health perspective. The use of the framework permitted the exploration of systematic differences among the oldest-old based on their use of formal long term care. Comparing the experiences of sub-groups within this population, and looking for systematic differences, demonstrated the complexity of predicting formal long term care use, but also demonstrated that it is possible to differentiate sub-groups on particular characteristics. This latter point illustrates the utility of this framework for future research, as well as for clinical practice and policy development.

The third unique feature of the current study was the inclusion of qualitative interviews to enhance the quantitative data and secondary analysis. As already noted in the first section of this chapter, the qualitative data added richness and detail to the quantitative findings, put a human face on the secondary analysis, and may make the

quantitative data more accessible and meaningful to a wider audience. While there are epistemological debates about whether qualitative and quantitative approaches to research can be combined (Goering & Streiner, 1996; Guba & Lincoln, 1994; Strange, Miller et al., 1994), it is clear from the results of this study that combining approaches has merit. The qualitative data pointed to the reductionism of the quantitative findings. In addition, the qualitative data provided greater insight into the complexity of formal long term care use, and how the components of the framework were interwoven and evolved over time. Unless a researcher used complex interactions in a secondary analysis, which can be very difficult to interpret, this level of understanding would be difficult to achieve.

The final unique feature of the current study was its use of three outcomes combined into three comparative dichotomies (Chapter 7). Other studies in this body of research have considered short versus long stays (e.g., Coughlin et al., 1990; Liu et al., 1991; Liu et al., 1994), or predictors over different lengths of time (e.g., Branch & Ku, 1989; Shapiro & Tate, 1985; Shapiro & Tate, 1988), but studies that capture all three outcomes in the same study could not be found in the existing literature. This study demonstrated that the way in which the three outcomes are grouped together and compared can dramatically alter the factors that show significant associations with the use of formal long term care. To some extent, these findings support the differences found in previous research (e.g., role of being female and role of marital status in predicting formal long term care - See Charts 3.4 and 3.10), and provide potential explanations for why some variables are predictive in some studies but not others, even though the samples may be very similar.

Ultimately, the use of three outcomes in different combinations showed that more research is required to understand formal long term care use, especially differentiating between users of home care and nursing home care, and that considering only part of the continuum limits understanding of the system as a whole. Future researchers may want to consider differences between non-users of home care, users of home care, users of adult daycare programs, and users of respite services. In addition, future researchers may want to explore how these community-based services are used in combination, and whether particular combinations of services are more or less likely to lead to institutional long-term care.

Implications for Clinical Practice

Decisions about the receipt of formal long term care are made through two primary avenues in Manitoba: hospital discharge planning teams and the community-based Continuing Care Program. For clinicians such as physicians, nurses, social workers, and occupational and physical therapists who are involved in these practice areas, the findings of this study suggest that the assessments currently being used to make these formal long term care decisions are successful at the aggregate level. That is, the members of the study sample who experienced changes that increased their need for care were the ones who were receiving formal long term care services in 1996. Examples of changes that increased the need for care include declines in health and functioning, acquiring specific health conditions, moving to a new community, and declines in general life satisfaction.

Although all of the formal long term care decisions effecting the members of the study sample occurred in the past, there have been no fundamental changes to Manitoba's

single-entry system, or its needs-based assessment process, that would lead one to doubt the current relevance of the study findings. Had the findings shown no association between changes in health and functioning, changes in the physical environment, and the probability of using formal long term care services, the process used to identify people in need of care would have been put into question. What remains unknown from this research is the extent to which people born in 1911 or before are similar to or different from people who will become the oldest-old over the next 5 to 10 years. Should this latter cohort be significantly different from the one used in this study, the relevance of these study findings could be questioned, and perhaps more importantly, it would be unknown whether the current assessment processes used for determining the need for formal long term care services would remain effective.

One of the unique contributions that the findings of this study offer to formal long term care decision making is the identification of changes that lead 100% of the members of this sample to use formal long term care services. These changes were initially presented in Chart 7.1 and showed that people who declined, or who remained stable but in a negative state, in any one of nine areas over a 7 year period (i.e., between 1983 and 1990) were all using formal long term care in 1996. These areas included getting around the house, getting in and out of bed, dressing and putting on shoes, feeding oneself, taking medications or treatments, using the toilet, doing nursing care, watching television, or listening to the radio, and using a wheelchair.

Based on the findings in this study, these changes could be labelled "red flags" or potential warnings indicating that people experiencing them, if they survive to be 85

years of age, are probable users of formal long term care services in the future⁹. As a result, there may be value in adopting clinical tools and assessments that could capture these changes among older clients who are seen on an on-going and long-term basis by occupational and physical therapists, Continuing Care Case Coordinators, and physicians. Monitoring these assessments, and looking for these “red flag” changes, could help to identify people who might benefit from rehabilitation programs that work towards reversing these changes, or at the very least, preventing further deterioration.

This type of targeted intervention might enable these individuals to remain in their own homes with minimal assistance. Similarly, there may be value in tracking changes in these “red flag” areas for those older people who are frequently admitted for short-term hospitalizations, and are known within the system as having the “revolving door syndrome.” Depending on the success of rehabilitation efforts, there may be the potential for cost savings to the system if people could be maintained with a lesser amount of formal long term care than they would have otherwise needed had they not been identified and had intervention not been offered.

Identifying these “red flag” changes for clinicians might be possible through the clinical use of minimum data sets in the facility or organization in which they work. Minimum data sets (MDS) have been given a lot of attention in recent years by practitioners, health care administrators, policy makers and researchers. Currently, MDS are used to track characteristics of the clients being served by an organization or facility,

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Since these changes measured in this study occurred between 1983 and 1990, and they predicted use in 1996, the changes were indicative of probable use *in the future*.

evaluate quality of care, measure outcomes of care, evaluate funding formulas, and determine changes and directions for policy (e.g., Berg, Sherwood, et al., 1997; Frijters, Mor, et al., 1997; Granieri, Turner & Organist, 1997; King, 1995; Nelson, 1997; Ozbolt, 1996; Pace, 1995).

Using MDS to identify clients who may benefit from particular interventions does not appear to be common practice among clinicians. Yet, the findings of this study suggest that there might be potential if a MDS that was accessible to clinicians could capture stability, improvements or declines in ADL, IADL, observed physical difficulties, self-rated health, and leisure participation, as well as in changes in the support provided by the physical environment. The challenge of MDS is keeping the data collection simple, short and at the same time, meaningful and useable.

The health and functioning and physical environment questions and response categories used in the AIM are simple and easy to complete with relatively little training. Yet, the data on changes over time produced by these questions and response categories provided statistically significant findings that distinguished formal long term care users from non-users, and in some cases, distinguished home care users from personal care home residents over long follow-up periods. Although short follow-up periods are more typical in clinical settings, modification to increase the sensitivity of these measures to short-term change (i.e., more response categories) may have merit.

An important caveat to consider regarding the clinical implications of these “red flag” changes is that they were identified at the aggregate level, and may not apply to specific individuals. As a result, people who experience these changes could be identified, but then there needs to be a place for considering the meaning and importance

of particular activities for individuals, for the “art” of clinical practice, and for the experience and reasoning of professionals to determine whether intervention is really necessary and whether it would be beneficial for a specific individual in a specific situation.

The final clinical practice implication of the study findings relates to the education of future clinicians. The quantitative component of this study has produced both two-wave and three-wave patterns of change across 56 health and functioning variables and eight physical environment variables among a group of people who survived past the age of 85. In these data, it is apparent that stability is the predominant experience of these survivors with respect to health and functioning variables, regardless of the specific ability or factor under consideration.

In addition, the qualitative data demonstrated that even in very old age, there are individuals who are capable of providing complex and integrative explanations for their current situations and needs. In a health care culture that continues to view older people as frail and sick (Stahl & Rupp-Feller, 1990), sharing these kinds of findings with upcoming clinicians may promote interest in gerontological practice, and spur the development of innovative programs and services that will enable older people to maintain this stability, and therefore, continue living in the community.

Implications for Eldercare Policy

As noted in the previous section, the findings of this study show that, at the aggregate level, the Continuing Care Program has been successful in identifying those individuals who are in need of care, whether for home care services or for personal care home placement. Given the recent debates and attempts to privatize Manitoba’s

Continuing Care Program, described in Chapter 3, this finding is particularly important and timely. While the findings of this study offer no insight into the cost-effectiveness or the efficiency of the Continuing Care Program, it is apparent that it is providing care to the people who need it the most, at least among people who survive to be over 85 years of age.

The findings of the study also show that the factors that lead to home care use are different than the factors that lead to personal care home use. This is an important finding for those individuals who are responsible for preparing the formal long term care system to meet future needs. By comparing Model 3 in Table 7.2 to Model 3 in Table 7.3, it can be seen that the changes between 1983 and 1990 that lead to home care use in 1996 were more diverse than the factors leading to personal care home use in 1996. Factors from six components of the Evans and Stoddard (1994) framework played a role in predicting home care use, but factors from only four components played a role in predicting personal care home use.

In terms of developing policy, these findings also show that the three outcomes used here (i.e., home without home care, home with home care, personal care home) are not clearly ordinal in nature. While these outcomes are not explicitly discussed as being ordered, it is implicit in how people talk about long term care, and in the actions and arguments of people who push the view that the growing numbers of the oldest-old will financially ruin the Canadian health care system.

Had the outcomes been clearly ordered, the factors predicting home care and personal care home would have been the same, and the odds ratios for the various predictive factors would have been greater for personal care homes than for home care

use, both relative to being at home without home care. In addition, the results would have supported the assumptions that older people steadily decline over time, that their need for assistance steadily increases, and that home care provides a lesser degree of assistance than does personal care home placement. The findings of this study do not support any of these assumptions.

As the findings of Chapter 5 show, the experience of decline in health and functioning over time was not the predominant finding. Instead, the findings show that the people in this sample were predominately stable over time in all of the areas of the Evans and Stoddard (1994) framework. While this stability may be an artifact of studying only survivors, planning for formal long term care services is based on the knowledge that a proportion of the older population will survive to use services, rather than die before they need services.

The assumption that the assistance needs of the oldest-old steadily increase over time is also not supported by the data. As shown in Chapter 5, only 64 people (10.8% of the sample) experienced the pattern of being at home without home care in 1983, being at home with home care in 1990, and living in a personal care home in 1996. Overall, this pattern was the fifth most commonly experienced pattern among members of the sample.

The final assumption underlying the perspective that these outcomes have an ordinal relationship is that home care provides a lesser degree of assistance than personal care home placement. Once again, the data do not support this assumption. The logistic regression models showed that changes in health and functioning could not distinguish people who were using home care in 1996 from people who were living in a personal care home in 1996. From the results presented, it appears that people at home with home care

and people in nursing homes have the same degree of functional limitation, but what distinguishes them from one another are other factors such as the social environment and general life satisfaction. This finding is consistent with the clinical experience of the author, and shows that the Continuing Care Program has a broad perspective on what constitutes need for formal long term care in Manitoba (i.e., social and psychological factors are not being ignored).

What does all of this mean for policy makers? First, it means that different kinds of information are required to determine future demands on the home care program and on the personal care home system. Therefore, although the Continuing Care Program needs to be viewed as a whole, and as providing a continuum of care, policy makers need to consider and weigh different types of information depending on the portion of the continuum for which they are planning. What this study does not provide is any insight into what information would be the most useful for planning in the middle of the continuum, that is, for services such as adult day care, supportive housing and respite care.

Not taking into account the differences that lead to the use of home care versus personal care home services may have serious ramifications for the older population and their ability to access appropriate care. In addition, it may have cost ramifications if monies are channelled in the wrong direction. For example, if monies are channelled into the personal care home system and not the home care system based on age distribution data only, inadequate human and financial resources might be available to the home care system which could force people to go without the care they need. This statement is not meant to imply that people would not receive any care, but rather that inappropriate

distribution of funds could influence people's ability to obtain the level and amount of care that they require, at the right time, and in the most appropriate setting.

Second, the findings regarding the physical environment suggest that monitoring movement into more supportive environments might be valuable for predicting future home care use. Rather than finding that people who move to more supportive environments have less risk for using institutional long-term care, just the opposite was found. This finding requires further consideration, and a better understanding of why people move into seniors' apartment complexes, and how these reasons are changing over time. During the early years of seniors' housing, older people who moved into these buildings tended to be older, less financially secure, more frail and unable to manage independent living in a house (Gutman & Blackie, 1988; Gutman & Wister, 1994). In more recent years, seniors' housing has expanded dramatically, offering life-leases, 55+ apartments, supportive housing, and seniors' condominiums. With the diverse array of seniors' housing now available, policy makers need to have a better understanding of how these living arrangements influence the use of formal long term care.

The use of change measures in the current study also has implications for policy makers. Although some of the individual measures from 1983 and 1990 also had the ability to predict 1996 outcomes with 100% probability, using a measure of change allows more confidence to be placed in the findings because the individuals have been followed over time. It is already known that being in a negative state at a particular time increases the probability of needing formal long term care services (see *Chapter 3 - Literature Review*). This study expands this knowledge by showing that being stable but in a negative state, and changing into a negative state, also increases the probability of

using formal long term care over time. With additional work by individuals knowledgeable in the costing of care, the knowledge generated through this study and the use of measures of change could be particularly valuable for policy makers.

Finally, the results presented in Chapter 7 support the assertion of Shapiro and Tate (1988) that it is *constellations* of traits, rather than an individual trait, that need to be considered when developing formal long term care policy for people over 85 years of age. Finding that different combinations of factors distinguish different outcomes provides this support. In addition, the findings of Chapter 6 point to the need to consider *changes* in traits over time. Together these findings demonstrate the complexity of formal long term care policy planning, and show that having information from population projections is inadequate for making formal long term care resource decisions.

Summary

This chapter has provided responses to the final two research questions, that is, the ways that the qualitative data enhance the quantitative findings, and the implications of the study findings for research, clinical practice and eldercare policy. The discussion in this chapter supported the use of the Evans and Stoddard (1994) framework for studying the predictors of formal long term care use, presented areas that require further study, and showed the additional insight that can be gained by combining qualitative interviews with secondary analysis.

The implications of the study findings are diverse for researchers, clinicians and policy makers. For all three constituencies, the current study has shown that changes in different factors lead to different long-term care outcomes, and that overall, predicting formal long term care use is a complex process. Using the process of concatenating

responses across interview waves has been shown to be a simple and useful way of considering heterogeneity in the current sample, and taking the time to consider these changes has provided additional knowledge about why some people use formal long term care while others do not.

CHAPTER 9 - CONCLUSIONS

People over 85 years of age are the fastest growing age group in Canada, yet relatively little is known about this population and the specific changes they have experienced as they have aged. People over 85 years of age are also the largest group of formal long term care service users; yet no previous research has exclusively studied this group and explored what factors and changes lead some of them to use these services.

Through the completion of this research, oldest-old survivors of the Aging in Manitoba Longitudinal Study were found to have experienced common patterns of formal long term care use between 1983 and 1996, with three specific patterns¹⁰ dominating. Among people who remained in their own homes in 1996 without home care, the experience of stability (i.e., no formal long term care use in 1983, 1990 and 1996) was the most common experience. The most common experience among people who were using home care in 1996 was no formal long term care service use in 1983 and 1990, followed by the use home care in 1996. Among the people who were living in a personal care home in 1996, the most common experience was no formal long term care service use in 1983 and 1990, followed by a move to a personal care home by 1996.

This research also found that women were more likely than men to experience a pattern of formal long term care use that ended in institutionalization. Married men were found to be the least likely to use formal long term care in 1996 (either home care or

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These patterns were: (1) home without home care in 1983, home without home care in 1990, home without home care in 1996; (2) home without home care in 1983, home without home care in 1990, home with home care in 1996; (3) home without home care in 1983, home without home care in 1990, living in a personal care home in 1996.

institutional care) when compared to women (both married and not married) and to not married men. Urban dwellers were found to be more likely than rural dwellers to experience a pattern of formal long term care use that ended in the use of home care in 1996.

This study also made some interesting discoveries in terms of the relationships between changes in health and functioning and the use of formal long term care. Two types of change were considered in this study - changes between 1983 and 1990, and changes across all three study waves (i.e., 1983, 1990 and 1996). Participants who experienced greater numbers of health and functioning declines between 1983 and 1990, and people who experienced steady declines in health and functioning across all three study waves, were more likely to be using formal long term care in 1996, either through home care or institutional care. Participants who experienced steady improvements in health and functioning across the three study waves were the least likely to be using formal long term care in 1996. In addition, changes in health and functioning between 1983 and 1990 were able to differentiate the outcome experiences (i.e., home without home care, home with home care, personal care home) of four sub-groups: men, women, urban dwellers and rural dwellers.

Changes in the physical environment, and their relationship to the use of formal long term care, were also a focus of this study. Unlike the findings related to changes in health and functioning, few significant differences were found in the outcome experiences of the study participants based on the physical environment changes they experienced over the course of the study. Changes to a more supportive physical environment between 1983 and 1990, and across all three study waves, were not

associated with the use of home care in 1996, as hypothesized. In addition, the ability of changes in the physical environment between 1983 and 1990 to distinguish the outcome experiences of men, women, and urban and rural dwellers was tenuous.

Finally, this study found that the addition of qualitative interviews to a secondary analysis greatly improved the depth and breadth of understanding of the factors leading to the use of formal long term care among the oldest-old. Through these findings, new insights have been gained regarding this unique population, and the changes and factors that lead them to use formal long term care services over time. Nevertheless, this study is not without limitations.

Study Limitations

This study has provided a unique look at people over 85 years of age, their use of formal long term care services over time, and the changes that have lead to this utilization. Although restricting this study to people who survived past the age of 85 is one of its unique features, it is also one of its limitations. This study makes no comment on who will survive past the age of 85, and therefore it is unknown to what extent some of the change that lead the survivors to use formal long term care may have also lead some of their cohort peers to death. Repeating this study and expanding the sampling criteria to include all people who were born in 1911 or earlier and participated in the 1983 wave of the AIM study would increase the generalizability of these findings. In addition, because of the focus on people surviving past the age of 85, the results of this study should not be generalized to the young-old or the middle-old (i.e., those people aged 65-74, or 75 to 84).

A second limitation of this study is the long follow-up periods (1983 to 1990, 1990 to 1996) and the inability to track the changes that people experienced between the contact points. People in the study may not have experienced the degree of stability that was indicated in the findings, but rather have experienced considerable status change during the interim periods. The limitation of the existing interview data is that it cannot capture this wavering of status between the interview waves. The linkage of the AIM interview records to the provincial health services utilization records could enable future researchers to look at use of formal long term care for the members of this sample continuously over time, although knowledge of changes in the independent variables (i.e., the interview data) would remain limited by the existing data.

A third limitation of this study is the definition of home care use as simply use or non-use of services. Home care services provided through the Continuing Care Program are diverse and could range from daily services for dressing, washing and meal preparation, to weekly medication monitoring, to occupational therapy services once a month. In addition, some people use home care services continuously over a long period of time, while other people use home care services for only short periods of time, for example, after a major surgery. Some of the difficulties in distinguishing people at home with home care from people at home without home care, or people living in personal care homes, might be attributable to this lack of sensitivity in the home care definition used for the study. It may be that there are differences between people at home without home care and people who use home care on a daily basis, as well as differences between people who use home care only twice a month and people living in personal care homes.

Duration of home care use or types of home care services used may also be major factors in distinguishing across the outcome groups that could not be captured in this study.

While numerous variables were available in this study to adjust for the components of the social environment and disease, only individual variables were actually used to adjust for these components. This decision goes against the observation of Evans and Stoddard (1994) that each component has a rich internal structure. This decision presents the fourth limitation of this study. In order to stay true to the rich structure of each component, some type of summary measure, such as that used to capture a change to a more supportive environment, would have been required for each component of the framework.

While these summary measures may have been a better test of the framework, testing the framework was not the purpose of the study. Rather the framework was used as an organizational tool, and to provide perspectives on formal long term care use that the Andersen and Newman (1973) model has been unable to provide (see discussion on pages 10 and 11). In addition, there were very limited numbers of variables available from the interview data to address the components of genetic endowment, individual responses and health care. Although the component of well-being and prosperity initially contained a number of promising variables, high proportions of missing data meant that these data could not be used.

Including a qualitative component to this study is another one of its unique features, and has contributed deeper understanding to the complexity of the changes people experience as they become the oldest-old. The inclusion of these qualitative data is a strength of this study, but not having interviews with people who experienced

patterns of care other than the two most common ones is the fifth limitation of this study. By restricting the interviews to people who had experienced the two most common patterns of formal long term care use, the interviewees tended to be the most robust of survivors. While these people could speculate about what lead them not to use formal long term care, it is unknown to what extent people who experienced a pattern ending in a personal care home would share these views. In addition, this study could not consider the perspectives of people who have died since 1983, and it will always be unknown to what extent their perspectives and opinions on longevity and formal long term care use are similar or different from their surviving cohort peers.

The Aging in Manitoba Study has always focussed on Manitoba's older population, and therefore, the current study also has this focus. The applicability of the findings from this study to oldest-old populations living in other Canadian provinces or living outside of Canada is unknown. While the findings make a unique contribution to existing knowledge, their generalizability outside of Manitoba is an important limitation.

The final limitation of this study is that the ability to apply these findings to improve forecasting and planning for formal long term care is limited by the existing knowledge of the oldest-old. While demographic data are available on factors such as age, sex and some diseases, very little is known about their functional status, changes over time, participation in leisure activities, satisfaction with life, and perspectives on life and use of services. Without broader population descriptors that can capture all of the components of the Evans and Stoddard framework, it will remain difficult to forecast and plan for formal long term care services, and other health services, with accuracy.

Main Messages

This research should leave readers with four main messages. First, although the oldest-old are a very heterogeneous population, the majority of people in this sample were able to continue living in their own homes without the assistance of formal long term care services. About equal proportions of the remaining members of the sample required home care or personal care home services. Second, although long term care is rightly considered a continuum of care, different factors played a role in predicting the use of home care than predicted the use of a personal care home.

The third message emanating from this study is that incorporating qualitative interviews enhanced the research findings, and added depth and understanding to the findings. Finally, the application of a different conceptual framework than has been used traditionally in this body of research provided new insights into the gaps in existing knowledge, permitted the exploration of systematic differences across the three outcomes, and generally provided a broader perspective on the complexity of predicting formal long term care use.

In conclusion, this study of long-term survivors living in Manitoba, Canada has provided a unique contribution to the literature on formal long term care use and the oldest-old in terms of conceptualization, methodology, practice implications and policy directions. Through the dissemination of this work, it is hoped that additional research on this remarkable group will be pursued and that other researchers and practitioners will be motivated to understand and contribute to the well-being of people over 85 years of age.

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APPENDICES

APPENDIX 1: AIM Variables Selected for Secondary Analysis

<i>Question/Variable</i>	<i>Framework Component</i>	<i>Missing or Proxy Data >8%</i>			<i>Missing Data Strategy</i>
		<i>1983</i>	<i>1990</i>	<i>1996</i>	
Observed Physical difficulties hearing impairment visual impairment wheelchair use cane, crutches, walker walking difficulties crippled hands or legs coughs continually shortness of breath speech problems other physical abnormalities	Health and functioning	No	Up to 11.4%	Up to 14%	Variables left in with greater than 8% missing data
Mental Status Questionnaire (10 questions)	Health and Functioning	No	15%	33%	Removed from analysis
Are you capable ofwithout help from anyone? Doing light housework Doing heavy housework Making a cup of tea or coffee Preparing a hot meal Shovelling and yardwork Shopping Managing financial matters Laundry Major household repairs	Health and Functioning	No	No	No	n/a
For your age, would you say in general that your health is good, fair or poor?	Health and Functioning	No	16%	19%	Proxy as legitimate if proxied due to health
How concerned are you about your health?	Health and Functioning	No	17%	39%	Removed from analysis

Are you capable of ...without help from anyone? Going up & down stairs Getting about the house Out of doors - bad weather Out of doors - any weather Getting in & out of bed Washing, bathing, grooming Dressing & putting shoes on Cutting toenails Eating Taking medications, treatment Using the toilet Nursing care Watching TV, listening to radio Using telephone	Health and Functioning	No	No	No	n/a
Have you participated in each of these activities within the past week? (21 activities)	Health and Functioning	No	No	No	n/a
Do you walk out of doors?	Health and Functioning	No	No	No	n/a
Do you and/or your spouse own this residence?	Prosperity	No	No	No	n/a
Income (3 variables)	Prosperity	Missing data ranged from a low of 10% to a high of 49%			Imputation failed. Removed from analysis.
Expenses (5 variables)	Prosperity	Missing data ranged from a low of 11% to a high of 52%			Imputation failed. Removed from analysis.
Can you tell me how well you think your income and assets currently satisfy your needs?	Prosperity	No	11%	33%	Left with greater than 8% missing data.
Can you tell me how well you think your income and assets will satisfy your needs in the future?	Prosperity	9%	14%	47%	Proxy as missing. Removed from analysis.
Do you experience any problems with your usual means of transportation?	Physical Environment	No	No	No	n/a

How do you rate the general physical condition of the respondent's present dwelling?	Physical Environment	No	No	10%	Left in with greater than 8% missing data.
What type of housing are you living in?	Physical environment	No	No	No	n/a
Do you have handrails on the stairs leading into your dwelling?	Physical Environment	No	No	No	n/a
Do you have handrails on the stairs inside your dwelling?	Physical Environment	No	No	No	n/a
Do you have grab-bars in the bathroom?	Physical Environment	No	No	No	n/a
Do you have a room where you can be by yourself if you wish?	Physical Environment	No	No	No	n/a
Is your present dwelling in need of any repairs?	Physical Environment	No	No	No	n/a
Have you had any of the following health problems in the last year, or do you still have the after effects from having had them earlier? (17 conditions)	Disease	No	No	No	n/a
Sex of Respondent	Genetic Endowment	No	No	No	n/a
Respondent's month and year of birth	Genetic Endowment	No	No	No	n/a
Respondent's state of mind	Individual response	No	14%	28%	Left with greater than 8% missing data
Respondent's comprehension of questions	Individual response	No	14%	29%	Left with greater than 8% missing
How many years or grades did you complete in school?	Individual response	No	No	No	n/a
What is/was your major occupation?	Individual response	No	No	No	n/a
Why did you move to this household?	Individual response	No	No	No	n/a
Do you belong to any church or religious organization?	Social Environment	No	No	No	n/a

What is your marital status?	Social Environment	No	No	No	n/a
How many persons live in this household with you?	Social Environment	No	No	No	n/a
How long have you lived in this community?	Social Environment	No	No	No	n/a
How long have you been living in your present household?	Social Environment	No	No	No	n/a
Do you have any relatives?	Social Environment	No	No	No	n/a
Where do your nearest relatives live?	Social Environment	No	No	No	n/a
Of those relatives not in the same household, where do your nearest relatives live?	Social Environment	No	No	No	n/a
How often do you get together with the neighbour which you see most frequently?	Social Environment	No	No	No	n/a
How many people that you know do you consider close friends?	Social Environment	No	No	No	n/a
Is there anyone on whom you can call, if you need help?	Social Environment	No	No	No	n/a
How would you describe your satisfaction with life at present?	Well-being	No	16%	36%	Proxy as legitimate if proxied due to health or hearing
Life Satisfaction Index A (20 statements)	Well-being	No	30%	38%	Proxy as missing. Removed from analysis.
Did you have any home care? (3 variables)	Health Care	85%	89%	No	Used administrative data.
Do you find it difficulty to see a dentist if you need one?	Health Care	No	18%	18%	Removed from analysis.
Do you find it difficult to see a doctor if you need one?	Health Care	No	25%	25%	Removed from analysis

APPENDIX 2: Concatenation Example

To begin the concatenation procedure, frequencies were run on all three variables of interest, e.g., dress83, dress90 and dress96, to ensure that both missing and proxy data had been assigned specific numeric values¹¹. Then, using the “transform→compute” function, the following syntax was used to create the 1983 to 1990 change variable:

```
[New variable name] = CONCAT(STRING,([1983 variable name],f1.0),  
STRING([1990 variable name], f1.0))
```

or the 1983 through 1996 change variable:

```
[New variable name] = CONCAT(STRING,([1983 variable name],f1.0),  
STRING([1990 variable name], f1.0),STRING([1996 variable name],f1.0))
```

This syntax combines the values of the individual variables (i.e., 1983, 1990, 1996). For example, if an individual's values were “2” for dress83, “3” for dress90 and “5” for dress96, the value for his/her 1983 to 1990 change variable would be “23”, and the value for his/her 1983 through 1996 change variable would be “235”. Frequencies for the new variables were run to identify values that reflected missing (e.g., “59”, “193”) or proxy values (e.g., “28”, “884”) in any of the years.

¹¹

Generally speaking, missing values were coded as 9 or 99, and proxy values coded as 8 or 88.

**APPENDIX 3: Contents for Filter Variables
(Values Which Are Filtered out for the Specific Model)**

	Endhome	Justcare	Nothcpt
Health and Functioning	Talk4=3 Cane4=4 W_c4=2, 3, 4 Usephon4=4 Tvradio4=4 Nursing4=2, 3 Toilet4=3 Takemed4=3, 4 Bed4=3 Goodwth4=2 Mobile4=3, 4 Stairs4=2 Meals4=2 Maketea4=2 Politic4=1 Radio4=2 Dress4=3, 4 Bath4=2	Mobile4=4 Bed4=2, 4 Dress4=2, 4 Eat4=3, 4 Takemed4=2 Toilet4=2, 4 Tvradio4=2, 3, 4 Usephon4=2, 4 Maketea4=4 Radio4=2 Politic4=1, 4 Work4=4 Sob4=2 Talk4=2, 3	W_c4=2, 3, 4 Cane4=4 Mobile4=3 Stairs4=2 Meal4=2 Maketea4=2, 4 Usephon4=2 Tvradio4=2, 3 Bed4=2, 3, 4 Work4=4 Politic4=4 Goodwth4=2 Nursing4=2, 3 Takemed4=2, 3, 4 Eat4=3, 4 Dress4=2, 3 Bath4=2 Talk4=2 Sob4=2
Name of Health and Functioning Filter	<i>Homefilt</i>	<i>Justfilt</i>	<i>Nthcflt</i>
Physical Environment	n/a	Transp4=2	Transp4=2
Prosperity	n/a	n/a	n/a
Social Environment	Marital=1	Marital=1	n/a
Individual Responses	n/a	Occupfix=17	Occupfix=17
Genetic Endowment	n/a	n/a	n/a
Well-being	n/a	n/a	n/a
Disease	Palsy=2	Palsy=2	n/a
Health Care	Statchg=11	Statchg=2, 12, 22	Statchg=2, 11, 12, 22
Name of filter for all control variables	<i>Filthome</i>	<i>Filtjust</i>	<i>Filthc</i>
Name of filter for all components	<i>Endhom\$</i>	<i>Justcar\$</i>	<i>Nothc\$</i>

APPENDIX 4 - An Example of the Initial Modelling Process Used to Reduce the Number of Variables

Outcome for Illustration:

Endcare (home without home care versus any formal long term care)

Results of Bivariate Analysis:

There were no changes that were associated 100% with being at home without home care in 1996. The following changes between 1983-1990 were associated 100% with the receipt of formal long term care in 1996:

Health and Functioning Factors: Activities-Daily-Living:

- Being stable but not independent for going up and down the stairs
- Declining in mobility around the house
- Being stable but not independent for going out of doors in good weather
- Being stable but not independent for getting in and out of bed
- Declining in ability to get in and out of bed
- Being stable but not independent in bathing
- Being stable but not independent for dressing
- Declining in ability to dress
- Being stable but not independent for taking medications
- Declining in ability to take medications
- Improving in ability to take medications
- Being stable but not independent for toileting
- Declining in ability to toilet
- Being stable but not independent for nursing care
- Declining in ability to do nursing care
- Being stable but not independent for watching television or listening to the radio
- Declining in ability to watch television or listen to the radio
- Being stable but not independent for using the telephone

Health and Functioning Factors: Instrumental-Activities-of-Daily-Living:

- Being stable but not independent for making tea or coffee
- Improving in ability to make tea or coffee
- Being stable but not independent for making a hot meal

Health and Functioning Factors: Leisure Activities:

- Being a stable participant in political activities

Health and Functioning Factors: Observed Physical Difficulties (as observed by interviewer):

- Stable in use of a wheelchair
- Became a wheelchair user
- Became a wheelchair non-user
- Became a cane non-user
- Stable in having shortness of breath

Physical Environment Factors:

- Being stable with difficulties in transportation

Individual Responses Factors:

- Was never employed

Disease Factors:

- Being stable with a palsy

Health Care Factors:

- Received home care services in both 1983 and 1990
- Was in a personal care home in 1990

Creation of Filter Variables:

Using the information obtained from the bivariate analysis, three filter variables were created:

1. **Carefilt** - to filter out all individuals who exhibited the health and functioning characteristics that were associated 100% with the receipt of formal long term care in 1996.
2. **Filtcare** - to filter out all individuals who exhibited the other (non-health and functioning) characteristics that were associated 100% with the receipt of formal long term care in 1996.
3. **Endcare\$** - to filter out all individuals who exhibited any of the characteristics that were associated 100% with the receipt of formal long term care.

Initial Modelling Process to Reduce Number of Variables:

Nine models were completed for the outcome "Endcare". Each model contained only those variables that were categorized as being in a given component (e.g., health and functioning, prosperity, social environment, etc) and therefore were not adjusted for other factors. All models used logistic regression and applied a forward conditional entry into the equation.

1. Health and Functioning model used the filter "Carefilt".
2. Prosperity model did not use a filter
3. Physical environment model filtered out people who were stable with difficulties for transportation
4. Social environment model did not use a filter
5. Genetic endowment model did not use a filter
6. Health care model filtered out people who had received home care in 1983 and 1990 and people who were in a personal care home in 1990
7. Well-being model did not use a filter
8. Individual responses model filtered out people who were never employed.
9. Disease model filtered out people who were stable with a palsy.

The variables identified as significantly associated with the outcome, Endcare, from models 4-9 (control rather than test components) were then used as control variables in more complex models later in the analytic process.

APPENDIX 5: Topic Guide for the Qualitative Interviews

CONFIRM: TAPE RECORDING

To begin, I would like you to tell me a little about yourself, your history and some of the major changes that you have experienced over the past few years.

- Current age and general birth information (e.g., born where?)
- History of living arrangement and location (e.g., length of time in Manitoba, in current residence, places lived)
- Education and work history (e.g., years of schooling, training programs, type of work, places worked)
- Marital status and family history (e.g., number of siblings, marital status history, children, grandchildren, current living arrangements)
- Health History - major health problems or experiences with the health care system over the course of life - flu epidemic, polio, experiences paying for health care before health insurance, etc
- Family and friends - contact now and in the past, and major changes
- Leisure time, mental activities, physical activities history - what things have you participated in that have been especially meaningful in your life?
- Major changes in the past 1-3 years:
 - living situation
 - use of health care services
 - help received - home care or paid help, help from family
 - personal health
 - leisure and/or physical activities, meaningful activities
 - loss or gain of family or friends
 - any other changes
- How would you rate your health compared to other people the same age? OR How would you rate your health now compared to what it was a year ago?

Now I would like to move on to talk about your ideas, thoughts and opinions about why you need to use (do not need to use). Everyone has ideas and theories about the things that have lead them to age in a certain way. I would like to hear what you think about your own aging.

- What things do you think have allowed you to remain living in your own home without the help of formal services?

Probe:

- Physical Environment (e.g., housing, railings, transportation)
- Health and Functioning (e.g., ADL & IADL performance, mental status, leisure activity participation)
- Prosperity and financial status (e.g., income, pensions)
- Social environment (e.g., marital status, family contacts, friendship networks)
- Disease and use of health services
- Individual responses, decisions, opportunities
- Personal philosophy of life and living

- If you could give advice to a twenty year old about how to live a long and healthy life, what would you tell them? Would your advice be different if you were to give it to a fifty year old? a seventy year old? How?
- Do you think that you will be able to stay here on your own for the remainder of your life? Why? (Or Why Not?)

I am all finished with my questions and we have talked about a lot of different things. Do you have any stories about your life, ideas, thoughts or opinions that you would like to add that would help me understand why (or how) people age in different ways?

APPENDIX 6: Study Information Sheet for Participants

Note: The information sheet was printed using a 13.5 point font and 1.3 spacing for the participants.

This study will add to knowledge about the factors and sequences of events that lead people to use formal long term care services as they live to be over 85 years of age. Formal long term care means home care and personal care home services. The results of the study will help health care professionals and government officials to plan programs and services, and to develop policies that will help older people stay at home for as long as possible.

For this study, a number of people who are over 85 and living in Manitoba will be interviewed. People will be selected because they were 85 years of age or older in 1996, and because they have been a participant in the Aging in Manitoba Longitudinal Study since 1983 or earlier.

People who volunteer will be interviewed one or more times. The interview (s) will be held at a place and time that is convenient for each person. There are no right or wrong answers during the interview. With permission, interviews will be tape recorded so that the researcher has people's actual words rather than just a summary of what was said.

The interview could take up to 4 hours, but it can be divided over a number of days. During the interview, people who volunteer will be asked to tell the researcher stories about their lives. People will be asked to tell stories about their health, living situation, use of long term care services, and the factors they think have contributed to their current use of services. If people do not use any long term care services, they will be asked about why they think this is the case.

Records of the interviews will be coded only with a number and not with a name to ensure confidentiality. Only the researcher will have access to the interview records. Any reports written about this project will not mention names nor provide any descriptions that might identify the people who are interviewed. Tapes of the interviews will be treated in the same confidential way, and will be destroyed once this research and any related publications are completed.

Being involved in this research is voluntary, and no one is under any obligation to participate. People who decide to participate can drop out at any time, even in the middle of the interview. The researcher is not working for any health service and this project is not being done for one. Therefore, services that people receive will not be affected by their participation in this study.

People who volunteer will be asked to sign a paper that says they have agreed to participate. If possible, someone other than the researcher will be asked to witness this signature (e.g., a family member or friend). The researcher will also sign this paper promising to keep all information confidential. Participants will be given a copy of this agreement to keep.

There is nothing about this study that should cause any problems for people who participate. If a person gets tired of answering questions, the interview can be stopped and continued at another time. If any of the questions that are asked are too personal, a person can refuse to answer them.

People who participate in this study might learn about community services that they did not know about before the interview. No payment will be provided to people who participate in the study, but participants who want a summary of the study findings may ask for one.

For More Information: People who have questions about the study can contact the researcher, Marcia Finlayson, at XXX-XXXX. There is an answering machine at this number, so please leave a message if no-one answers. Marcia Finlayson is a graduate student in the Department of Community Health Sciences, Faculty of Medicine, University of Manitoba, 750 Bannatyne Avenue, Winnipeg, Manitoba, R3E 0W3. Professor Betty Havens, Department of Community Health Sciences, is supervising the research. Ph: (XXX) XXX-XXXX.

APPENDIX 7: Consent Form

NOTE: The consent form was printed using a 13.5 point font and 1.3 spacing for the participants.

I, _____, voluntarily agree to participate in a study that is learning about the factors and sequence of events that lead people to use formal long term care services as they live to be over 85 years of age.

The study has been explained to me. I understand that there are no right or wrong answers, and that I can refuse to be tape-recorded. I understand that I can refuse to answer any questions that I do not wish to answer and that I can end the interview at any time.

I understand that my ideas, opinions and stories will be kept confidential and that the information I share will be identified by code rather than by name. I understand that the master list of names and codes will be destroyed when all of the research is completed. I have been assured that the names of individuals will not be used in any reports of the study's findings.

I would like a brief summary report of the study when it is completed:

YES

NO

Signature of Participant:

Witness:

Date:

I have fully explained to _____ the nature and purpose of this research as described on the Study Information Sheet that has been given to the participant. I have asked the participant if s/he has any questions about the study, and have answered these questions to the best of my ability. I will ensure during the course of this research that all records are kept confidential.

Signature of Investigator:

Date:

APPENDIX 8: Variables Used in the Fully Adjusted Models Presented in Chapter 7

For this study, a number of variables fit into each of the components of the Evans and Stoddard (1994) framework. To ensure that only those variables that had a significant association with the outcomes were included in the modelling process, an initial set of forward logistic regression models were completed. These models ran all of the variables in a given component against each of the outcomes, for example, one model ran all of the social environment variables against the outcome “Endhome”. Through this process, the individual variables within each component that maintained a unique influence on the outcome were identified. They were not adjusted for variables from any other component (e.g., age and sex from the genetic endowment component). The variables listed below are those variables that demonstrated a unique and significant influence on the outcomes, and are the ones used in the fully adjusted models in Chapter 7. Note: the health and functioning component is not included here because it was the test component.

Table A1: Significant Variables for Each Component Based on Unadjusted Forward Stepwise Logistic Regression Models

	Endhome	Justcare	Nothept
Physical Environment	Grbar4	Dwell4 Typhse4	Dwell4 Typhse4
Prosperity	Ownhse4 Curinc4	<i>NONE</i>	Ownhse4
Social Environment	Lgcm90ch	Marital4	Marital4 Lgcm90ch
Individual Responses	<i>NONE</i>	Mind4	Mind4 Occupfix
Genetic Endowment	Age90b Sex96	Age90b Sex96	Age90b Sex96
Well-being	<i>NOT IN</i>	Gensat4	Gensat4
Disease	Foot4 Heart4	Mi4 Nerve4 Palsy4 Teeth4	Nerve4 Heart4 Kidney4 Eyes4 Dermat4 Asthma4 Cva4 Bp4
Health Care	Statchg	Statchg	Statchg