

Social Engagement as a Predictor of Health Services Use in
Baby-Boomers and Older Adults

By

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Abstract

Purpose: To examine the relationship between social engagement (SE) and health care use (HCU) in baby-boomers (age 45-64) and older adults (65+).

Methods: Data from the Wellness Institute Services Evaluation Research III was used. SE was assessed using measures of formal, informal, and civic activities. HCU was assessed using administrative health care records (hospital use and length of stay, overall general and family physician use).

Results: Higher formal SE indicated higher contact with physicians in general, higher hospital visits, and longer lengths of stay in hospital. Higher informal SE indicated shorter lengths of stay. Results were found while controlling for demographic variables, chronic conditions, and self-rated health. Older adults had higher HCU overall, compared to baby-boomers.

Conclusion: While further research is necessary, this study has implications in determining the impact that certain types of SE can have on the health care system for different age groups.

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Dedication

This thesis is dedicated to my mother, Jean, for the many late nights she spent helping me study.

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Social Engagement as a Predictor of Health Services Use in Baby-Boomers and Older Adults

Section 1: Introduction

1.1 Overview

In Canada the number of adults age 65 years or older has risen significantly in recent years, and this trend is only expected to accelerate. It is estimated that by the year 2036 older adults will account for approximately 25% of the population; nearly doubling the 14% seen in 2010 (Statistics Canada, 2010). With an aging population comes an increase in health care costs. Older adults have different needs of the health care system compared to individuals in other age categories, and consume a higher proportion of health care spending and resources. For instance while adults age 65 years or older represented only a little over 13% of the population in 2005, they consumed approximately 44% of health care spending (Sinha, McElhaney, & Rockwood, 2009). In the province of Manitoba, it has been found that 60% of all hospital costs can be attributed to older adults (Menec, MacWilliam, Soodeen, & Mitchell, 2002). Thus studying factors which influence health care utilization in older adults is essential, as determinants of health care use in this age group have an especially large impact on the health care system.

Research has demonstrated that there are numerous behavioural and social determinants of health care utilization in older adults. The extent to which one is socially engaged is the determinant of interest for this particular study. Social engagement has previously been researched in relation to health status of older adults, however a review

of the literature suggests that few studies have examined social engagement as a predictor of health services use in older adults. Of the few studies that have examined this relationship, each was lacking an objective measure of health care utilization. The common method for assessing health services use has been through subjective questionnaires, rather than through the use of administrative health data. Additionally, no study has examined the relationship between social engagement and health services use using both older adults as well as baby-boomers as a study sample. By doing so, previous studies have failed to acknowledge that the older adults of today will likely differ from the older adults of the near future. Therefore this study will address this gap in the literature.

1.2 Purpose

The primary purpose of this secondary data analysis study was to examine the relationship between social engagement and health care utilization in baby-boomers and current older adults in Winnipeg, Manitoba, using the Anderson Behavioral Model of Healthcare Utilization as a guiding conceptual framework. A conceptual definition of social engagement will also be offered, based on a review of existing literature of the concept. A secondary purpose of this study was to compare older adults and baby-boomers in terms of this relationship between social engagement and health care utilization, and well as compare the two age groups on a number of characteristics and variables.

Section 2: Literature Review

2.1 Aging

It is not a new or surprising concept that the Canadian population is aging. Nor is this trend unique to Canada. According to the World Health Organization, the world's population aged 60 years and older will more than triple between the years 2000 and 2050, increasing from approximately 600 million to 2 billion individuals (World Health Organization, 2011). This age group is the fastest growing of all age groups worldwide. In the 2011 Canadian census report, the 60-64 age group showed the highest increase since the 2006 report, at 29.1%. In fact all age groups that increased by 20% or more were above age 60 (Statistics Canada, 2011A).

Cut-off points for defining the aged population can vary depending on the research being conducted. There is no single method for categorizing age groups, and the age selected to define an older adult is often somewhat arbitrary. Many studies have used age 65 as the start of old age, as it coincides with the set time of retirement and the time at which pension benefits begin (World Health Organization, 2013). While this may work in developed countries, it is not as suitable for some developing countries. For example it has been said that if age 65 is used in most developed countries, a comparable cut-off in parts of Africa would be 50-55 (World Health Organization, 2013). This is due to different life expectancies, birth rates, and overall different ideas surrounding age.

The idea of using a set age to create age groupings is of course based on chronological age alone. It should be noted that there are several other methods to

measuring one's age. Chronological age is merely a representation of how long someone has been alive. Psychological age however is often another measurement used to examine age. Psychological age is a perceived level of age (i.e., how old or young one feels). It refers to the "adaptive capabilities of individuals to deal with a changing environment compared with chronological age peers," (Chappell, McDonald, & Stones, 2007). Social age is another measure sometimes found in the literature. Social age refers to the social conditions and norms surrounding chronological age, and the roles expected of people during different points in life (Chappell et al., 2007).

The current study uses chronological age groupings of 45-64 years, and 65 years and older. As a developed country, this fits with the majority of existing definitions used to define older adults (65 years and older) and middle aged adults (45-64). More specifically, these middle aged adults represent baby-boomers born between the years 1946-1965. Since the primary comparison in this study is between older adults and baby-boomers, no subgrouping within these two age groups (i.e. young-old or old-old) shall be used.

2.2 Comparing Baby-Boomers and Older Adults

Baby-boomers are defined as individuals born during a period of time where there was a sudden rise in births, followed by a sudden drop (Statistics Canada, 2011B). While there have been a number of baby-booms throughout history, the boom most people are familiar with in Canada is the one that followed World War II. Between 1945 and 1946 when the boom started, there was a 15% increase in births across the country. The

baby-boom period lasted 20 years, (ending in 1964), during which time 8.2 million babies were born (Statistics Canada, 2011B). While this group is often referred to simply as the “boomers,” it is important to note that baby-boomers are not a homogeneous group, and should not be treated as such. This is especially important to keep in mind for those born in the early or later ends of the boom, as a twenty year period is a lengthy amount of time (Easterlin, Schaeffer & Macunovich, 1993). That being said, regardless of when a baby-boomer was born, they were raised in an entirely different social and economic climate than their parents. The “parents of baby-boomers” as they are often called, are captured in this study’s “older adult” category (Statistics Canada, 2011B).

Because of the various social, economic and political differences that existed between the generation of the baby-boomers and their parents’ generation, these cohorts differ in a number of ways. The parents of baby-boomers were born during the depression (1929-1939), and following the depression leading up to World War II. Thus these individuals were raised in times of economic hardship. Conversely baby-boomers were born in a period of economic growth (Mellor & Rehr, 2005). Compared to their parents, baby-boomers were more likely to marry at a later age, have fewer children, and have higher rates of divorce (Mellor & Rehr, 2005). Despite high remarriage rates, it has been predicted that baby-boomers will hit record highs for living alone in retirement (Easterlin, Schaeffer & Macunovich, 1993). Research has indicated that when examining the same points within the life cycle, baby-boomers are considerably better-off than their parents, in terms of wealth and income (Easterlin, Schaeffer & Macunovich, 1993). It is anticipated that these favourable circumstances will follow the baby-boomers into

retirement.

Baby-boomers' views on retirement are generally different from current older adults. Baby-boomers are likely to state that they plan to retire several years earlier than their parents' generation did, and that if they choose to work for longer, it will be because they want to, not because they need to. Current older adults were not as likely to have this option (Mellor & Rehr, 2005). How baby-boomers and older adults spend their retirements is also predicted to differ in some ways. Boomers are sometimes referred to as the "sandwich generation," because they are caring for two generations at the same time (Grundy & Henretta, 2006). More baby-boomers than current older adults will likely spend the first years of their retirement caring for their own children while also caring for their older parents (Mellor & Rehr, 2005).

Overall activities of baby-boomers and current older adults are also predicted to differ as baby-boomers age. For example while both groups do considerable amounts of volunteer work, it is predicted that baby-boomers may do more volunteer work in their retirement than their parents (Mellor & Rehr, 2005). How the two groups spend their leisure time also differs. A study that examined internet activity between the two groups for example found several differences. Baby-boomers were found to use the internet significantly more than current older adults, and the two groups were likely to use the internet in different ways. Older adults were more likely to use the internet as a source of leisure entertainment by playing games, while baby-boomers were found to be more likely to use the internet for research purposes or chat groups (Statistics Canada, 2009).

These results indicate that future older adults will be more active on the internet than today's older adults.

2.3 Health and Health Care Use of Baby-Boomers and Older Adults

Social, economic, and lifestyle differences between these generations also means a difference in their health and use of the health care system. A study was recently released which indicates that baby-boomers are less healthy than the generation before them in a number of ways (King, Matheson, Chirina, Shankar, & Broman-Falks, 2013). For self-reported health, only 13.2% of boomers reported "excellent" health, compared to 32% in the earlier generation ($p < .001$). Controlling for outside sociodemographic variables, baby-boomers were found to have significantly higher odds of having hypertension, diabetes, and hypercholesterolemia. Baby-boomers are also significantly more likely to be obese, exercise less, and drink alcohol more than the older generation. On a positive note however, boomers reportedly smoke less and experience less emphysema and myocardial infarction (King et al., 2013).

The baby-boomers are expected to live longer than the generation before them, and the longer someone lives, the more likely they are to have more chronic conditions (Mellor & Rehr, 2005). Combining this with the fact that boomers are already going into old-age with more health ailments than the generation before them, it is no wonder that media and researchers alike have been focusing on what the aging of this generation will do to the health care system. Of primary concern is whether or not our long-term care system will be prepared for the aging baby-boomers. There is a general fear that having

to support the long-term care needs of the baby-boomer population will be a substantial economic burden in the near future, however research has shown that this does not need to be the case, and these fears are essentially unfounded (Knickman & Snell, 2002).

2.4 Defining Social Engagement

Social engagement has been varyingly defined in the literature, with there being no single conceptual definition. The terms used to comprise social engagement often vary from study to study, and thus there is an issue with consistent measuring of this concept as a whole. A wide variety of different terms exist for describing social engagement. The terms that are arguably most frequently associated with social engagement are social participation, social support, and social networks (Bath & Deeg, 2005). Often these terms are used synonymously with social engagement. Social engagement and social participation in particular are often used interchangeably.

For example in a recent literature review on social participation by Levasseur, Richard, and Raymond (2010), papers were retrieved using keywords Social participation OR Social engagement (OR Community involvement OR Community participation OR Social involvement). The final review examined 43 papers from a variety of fields such as gerontology, rehabilitation, public health, and psychology. The terms most commonly used in the definitions were social participation (53.5%) or social engagement (30.2%), and the majority of the definitions involved an older adult population (62.8%). From this review, a taxonomy was proposed. As can be seen in Figure 1, the taxonomy has six proximal to distal levels. These levels are distinguished from one another through

assessment of 1) individual proximity of involvement with others, and 2) goals of the activity. Activities can be done alone (levels 1 and 2), with other individuals (levels 3 and 4) or for other individuals/society (levels 5 and 6).

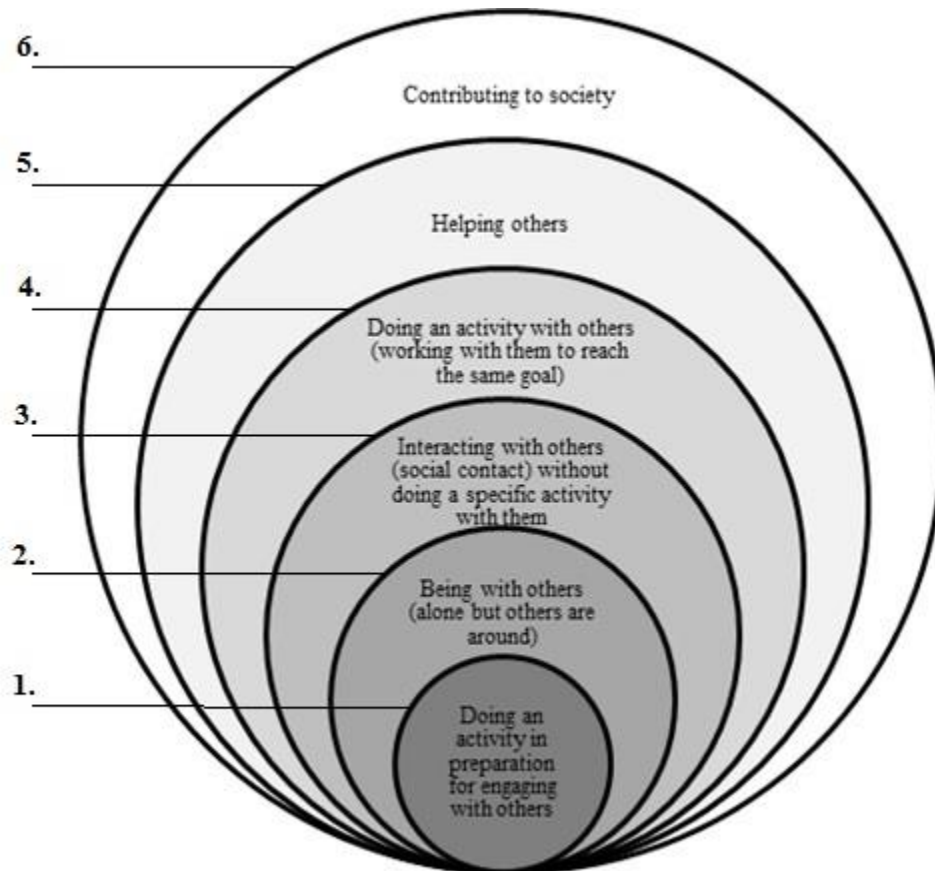


Figure 1. Proposed taxonomy of social activities based on 1) levels of involvement of the individual with others, and 2) goals of these activities (Adapted from Levasseur et al., 2010)

The first level involves activities that an individual will typically do alone as a means to prepare for interaction with others. This includes activities such as watching television or listening to the radio, which connects the individual with society and informs him or her of activities occurring in the world. The second level also involves the individual acting alone however with some interaction with the community. This can include any community involvement where other people are around, but not directly interacting with the individual. The third level starts to get into actual social interaction with other individuals. This level involves interaction with others without a specific shared activity. This may include talking to the cashier at the grocery store while paying for groceries, or socially connecting with someone over the internet. In the fourth level, the individual performs an activity with other individuals while working collaboratively to reach a singular goal. This is the level within the taxonomy where most recreational activities can be found, such as playing group sports or card games with others. The fifth level involves activities where the individual helps other people. This can include doing volunteer work or acting as a caregiver to a family member. The sixth and final level of the taxonomy also involves helping others, but on a larger scale. The individual contributes more broadly to society as a whole rather than just assisting one or two individuals. Examples of this may include being involved in a political party or large organization.

This taxonomy provides a detailed and well-rounded description of social participation, which is useful in conceptualizing how social engagement is to be defined within the current research. In the review by Levasseur et al., it was noted that social

engagement may indicate more of a “desire for social change or to be heard to affect community choices,” while social participation indicates a less formal involvement with family and friends (Levasseur et al., 2010). Accordingly, social engagement can be said to require more of a conscious decision on the part of the individual compared to social participation. While it is true many study definitions require individuals to actively and productively pursue involvement with society and contribute to society in some way, in order for them to be considered socially engaged (e.g. Glass, De Leon, Bassuk, & Berkman, 2006), it is certainly not true of all of them. For example, Zimmerman et al. (2003) defined social engagement in older adults by looking at participation in social activity and the frequency of visits and telephone contacts with family and friends. Similarly, Graves, Jang, Mortimer, & Haley (2004), defined social engagement in older adults as merely the individuals participation in social activities, their interpersonal relationships, and level of social connectedness with family and friends. These definitions are nearly identical to numerous definitions of social participation (for example Bath & Deeg, 2005; Lindstrom, Hanson, & Ostergren, 2001).

Thus while some definitions indicate a need for active and formal engagement with society, it can also be seen that informal and symbolic engagement with society is another means of measuring social engagement. Therefore while Levasseur et al. defined social engagement more narrowly within their taxonomy, limiting the term specifically to activities that contribute to others and society as a whole, I would like to broaden this definition by arguing that social engagement can take place without necessarily actively helping others.

2.5 Social Engagement: A Different Concept than ‘Social Support’ and ‘Social Network’

The terms ‘social network’ and ‘social support’, as mentioned, are also commonly associated with social engagement. Unlike social participation however, there is a stronger literature on the distinction between these terms and social engagement. One definition of social network is “the number of contacts with friends and relatives and membership of groups and organizations” (Bath & Deeg, 2005). Social support has been defined as the “instrumental and emotional help available to an individual” (Bath & Deeg, 2005). The reason these terms are commonly associated with social engagement is that it can be difficult to measure one without also measuring the others (Bath & Deeg, 2005). For instance while a social engagement scale may just seek to understand how often an individual attends events through church or how often she or he visits with neighbours, it may pick up aspects of group membership and provide a degree of the individual’s social network as well. This in turn may provide a picture of the individual’s level of social support, as those who are in regular contact with friends or family are likely to have those individuals to rely on for instrumental and emotional support. A key difference between these two concepts and social engagement is that social engagement focuses on the individual’s interaction with his or her environment, while social support and social networks reflects the individual’s environment alone (Levasseur et al., 2010). Social engagement is not considered the result of social networks or social support, but rather the involvement in a meaningful social context (Berkman, Glass, Brissette, & Seeman, 2000).

Taking into consideration the existing research and in particular, the work done by Levasseur et al (2010), social engagement will be defined broadly, to remain as inclusive as possible for the purpose of this study. Examining the taxonomy created by Levasseur et al. (2010), this research will define social engagement using levels three through six of the continuum (Figure 1.). Thus, social engagement is defined not only through actions that help others, but can include more informal participation with the community. For the purpose of this study, social engagement refers to the degree to which an individual engages with society, from informal involvement (e.g., talking on the phone or internet with friends), to more formal involvement (e.g., participating in organized church activities), to civic and large-scale social involvement (e.g., volunteer work or employment). This definition combines aspects of definitions seen in various research conducted on social engagement in older adults described earlier. Social support and social networks will not be explicitly measured as part of the current definition of social engagement. They will however be separately measured as predictor variables within the model being used. By separating out social networks and social support from social engagement, we will better understand the importance of the social environment compared to ones engagement with their social environment, in relation to health services use.

2.6 Social Engagement and Older Adults

It has been found that adults 65 years and older have the lowest rates of social engagement of all age categories in Canada (Statistics Canada, 2003). This has been

found for formal interactions, informal interactions, involvement in organizations such as political groups, and doing volunteer work (Statistics Canada, 2003). For example in 2007, 58% of 15 to 24 year olds volunteered, compared to only 36% of those 65 and over (Statistics Canada, 2009). That being said, older adults who do volunteer have been found to contribute more hours to their volunteer work than younger people. For example, while 15 to 24 year olds volunteered an average of 138 hours in 2007, those 65 and over volunteered an average of 218 hours (Statistics Canada, 2009).

Social engagement in older adults has been found to be influenced by demographic variables such as income, social class, and education. For instance, in a study by Harwood, Pound, and Ebrahim (2000), which examined social engagement in older men (age 51-70 years), it was found that wealth and a higher social class were significantly associated with higher levels of social engagement. Similarly, in a study by Tang (2008), it was found that older adults with higher levels of education were more likely to volunteer, contribute more hours to volunteering, and volunteer in a wider range of organizations (e.g., political, religious, educational).

Other demographic characteristics which have been examined in relation to social engagement in older adults include age, gender, and marital status. Even when just examining older adults, studies using populations of seniors have found that advancing age is associated with lower social engagement (Bukov, Maas, & Lampert, 2002; Harwood et al., 2000). Social engagement has also been found to differ between men and women. For instance older women have been shown to be more socially engaged than

older men, and have a larger number of social relationships (Thomas, 2011). There have been mixed findings on the effect of marital status in older adults on social engagement. While some studies have found that married older adults are more likely to be socially engaged than single older adults (e.g., Harwood et al, 2000), other studies have found no such effect (Bukov et al, 2002). Several studies have confirmed that widowhood has an effect on social engagement, in that older adults tend to increase their level of social engagement after the loss of a spouse (Donnelly & Hinterlong, 2010; Utz, Carr, Ness, & Wortman, 2002). To the best of my knowledge, no research has been conducted which has directly compared social engagement in baby-boomers versus older adults.

2.7 Social Engagement and Health

Recent research has demonstrated that there is a strong relationship between health behaviours such as level of physical activity, and health care utilization in older adults (Woolcott, Ashe, Miller, Shi, & Marra, 2010). Social engagement however, has not been examined as thoroughly in connection with health care use, despite being known to have numerous benefits for older adults. In fact, while there is much debate over what it means to “age successfully,” Rowe and Kahn (1998) argue that a key component of successful aging is active engagement with life. Their research maintains that productive activity, (an activity that creates societal value regardless of reimbursement) and interpersonal relationships are necessary to be a successful ager. Thus even if an individual is free of disease and disability and has managed to maintain a high degree of cognitive and physical functioning, she or he would not be considered as having aged successfully if they were not also socially engaged to some degree. This model of

successful aging supports the notion that aspects of social engagement are necessary in order to live a truly healthy life.

In terms of health benefits, a number of studies have been able to demonstrate the impact that social engagement can have on the lives of older adults (see Herzog, Ofstedal, & Wheeler, 2002). The majority of studies in this area have specifically looked at the effects of social engagement on mortality. For instance, Sampson, Bulpitt, and Fletcher (2009), found that in a sample of community-dwelling older adults, those with the lowest levels of social engagement had a significantly higher mortality risk compared to individuals with the highest levels of social engagement. This was the case even when controlling for health, lifestyle factors, and functional ability.

In a similar study, Glass, De Leon, Marottoli, and Berkman (1999) assessed all-cause mortality related to social activity in a sample of 2761 older adults, controlling for previous medical conditions, demographic variables, and physical activity levels. Results from this study indicated that older adults in the least active quarter of the sample were 20.3% more likely to die than those in the top quarter of socially active older adults. Research has also been conducted in non-community samples of older adults. For example, Kiely and Flacker (2001) examined the effect of social engagement on mortality in a large sample ($n=30,055$) of nursing home residents age 65 years or older. Again significant results were found in that the more socially engaged an individual was at baseline, the less likely they were to have died by the one year follow up.

Other research has looked more specifically at the benefits of social engagement on physical health. A recent study by Thomas (2011), found that older adults with moderate to high levels of social engagement, and especially those with increasing levels of social engagement, were significantly less likely to be experiencing physical impairment compared to individuals with low, decreasing levels of social engagement. Similarly, Avlund, Lund, Holstein, and Due (2004) found that low levels of social engagement were significantly related to functional decline in adults 75 years and older. James, Boyle, Buchman, and Bennett (2010) found overall social activity to be associated with a decreased risk of incident disability in activities of daily living, mobility, and instrumental activities of daily living, in a sample of community-dwelling older adults. Furthermore, in a longitudinal study by Menec (2003), participation in social activity was found to be related to better physical and cognitive function six years later, in addition to reduced mortality.

In addition to physical health, social engagement has also been implicated in the cognitive functioning and mental health of older adults. James, Wilson, Barnes, and Bennett (2011) examined cognitive decline specifically related to social activity in a sample of adults 65 years or older without existing dementia. In this study, more frequent social activity was found to be significantly associated with less cognitive decline over follow-up. Wang, Karp, Winblad, and Fratiglioni (2002) found that older adults who were regularly socially active were significantly less likely to develop dementia. Social engagement has also been linked to depression and life satisfaction in older adults (Hong, Hasche, & Bowland, 2009; Graves et al., 2004). A summary of the findings of these

studies can be viewed in Table 1.

Table 1

Research Findings on Social Engagement and Health in Older Adults

Study	Primary Independent Variable	Primary Finding
Avlund, Lund, Holstein, and Due (2004)	Functional Decline	Extensive social relations reduces the risk of onset of disability
James, Boyle, Buchman, and Bennett (2010)	Incident Disability	Higher social activity associated with decreased incident disability
Glass, De Leon, Marottoli, and Berkman (1999)	Mortality	More engaged older adults are less likely to die
Graves, Jang, Mortimer, & Haley (2004)	Life Satisfaction	Social engagement associated with greater life satisfaction for disabled older adults
Hong, Hasche, & Bowland, (2009)	Depression	Higher participation associated with lower baseline depression, and a longitudinal protection against depression
James, Wilson, Barnes, and Bennett (2011)	Cognitive Decline	Less cognitive decline over follow-up with higher levels of social engagement
Kiely and Flacker (2001)	Mortality	Higher social engagement at baseline associated with lower odds of mortality at follow-up
Menec (2003)	Physical and Cognitive Function, Mortality	Greater overall activity positively related to physical and cognitive function, and morality

Sampson, Bulpitt, and Fletcher (2009)	Mortality	Lowest mortality risk for those with high social engagement
Thomas (2011)	Physical and Cognitive Impairment	Those with high and increasing levels of social engagement showed decreased impairment
Wang, Karp, Winblad, & Fratiglioni (2002)	Dementia	Regular social activity associated with decreased risk of developing dementia

While there is a considerable amount of research pertaining to the effects of social engagement on the various aspects of health and wellbeing, there has been very little research which has looked at social engagement and health care utilization in older adults. It stands to reason that if individuals who are more socially engaged are healthier physically and mentally, they would have different use of physicians and hospitals. This relationship has yet to be objectively examined however. With older adults accounting for a considerable portion of health care spending and resources, and social engagement proving to play an important role in the health of older adults, it is important that the relationship between social engagement and health care utilization be studied.

Section 3: Conceptual Framework

3.1 Andersen's Behavioral Model of Health Services Use

Andersen's Behavioral Model of health services use (Andersen, 2008), is arguably the most frequently used model for examining health services utilization, and has been used in many studies of older adult health (e.g., Parboosingh, & Larsen, 1987; Fan, Shah, Veazie, & Friedman, 2011). It was developed in 1968 by the US medical

sociologist and health services researcher Ronald M. Andersen. This model views the utilization of health services as an individual behavior, which can be influenced by three separate types of factors: predisposing factors, enabling factors, and need factors (Aday & Anderson, 1974; Andersen, 2008).

3.2 Predisposing, Enabling, Need Factors

Predisposing factors pertain to the inclination of the individual to seek the health care services. Predisposing factors, which exist prior to the perceived need for services, include demographic variables (e.g., age, gender), social variables (e.g., education), and beliefs about one's health (e.g., values, attitudes, and knowledge surrounding health and illness). Predisposing factors are important to consider because while some people may have access to health services and may have a need to use them, they may still choose not to. In situations such as this, the individual does not seek health care merely because their individual characteristics predispose them not to. For example, research has found that young men are much less likely compared to women to seek out the help of health services (Galdas, Cheater, & Marshall, 2005). The age and gender of young men are the predisposing factors which appear to influence the likelihood of using the health care system. Researchers are still unsure exactly what mechanisms are at play here, however it has been suggested that perceptions of masculinity in this group may be what hinders their use of health services.

Conversely, just because individuals are inclined to use health services, does not necessarily mean they have the capacity to do so. Enabling factors are those that indicate

the accessibility of services to the individual. Certain circumstances or individual characteristics may hinder or facilitate the individual's ability to access health services. This can include income, supplemental insurance, availability of medical services within the community, social networks, and social support.

The last factor to be considered is the individual's levels of need. Need factors include both perceived level of need, and evaluated level of need (e.g., level of disability, illness, function, as perceived by the individual versus clinically evaluated).

Need has previously been found to be the most strongly associated factor with health services use (Parboosingh & Larsen, 1987). It has been reported that need characteristics alone can account for 56.8%-77.7% of the variation in health services utilization (Wolinsky & Coe, 1984). Predisposing and enabling factors play a smaller role in explaining the variation in health services use, but are important factors nonetheless. For example in one study of physician use by older adults, it was found that higher education, a predisposing variable, was the most important predictor in explaining physician contact (Stoller, 1982). In other research it has been found that older women (age and gender also being predisposing factors), are at a disadvantage when it comes to securing health services (Keen & Li, 2005).

3.3 Versions of Model

There are several different versions of this model. The most recent version of the model (the fifth version) is the most detailed and complicated. It goes beyond individual

characteristics and incorporates contextual characteristics such as health organization and provider-related factors, as well as community characteristics (Andersen, 2008). The behaviour of health providers who interact with patients is also examined within this model. Feedback loops incorporated in the fourth phase of the model, are also still in place. They demonstrate that outcomes can have a returning impact on the predisposing, enabling, and need characteristics of the population and their health services use (Andersen, 2008). These more recent versions of the model go beyond what is needed for the purpose of this study, and instead this research will use the original version of the Andersen Behavioral Model. The purpose of this research does not require looking beyond the enabling characteristics of the individual, to the contextual factors surrounding individual health service use. Additionally, the contextual factors in the broader model were not captured in the data collected and used for this study, thus it is not possible to examine these factors. It is also not within the scope of this study to use the more complicated versions of the model as it would require a more longitudinal or perhaps experimental design (Andersen, 2008).

Section 4: Research Questions and Hypotheses

4.1 Research Questions

Using Andersen's behavioral model as a framework, this study is designed to determine whether individuals who are more socially engaged utilize certain health care services differently than those who are less socially engaged. More specifically, do more socially engaged individuals make more physician visits (in general and family) than their less socially engaged counterparts? Are socially engaged individuals more or less

likely to be hospitalized, and have shorter or longer lengths of stays than those who are less socially active? Finally, how do these relationships differ between baby-boomers (45-64), and current older adults (65+)?

4.2 Hypotheses

Those with higher levels of social engagement are hypothesized to utilize health care services differently than individuals who are less socially engaged. Specifically, it is hypothesized that highly socially engaged individuals will be less likely to be hospitalized, and have shorter lengths of stays while in the hospital, than less socially engaged individuals. It is also hypothesized that those with higher social engagement will different physician use patterns than their less socially engaged counterparts. This applies to physicians in general as well as family physicians specifically. This relationship is exploratory in that it is possible that socially engaged older adults may have more or fewer physician visits than less socially active individuals.

The reasoning for this exploratory hypothesis is that hospital visits have been found to be especially influenced by need variables such as existing health, rather than predisposing variables such as social engagement (Andersen, 1995). Physician's visits and other more routine health visits (e.g., dental appointments) are much less likely to be determined by need (Andersen, 1995). Appointments such as these may be more of a type of regular health maintenance (e.g. going for "check-ups"), than the actual need for the services. Based on this information, whether or not socially engaged individuals have more or fewer visits with physicians in general and family physicians specifically

compared to their less socially engaged counterparts, will depend on whether this relationship is more strongly predicted by need (health status) or social engagement.

Regarding age, it is hypothesized that the relationships found will be stronger for older adults compared to the younger baby-boomers, as social engagement may play an increasingly important role in their lives. This result is predicted as it has been found that compared to younger adults, older adults are less likely to be socially engaged (Statistics Canada, 2003). Similarly, older adults are known to have a greater number of chronic health conditions; they also use the health care system more. Thus, if an older adult is highly socially engaged it will likely have an even stronger impact on health service use than if a younger adult were equally socially engaged. The effect of gender on all relationships will also be explored, as gender has been found to play a strong role in both the accessibility of health care and attitudes towards health (Calasanti, 2010).

Section 5: Methodology

5.1 Design and Dataset

This study is a retrospective cohort study which utilized data from the Winnipeg-based Wellness Institute Services Evaluation Research (WISER) study. This evaluation study began in January 1998 at the University of Manitoba in Winnipeg Canada, in cooperation with the Wellness Institute at Seven Oaks General Hospital, also located in Winnipeg. The initial primary objective of the WISER program was to evaluate the effects of health promotion programming and related services on general health status and health behaviours. A long term goal of this study was also to assess

whether health promotion programs contribute to reducing health care costs by influencing the use of the formal health care system.

This longitudinal study has gone through four phases. Phases One and Two, led by Dr. Alex Segall (Department of Sociology) were conducted in affiliation with the Health, Leisure, and Human Performance Research Institute at the University of Manitoba. Funding for these early phases came from the Winnipeg Foundation, the Max Bell Foundation, the Norlien Foundation, Manitoba Health, and the University of Manitoba. Phases Three and Four were led by Drs. Segall and Menec and funded through Dr. Menec's Canada Research Chair in Healthy Aging. These last two phases were conducted for follow-up purposes, with the goal of learning more about the factors that contribute to healthy and active aging.

The current study assesses data from WISER Phase Three data which were collected in 2007/08. This phase was selected as it has the most in-depth assessment of social engagement. Phase Three of the WISER study has four components. The first component is in-person interviews, which were conducted by a trained female interviewer in the participant's place of residence. A primary objective of these interviews was to gain a better understanding of the social determinants of population health and the factors that keep Manitobans healthy as they age. The second component of this phase was a physical activity component involving pedometers. The purpose of the pedometer component was to get an objective measure of walking behaviour in study participants. This was an optional component which asked participants to wear a

pedometer for a three-day period and then record the number of steps taken each day. A third component to this phase of the study was an administrative health care record component. In the province of Manitoba, universal health care coverage is offered to its residents, and extensive databases maintain the use of all physician, hospital, and pharmaceutical services. Data on these services were linked to the interview data for participants who provided consent for their information to be accessed. This allowed for a complete assessment of health care use both prior to and following the interview. The fourth and final component of this phase of the study was a data linkage component to public access census data, to allow examination of neighborhood factors such as neighbourhood income. Census data allow examination of the relationship between neighborhood factors and health and health care use.

5.2 Participants

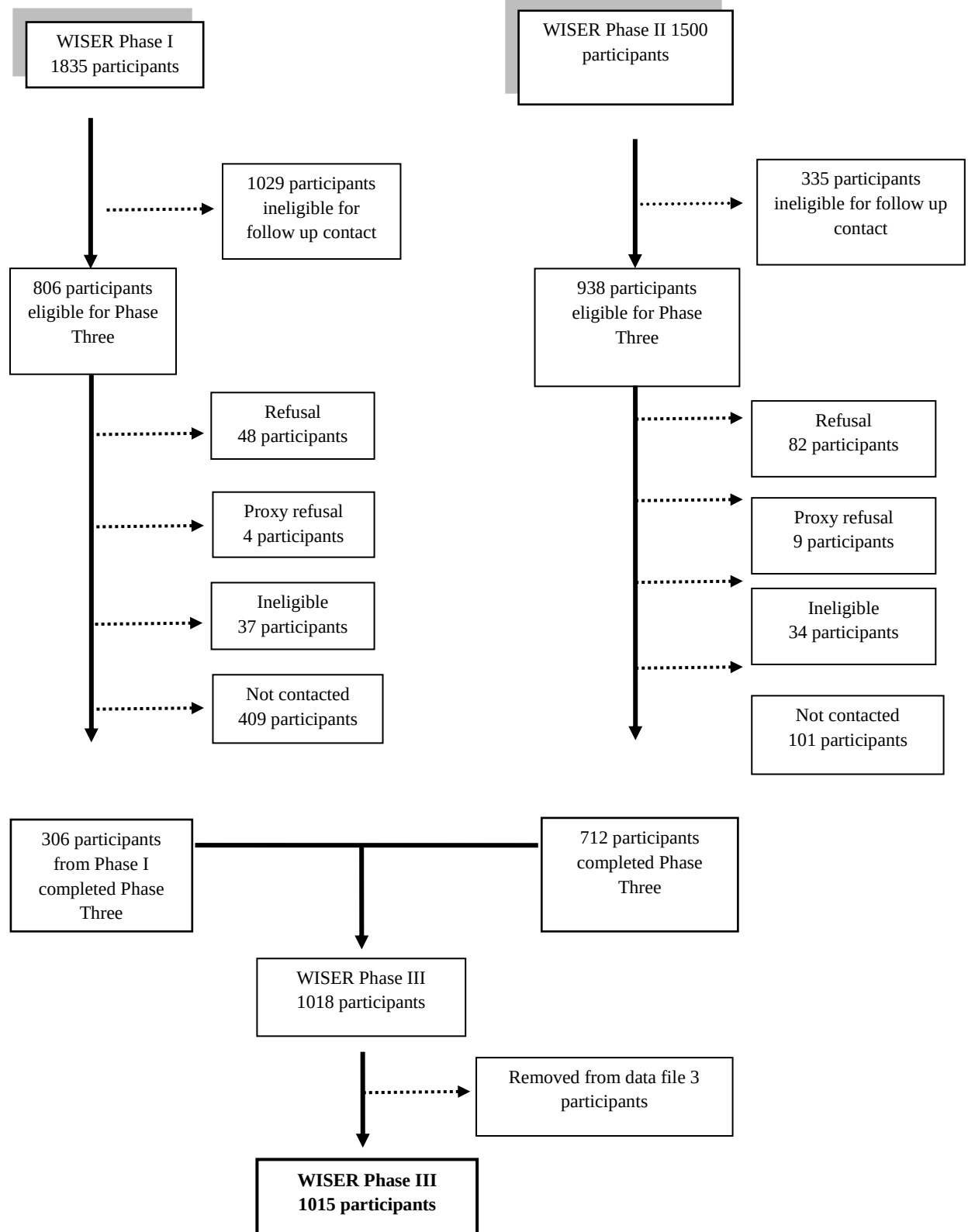
Participants for this research are community-dwelling adults age 45 years and older who participated in Phase Three of the WISER study. This allows a look at health care use among current older adults (65+), as well as baby-boomers (45-64) (i.e. future older adults). One thousand and fifteen individuals completed the questionnaire portion of the WISER Phase Three study, and of those participants, 954 provided consent for the study to access their Manitoba Health records. All participants had also previously participated in an earlier phase of the study (Phase One or Two).

Fifteen-hundred individuals were interviewed in Phase Two of the WISER study, and 1165 were eligible to be contacted for follow up. This sample was comprised of

Wellness Institute members, individuals from the community, and former members of the Wellness Institute who participated in the Former Member Survey (also known as the Exit Survey Group). Follow up contact resulted in 938 participants being eligible for Phase Three of the WISER study. Of these 938 eligible participants, 712 completed Phase Three, resulting in a response rate of 82.6% and a refusal rate of 12.3%. The original sample size that researchers were aiming for in Phase Three was 1000 participants. To achieve this, sample obtained from WISER Phase Two was supplemented with individuals who had participated in WISER Phase One only. There were 1835 individuals who participated in WISER Phase One. Of these individuals, 806 were eligible to be contacted for Phase Three. See figure 2 for a detailed outline of the sampling.

Participants were all community-dwelling residents recruited in Winnipeg, Manitoba, and the surrounding areas of East St. Paul and West St. Paul. The area of recruitment in Winnipeg has a diverse population in terms of ethnicity, age, and socioeconomic status.

Figure 2. WISER Study Phase Three Sampling



5.3 Measures

The organization of the predictor variables within the context of the Andersen Behavioral Model of Health Services Use can be seen in Table 2.

Table 2.

Predictor Variables Grouped According to Andersen Behavioral Model of Health Services Use

Predictor Variables

Predisposing	Enabling	Need
Age	Availability of	Perceived Need
Gender	Health Services	i. Self-rated Health
Education	Living Arrangement	Evaluated Need
Health Beliefs	Social Support	i. Existing Health/Chronic
Social Engagement		Conditions
i. Formal		ii. BMI
ii. Informal		iii. Perceived Physical
iii. Civic		Activity

5.3.1 Predictor Variables: Individual Characteristics.

5.3.1.1 ***Predisposing factors.*** Sociodemographic variables including age, gender, and education were examined as predisposing factors. These variables were obtained from an updated demographic section in the WISER Phase Three interview, with the exception of age which was calculated by subtracting the respondent's date of birth (provided in earlier phases of WISER) from the date of the Phase Three interview (see Appendix A for full questionnaire items).

Once age at the time of interview was calculated, participants were then grouped according to baby-boomer versus older adult status. Baby-boomers are those born between the years 1946 and 1965 (i.e. age 45-64 at the time of the study) (Statistics Canada, 2011). Older adults are therefore those age 65 years and older at the time of the interview. This categorization allows the comparison of current older adults, to future older adults. Of the total sample ($n = 954$), there were more baby-boomers ($n = 565$) included than older adults ($n = 389$). See Table 3 for coding and descriptive statistics. The average age of each group is 56.3 ($SD = .22$) and 73.8 ($SD = .33$), respectively, with the overall average age at 63.5 ($SD = 10.41$).

Table 3

Coding and Descriptive Statistics for Predisposing Variables

Variable	Coding	N	%	Mean (SD)
Age	Baby-Boomers (0)	565	59.2	--
	Older Adults (1)	389	40.8	--
Gender	Female (0)	441	53.8	--
	Male (1)	513	46.3	--
Education	0-13 Years (0)	359	37.6	--
	13+ Years (1)	591	61.9	--
Health Beliefs	Scale (1 – 6)	--	--	4.3(0.58)
Social Engagement				
Formal	Scale (1 – 5)	--	--	1.4 (0.40)
Informal	Scale (1 – 5)	--	--	2.7 (0.47)
Civic	Scale (1 – 4)	--	--	1.8 (1.12)

Gender was a dichotomous variable, with males coded as 1 and females coded as 2. Females represented slightly more than half of the sample overall (53.8%), with 52% of the baby-boomer group being female, and 56.3% of the older adult group being female. For level of education, participants were asked, "What is the highest level of education that you have attained?" Possible options included: "No schooling," "One to eight years," "Nine years," "Ten years," "Eleven years," "Twelve years," "Thirteen years," "Some university, community college, technical or trade college," "Diploma or certificate from a community college, technical or trade college," "Bachelor's or undergraduate degree from a university," "Master's degree, doctorate, or degree in medicine or dentistry," and "Other." Due to a small sample size in many of the categories, these responses were collapsed so that education became a dichotomous variable. Participants were categorized as having 0-13 years of schooling (i.e. up to completion of high school), or more than 13 years of schooling (completion of high school, plus some or all training in college or university) (see Table 3).

A measurement of health beliefs was also examined as a predisposing factor. The WISER Phase Three questionnaire included a large section on health beliefs, from which these data were taken. For example, for one set of questions participants were given statements such as, "You reflect about your health a lot," and, "You are alert to changes in your health." They were then asked to rate themselves on a scale from 1, "Does not describe you at all," to 5, "Describes you very well." Another set of questions used a scale ranging from 1, "Strongly disagree," to 6, "Strongly agree," and provided participants with statements to rate themselves on regarding how they think they handle

their health. A final question in this section simply asked participants how they think they are doing looking after their health. Possible responses included, “Excellent,” “Very Good,” “Good,” “Fair,” and “Poor.” All of these questions and scales can be reviewed in Appendix A. To create an overall “Health Beliefs” measure, several of these scales had to first be reverse coded. For example, where “Excellent” was originally coded as “1,” it was recoded as “6.” Once reverse coding complete, an overall mean was taken of the scores, which provided a final score for health beliefs. Thus higher numbers indicated greater concern with one’s health.

Social engagement was also included as a predisposing factor. Individual social characteristics that may impact an individual’s predisposition to go out and seek care are considered predisposing factors, and social engagement is considered as such. Social engagement was assessed using the interview portion of the WISER Phase Three dataset. The “Leisure Participation” section of the dataset allowed for assessment of both formal and informal social engagement. In total five items were used to measure informal social engagement, which people could either participate in on their own or with others. These items included: Visiting with friends or relatives, Attending cultural events (such as musical performances or plays), Attending sports events as a spectator, Artistic or cultural activities, and Telephone conversations with friends/relatives (see Appendix A). These items were selected from the original list of thirteen items in the WISER III questionnaire section on leisure participation. Specifically participants were asked: “Thinking about activities that you do on your own or with others but that are NOT provided through organizations, how often did you participate in each of the following

during the past 6 months?” For each item, respondents were asked to rate their participation on a five-point scale (daily, once a week to several time a week, once a month to several times a month, less than once a month, never). Daily was coded as five, while never was coded as one (Appendix A). From these items, an overall mean score was calculated to indicate level of informal engagement (see Table 3).

Formal social engagement includes any organized activities such as participating in religious or cultural programs. This was assessed through the question , “How frequently do you participate in each of the following activity programs?” in which the activity programs listed all referred to activities organized through community centres, recreation facilities, seniors’ apartments, or various organizations. Nine items were listed in total. The same five-point scale used for informal engagement was used here as well. For each item, respondents were asked to rate their participation (daily, once a week to several time a week, once a month to several times a month, less than once a month, never). Once again daily was coded as five, and never coded as one (Appendix A). Again, a mean of these items was calculated to provide an overall formal engagement score for each participant (see Table 3).

Finally, civic engagement was also measured by examining the amount of time participants spent doing volunteer work. This was measured using the following questions: “In the past 12 months, did you do any unpaid volunteer work for any organization?” and “On average, about how many hours per month did you volunteer for this organization or these organizations?” These questions were adapted from the General

Social Survey (2003, cycle 17). Only participants who responded “yes” to the first question were able to move on to the second question, while those who answered “no” moved on to a new section. Participants were categorized as: “None/less than one hour per month,” “One to four hours per month,” “Five to fifteen hours per month,” or “Over 15 hours per month.” If the participant could only answer the first of the two questions, (i.e. they did not volunteer), they were categorized as “None/less than one hour per month.” (Appendix A for questions and Table 3 for descriptive statistics).

5.3.1.2 Enabling. As identified in Andersens Behavioral Model of Health Services Use, availability of health care services is an important enabling factor. This was measured using the interview portion of the WISER questionnaire. Participants were asked, “Overall, how would you rate the availability of health care services in Winnipeg?” Possible responses include: “Excellent,” “Good,” “Fair,” and “Poor.” (Appendix A). “Excellent” was originally coded as “1,” and “Poor” as “4,” however this was reverse coded so that excellent became “4” and poor “1.”

Participant’s social networks and level of social support, while not considered to be a measure of social engagement for the purpose of this study, were also considered as enabling factors. While some studies using the Andersen Model to assess health care use in older adults have included social networks and social support as predisposing factors (Creel & Chavez, 1983; Coulton & Frost, 1982), they have more commonly been included as enabling factors (Redondo-Sendino, Guallar-Castillón, Banegas, & Rodríguez-Artalejo, 2006; Wang, Wu, Zhou, Zhang, Zhen, & Chen, 2009). Additionally,

Andersen himself stated that the presence of social relationships may serve as an enabling factor that can impede or facilitate health services use, and that they best fit in as enabling resources within the model (Andersen, 1995). Again this is different from social engagement in that social networks and social support are factors within the individual's environment, while social engagement is the individual's reaction to his or her environment. Hence these two factors are considered enabling, while social engagement is considered predisposing.

Social network was measured by examining the living arrangements of the participants. Participants were asked: "How many people are there in your household in each of the following age groups, including yourself?" The age groups consisted of: Children 0 – 12 years, Adolescents 13 – 19 years, Adults aged 20 – 64 years, and Adults aged 65+ years. Due to small sample sizes, participants were categorized as either living alone (coded as "1"), or living with at least one other person (coded as "0") (see Table 4 for descriptive statistics and Appendix A for the questionnaire). Using living arrangement as a measure of social network has been commonly used in previous studies (e.g. DeCoster & Kozyrskyj, 2000). It is clear that those who live alone have a significantly smaller social network, than those who live with even just one other person (Chou & Chi, 2008). Marital status was not separately measured as it was deemed to have too much overlap with this variable.

Table 4*Coding and Descriptive Statistics for Enabling Variables*

Variable	Coding	N	%	Mean (SD)
Availability of Health Services	Scale (1 – 4)	--	--	2.6 (0.88)
Social Support	Scale (1 – 4)	--	--	2.1 (0.93)
Living Arrangement	Living Alone (1)	176	18.4	--
	Living With 1+ (0)	776	81.5	--

Social support was measured using the following question: “When you are feeling anxious or upset and you need to talk, how much of the time do you have someone you can count on to listen to you?” Possible responses included: “None of the time”, “A little of the time”, “Some of the time” (coded as 1), “Most of the time” (coded as 2), or “All of the time” (coded as 3) (Appendix A). The first two categories were combined as “None/A little of the time” and coded as “0”, due to small sample sizes in these groups. This single-item question was used as it was felt this particular question gets to the core of social support, and how strongly the participant feels they do or do not have that support available for them. This question allows for the participant to think of anyone they know, and thus it is not restricting to a particular type of relationship.

5.3.1.3 Need. Both perceived and evaluated need for health services were measured in WISER III and examined in the present thesis. Perceived need was measured using questions from the Health Status portion of the WISER Phase Three questionnaire.

This section of the questionnaire asked participants about their general health, specific health conditions, recent falls, pain and discomfort, and overall feelings of wellness. To measure self-rated health, participants were given the following statement to answer: “In general, would you say your health is...” Possible responses included: “Excellent,” (coded as 4) “Very good,” (coded as 3) “Good,” (coded as 2) “Fair,” and “Poor” (coded as 1) (See Table 5 and Appendix A). Due to small sample sizes, “Fair” and “Poor” were combined into one category, leaving a scale of 1-4 rather than 1-5. Self-rated health has been used extensively in the literature to measure need of health care services, and has consistently been found to predict outcomes such as mortality (Idler & Benyamini, 1997).

Table 5

Coding and Descriptive Statistics for Need Variables

Variable	Coding	N	%	Mean (SD)
Self-rated Health	Scale (1 – 4)	--	--	2.5 (0.92)
Chronic Conditions	Total # of conditions	--	--	3.3 (2.45)
Body Mass Index	Underweight/Normal (0)	263	27.6	--
	Overweight(1)	393	41.2	--
	Obese (2)	270	28.3	--
Physical Activity	Scale (1 – 4)	--	--	2.5 (0.93)

Evaluated need for health services was measured in a number of ways. The first was through the measurement of chronic health conditions. It has been found that the number of chronic conditions older adults have is a significant driver of their use of the health care system. The more chronic conditions older adults have, the more likely they

are to make use of health services (Canadian Institute for Health Information, 2011). In the WISER interview, participants were told to think about any long-term conditions that they have, lasting 6-months or more, as diagnosed by a health professional. They were then given a list of 25 chronic conditions to select from, including an “other” option where conditions not-listed could be added. Examples from this list include asthma, arthritis or rheumatism, high blood pressure, urinary incontinence, Alzheimer’s disease or other dementia, and osteoporosis. A total tally of chronic conditions was used to determine how many chronic health issues each participant had.

Body Mass index (BMI) is another measure of evaluated need for health services. This is calculated by dividing the individual’s weight (in pounds or kilograms) by height (in inches or centimeters), as provided in the WISER interview. Participants were then categorized as being “underweight” if they had a BMI of less than 18.4, “normal weight” if their BMI was between 18.4 and 29.9, “overweight” if their BMI was between 25.0 and 29.9, and “obese” if their BMI was 30 or over. Because of a small sample size in the first two categories, “underweight” and “normal weight” were combined into one category leaving three BMI categories in total (see Table 5). These cut-off points are those set forth by health Canada, for anyone over the age of 18 who is not pregnant (Health Canada, 2003). This method has been used in previous research as a need predictor of health services use (Redondo-Sendino et al., 2006; Wolinsky & Coe, 1984). BMI is considered to be an evaluated measure of need, as it is a physical characteristic which has proven to be associated with health services use (Twells, Knight, & Alaghebandan, 2010).

Physical activity has also been found to be significantly related to health care utilization in older adults (e.g., Woolcott et al. 2010). Since physical activity has been found to be such a strong indicator of health care utilization, it will be assessed as a need variable. This has been done in other studies using the Andersen model to assess health services use in older adults (Redondo-Sendino et al., 2006). While physical activity was originally measured using pedometers as well as questions from the interview, it was deemed unnecessary to use both sources of measurement. Of the original sample of 1015 participants, 849 individuals (83.6%) agreed to wear a pedometer. Combining this with the fact that not all participants consented to have their health care information accessed, this resulted in a fairly large loss of participants. Due to this loss in sample size, it was decided that only the WISER interview would be used to assess physical activity. In the questionnaire participants were asked: “Thinking of your current participation in physical activities, how active are you compared to others of your own age and sex?” This question was asked in this manner so that each person was using the same reference point, and not (for example), comparing their level of physical activity to themselves at a younger age. Possible responses included; “Much more active,” (coded as 1), “More active,” (coded as 2), “About the same,” (coded as 3), “Less active,” and “Much less active.” Due to small sample sizes in the last two categories, they were combined to create “Less/Much less active,” and coded as “4” (see Table 5).

5.3.2 Outcome Variables: Health Care Use

The outcome variable examined in this study was objectively measured health services use. Health services use was examined using administrative health care records

obtained from the provincial health ministry. These health care records provide complete information on actual health care use, including hospital use, hospital length of stay, and physician use (Roos & Nicol, 1999; Roos, et al.,1993).

Physician use was assessed using medical claims data. The data provide information about the date of visits to physicians, as well as the type of physician visited (i.e. physician speciality). Two measures were derived from the data: 1) visits to all physicians regardless of their specialty, and 2) visits to family physicians. Both types of physicians were examined as participants' patterns of use and reasons for use may differ between type of physician. Research has found that what predicts the use of a specialist physician may not necessarily be the same as what predicts the use of a family physician (Suominen-Taipale, Koskinen, Martelin, Holmen, & Johnsen, 2004). Data were available for one year prior to each individual's interview and several years following the interview. To allow for the longest possible follow-up of health care use, data were examined 2.5 years after WISER interviews were conducted. This is from each participant's actual interview date, so all participants are followed for the exact same amount of time.

After examining the frequency distribution for physician visits in general (Figure 3), a median split was selected to form category cut-offs. A median split was selected to allow for the two groups of (low and high users) to be evenly distributed, and because no clear definition of high versus low physician use currently exists. Those who had zero to nine visits were categorized as "low," and those with more than ten visits categorized as "high." The same method was used to categorize participants according to their family

physician visits, with those having zero to fifteen visits within the study timeframe were deemed “low” users, whereas those who had more than sixteen visits were deemed “high” users (Figure 4).

Figure 3. Histogram showing frequency of physician visits in general 2.5 years after WISER interview.

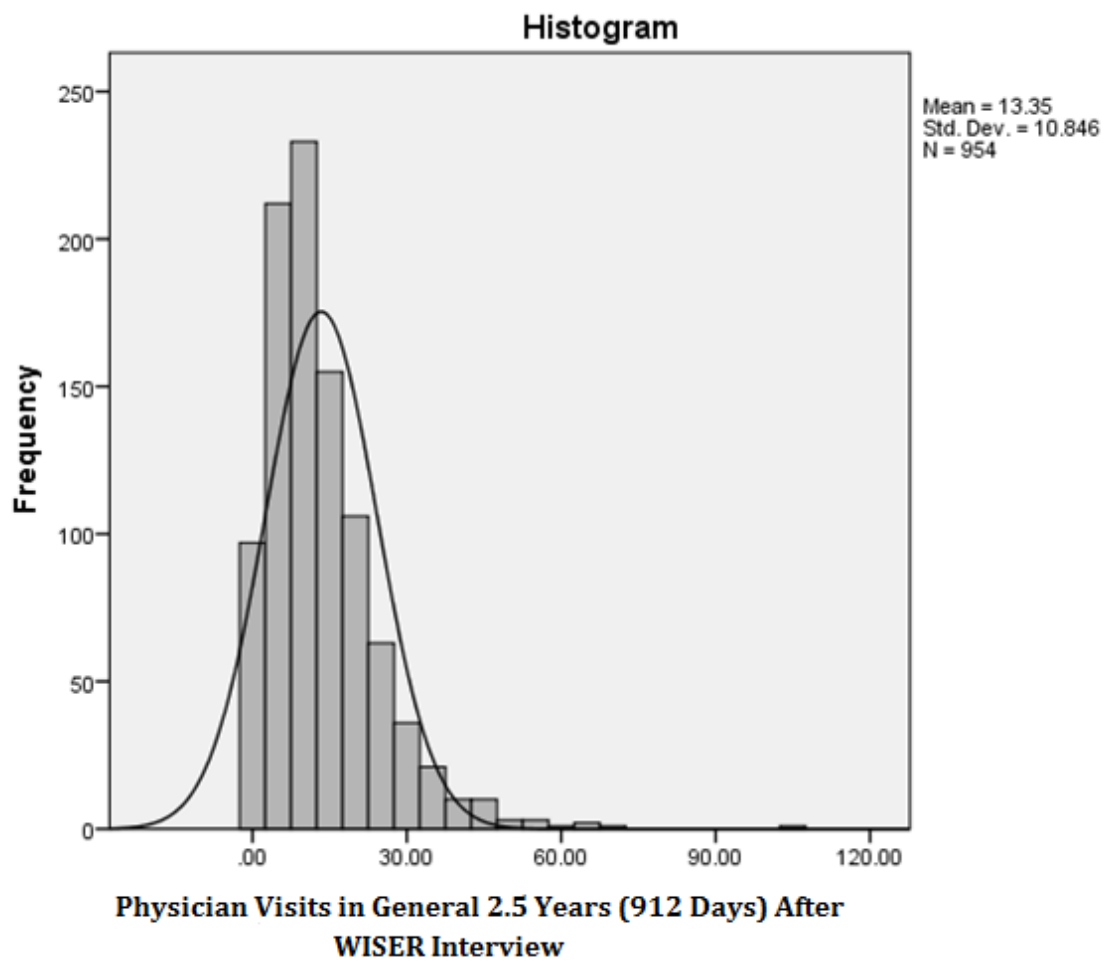
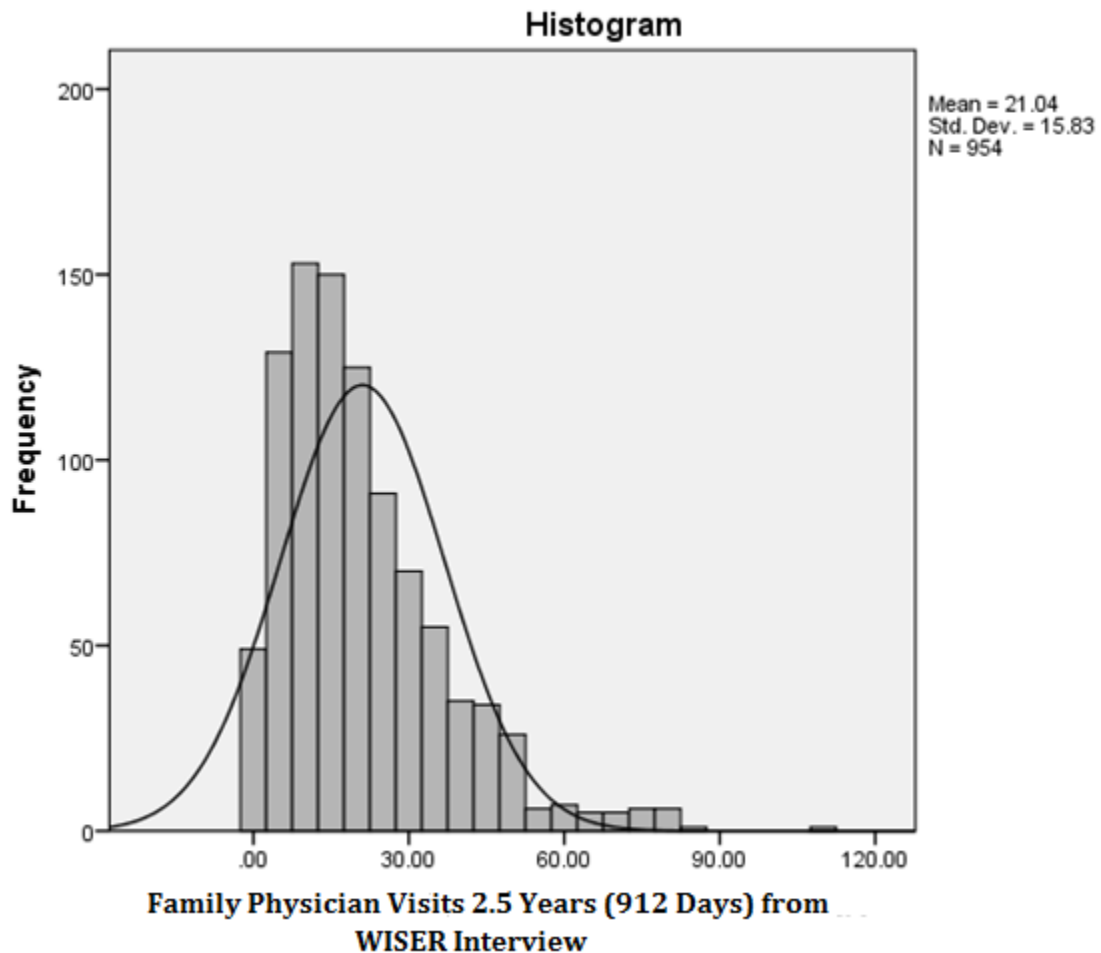


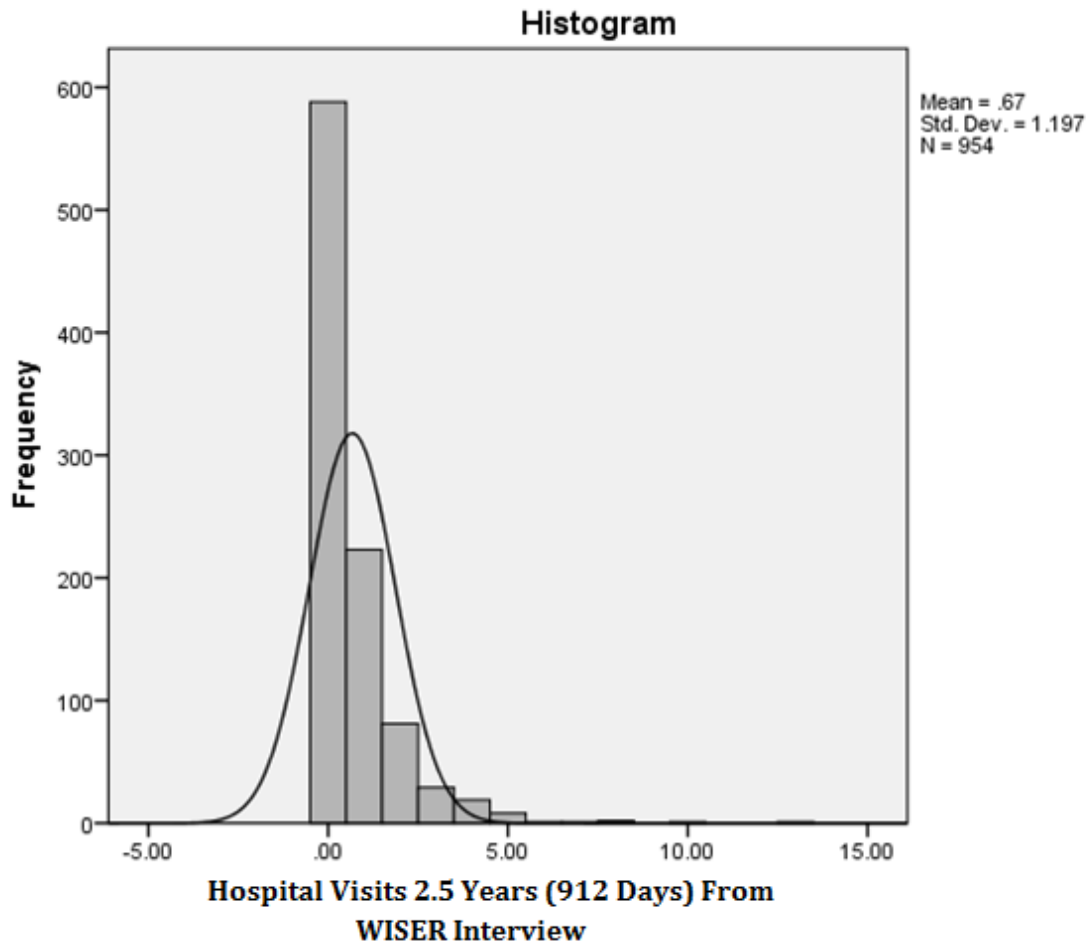
Figure 4. Histogram showing frequency of family physician visits 2.5 years after WISER interview.



Hospital use was derived from hospital discharge abstracts. Among other things, these data provide information about the date of admission and the date of separation (discharge). From this, the number of hospitalizations as well as length of hospital stays can be determined. Hospital use was determined by looking at the time period between the date of interview for that particular participant, and 912 days (2.5 years) after that date. Participants were grouped according to “no admissions” within the 2.5 year time

frame (“0”), or “one or more admissions” within the 2.5 year time frame (“1”). It was decided that the variable should be dichotomized since the vast majority of the sample had either zero hospitalizations, or just one hospitalization, within the follow-up period. Relatively few participants had multiple visits, thus they were grouped with those who had only one visit (Figure 5).

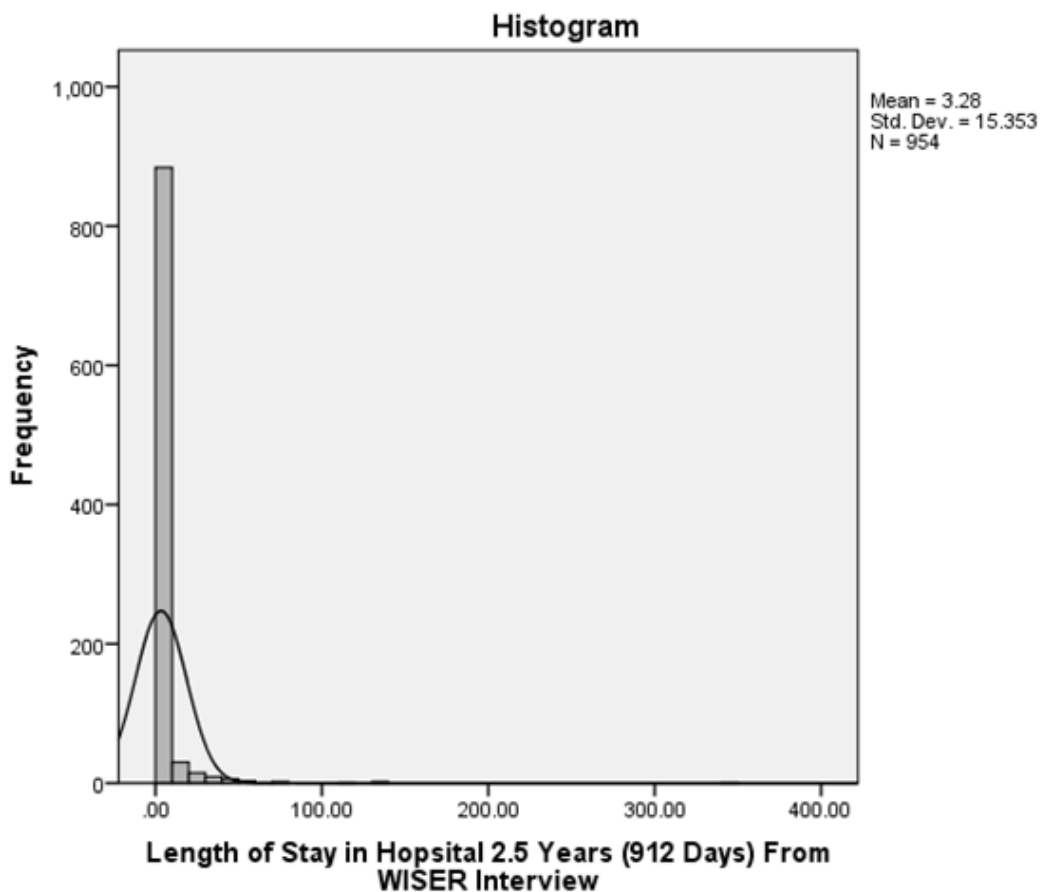
Figure 5. Histogram showing frequency of hospitalizations 2.5 years after WISER interview.



Distributions for hospital lengths of stay were also examined to determine cut-offs

points (Figure 6). Participants were categorized as having “short lengths of stay” versus “long lengths of stay.” Participants were categorized as having a “short stay” if they were in the hospital for less than four days, and a “long stay” if they were in the hospital for five or more days. In Canada in 2008-2009, the statistically average length of stay in an acute care hospital was 7.6 days (Canadian Institutes of Health Information, 2010). Because very few participants in the current study had lengths of stay longer than that amount of time, a lower cut-off was selected.

Figure 6. Histogram showing frequencies of different lengths of stay in the hospital 2.5 years after WISER interview.



The summary of each type of outcome variable and how they are coded can be seen in Table 6.

Table 6	
<i>Coding of the Outcome Variable: Health Services Utilization</i>	
Variable	Scale
Physician Visits in General	Low (0-9 visits) High (10+ visits)
Family Physician Visits	Low (0-15 visits) High (16+ visits)
Hospital Use	No Visits (0) One or More Visits (1)
Hospital Length of Stay	Short (0-4 days) Long (5+days)

5.4 Ethical Approval

Ethical approval was received for WISER Phase Three from the Health Information Privacy Committee, Manitoba Health, and the Psychology/Sociology Research Ethics Board (PSREB), Human Ethics Secretariat, University of Manitoba. Ethical approval for the use of this data for the purpose of the current study was obtained from the Health Research Ethics Board (HREB) on the University of Manitoba Bannatyne campus (Appendix B). Completion of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans Course on Research Ethics (TCPS 2: CORE) which is a requirement of all researchers whose research involves humans at the University of Manitoba. This certificate was obtained November 21st, 2011(Appendix C).

Use of administrative health care records requires that researchers complete online training for the Personal Health Information Act of Manitoba (PHIA). This was conducted and a pledge was signed January 27th, 2011. To ensure information used in this study was kept private, data had previously been stripped of names and each participant was given a unique study ID. For the entirety of the research, data were stored on a password protected computer in a locked room. To further ensure confidentiality, data will be destroyed after completion of the study, once enough time has passed to allow for publishing and disseminating of the research findings.

5.5 Data Analyses

Data were analyzed using the statistical software SPSS (IBM SPSS Statistics 21.0). First, cross-tabulations and chi-square tests were calculated to examine sample characteristics and compare baby-boomers and older adults by these characteristics. This was done for predisposing, enabling, and need factors, as well as the outcome variable health services use. Second, logistic regression analysis was used to determine the significance of the primary independent variable social engagement (informal, formal, civic) on the dependent variable health services use (use of physicians in general, family physician use, hospital use, length of stay), while controlling for other variables. In particular, the relationship between the three types of social engagement (informal, formal and civic) and health care use was examined. This was done in a four-block sequence, with need factors entered as block one, followed by enabling factors in block two, then predisposing factors not including social engagement in block three, and finally

social engagement in block four. This allowed social engagement to be considered without the influence of other predisposing factors, enabling or need factors.

After each step, any non-significant variables were removed from the model. A lenient level of significance ($p < 0.10$) was used so as to not rule out any potentially important predictor variables, which may have otherwise been considered borderline significant. Thus by the time social engagement was added, only significant predictor variables remained. As social engagement was the variable of interest, it was kept regardless of which variable (i.e. informal, formal, or civic), reached significance level. Odds ratios and confidence intervals were examined to determine the significance and odds of association between each predictor variable with the outcome variable.

Lastly, to more thoroughly examine age and gender effects, interaction variables were created and tested for each form of social engagement (e.g. Civic Engagement X Gender represents an interaction variable between gender and civic social engagement). These interaction variables were added to the final models for each of the different types of health care utilization. Only one interaction variable was examined at a time (i.e. Informal engagement x Gender was added, examined, then removed. This was then done for formal, and civic engagement).

Section 6: Results

6.1 Description of the sample

6.1.1 Predisposing variables

Predisposing characteristics included: age, gender, education, health beliefs, and social engagement (formal, informal, and civic). Overall descriptive statistics for the three types of social engagement can be seen in table 7. Informal social engagement proved to show the highest mean level of participation ($M=2.7$; $SD=0.47$), followed by civic engagement ($M=1.8$; $SD=1.12$), and finally formal engagement ($M=1.44$; $SD=0.40$).

Table 7:
Descriptive Findings of Social Engagement Variables

	N	Minimum	Maximum	Mean	SD
Informal SE	954	1.00	4.20	2.7023	.47265
Formal SE	954	1.00	3.22	1.4411	.39690
Civic SE	954	1.00	4.00	1.8417	1.11796
Valid N	954				

The sample was broken down into the two age groups; baby-boomers (45-64) and older adults (65+). Of the total sample ($n = 954$), there were more baby-boomers ($n = 565$) than older adults ($n = 389$). Baby-boomers reported obtaining more years of education than older adults; with baby-boomers having 14.33 years of education on

average (SD = 2.05), while older adults obtained 12.74 years of education on average (SD = 2.80). A chi-square test revealed that this association between age group and level of education (dichotomized as 0-13 years of education versus more than 13 years) was significant, $X^2 (1, 950) = 64.03, p < .001$ (see Table 8).

Table 8

Findings from Chi-Square Analyses, Predisposing Variables

	Age 45-64		Age 65+			
Characteristic	n	%	n	%	X^2	P value
Gender						
Male	271	48.0	170	43.7	1.68	.194
Female	294	52.0	219	56.3		
Education						
0-13 Years	154	27.4	205	53.0	64.03	.000
More than 13 Years	409	72.6	182	47.0		***
Mean Years of Education (SD)	14.3 (2.05)		12.7 (2.80)			
Total Sample	565		389			

An independent samples t-test revealed that the two groups did differ significantly in terms of health beliefs, $t(952) = -2.516, p < 0.05$. On the scale ranging from 1 through 6 (1 representing low/poor health beliefs, 6 representing high/good health beliefs), baby-boomers had a mean score of 4.2 (SD = .58). Older adults had slightly more

positive health belief than baby-boomers, with a mean score of 4.3 (SD = .57).

Table 9

Findings from Independent Samples T-Tests, Predisposing Variables

	Age 45-64		Age 65+		t-value	p
	Mean	SD	Mean	SD		
Health Beliefs	4.2	0.58	4.3	0.03	-2.516	0.012
Formal SE	1.4	0.39	1.5	0.41	-2.047	0.041
Informal SE	2.7	0.46	2.6	0.49	2.910	0.004
Civic SE	1.9	1.09	1.8	1.15	0.230	0.749

Older adults reported higher formal social engagement on average compared with baby-boomers. The mean score for baby-boomers was found to be 1.4 (SD = 0.39), while the mean score for older adults was 1.5 (SD= 0.41) (see Table 9). An independent samples t-test found this difference to be significant, at $t(952) = -2.047$, $p < 0.05$. Conversely, baby-boomers reported higher informal engagement compared to older adults. The mean score for baby-boomers for informal engagement was 2.7 (SD = 0.46), while the mean score for older adults was 2.6 (SD = 0.49). This difference was shown to be significant at $t(952) = 2.910$, $p < 0.01$. In terms of civic engagement, older adults reported a mean score of 1.8 (SD = 1.15) on average, while baby-boomers reported a mean score of 1.9 (SD = 1.09) on average. An independent t-test revealed that this difference was not significant, $t(952) = 0.320$, $p > 0.05$.

6.1.2. Enabling variables

Enabling characteristics include: availability of health services, living arrangement, and social support. The cross-tab and chi-square analyses findings of these characteristics can be viewed by age group in Tables 10 and 11. Ratings of availability of health services were not found significantly differ by age, $t(934) = -1.353$, $p > .05$ (see Table 9). Older adults reported a mean score of 2.6 ($SD = 0.88$), while baby-boomers reported a slightly higher score of 2.7 ($SD = 0.89$). Ratings of social support also did not significantly differ by age. Despite baby-boomers reporting slightly higher mean levels of social support ($M = 2.1$, $SD = 0.89$) compared to older adults ($M = 2.0$, $SD = 0.98$), an independent samples t-test revealed that this difference was non-significant, $t(948) = 1.702$, $p > 0.05$.

Table 10

Findings from Independent Samples T-Tests, Enabling Variables

	Age 45-64		Age 65+		t-value	p-value
	Mean	SD	Mean	SD		
Availability of Health Services	2.6	0.88	2.7	0.89	-1.353	0.176
Social Support	2.1	0.89	2.0	0.98	1.702	0.089

In terms of living arrangements, the majority of each group lived with at least one other person. Of the baby-boomers, only 9.7% reported living alone, while 31.3% of older adults lived alone. Chi-square analysis found this association to be significant, at X^2

(1, 952) = 70.66, $p < .001$ (Table 11).

Table 11

Findings from Chi Square Analyses, Living Arrangement

	Age 45-64		Age 65+			
Characteristic	n	%	n	%	X^2	P value
Living Arrangement						
Alone	55	9.7	121	31.3	70.66	.000
With at least one other person	510	90.3	266	68.7		
Total Sample	565		385			

6.1.3. Need variables

Need characteristics included: self-rated health, chronic conditions, perceived level of physical activity compared to others, and body mass index. The cross-tab and chi-square analyses findings of these characteristics can be viewed by age group in Tables 12 and 13. An independent samples t-test was conducted to compare self-rated health between baby-boomers and older adults. Baby-boomers reported a mean score of 2.5 (SD= 0.90), while older adults reported a mean score of 2.3 (SD = 0.93). The t-test revealed that difference is highly significant, at $t(950) = 4.105$, $p = 0.000$ (see Table 12).

Table 12*Findings from Independent Samples T-Tests, Need Variables*

	Age 45-64		Age 65+		t-value	p-value
	Mean	SD	Mean	SD		
Self-rated Health	2.6	0.90	2.3	0.94	4.105	0.000
Chronic Conditions	2.6	2.16	4.2	2.56	-10.166	0.000
Physical Activity	2.5	0.92	2.5	0.95	1.222	0.222

An independent samples t-test was also conducted to compare baby-boomers and older adults on the number of chronic conditions reported by each group. It was found that older adults had significantly more chronic conditions than baby-boomers, $t(952) = -10.166$, $p = 0.000$. Baby-boomers reported 2.6 (SD = 2.16) chronic conditions on average, while older adults reported 4.2 (SD = 2.56). The scores of baby-boomers and older adults were also compared for perceived levels of physical activity. An independent samples t-test revealed that this difference was not significant, $t(924) = 1.222$, $p > 0.05$.

For body mass index (BMI), the majority of participants (42.4%) were classified as being overweight. Baby-boomers had slightly higher BMI score's on average (28.61) compared with older adults (27.17). This association between age group and BMI was found to be significant at $X^2(2, 926) = 10.23$, $p < .010$ (see Table13).

Table 13*Findings from Chi-Square Analysis, Body Mass Index*

	Age 45-64		Age 65+			
Characteristic	n	%	n	%	χ^2	P value
Body Mass Index						
Underweight/Normal	141	25.5	122	32.7	10.23	.006
Overweight	231	41.8	162	43.4		
Obese	181	32.7	89	23.9		
Mean BMI	28.61		27.17			

6.1.4 Health Services Use

Types of health services use include: physician visits in general, family physician visits, hospital visits, and hospital length of stay. The cross-tab and chi-square analyses findings for these types of health care use can be viewed by age group in Table 14. Older adults were more likely to have a high number of visits with a physician in general compared to baby-boomers. Of older adults, 71.1% had ten or more visits, while only 47.8% of baby-boomers had ten or more visits. This association between age and visits to a physician in general was found to be significant at, $\chi^2 (1, 954) = 54.02, p < .001$. Older adults were also more likely to have a high number of family physician visits compared to baby-boomers. Of older adults, 73.5% had sixteen or more visits, whereas only 43.5% of baby-boomers had 16 or more visits. Chi-square analysis indicated that this association between age and family physician visits was significant at $\chi^2 (1, 954) = 83.96, p < .001$.

Table 14*Findings from Chi-square Analyses, Health Services Use*

	Age 45-64		Age 65+			
Characteristic	n	%	n	%	X	P value
Physician Visits in						
General						
Low (0-9)	295	52.2	110	28.3	54.02	.000
High (10+)	270	47.8	279	71.7		***
Family Physician						
Visits						
Low (0-15)	319	56.5	103	26.5	83.96	.000
High(16+)	246	43.5	286	73.5		***
Hospital Visits						
None	391	69.2	197	50.6	33.57	.000
1+	174	30.8	192	49.4		***
Length of Stay						
Short (0-4 days)	532	94.2	311	79.9	45.25	.000
Long (5+ days)	33	5.8	78	20.1		***

This pattern of higher health services use by older adults compared to baby-boomers is followed into hospital visits and length of stay while in the hospital. Within the follow-up period following the WISER III questionnaire, more older adults (49.4%) than baby-boomers (30.8%) were hospitalized. This association between age

group and hospital visits was significant at $X^2(1, 954) = 33.57, p < .001$. Similarly, older adults (20.1%) were more likely than baby-boomers (5.8%) to stay five or more days in the hospital. This association between age group and length of stay in hospital was significant at $X^2(1, 954) = 45.25, p < .001$ (see Table 14).

6.2 Univariate Logistic Regression

Univariate logistic regression was conducted to determine the individual significance of each predictor variable as it relates to each type of health services use. Analyses were conducted for physician visits in general, family physician visits, hospital admissions, and length of stay.

6.2.1 Physician Visits in General

As can be seen in Table 15, several predictor variables when tested separately, significantly predicted use of overall physician visits. Gender was found to significantly predict overall physician visits, with females having higher odds of having high visits with a physician in general [OR=1.36; (95% CI: 1.050-1.759)]. Age was also found to significantly predict visits with a physician in general, with older adults having nearly three times the odds of having high visits [OR=2.77; (95% CI: 2.104-3.650)]. Education was also found to be a significant predictor of physician visits in general, with individuals with less than 13 years of education having higher visits during the time period since the WISER III interview, [OR=1.54; (95% CI: 1.18-2.02)].

Table 15

Univariate Analyses of Predictor Variables for Physician Visits in General, (Low, 0-9; High, 10+)

Variable	OR	[95% CI]	p-value
Gender			
Male (Reference)	--	--	--
Female	1.34	(1.05-1.76)	.020
Age			
45-64 (Reference)	--	--	--
65+	2.77	(2.10-3.65)	.000
Education			
0-13 yr (Reference)	--	--	--
13+ yr	0.65	(0.50-0.85)	.002
Health Beliefs	0.086	(0.69-1.07)	.181
Social Engagement			
Formal	1.44	(1.03-2.00)	.031
Informal	0.92	(0.70-1.20)	.527
Civic	1.00	(0.89-1.13)	.958
Living Alone			
Yes	1.74	(1.23-2.47)	.002
No (Reference)	--	--	--
Social Support	0.90	(0.78-1.04)	.140
Availability of Health Services	0.95	(0.82-1.11)	.530
Physical Activity	1.23	(1.067-1.41)	.005

BMI			
Normal/Underweight (Reference)	--	--	--
Overweight	1.01	(0.74-1.39)	.933
Obese	1.47	(1.04-2.08)	.029
Chronic Conditions	1.49	(1.39-1.60)	.000
Self-Rated Health	0.55	(0.47-0.63)	.000

In regards to social engagement, formal social engagement was the only form that emerged as a significant predictor of visits with overall physician visits, [OR=1.44; (95% CI: 1.033-1.999)]. Living arrangements also significantly predicted use of physicians in general, with those who lived alone having nearly twice the odds of having high visits with a physician, [OR = 1.74; (95% CI: 1.23-2.47)]. BMI was significant predictor when comparing obese individuals to underweight/normal weight individuals. Obese individuals had approximately 1.5 times the odds of seeing a physician at a high rate, compared to underweight or normal weight participants, [OR = 1.47; (95% CI: 1.04-2.08)]. Other significant predictor variables for this type of health services use include: physical activity [OR=1.23; (95% CI: 1.07-1.41)], number of chronic conditions [OR=1.49; (95% CI: 1.39-1.60)], and self-rated health [OR=0.55; (95% CI: .47-.63)].

6.2.2 Family Physician Visits

The results from the univariate logistic regression for family physician use can be seen in Table 16. Age was found to significantly predict family physician use, with older adults having more than three times the odds of making a high number of visits with a family physician [OR=3.60; (95% CI: 2.72-4.76)]. Years of education also predicted

family physician visits, with those with more than thirteen years of education having lower odds of a high number of visits [OR=0.66; (95% CI: 0.50-0.85)].

Table 16:

Univariate Analyses of Predictor Variables for Family Physician Visits (Low, 0-15; High, 16+)

Variable	OR	(95% CI)	p-value
Gender			
Male (Reference)	--	--	--
Female	1.21	(0.93-1.56)	.153
Age			
45-64 (Reference)	--	--	--
65+	3.60	(2.72-4.76)	.000
Education			
0-13 yr (Reference)	--	--	--
13+ yr	0.66	(0.50-0.85)	.002
Health Beliefs	1.04	(0.84-1.30)	.727
Social Engagement			
Formal	1.30	(0.94-1.80)	.112
Informal	0.90	(0.69-1.18)	.438
Civic	1.11	(0.99-1.24)	.089
Living Alone			
Yes	1.69	(1.20-2.38)	.003
No (Reference)	--	--	--
Social Support	0.92	(0.80-1.05)	.214
Availability of Health Services	0.96	(0.83-1.11)	.564

Physical Activity	1.18	(1.02-1.35)	.023
BMI			
Normal/Underweight (Reference)	--	--	--
Overweight	0.90	(0.66-1.23)	0.494
Obese	1.30	(0.92-1.83)	0.137
Chronic Conditions	1.63	(1.51-1.76)	.000
Self-Rated Health	0.53	(0.46-0.62)	.000

Univariate logistic regression did not show social engagement to be a strong predictor of family physician use, however civic engagement was found to predict family physician use at a significance level of $p < .10$, [OR = 1.11; 95% CI: .99-1.24]. Those who lived alone were found to have significantly higher odds of visiting with a family physician at a high rate [OR=1.69; (95% CI: 1.20-2.38)]. Physical activity, [OR=1.18; (95% CI: 1.02-1.35)], number of chronic conditions [OR=1.63; (95% CI: 1.51-1.76)], and self-rated health [OR=0.53; (95% CI: (.46-.62))], were also found to be significant predictors of high visits with a family physician.

6.2.3 Hospital Admissions

Univariate logistic regression results for hospital admissions can be viewed in Table 17. As with general and family physician visits, age was shown to significantly predict number of hospitalizations. Older adults had more than two times the odds of going to the hospital compared to baby-boomers [OR=2.19; (95% CI: 1.677-2.861)]. Living arrangement also significantly predicted hospital use. Individuals who lived alone

were found to have significantly higher odds of being admitted to a hospital, [OR=1.60; (95% CI: 1.15-2.23)]. Number of chronic conditions [OR=1.26; (95% CI: 1.190-1.336)] and self-rated health [OR=0.74; (95% CI: .640-.855)] were also significant predictors of hospitalization.

Table 17

Univariate Analyses of Predictor Variables for Hospitalizations (None versus 1+)

Variable	OR	(95% CI)	p-value
Gender			
Male (Reference)	--	--	--
Female	1.02	(0.79-1.33)	.874
Age			
45-64 (Reference)	--	--	--
65+	2.19	(1.68-2.86)	.000
Education			
0-13 yr (Reference)	--	--	--
13+ yr	0.88	(0.67-1.15)	.331
Health Beliefs	1.00	(0.80-1.25)	.983
Social Engagement			
Formal	1.26	(0.91-1.74)	.173
Informal	0.83	(0.63-1.09)	.184
Civic	0.98	(0.87-1.10)	.718
Living Alone			
Yes	1.60	(1.15-2.23)	.005
No (Reference)	--	--	--
Social Support	0.89	(0.78-1.03)	.106

Availability of Health Services	0.90	(0.77-1.04)	.152
Physical Activity	1.10	(0.96-1.27)	.186
BMI			
Normal/Underweight (Reference)	--	--	--
Overweight	0.79	(0.57-1.09)	.150
Obese	0.94	(0.67-1.33)	.734
Chronic Conditions	1.26	(1.19-1.34)	.000
Self-Rated Health	0.74	(0.64-.86)	.000

6.2.4 Length of Stay

As seen in Table 18, there were a number of variables that significantly emerged from the univariate logistic regression analyses as significant predictors of length of stay in the hospital. As with the other health care variables, age significantly predicted length of stay. Older adults were found to have four times the odds of having a long length of stay in the hospital as compared to baby-boomers [OR= 4.04; (95% CI: . 2.63-6.22)]. Education was found to be borderline significant at predicting length of stay in the hospital, with those who reported more than 13 years of education having lower odds of having long stays in the hospital [OR=0.67; (95% CI: .45-1.00)].

Table 18

Univariate Analyses of Predictor Variables for Length of Stay (Short stay, 0-4 days; Long stay, 5+ days)

Variable	OR	(95% CI)	p-value
Gender			
Male (Reference)	--	--	--
Female	0.86	(0.58-1.28)	.455
Age			
45-64 (Reference)	--	--	.000
65+	4.04	(2.63-6.22)	
Education			
0-13 yr (Reference)	--	--	--
13+ yr	0.67	(0.45-1.00)	.050
Health Beliefs	1.10	(0.78-1.55)	.587
Social Engagement			
Formal	1.53	(0.95-2.45)	.079
Informal	0.54	(0.35-0.82)	.004
Civic	0.89	(0.74-1.07)	.226
Living Alone			
Yes	2.52	(1.64-3.90)	.000
No (Reference)	--	--	--
Social Support	0.88	(0.71-1.08)	.213
Availability of Health Services	1.07	(0.86-1.35)	.547
Physical Activity	1.17	(0.95-1.46)	.147

BMI			
Normal/Underweight (Reference)	--	--	--
Overweight	0.78	(0.48-1.24)	.290
Obese	0.76	(0.45-1.28)	.300
Chronic Conditions			
	1.25	(1.16-1.34)	.000
Self-Rated Health			
	0.62	(0.45-0.78)	.000

The analysis shows that formal engagement did not quite reach levels of significance at the $p < .05$ levels, however it was a significant predictor at $p < .10$, [OR = 1.53; 95% CI: .95-2.45)]. Informal engagement however was found to be a highly significant predictor of length of stay, [OR=0.53; (95% CI: .350-.818)]. Living arrangement also proved to be a significant predictor, with those living alone having twice the odds of having a long stay in the hospital, compared to those who lived with at least one other person [OR=2.52; (95% CI: 1.64-3.90)]. Lastly, chronic conditions and self-rated health also significantly predicted length of stay in the hospital. Univariate findings for each being [OR=1.25; (95% CI: 1.156-1.341)] and [OR=0.62; (95% CI: .496-.776)] respectively.

6.3 Multivariate Logistic Regression

Tables 19, 21, 23, and 25 show the addition and deletion of variables in the multiple logistic regression analyses for each type of health services use. First only need variables were entered, followed by enabling, predisposing without social engagement variables, then finally the social engagement variables were added. At each block non-significant variables were removed. Social engagement variables were included

regardless of final level of significance. Model 4 of each table represents the final model of each multiple logistic regression. Tables 20, 22, 24, and 26 provide the results for these final models, for physician visits in general, family physician visits, hospital admissions, and length of stay in the hospital.

6.3.1 Physician Visits in General

Of the need variables analyzed, self-rated health and chronic conditions were both included in the final model (see Table 19). Decreasing self-rated health was associated with significantly higher odds of having a high number of visits with physicians in general, versus having less visits [OR=0.73; (95% CI: 0.610-0.862)], as did having a higher number of chronic conditions [OR= 1.37; (95% CI: 1.271-1.485)] (Table 20). Age also remained a significant predictor of physician use in general, with older adults being more likely to visit all physicians compared to baby-boomers [OR=1.81; (95% CI: 1.332-2.450)]. Of the three types of social engagement, formal social engagement emerged as a significant predictor of physician use in general. Increasing formal engagement was associated with higher visits with physicians overall, [OR=1.63; (95% CI: 1.099-2.419)]. Informal [OR=1.04; (95% CI: 0.750-1.436)] and civic engagement [OR=0.95; (95% CI: 0.831-1.088)] were not found to be significantly related to greater visits with physicians in general.

Table 19*Models for Multivariate Logistic Regression Analysis, Physician Visits In General*

	Model 1	Model 2	Model 3	Model 4
Need	Self-rated health ***	Self-rated health***	Self-rated health***	Self-rated health***
	Chronic conditions***	Chronic conditions***	Chronic conditions***	Chronic conditions***
	Physical activity ns	--	--	--
	BMI ns	--	--	--
Enabling		Living alone ns	--	--
		Availability of health services ns	--	--
		Social Support ns	--	--
Predisposing			Age***	Age***
			Gender ns	--
			Education ns	--
			Health Beliefs ns	--
Social Engagement				Formal**
				Informal ns
				Civic ns
R^2_L	0.137	0.002	0.013	0.006

Note: ns= not significant; a dash (-) indicates that the variable was not entered into the model because it was not statistically significant in the previous model; * $p < .10$; ** $p < .05$; *** $p < .010$. R^2 represents proportion of reduction in error.

Table 20

Results of Final Model from Multiple Logistic Regression, Physician Visits in General

	OR	(95% CI)	p-value
Self-rated Health	0.725	(0.610-0.862)	.000
Chronic Conditions	1.374	(1.271-1.485)	.000
Age	1.806	(1.332-2.450)	.000
Informal Engagement	1.038	(0.750-1.436)	.821
Formal Engagement	1.631	(1.099-2.419)	.015
Civic Engagement	0.951	(0.831-1.088)	.468

6.3.2 Family Physician Visits

For family physician visits, only two of four need variables remained through to the final model (see Table 21). Self-rated health proved to be a significant predictor, with low self-rated health related to higher odds of having high visits with a family physician [OR=0.69; (95% CI: 0.573-0.841)] (see Table 22). Having a higher number of chronic conditions was also found to be associated with having higher visits with a family physician, [OR=1.49; (95% CI: 1.366-1.615)]. No enabling variables proved to be significant predictors, and were thus left out of the final model. Of the predisposing variables, age was found to be significant at [OR=2.27; (95% CI: 1.658-3.116)], with older adults having significantly higher odds of having high visits with a family physician. In fact older adults had more than two times the odds of having high use of a

family physician, compared to baby-boomers. Health beliefs were also found to be a significant predictor of family physician use, [OR=1.36; (95% CI: 1.029-1.790)].

Informal engagement, [OR=1.01; (95% CI: 0.723-1.421)] formal engagement, [OR=1.25; (95% CI: 0.839-1.873)], and civic engagement, [OR=1.20; (95% CI: 0.955-1.265)], did not significantly predict family physician use.

Table 21

Models for Multivariate Logistic Regression Analysis, Family Physician Use

	Model 1	Model 2	Model 3	Model 4
Need	Self-Rated Health***	Self-Rated Health***	Self-Rated Health***	Self-Rated Health***
	Chronic Conditions***	Chronic Conditions***	Chronic Conditions***	Chronic Conditions***
	Physical Activity ns	--	--	--
	BMI*	BMI ns	--	--
Enabling		Living Alone ns	--	--
		Availability of Health Services ns	--	--
		Social Support ns		
Predisposing			Age***	Age***
			Gender ns	--
			Education ns	--

			Health Beliefs**	Health beliefs**
Social Engagement				Formal ns
				Informal ns
				Civic ns
R^2_L	0.177	0.001	0.033	0.004
Note: ns= not significant; a dash (-) indicates that the variable was not entered into the model because it was not statistically significant in the previous model; * $p < .10$; ** $p < .50$; ** $p < .010$. R^2_L represents proportion of reduction in error.				

Table 22

Results from Final Model of Multiple Logistic Regression, Family Physician Visits

	OR	(95% CI)	p-value
Self-rated Health	0.694	(0.573-0.841)	.000
Chronic Conditions	1.485	(1.366-1.615)	.000
Age	2.273	(1.658-3.116)	.000
Health Beliefs	1.357	(1.029-1.790)	.031
Informal Engagement	1.013	(0.723-1.421)	.939
Formal Engagement	1.254	(0.839-1.873)	.269
Civic Engagement	1.099	(.955-1.265)	.188

6.3.3 Hospitalizations

The variables added and removed at each block of the logistic regression analysis for hospital visits can be seen in Table 23. For hospital visits, only chronic conditions and

age were kept in the final model, in addition to the three social engagement variables (see Table 23). Older adults were found to have more than one and a half the odds of baby-boomers of visiting the hospital within the time-frame following the WISER III interview, [OR=1.61; (95% CI: 1.205-2.138)] (see Table 24). Higher chronic conditions also significantly predicted higher use of the hospital, [OR=1.23; (95% CI: 1.156-1.304)]. At $p = 0.085$, formal social engagement did not quite reach levels of significance, [OR=1.38; (95% CI: 0.956-2.001)]. Informal engagement [OR=0.88; (95% CI: 0.646-1.196)] and civic engagement [OR=0.95; (95% CI: 0.838-1.082)] were not significant predictors of hospital use.

Table 23

Models for Multivariate Logistic Regression Analysis, Hospitalizations

	Model 1	Model 2	Model 3	Model 4
Need	Self-Rated Health ns	--	--	--
	Chronic Conditions***	Chronic Conditions***	Chronic Conditions***	Chronic Conditions***
	Physical Activity ns	--	--	--
	BMI*	BMI ns		
Enabling		Living Alone*	Living Alone ns	--
		Availability of Health Services	--	--
		Social Support		--
Predisposing			--	
			Age***	Age***

			Gender ns	--
			Education ns	--
			Health Beliefs ns	--
Social Engagement				Formal*
				Informal ns
				Civic ns
R^2_L	0.057	0.004	0.011	0.003
Note: ns= not significant; a dash (-) indicates that the variable was not entered into the model because it was not statistically significant in the previous model; * $p < .10$; ** $p < .50$; ** $p < .010$. R^2_L represents proportion of reduction in error.				

Table 24

Results from Final Model of Multiple Logistic Regression, Hospitalizations

	OR	(95% CI)	p-value
Chronic Conditions	1.228	(1.156-1.304)	.000
Age	1.605	(1.205-2.138)	.001
Informal Engagement	0.879	(0.646-1.196)	.413
Formal Engagement	1.383	(0.956-2.001)	.085
Civic Engagement	0.953	(0.838-1.082)	.456

6.3.4 Length of Stay

The variables added and removed at each block of the logistic regression analysis for hospital visits can be seen in Table 25. The final model for length of stay included more variables compared to the final models of the other types of health services use (see

Table 25). Chronic conditions and self-rated health both predicted length of stay in hospital, however once all other variables were included, only chronic conditions was found to be significant at $p < .01$. Higher chronic conditions was related to significantly higher odds of having a long stay in the hospital, [OR= 1.15; (95% CI: 1.051-1.256)] (see Table 26). Decreased self-rated health was associated with greater odds of a long stay in the hospital [OR= 0.79; (95% CI: 0.616-1.023)], however this was not quite significant at $p = .074$. Living alone remained highly significant, with those who reported living alone having twice the odds of having a long stay in the hospital [OR= 2.00; (95% CI: 1.211-3.297)]. Age also significantly predicted length of stay in the hospital, with older adults having nearly three times the odds of having along stay, compared to baby-boomers [OR= 2.60; (95% CI: 1.635-4.148)]. Gender emerged as a significant predictor as well, with men having higher odds than women of having along stay while in the hospital [OR= 1.64; (95% CI: 1.038-2.595)].

Table 25

Models for Multivariate Logistic Regression Analysis, Length of Stay

	Model 1	Model 2	Model 3	Model 4
Need	Self-rated health***	Self-rated health**	Self-rated health**	Self-rated health*
	Chronic conditions***	Chronic conditions***	Chronic conditions***	Chronic conditions***
	Physical Activity ns	--	--	--
	BMI**	BMI*	BMI ns	

Enabling	Living alone***	Living alone***	Living alone***	
	Availability of health services ns	--	--	
	Social support ns	--	--	
Predisposing		Age***	Age***	
		Gender**	Gender**	
		Education ns	--	
		Health Beliefs ns	--	
Social Engagement			Formal***	
			Informal**	
			Civic ns	
R ² _L	0.068	0.017	0.044	0.017

Note: ns= not significant; a dash (-) indicates that the variable was not entered into the model because it was not statistically significant in the previous model; * p<.10; ** p<.50; *** p<.010. R^2_L represents proportion of reduction in error.

Table 26

Results from Final Model of Multiple Logistic Regression, Length of Stay

	OR	(95% CI)	p-value
Self-rated Health	0.794	(0.616-1.023)	.074
Chronic Conditions	1.149	(1.051-1.256)	.002
Living Alone	1.998	(1.211-3.297)	.007
Gender	1.641	(1.038-2.595)	.034

Age	2.604	(1.635-4.148)	.000
Informal Engagement	0.605	(0.375-0.975)	.039
Formal Engagement	2.164	(1.263-3.710)	.005
Civic Engagement	0.917	(0.752-1.117)	.390

As for the social engagement variables, both formal and informal engagement were found to significantly predict length of stay in the hospital. Thus while controlling for all other variables in the model, higher informal social engagement significantly predicted having lower odds of a long length of stay in the hospital, [OR= 0.61; (95% CI: 0.375-0.975)]. Conversely, higher formal engagement indicated significantly longer lengths of stay in the hospital [OR= 2.16; (95% CI: 0. 1.263-3.710)]. Civic engagement did not emerge as a significant predictor of length of stay, [OR= 0.91; (95% CI: 0. 0.752-1.117)].

6.4 Interaction Effects

The interaction variables for gender (e.g. Type of health care use X Gender) and Age (e.g. Type of health care use X Age) were added to the final models of the multiple logistic regression analyses. As can be seen in Tables 27 & 28, no significant findings were found for any of the interaction effects.

Table 27*Results of Gender by Social Engagement Interactions*

	OR	95% CI	p-value
Physician Visits in			
General			
Informal SE	1.04	(0.94-1.16)	0.421
Formal SE	1.07	(0.89-1.30)	0.468
Civic SE	1.08	(0.95-1.24)	0.250
Family Physician Visits			
Informal SE	0.97	(0.87-1.08)	0.595
Formal SE	0.98	(0.80-1.20)	0.851
Civic SE	1.04	(0.90-1.19)	0.588
Hospitalizations			
Informal SE	0.95	(0.86-1.05)	0.324
Formal SE	0.94	(0.78-1.13)	0.523
Civic SE	1.02	(0.90-1.16)	0.782
Length of Stay			
Informal SE	0.89	(0.76-1.04)	0.139
Formal SE	0.87	(0.66-1.14)	0.318
Civic SE	0.88	(0.72-1.08)	0.208

Table 28*Results of Age by Social Engagement Interactions*

	OR	95% CI	p-value
Physician Visits in			
General			
Informal SE	1.12	(0.60-2.11)	0.720
Formal SE	0.91	(0.43-1.92)	0.800
Civic SE	0.98	(0.75-1.27)	0.853
Family Physician			
Visits			
Informal SE	1.76	(0.91-3.40)	0.093
Formal SE	0.67	(0.40-1.81)	0.847
Civic SE	0.94	(0.71-1.23)	0.627
Hospitalizations			
Informal SE	0.83	(0.46-1.49)	0.531
Formal SE	0.89	(0.45-1.77)	0.746
Civic SE	1.07	(0.84-1.37)	0.594
Length of Stay			
Informal SE	0.56	(0.22-1.45)	0.233
Formal SE	0.51	(0.19-1.34)	0.188
Civic SE	1.03	(0.69-1.54)	0.889

Section 7: Discussion

7.1 General Discussion

The primary purpose of this study was to examine the relationship between social engagement and health care utilization in baby-boomers and older adults in Winnipeg, Manitoba, using the Anderson Behavioral Model of Healthcare Utilization as a guiding conceptual framework (Aday & Anderson, 1974; Andersen, 2008). This study was the first to examine social engagement as a predictor of health services use using administrative health care data along with several different types of social engagement as predictor variables. This study also provided a conceptual definition of social engagement. Review of existing literature found that no conceptual definition existed, and the way in which social engagement was used varied drastically from study to study. By differentiating social engagement from similar terms such as social support, social participation, and social networks, a broad and inclusive definition was formed within this research. This definition distinguished between informal, formal, and civic forms of social engagement. This study is the first to examine the relationship between health services use and these specific forms of social engagement.

This study is also set apart from previous research in that it was conducted from a Canadian context with both baby-boomers and older adults as participants. Research has shown that baby-boomers are different from current older adults in a number of ways, including their health status and how they socially engage. Thus when it comes to examining how social engagement relates to health services use, it is wise to consider how these two groups might differ.

Andersen's Behavioural Model of Health Services use provided a framework for examining predisposing, enabling, and need variables, in relation to health services use of older adults. This model was selected as it is the most widely used model in research of health services use. The WISER Phase III dataset was selected as it allowed for an in-depth assessment of each of the predictor variables, and especially allowed for a thorough assessment of social engagement. This dataset was previously linked to the administrative health care data required for the study, and thus thoroughly assessed all major components of the research.

This section of the paper will discuss the findings of the research as they relate to the research questions and hypotheses proposed earlier. It will also discuss the findings of the research as they relate to what is currently known in the literature. Some potential limitations of the study will be touched on and discussed in relation to where research on this topic should go in the future. In addition to implications for future research, this section will discuss what implications these findings have for health policy planning for baby-boomers and older adults.

7.2 Social Engagement and Health Care Use

7.2.1 Informal Engagement

When tested independently from all other variables via univariate logistic regression, informal engagement was found to significantly predict length of stay in the hospital. This relationship remained strong once all other significant variables were added

in the multiple logistic regression model. It was determined that with increasing levels of informal social engagement, there are greater odds of having a short length of stay in the hospital. This confirms the original hypothesis, that higher social engagement would result in shorter stays while in the hospital.

7.2.2 Formal Engagement

The univariate logistic regression analyses found that, when tested apart from all other variables, formal engagement significantly predicts physician visits in general. Once all other variables were controlled for in the multiple logistic regression analysis, this effect became even stronger. Those with higher levels of formal engagement were significantly more likely to have high visits with physicians in general. Significant results regarding formal engagement were also found for hospitalizations and length of stay while in hospital. Formal engagement did not emerge as a significant predictor of length of stay during univariate analyses, however multiple logistic regression found formal engagement to be a highly significant predictor. It was found that individuals with high formal engagement had more than two times the odds of those with low formal engagement of staying long while in the hospital. Actual hospitalizations did not quite reach a level of significance, but the pattern followed the same direction, in that higher formal engagement indicated a higher odds of being hospitalized.

For each of these types of health services use, a direct relationship was found; higher formal engagement directly indicated higher use of the health services. This contrasts with what was hypothesized for hospitalizations and length of stay in the

hospital. It was hypothesized that higher social engagement would actually result in lower use of these health services. These findings do fit with one of the possible exploratory hypotheses proposed for physician visits however. For physician visits in general, it was hypothesized that those with high engagement would differ from those with low engagement in terms of their use of the physicians. A possible explanation for why those with higher formal social engagement also have higher visits with physicians in general, is that their formal activities may also be a means of accessing health care information. These are individuals who have high attendance in groups such as seniors centres, community groups, and church organizations. It may be that these groups provide these individuals with more information regarding their health and how to access the health care system, than they would typically receive in the community. This in turn puts these people in more regular contact with the health care system.

There are a number of studies which have looked at the existence of and effectiveness of health promotion plans in seniors centres (Krieger, Castorina, Walls, Weaver, & Ciske, 2000; Baker, Gottschalk, & Bianco, 2007; Hendrix et al., 2008; Speer, et al., 2008). For example Krieger et al. (2000) found that a senior centre based pneumococcal and influenza promotion program was successful at increasing rates of both types of immunizations to high levels in older adults seniors centre attendees. Similarly recent research in Manitoba has found that seniors centres provide a variety of health information and support to attendees (Novek, Menec, Tran, & Bell, 2013). Some of these centres had health care professionals such as nurses, dieticians, and occupational therapists on staff, who could make referrals to other health care professionals.

Qualitative findings of the study found that seniors felt their participation at the centres kept them healthy both physically and mentally, and provided them with health knowledge. It was reported that attendees of seniors centres with extensive health information valued this access to health information. Thus individuals with high participation in programs like these may have a better knowledge of when to seek the health care system.

7.2.3 Civic Engagement

Civic engagement did not emerge as a significant predictor of any type of health service tested in this study. It emerged on the cusp of significance during univariate logistic regression analyses for family physician visits, however once other variables were considered in the multiple logistic regression, the finding disappeared. This result is interesting, as it was anticipated that higher civic engagement would result in lower hospitalizations and length of stay in the hospital. This effect did not emerge however. It is possible that by only measuring volunteer work, rather than using a more rounded measure of civic engagement which might include employment and political activities, an effect was missed. It is also possible that civic engagement does not act as a direct indicator of health services use, but rather indirectly influences health services use by promoting good health. Numerous studies have been able to demonstrate the benefits that volunteering can have on the physical and mental health of older adults (Lum & Lightfoot, 2005).

7.3 Other Predisposing Variables

Apart from the social engagement variables, there were four predisposing variables examined in this study. Age, gender, and health beliefs, all proved to significantly predict health care use in one form or another. Education independently predicted physician use in general, family physician use, and length of stay in the hospital. Without controlling for any other outside variables, it could be said that lower education was associated with higher health care use in these areas. When other variables were accounted for in the multiple logistic regression however, this relationship was eliminated. A possible explanation for this is the difference in educational levels between baby-boomers and older adults. Older adults are less likely than baby-boomers to have higher education (as supported by this study), thus when age is added to the multiple logistic regression, the effect of education on health care use disappears. In previous research, Dunlop, Coyte, and McIsaac (2000) found that individuals with post-secondary education were more likely to make use of physician visits, than those with lower levels of education. Few studies however have looked directly at education alone (i.e. rather than overall socioeconomic status), as it relates to health services use

Upon reviewing the results from the chi-square analyses, univariate analyses, and multiple logistic regressions, there are several interesting findings in regards to age and the role it plays as a predictor of health services use. The crosstab and chi-square analyses revealed that there is a high association between age and each type of health care utilization. The percentage of older adults who had high use of the health care system was significantly larger than high users in the baby-boomer age category. This association

was confirmed by univariate logistic regression. Tested independently from all other variables, it was found that older adults had nearly four times the odds compared to baby-boomers of having high visits with a family physician, with similar findings for visits with physicians overall. When taking into consideration other predisposing, enabling, and need factors, this relationship was still strong. In fact while controlling for these additional variables, older adults still had twice the odds compared to baby-boomers of having high visits with a family physician. Nearly identical findings were found when examining age as a predictor of physician visits in general. After considering all other significant variables, logistic regression showed that older adults had almost twice the odds of visiting with a physician in general at a high rate, compared with baby-boomers.

The same relationship was found between age and hospital visits, in that older adults were significantly more likely to visit the hospital in the years following the WISER III interview. Even after controlling for the effects of other predisposing, enabling, and need variables, age proved to be a significant predictor. Logistic regression demonstrated that older adults had more than one and a half time the odds of visiting a hospital compared to baby-boomers. Findings were especially strong for length of stay in hospital. Older adults were found to have nearly three times the odds compared to baby-boomers of having a long length of stay in the hospital.

This strong association between age and use the health care system confirms what is found in the existing literature. Numerous studies have found that older adults are more

likely to have higher visits with their family physician, and this only increases with age (Canadian Institutes of Health Information, 2011). Studies have primarily found that it is chronic conditions rather than age itself that influences visits with health care providers and acute care facilities, however the results from this study show that age itself is still a significant predictor while controlling for existing chronic conditions. Thus while chronic conditions are still a significant predictor of health care use, these findings demonstrate that age itself may act as a predisposing factor which may make older adults more likely than baby-boomers to seek health care services. It should be noted however that while many chronic conditions were captured and controlled for, it was not possible to capture all ailments that may be more likely to come with age. For example there are many acute conditions that may still have an influence on this relationship. Measures of recent falls, frailty, and functional status, if included, may have influenced this relationship.

Gender, tested as predisposing factor, had limited findings as related to health care use in this study. Univariate logistic regression revealed that gender significantly predicted visits with a physician in general, with females having higher visits compared to males. It did not significantly predict visits with family physicians, hospital visits, or length of stay in the hospital however. Interestingly, when other variables were taken into consideration during the logistic regression analyses, gender no longer came through as a significant predictor of physician visits in general. Instead, gender was found to be a significant predictor of length of stay in the hospital, with females having longer lengths of stays than males. One possibility for why women are more likely to have longer stays compared to men is that women are more likely to be widowed and live alone (Statistics

Canada, 2011C), which has been associated with longer hospital stays (DeCoster & Kozyrskyj, 2000). Previous studies directly examining gender as a predictor of length of stay have mixed findings, with some studies demonstrating it does significantly predict length of stay, and others finding no such relationship (Campbell, Seymour, & Primrose (2004).

Multiple logistic regression found that health beliefs significantly predicted visits with a family physician. Those who scored higher on the health beliefs scale had significantly higher odds of seeing a family physician at a high rate. Those who report having high health beliefs are individuals who are aware of their health, reflect about their health more often, and find they know how to solve health problems when they arise. Thus it makes sense that these individuals are interacting with their family physicians at a higher rate than those who are less aware and reflect less about their health, and do not know how to handle health issues that come their way.

7.4 Enabling Variables

Of the three enabling variables tested, only one emerged as significant in final multiple logistic regression analyses. Social support and availability of health services were not significant predictors of any type of health services, at the univariate analyses level, nor the multiple logistic regression analyses level. It may be that for each of these, a single-item measure of the variable may not have captured enough of the concept to fully allow for analyses. That being said, previous research on these two particular variables and whether or not they predict health services use have been mixed. For

example for social support, Maguire, Taylor, and Stout (1986) found no association between social support and length of stay in the hospital in a sample of older adult patients. Williams, Boyce, and Wright (1993) however did find perceived social support to be significantly associated with length of stay in the hospital for a sample of Navajo Indian people.

Whether or not a participant lived alone versus with another person at the time of the WISER III interview was the one enabling variable that significantly predicted health services use. Univariate logistic regression revealed that when tested independently from all other variables, those who lived alone were significantly more likely to visit with physicians in general, see a family physician, go to the hospital, and have a longer length of stay in the hospital. Once other variables were controlled for however, living arrangement only significantly predicted length of stay. One possibility for why this variable appeared so strongly during univariate analyses, but disappeared for the most part in multiple logistic regression, is that it is confounded with age. As supported by this research, older adults are significantly more likely than baby-boomers to live alone. Thus when age was controlled for in the multiple logistic regression, the effect living arrangement had on the health services no longer appeared.

This association between living alone and a longer length of stay while in hospital has been found in previous research. For example, in another study conducted in Winnipeg, Manitoba, which examined acute care use by long-stay patients in the hospital, it was found living alone increased LOS by 3% to 5% over those who lived with someone

else prior to admission (DeCoster & Kozyrskyj, 2000). Additionally in a sample of older heart attack patients, Schmaltz et al. (2007) found those who lived alone had significantly longer stays while in the hospital compared to those who lived with someone else.

7.5 Need Variables

Of the four need variables studied, only two emerged as significant predictors of health care use; self-rated health and chronic conditions. Multiple logistic regression revealed that physical activity and body mass index did not significantly predict any type of health care use, once other variables were taken into consideration. Univariate analyses revealed that physical activity independently predicted both physician visits in general and family physician visits specifically, but not hospital visits or length of stay in hospital. Univariate analyses also revealed that BMI only significantly predicted physician visits in general. These levels of significance disappeared when other variables were added in via multiple logistic regression, and thus these two variables did not prove to be direct predictors of health care use. Previous research has demonstrated that both of these factors are predictors of health in general however, and thus their effect on the health care system may be more of an indirect relationship. For example it has been found that those with higher BMI's are more likely to have multiple chronic conditions, which can lead to higher use of the healthcare system (Twells, Knight, & Alaghebandan, 2010).

Univariate and multiple logistic regressions found self-rated health to be a significant predictor of all four types of health services. This confirms existing research

which has found self-rated health to be an excellent measure of actual health status (Idler & Benyamini, 1997). Those who rated their health as low (poor), had significantly higher odds of using the health care system to a greater extent. Previous research has demonstrated this same inverse relationship. For example Miilunpalo, Vuori, Oja, Pasanen, and Urponen (1997) demonstrated this effect in a sample of working aged adults (aged 35-64), wherein self-reported health was found to be a valid measure, which significantly and inversely related to physician visits. This relationship was also found in a Manitoba study which found self-rated health to be positively associated with number of physician visits during a 12 month follow up period, as well as the number of tests (e.g. laboratory tests, x-rays) incurred during that time (Menec & Chipperfield, 2001). There is also a large literature which consistently shows that self-rated health is an indicator of mortality, regardless of other covariates accounted for (Idler & Benyamini, 1997).

The findings in the study regarding chronic conditions and their relation to health care use also support what is presently known in the literature. Both univariate and multiple logistic regression analyses demonstrated that there was a strong direct relationship between chronic conditions and each type of health services use measured. Having a higher number of chronic conditions indicates more use of physicians in general, family physicians, more hospital visits, and a longer length of stay while in hospital. This finding supports the vast research which currently exists stating that chronic conditions are a direct indicator of health services use (Canadian Institute for Health Information, 2011).

7.6 Potential Limitations

As with all studies, there are some potential limitations to this research. One limitation is that this research was conducted via secondary data analysis, and thus the questionnaire presented to participants was not something that could be altered for the purposes of this study. While the WISER III questionnaire was selected due to its diversity in topics covered and allowed for numerous variables to be measured, it was ultimately still a questionnaire not designed for the specific purposes of this study.

That being said, it could be argued that the use of a single item for measuring Social Support was not adequate. This could be viewed as an additional limitation, as more detailed measures are more typically used (Heitzmann & Kaplan, 1988). This may be worth adjusting in future research.

The sample in this study could also be viewed as a limitation. As the sample was collected from those who participated in the first two phases of the WISER study, it means participants were all recruited from the same area of Winnipeg, Manitoba. This is a larger area of Winnipeg which is socioeconomically and ethnically diverse, however it still limits the findings to urban, community dwelling older adults alone. Many (though not all) of these participants were also originally recruited from the Seven Oaks Wellness Institute. Thus while these individuals still proved to range in the amount of activities they undertook, active individuals made still be slightly over represented . This sample may not access the truly sedentary, who may provide different results due to lower levels of engagement.

In terms of the analyses, it could have been possible to check interactions between Social Engagement and Need (e.g. Formal SE x Chronic Conditions, Informal SE x Self-Rated Health, etc.). Although these analyses were not conducted as part of this study, they should be considered in future research. This sort of analysis would provide information on the effect social engagement can have when individuals have higher versus lower levels of need, which has previously been found to be an important indicator of health care use.

A final limitation of this study is the fact that only four general types of health services were able to be examined. Ideally, health services use would have been broken down into more detail and examined more thoroughly. For example, how does social engagement influence avoidable hospitalizations, rather than hospitalizations in general? While it would have been possible to run an algorithm to calculate the number of avoidable hospitalizations, there would have been far too few people in this group to allow for analyses. Thus more detailed analyses were not manageable due to the small sample sizes that would have emerged.

7.7 Implications of the Study Findings (Policy and Research)

The results of this study demonstrated that an individual's level of social engagement can influence their use of certain types of health care services. The finding that higher formal engagement is so highly associated with high use of health care services (physician use in general, hospitalizations, and length of stay in the hospital), has

some particularly important implications. This demonstrates that individuals who are involved in more organizational activity are also more likely to be in contact with the health care system. It would be beneficial for future research to look at this association specifically, to gain a better understanding of what types of groups these individuals are participating in, why they are more likely to seek health care services, and specifically what services they are seeking. As mentioned, many seniors centers offer health information and support on site to those who attend, and also have health care professionals available who can refer these individuals to other avenues in the health care system (Novek, et al., 2013). It is possible that this is why the more formally engaged are higher users of the health care system. If this is the case, it would be beneficial for all seniors centres and seniors organizations to ensure that they provide adequate health information and support to their attendees. That being said, future research would need to be conducted to confirm that these contacts with the health care system are not avoidable ones.

The findings of this study are also valuable in addressing the differences between types of social engagement, and how each type relates to health care use. In terms of length of stay in the hospital, higher formal engagement resulted in a longer stay, while higher informal engagement resulted in a shorter stay. It would be beneficial for future research to look closer at this relationship. Without knowing why individuals were in the hospital for as long as they were, it is difficult to say whether a long stay should be viewed as positive or negative. If upon future research, there is a relationship between certain types of engagement and appropriate lengths of stay in the hospital however, this

will have important health policy implications. This sort of research would provide evidence for fostering social engagement in older adults, as a means to more efficiently make use of hospital beds.

Age was found to significantly predict use of health services, with older adults having been found to have higher use of the health care system overall compared to baby-boomers. Baby-boomers were also found to be less formally engaged than older adults. Given that formal social engagement has been found to be associated with health status, and in turn health care utilization, a question for future study is how could baby-boomers become more engaged in formal social activities as a means of preventing future health care use? The health policy implication of this being that perhaps earlier investment in promoting formal social engagement in the baby-boomer cohort, could lead to better use of the health care system when these individuals reach old age. Investing in the promotion of formal engagement in baby-boomers may prove to be a valuable way to reduce some health care related costs for this age group in the future.

Many of the other findings in this study confirm what has been found in existing literature. For example previous research has repeatedly demonstrated the roles that chronic conditions and self-rated health play in predicting health care use (Idler & Benyamini, 1997; Canadian Institute for Health Information, 2011). The findings of this study strengthen the existing literature by confirming their role using objective measures of health care use as the outcome variable.

7.8 Summary and Conclusions

The results from this study, while not always entirely anticipated, were interesting nonetheless, and have important implications for future research and health policy planning. Formal and informal engagement were found to significantly predict length of stay although in reverse directions from one another. This creates questions for future research. Formal engagement also significantly predicted physician use in general, which supports the possible theory that providing older adult's health information via seniors groups and centres, provides them with the tools to better access the health care system. Baby-boomers and older adults were found to differ in their use of the health care system as well as their levels of social engagement. Gender did not play as large of a role as expected. This study provides an introductory examination of the relationship between social engagement and health services use, and the importance of distinguishing between types of social engagement.

Section 8: References

- Aday, L. A., & Andersen, R. (1974). A framework for the study of access to medical care. *Health Services Research*, 9(3), 208-220.
- Andersen, R. M. (1995). Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health and Social Behavior*, 36(1), 1-10.
- Andersen, R. M. (2008). National health surveys and the behavioral model of health services use. *Medical Care*, 46(7), 647-653. doi: 10.1097/MLR.0b013e31817a835d
- Avlund, K., Lund, R., Holstein, B. E., & Due, P. (2004). Social relations as determinant of onset of disability in aging. *Archives of Gerontology and Geriatrics*, 38(1), 85-99. doi:10.1016/j.archger.2003.08.003
- Baker, D. I., Gottschalk, M., & Bianco, L. M. (2007). Step by step: Integrating evidence-based fall-risk management into senior centers. *Gerontologist*, 47(4), 548-554.
- Bath, P. A., & Deeg, D. (2005). Social engagement and health outcomes among older people: Introduction to a special section. *European Journal of Ageing*, 2(1), 24-30. doi: 10.1007/s10433-005-0019-4
- Berkman, L. F., Glass, T., Brissette, I., & Seeman, T. E. (2000). From social integration to health: Durkheim in the new millennium. *Social Science & Medicine* (1982), 51(6), 843-857. doi: 10.1016/S0277-9536(00)00065-4
- Bukov, A., Maas, I., & Lampert, T., (2002). Social participation in very old age: Cross-sectional and longitudinal findings from BASE. *The Journals of Gerontology*, 57B(6), P510-P517. doi: 10.1093/geronb/57.6.P510
- Calasanti, T. (2010). Gender relations and applied research on aging. *The*

Gerontologist, 50(6), 720-734.

Campbell, S.E., Seymour, D.G., & Primrose, W.R. (2004). A systematic literature review of factors affecting outcome in older medical patients admitted to hospital.

Age and Ageing, 33(2), pp.110-115.

Canadian Institutes of Health Information (2010). *Highlights of 2008–2009 inpatient hospitalizations and emergency department visits*. Retrieved from:

http://www.cihi.ca/CIHI-ext-portal/pdf/internet/NACRS_HIGHLIGHTS_18MAY10_EN

Canadian Institutes of Health Information (2011). Seniors and the health care system:

What is the impact of multiple chronic conditions? Retrieved from:

https://secure.cihi.ca/free_products/air-chronic_disease_aib_en.pdf

Chappell, N. L., McDonald, L., & Stones, M. (2007). *Aging in contemporary Canada* (2nd ed.). Toronto, ON: Pearson Education Canada.

Coulton, C., & Frost, A. K. (1982). Use of social and health services by the elderly. *Journal of Health and Social Behavior*, 23(4), 330-339.

DeCoster, C, & Kozyrskyj, A. (2000) Long-Stay Patients in Winnipeg Acute Care Hospitals. Winnipeg, Man: Manitoba Centre for Health Policy, Dept. of Community Health Sciences, Faculty of Medicine, University of Manitoba

Donnelly, E. A., & Hinterlong, J. E. (2010). Changes in social participation and volunteer activity among recently widowed older adults. *The Gerontologist*, 50(2), 158-169. doi: 10.1093/geront/gnp103

Doupe, M. B., & Manitoba Centre for Health Policy. (2011). *Population aging and the continuum of older adult care in Manitoba*. Winnipeg, Man: Manitoba Centre for

Health Policy, Dept. of Community Health Sciences, Faculty of Medicine,
University of Manitoba

Dunlop, S., Coyte, P.C., & McIsaac, W. (2000). Socio-economic status and the utilisation of physicians' services: results from the Canadian National Population Health Survey *Social Science & Medicine*, 51(1), 123-133.

Easterlin, R.A., Schaeffer C.M., & Macunovich, D.J. (1993). Will the baby boomers be less well off than their parents? Income, wealth, and family circumstances over the life cycle in the United States. *Population and Development Review*, 19(3), 497-522

Fan, L., Shah, M. N., Veazie, P. J., & Friedman, B. (2011). Factors associated with emergency department use among the rural elderly. *The Journal of Rural Health*, 27(1), 39-49. doi: 10.1111/j.1748-0361.2010.00313.x

Galdas, P.M, Cheater, F., & Marshall, P. (2005). Men and health help-seeking behaviour: literature review. *J Adv Nurs*.49(6), 616-23.

General Social Survey (GSS): Cycle 17 – Survey on Social Engagement in Canada (2003). Retrieved from:
http://www.statcan.ca/english/sdds/instrument/5024_Q1_V1_E.pdf

Glass, T. A., De Leon, C. F., Bassuk, S. S., & Berkman, L. F. (2006). Social engagement and depressive symptoms in late life: longitudinal findings. *Journal of Aging and Health*, 18(4), 604e628.

Glass, T.A., De Leon, C.M., Marottoli, R.A., & Berkman, L.F. (1999). Population based study of social and productive activities as predictors of survival among elderly Americans. (1999). *BMJ : British Medical Journal*, 319(7217), 1130-1130.

- Graves, A. R. B., Jang, Y., Mortimer, J. A., & Haley, W. E. (2004). The role of social engagement in life satisfaction: Its significance among older individuals with disease and disability. *The Journal of Applied Gerontology*, 23(3), 266-278. doi:10.1177/0733464804267579
- Grundy, E. and Henretta, J.C. (2006). Between elderly parents and adult children: a new look at the intergenerational care provided by the ‘ sandwich generation.’ *Ageing & Society* 26, 2006, 707–722. doi:10.1017/S0144686X06004934
- Harwood, R. H., Pound, P., & Ebrahim, S. (2000). Determinants of social engagement in older men. *Psychology, Health & Medicine*, 5(1), 75-85. doi: 10.1080/135485000106025
- Health Canada (2003). Canadian Guidelines for Body Weight Classification in Adults. Ottawa: Minister of Public Works and Government Services Canada. Retrieved from: http://www.hc-sc.gc.ca/fn-an/nutrition/weights-poids/guide-ld-adult/bmi_chart_java-graph_imc_java-eng.php
- Heitzmann, C.A., & Kaplan, R.M. (1988). Assessment of methods for measuring social support. *Health Psychology* 7(1), 75-109.
- Hendrix, S. J., Fischer, J. G., Reddy, S., Lommel, T. S., Speer, E. M., Stephens, H., Park, S., & Johnson, M. A. (2008). Fruit and vegetable intake and knowledge increased following a community-based intervention in older adults in Georgia senior centers. *Journal of Nutrition for the Elderly*, 27(1–2), 155–178.
- Herzog, A. R., Ofstedal, M. B., & Wheeler, L. M. (2002). Social engagement and its relationship to health. *Clinics in Geriatric Medicine*, 18(3), 593-609. doi:10.1016/S0749-0690(02)00025-3

- Hong, S., Hasche, L., & Bowland, S. (2009). Structural relationships between social activities and longitudinal trajectories of depression among older adults. *The Gerontologist*, 49(1), 1-11. doi:10.1093/geront/gnp006
- Idler, E.L. & Benyamini, Y. (1997) Self-Rated Health and Mortality: A Review of Twenty-Seven Community Studies. *Journal of Health and Social Behavior*, 38, 21-3.
- IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.
- James, B. D., Wilson, R. S., Barnes, L. L., & Bennett, D. A. (2011). Late-life social activity and cognitive decline in old age. *Journal of the International Neuropsychological Society: JINS*, 17(6), 998-1005. doi:10.1017/S1355617711000531
- Keene, J., & Li, X. (2005). Age and gender differences in health service utilization. *Journal of Public Health (Oxford, England)*, 27(1), 74.
- Kiely, D., & Flacker, J. (2001). The protective effect of social engagement on mortality in newly admitted nursing home residents. *Gerontologist*, 41, 302-302.
- King, D.E, Matheson, E., Chirina, S., Shankar, A, & Broman-fulks, J. (2013). The status of baby boomers' health in the United States: The healthiest generation? *JAMA Internal Medicine*, 173(5), pp.385-6.
- Knickman, J.R. & Snell, E.K. (2002). The 2030 Problem: Caring for Aging Baby Boomers. *Health Services Research*, 37(4), 849-84.
- Krieger, J. W., Castorina, J. S., Walls, M. L., Weaver, M. R., & Ciske, S. (2000). Increasing influenza and pneumococcal immunization rates: A randomized

controlled study of a senior center-based intervention. *American Journal of Preventive Medicine*, 18(2), 123–131. doi:

[http://dx.doi.org.proxy2.lib.umanitoba.ca/10.1016/S0749-3797\(99\)00134-8](http://dx.doi.org.proxy2.lib.umanitoba.ca/10.1016/S0749-3797(99)00134-8)

Levasseur, M., Richard, L., Gauvin, L., & Raymond, E. (2010). Inventory and analysis of definitions of social participation found in the aging literature: Proposed taxonomy of social activities. *Social Science & Medicine* (1982), 71(12), 2141–2149. doi: 10.1016/j.socscimed.2010.09.041

Lindstrom, M., Hanson, B. S., & Ostergren, P. O. (2001). Socioeconomic differences in leisure-time physical activity: the role of social participation and social capital in shaping health related behaviour. *Social Science & Medicine*, 52(3), 441e451.

Maguire, P.A., Taylor, I.C., & Stout, R.W. (1986). Elderly patients in acute medical wards: factors predicting length of stay in hospital. *Br Med J (Clin Res Ed)*. 1986 May 10; 292(6530): 1251–1253.

Mellor, M. & Rehr, H.J (2005). *Baby boomers: Can my eighties be like my fifties?* Springer Publishing Company. New York, NY, USA

Menec V.H, Chipperfield J.G. A prospective analysis of the relation between self-rated health and health care utilization among elderly Canadians. *Can J on Aging* 2001, 20:293-306.

Menec, V.H., MacWilliam, L, Soodeen, R.A., & Mitchell, L. (2002). *The health and health care use of Manitoba's seniors: Have they changed over time?* Winnipeg: The University of Manitoba, Manitoba Centre for Health Policy

Menec,V.H. (2003). The relation between everyday activities and successful aging: A six-year longitudinal study. *J Gerontol. Soc Sci*, 58:S74-S82.

- Miilunpalo, S., Vuori, I., Oja, P., Pasanen, M., and Urponen, H.(1997). Self-rated health status as a health measure: The predictive value of self-reported health status on the use of physician services and on mortality in the working-age population. *J Clin Epidemiol*, 50(5), 517-528.
- Novek, S., Menec, V., Tran, T., Bell, S. (2013) *Exploring the Impacts of Senior Centres on Older Adults*. Winnipeg, MB: Centre on Aging.
- Parboosingh, E. J., & Larsen, D. E. (1987). Factors influencing frequency and appropriateness of utilization of the emergency room by the elderly. *Medical Care*, 25(12), 1139-1147. doi: 10.1097/00005650-198712000-00003
- Quan, H., Fong, A., De Coster, C., Wang, J., Musto, R., Noseworthy, T. W., & Ghali, W. A. (2006). Variation in health services utilization among ethnic populations. *CMAJ : Canadian Medical Association Journal = Journal De l'Association Medicale Canadienne*, 174(6), 787-791. doi: 10.1503/cmaj.050674
- Redondo-Sendino, A., Guallar-Castillón, P., Banegas, J. R., & Rodríguez-Artalejo, F. (2006). Gender differences in the utilization of health-care services among the older adult population of Spain. *BMC Public Health*,6(1), 155-155. doi: 10.1186/1471-2458-6-155
- Riphahn, R. T., & Serfling, O. (2005). Item non-response on income and wealth questions. *Empirical Economics*, 30(2), 521-538. doi: 10.1007/s00181-005-0247-
- Roos, N.P., & Shapiro, E. (1981). The Manitoba longitudinal study on aging: Preliminary finding of health care utilization by the elderly. *Medical Care*, 19,644-657.
- Roos, L. L., Mustard, C. A., Nicol, J. P., McLerran, D. F., Malenka, D. J., Young, T. K., & Cohen, M. M. (1993). Registries and administrative data: Organization and

accuracy. *Medical Care*, 31(3), 201-212. doi: 10.1097/00005650-199303000-00002

Roos, L. L., & Nicol, J. P. (1999). A research registry: Uses, development, and accuracy. *Journal of Clinical Epidemiology*, 52(1), 39-47. doi: 10.1016/S0895-4356(98)00126-7

Rowe, J.W., & Kahn, R.L. (1998). *Successful aging*. New York: Pantheon Books.

Sampson, E. L., Bulpitt, C. J., & Fletcher, A. E. (2009). Survival of community-dwelling older people: The effect of cognitive impairment and social engagement. *Journal of the American Geriatrics Society*, 57(6), 985-991. doi:10.1111/j.1532-5415.2009.02265.x

Sinha, S.K., McElhaney, J., & Rockwood, K. (2009). Canada's coming of age: How demographic imperatives will force the redesign of acute care service delivery. *Council on Health Promotion*, 51(7), 310.

Schmaltz, H.N, Southern, D, Ghali, W.A., Jelinski, S.E., Parsons, G.A., King, K.M., Maxell, C.J. (2007). Living Alone, Patient Sex and Mortality After Acute Myocardial Infarction, *J Gen Intern Med*. 22(5): 572–578.,

Speer, E. M., Reddy, S., Lommel, T. S., Fischer, J. G., Stephens, H., Park, S., & Johnson, M. A. (2008). Diabetes self-management behaviors and A1c improved following a community-based intervention in older adults in Georgia senior centers. *Journal of Nutrition for the Elderly*, 27(1–2), 179–200.

Statistics Canada (2003). *General Social Survey on Social Engagement, Cycle 17: An Overview of Findings*. Retrieved from http://www4.hrsdc.gc.ca/.3ndic.1t.4r@-eng.jsp?iid=70#M_3

Statistics Canada. (2009). Caring Canadians, involved Canadians: Highlights from the Canada survey of giving, volunteering and participating. Ottawa, ON: Statistics Canada.

Statistics Canada (2009). Online activities of Canadian boomers and seniors. Ottawa, ON: Statistics Canada. Retrieved from: <http://www.statcan.gc.ca/pub/11-008-x/2009002/article/10910-eng.htm>.

Statistics Canada (2010). Age structure of the population. Retrieved from: <http://www.statcan.gc.ca/daily-quotidien/100526/dq100526b-eng.htm>

Statistics Canada (2011A). The Canadian population in 2011: Age and Sex. Ottawa, ON: Statistics Canada. Retrieved from: <http://www12.statcan.gc.ca/census-recensement/2011/as-sa/98-311-x/98-311-x2011001-eng.pdf>

Statistics Canada (2011B). Generations in Canada; Age and sex, Census 2011. Ottawa, ON: Statistics Canada. Retrieved from: http://www12.statcan.gc.ca/census-recensement/2011/as-sa/98-311-x/98-311-x2011003_2-eng.pdf

Statistics Canada (2011C). Living arrangements of seniors: Families, households and marital status. Structural type of dwelling and collectives, 2011 Census of Population. Ottawa, ON: Statistics Canada. Retrieved from: http://www12.statcan.gc.ca/census-recensement/2011/as-sa/98-312-x/98-312-x2011003_4-eng.pdf

Stoller, E. P. (1982). Patterns of physician utilization by the elderly: A multivariate analysis. *Medical Care*, 20(11), 1080-1089. doi: 10.1097/00005650-198211000-00003

Suominen-Taipale, A.L., Koskinen, S., Martelin, T., Holmen, J., & Johnsen, R. (2004).

Differences in older adults' use of primary and specialist care services in two Nordic countries. *Eur J Public Health*, 14(4):375-80.

Tang, F. (2008). Socioeconomic disparities in voluntary organization involvement among older adults. *Nonprofit and Voluntary Sector Quarterly*, 37(1), 57-75. doi: 10.1177/0899764007300409

Thomas, P. A. (2011). Trajectories of social engagement and limitations in late life. *Journal of Health and Social Behavior*, 52(4), 430-443. doi:10.1177/0022146511411922

Twells, L. K., Knight, J., & Alaghebandan, R. (2010). The relationship among body mass index, subjective reporting of chronic disease, and the use of health care services in Newfoundland and Labrador, Canada. *Population Health Management*, 13(1), 47-53. doi:10.1089/pop.2009.0023

Utz, R. L., Carr, D., Nesse, R., & Wortman, C. B. (2002). The effect of widowhood on older adults' social participation: An evaluation of activity, disengagement, and continuity theories. *The Gerontologist*, 42(4), 522-533. doi: 10.1093/geront/42.4.522

Wang, J., Wu, Y., Zhou, B., Zhang, S., Zheng, W., & Chen, K. (2009). Factors associated with non-use of inpatient hospital care service by elderly people in China. *Health & Social Care in the Community*, 17(5), 476. doi: 10.1111/j.1365-2524.2009.00849.x

Wolinsky, F. D., & Coe, R. M. (1984). Physician and hospital utilization among noninstitutionalized elderly adults: An analysis of the health interview survey. *Journal of Gerontology*, 39(3), 334.

Wolinsky, F. D., Coe, R. M., Miller, D. K., Prendergast, J. M., Creel, M. J., & Chávez, M. N. (1983). Health services utilization among the noninstitutionalized elderly. *Journal of Health and Social Behavior*, 24(4), 325-337.

Woolcott, J. C., Ashe, M. C., Miller, W. C., Shi, P., & Marra, C. A. (2010). Does physical activity reduce seniors' need for health care? A study of 24 281 Canadians. *British Journal of Sports Medicine*, 44(12), 902.

Zimmerman, S., Scott, A. C., Park, N. S., Hall, S. A., Wetherby, M. M., GruberBaldini, A. L., et al. (2003). Social engagement and its relationship to service provision in residential care and assisted living. *Social Work Research*, 27(1), 6e18

Appendix A: Questionnaire Items from WISER Phase III

PREDISPOSING VARIABLES**Gender**

Gender of participant:

- 1 – Male
- 2 – Female

Age

Age at the time of the Phase Three interview was calculated by subtracting the date of the Phase Three interview from the respondent's date of birth (provided in earlier phases of WISER).

Education

From SECTION G: DEMOGRAPHICS

The next few questions will provide important basic information about yourself and the people in your household.

4. What is the highest level of education that you have attained? **[DO NOT READ LIST. MARK ONE ONLY]**

- No schooling 1
- One to eight years 8
- Nine..... 9
- Ten10
- Eleven11
- Twelve.....12
- Thirteen13
- Some university, community college, technical
or trade college.....14

Diploma or certificate from a community college,

technical or trade college15

Bachelor's or undergraduate degree from
a university16

Master's degree, doctorate, or degree in medicine
or dentistry17

Other18

(Specify) _____

DK/R99

Health Beliefs

From SECTION C: HEALTH BELIEFS

Now, we would like to ask you some questions that deal with how you think about your health.

1. For the following, please indicate the extent to which each statement describes you, on a scale of one to five. One indicates that the statement does not describe you at all, while five indicates that the statement describes you very well. **[SHOW CARD 1C]**

Does not

Describe

	describe you at all				s you very well	DK/ R
a) You reflect about your health a lot	1	2	3	4	5	9
b) You are alert to changes in your health ...	1	2	3	4	5	9
c) You are usually aware of your health	1	2	3	4	5	9
d) You notice how you feel physically as you go through the day.....	1	2	3	4	5	9
e) You notice how you feel emotionally as you go through the day.....	1	2	3	4	5	9

2. I would like you to tell me how strongly you disagree or agree with the following statements. Please choose the number on this scale that most closely represents how you feel. A “1” indicates that you strongly disagree and a “6” indicates that you strongly agree. **[SHOW CARD 2C]**

	Strongly Disagree					Strongly Agree	DK/R
a) You handle yourself well with respect to your health.....	1	2	3	4	5	6	9
b) It is difficult for you to find effective solutions to the health problems that come your way.....	1	2	3	4	5	6	9
c) You're generally able to accomplish your goals with respect to your health	1	2	3	4	5	6	9
d) You find your efforts to change things you don't like about your health are ineffective.....	1	2	3	4	5	6	9

3. How good a job do you think you are doing looking after your health?

Excellent1

Very good2

Good3

Fair.....4

Poor.....5

DK/R.....9

Informal Social Engagement

From SECTION A: LEISURE PARTICIPATION

I am interested in the types of things you do during your leisure time. I am first going to ask you about the kinds of activities you do on your own or with others that are not formally organized. After that, I am going to ask about activities that are provided through organizations.

- 1a. Thinking about activities that you do on your own or with others but that are NOT provided through organizations, how often did you participate in each of the following during the past 6 months?

	Daily	Once a week to several times a week	Once a month to several times a month	Less than once a month	Never	DK/R
Visiting with friends or relatives	5	4	3	2	1	9
Attending cultural events (such as musical performances or plays)	5	4	3	2	1	9
Attending sports events as a spectator.....	5	4	3	2	1	9
Artistic or cultural activities, such as painting or playing a musical instrument	5	4	3	2	1	9
Telephone conversations with friends/relatives	5	4	3	2	1	9

Formal Social Engagement

From SECTION A: LEISURE PARTICIPATION

The next questions focus on organized activities that are provided through community centres (including senior centres), recreation facilities, seniors' apartments, or various organizations. I am interested in how often you participate in each activity program.

a) How frequently do you participate in each of the following activity programs?

		How frequently used in last 6 months				
	Daily	Once a week to several times a week	Once a month to several times a month	Less than once a month	Never	DK/R
a) Arts and crafts programs	5	4	3	2	1	
b) Games (e.g., bridge)	5	4	3	2	1	9
c) Continuing education/life long learning (e.g., courses, computer/internet training and use)	5	4	3	2	1	9
d) Organized cultural outings/day trips	5	4	3	2	1	9
e) Exercise/physical fitness programs	5	4	3	2	1	9

f) Organized outdoor nature activities.....	5	4	3	2	1	9
g) Intergenerational activities (e.g., reading to school children).....	5	4	3	2	1	9
h) Organized social activities (e.g., dances)	5	4	3	2	1	9
i) Organized church or other religious related activities.....	5	4	3	2	1	9

Civic Social Engagement

From SECTION F: EMPLOYMENT AND CIVIC ENGAGEMENT

The following questions deal with employment and volunteering.

8. In the past 12 months, did you do any unpaid volunteer work for any organization?

Yes1

No.....2 → (Go to Question 10)

DK/R.....9 → (Go to Question 10)

9. On average, about how many hours per month did you volunteer for this organization or these organizations?

Over 15 hours per month1

5 to 15 hours per month	2
1 to 4 hours per month	3
Less than 1 hour per month.....	4
DK/R.....	9

ENABLING VARIABLES

Availability of Health Services

From SECTION B: HEALTH STATUS [*Health Care Utilization*]

Now, I'd like to ask about your contacts with health professionals during the past 12 months...

9. Overall, how would you rate the availability of health care services in Winnipeg? Would you say it is:

Excellent	1
Good.....	2
Fair	3
Poor	4
DK/R.....	9

Social Network

From SECTION G: DEMOGRAPHICS

The next few questions will provide important basic information about yourself and the people in your household.

3. How many people are there in your household in each of the following age groups, including yourself?

Adults aged 65 + years _____

Adults aged 20 – 64 years _____

Children 0 – 12 years _____

Adolescents 13 – 19 years _____

TOTAL _____

DK/R 99

Social Support

From SECTION C: HEALTH BELIEFS

Now, we would like to ask you some questions that deal with how you think about your health.

8. When you are feeling anxious or upset and you need to talk, how much of the time do you have someone you can count on to listen to you?

None of the time.....1

A little of the time2

Some of the time3

Most of the time4

All of the time5

DK/R.....9

NEED VARIABLES**Self-Rated Health**

From SECTION B: HEALTH STATUS

This part of the survey deals with various aspects of your health. By health, we mean not only the absence of disease or injury, but

also physical, emotional, and social well-being.

1a. In general, would you say your health is:

Excellent1

Very good....2

Good.....3

Fair4

Poor5

DK/R.....9

Chronic Conditions

From SECTION B: HEALTH STATUS [*Chronic Conditions*]

4. Now, I'd like to ask about any chronic health conditions you may **currently** have. This refers to long-term conditions that have lasted or are expected to last 6 months or more, and **have been diagnosed** by a health professional.

a. Do you have any of the following long-term conditions? **[READ LIST]**

CONDITION:

No Yes DK/R

a) Food or other allergies?	2	1	9
b) Asthma?	2	1	9
c) Arthritis or Rheumatism?	2	1	9
d) Back problems excluding arthritis?	2	1	9
e) High blood pressure?	2	1	9
f) Migraine headaches?	2	1	9
g) Chronic bronchitis or emphysema?	2	1	9
h) Diabetes?	2	1	9
i) Epilepsy?	2	1	9
j) Heart disease?	2	1	9
k) Cancer? (specify:_____)	2	1	9
l) Stomach or intestinal ulcers?	2	1	9
m) Effects of stroke?	2	1	9
n) Peripheral circulatory problems?	2	1	9
o) Urinary incontinence?	2	1	9
p) Osteoporosis?	2	1	9
q) Alzheimer's disease or other dementia?	2	1	9

r) Cataracts, glaucoma or retinal disease?	2	1	9
s) Dental problems?	2	1	9
t) Skin trouble including acne?	2	1	9
u) Ear trouble (hearing loss?)	2	1	9
v) Depression, anxiety or panic attacks?	2	1	9
w) Any long-term disability, handicap or effects of injury? (specify:_____)	2	1	9
x) Any long-term mental health problem?	2	1	9
y) Any other long-term condition?	2	1	9
(specify:_____)			

Physical Activity

From SECTION D: HEALTH BEHAVIOUR

Now, I have a number of questions about your participation in physical activities during your leisure time. This includes physical activities at fitness facilities or clubs as well as other settings.

5a. First, thinking of your **current** participation in physical activities, how active are you compared to others of your own age and sex?

	Current	Compared to past
Much more active	1	1
More active	2	2
About the same	3	3
Less active.....	4	4
Much less active.....	5	5
N/A.....	7	7
DK/R.....	9	9

Body Mass Index

BMI was calculated from the following two questions in SECTION G: DEMOGRAPHICS

The next few questions will provide important basic information about yourself and the people in your household.

1a. How tall are you without shoes on?

_____ Feet _____ Inches

OR _____ Centimetres

N/A (recorded in Cm)

.....7.....777.0

N/A(recorded in Feet/Inches) 777.0

DK/R.....9.....99.0

.....DK/R..... 999.0

b. How much do you weigh?

_____ Pounds

OR _____ Kilograms

N/A (recorded in Kilograms).777

N/A (recorded in Pounds) 777.0

DK/R.....999

DK/R.....999.0

Appendix B: Ethics Approval from the Health Research Ethics Board (HREB) of the University of Manitoba

 UNIVERSITY OF MANITOBA		BANNATYNE CAMPUS	
		Research Ethics Boards	
HEALTH RESEARCH ETHICS BOARD (HREB)			
CERTIFICATE OF FINAL APPROVAL FOR NEW STUDIES			
Delegated Review			
PRINCIPAL INVESTIGATOR: Ms. J. McArthur		INSTITUTION/DEPARTMENT: UofM / Community Health Sciences	
APPROVAL DATE: March 5, 2013		ETHICS #: HS16064 (H2013:040)	
STUDENT PRINCIPAL INVESTIGATOR SUPERVISOR (if applicable): Dr. V. Menec		EXPIRY DATE: March 6, 2014	
PROTOCOL NUMBER: NA		PROJECT OR PROTOCOL TITLE: The Role of Social Engagement in Health Services Use for Baby-Boomers and Older Adults	
SPONSORING AGENCIES AND/OR COORDINATING GROUPS: NA			
Submission Date of Investigator Documents: January 9 and February 15, 27, 2013		HREB Receipt Date of Documents: January 14 and February 15, 27, 2013	
THE FOLLOWING ARE APPROVED FOR USE:			
Document Name		Version (if applicable)	Date
Protocol: Proposal received January 14, 2013 with clarification received February 15 and 27, 2013			
Consent and Assent Form(s):			
Other: List of Data Fields received January 14, 2013			
CERTIFICATION The above named research study/project has been reviewed in a <i>delegated manner</i> by the University of Manitoba (UM) Health Research Board (HREB) and was found to be acceptable on ethical grounds for research involving human participants. The study/project and documents listed above was granted final approval by the Chair or Acting Chair, UM HREB.			
HREB ATTESTATION The University of Manitoba (UM) Research Board (HREB) is organized and operates according to Health Canada/ICH Good Clinical Practices, Tri-Council Policy Statement 2, and the applicable laws and regulations of Manitoba. In respect to clinical trials, the HREB complies with the membership requirements for Research Ethics Boards defined in Division 5 of the Food and Drug Regulations of Canada and carries out its functions in a manner consistent with Good Clinical Practices.			
QUALITY ASSURANCE The University of Manitoba Research Quality Management Office may request to review research documentation from this research study/project to demonstrate compliance with this approved protocol and the University of Manitoba Policy on the Ethics of Research Involving Humans.			
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www.umanitoba.ca/faculties/medicine/ethics			

Appendix C: Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans Course on Research Ethics (TCPS 2: CORE)

