HEALTH DIFFERENTIALS AMONG ELDERLY WOMEN:

A RURAL-URBAN ANALYSIS

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ABSTRACT

This thesis examines the influence and interrelations of socio-economic, regional and social factors on elderly women's health from a life course perspective, integrating the concept of "social capital." A sample of 8,684 women aged 65+ is drawn from the master files of the 2001 Canadian Community Health Survey. Using logistic regression, analyses indicate elderly rural women are more likely to report having any chronic condition, hypertension, diabetes and heart disease, compared to elderly urban women, after controlling for socio-economic status, social capital and lifestyle. However, while community integration (a form of social capital associated with better health) is often stronger in rural communities, no rural advantage for subjective health is observed. Separate analyses of rural and urban sub-samples of elderly women also reveal a number of striking differences in the factors associated with subjective and objective health outcomes. Findings are discussed with regard to implications for policy and future research.

DEDICATION

To my Grandmothers,

Dorothy Cullen and Ramona Wanless

--- Your strength is an inspiration.

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TABLE OF CONTENTS

Approval ii

Abstract iii

Dedication iv

Acknowledgements v

Table of Contents vi

List of Tables viii

1. Introduction 1

2. Literature Review 5

2.1 Life Course Theory 5
2.2 Low-Income Elderly Women 9
2.2.1 Health Status and Low-Income Levels 10
2.3 Rural-Urban Dwelling Seniors 14
2.3.1 Health Status and Rural-Urban Residence 18
2.4 Additional Determinants of Health 21
2.5 Hypotheses 25

3. Methodology 26

3.1 Data Source 26
3.2 Measurement 28
3.2.1 Dependent Variables 29
3.2.2 Independent Variables 31

4. Data Analysis 40

4.1 Bivariate Analysis 40
4.1.1 Health Status and Income – Hypothesis 1 41
4.1.2 Health Status and Social/Community Support – Hypothesis 2 41
4.1.3 Health Status and Place of Residence – Hypothesis 3 42
4.2 Multivariate Analysis 43
4.2.1 Comparative Analysis – Rural/Urban Residence 48

5. Discussion 67

5.1 Research Hypotheses 67
5.1.1 Hypothesis 1 67
5.1.2 Hypothesis 2 69
5.1.3 Hypothesis 3 72
5.1.4 Hypothesis 4 76
5.1.5 Hypothesis 5 77
5.2 Additional Determinants of Health among Elderly Women 78
5.2.1 Socio-Demographics 78
5.2.2 Other Measures of Socio-Economic Status 79
5.2.3 Lifestyle Factors 81

6. Key Findings, Implications, Limitations and Future Research 82
6.1 Key Findings 82
6.2 Policy Implications 86
6.3 Limitations 87
6.4 Directions for Future Research 93
7. Appendices 97
7.1 Logistic Regression Analysis 97
7.1.1 Logistic Regression – Self-Perceived Health 97
7.1.2 Logistic Regression – Any Chronic Condition 102
7.1.3 Logistic Regression – Arthritis/Rheumatism 106
7.1.4 Logistic Regression – High Blood Pressure 110
7.1.5 Logistic Regression – Diabetes 114
7.1.6 Logistic Regression – Heart Disease 118
7.2 Study Sample 123
8. Reference List 125

LIST OF TABLES

Table 3.1: Dependent Variable Frequencies 31
Table 4.1: Bivariate Analysis – Income 41
Table 4.2: Bivariate Analysis – Social/Community Support 42
Table 4.3: Bivariate Analysis – Place of Residence 43
Table 4.4: Logistic Regression – Hierarchical Model 45
Table 4.5: Logistic Regression – Summary Table 48
Table 4.6: Comparative Analysis – Self-Perceived Health 52
Table 4.7: Comparative Analysis – Chronic Condition 55
Table 4.8: Comparative Analysis – Arthritis/Rheumatism 57
Table 4.9: Comparative Analysis – High Blood Pressure 60
Table 4.10: Comparative Analysis – Diabetes 63
Table 4.11: Comparative Analysis – Heart Disease 66
Table 7.1: Logistic Regression – Self-Perceived Health 101
Table 7.2: Logistic Regression – Chronic Condition 105
Table 7.3: Logistic Regression – Arthritis/Rheumatism 109
Table 7.4: Logistic Regression – High Blood Pressure 113
Table 7.5: Logistic Regression – Diabetes 117
Table 7.6: Logistic Regression – Heart Disease 121

1. INTRODUCTION

Elderly women comprise a considerable portion of the Canadian population. Based upon 2001 data, they represent 7.4% of the total population, and 57.2% of those aged 65 and over (Statistics Canada, 2003a). Indeed, it is projected that the percentage of women 65 years of age or older will increase to 11.7% of the Canadian population by the year 2026 (Statistics Canada, 2004b). Moreover, many elderly women are poor; 21.5% of women 65 years of age or older were considered low income in 2000, as measured by Statistics Canada's low-income cut-offs (Statistics Canada, 2001b). In fact, women are more likely than men to be poor at each stage of their lives, as well as being more likely to be ensnared in a lifetime of poverty (Lochhead & Scott, 2000). In 2000, 16.3% of women of all ages in Canada were poor compared with 13% of men (Statistics Canada, 2001b). Furthermore, elderly women were more likely to have low-income levels (21.5%), than women 18 to 64 years of age (15.1%) (Statistics Canada, 2001b). This general trend of poverty among elderly women is worrisome, given that income is a major determinant of health (Bolig, Borkowski & Brandenberger, 1999). Thus, given that women aged 65 and older will make up an ever greater portion of the Canadian population in the future, their health and well-being will also be of increasing importance.

Additionally, in 2001, 19.2% of seniors in Canada (727,480 seniors) were living in rural areas (Statistics Canada, 2004c), and as will be shown, these seniors have unique challenges and experiences due to their rural residency. Statistics Canada defines rural areas as those not classified as an urban area, which are categorized as those places with a "minimum population concentration of 1,000 persons and a population density of

at least 400 persons per square kilometre" (2001a, p. 1). It is also important to note that the rural landscape in Canada is ever changing, as illustrated by the fact that the percentage of seniors in these areas has declined from 24% in 1996 to 19.2% in 2001 (Statistics Canada, 1999c, 2004b).

Research establishes that rural residency can have both a positive and negative effect on health (Gerritsen, Wolffensperger & Van Den Heuvel, 1990; Mitura & Bollman, 2003). Notably, lower incomes are more prevalent in rural areas, and are associated with poorer health status. Research also suggests that rural residents receive more community support (indicating a higher level of "social capital"[1]), which may buffer the effects of low-income on health status (McCulloch, 1998; Pearson Scott & Roberto, 1985, 1987). These findings on the impact of rural residence on elderly women's health in relation to these seemingly contradictory patterns therefore need to be explored in more detail.

Furthermore, Canadians are living longer than ever before. Thus, the number of "healthy years," that is, those years lived without chronic illness or disability in late life, is becoming increasingly important to consider as well. The 1998/99 National Population Health Survey documented a prevalence rate for those aged 65 years and older as 41.5% having arthritis/rheumatism, 35.6% for hypertension, 17.4% for heart disease and 11.6% having diabetes (Statistics Canada, 1999b). In spite of the prevalence of chronic conditions in late life, 77% of seniors rated their health as excellent, very good or good, compared to the 23% who perceived their health as fair or poor (Statistics Canada, 1999a). Yet, elderly women are found to have higher prevalence rates of

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[1] Social capital refers to the amount and quality of social or "non-tangible" support available from family and community (Bowen, Richman & Bowen, 2000), which allows for certain events to occur which would have not otherwise transpired (Coleman, 1988). This concept will be further defined in Chapter 2 (pg. 6-7).

arthritis/rheumatism and hypertension, than their male counterparts, while having lower rates of heart disease and diabetes (Statistics Canada, 1999a). This illustrates the fact that elderly women have different health experiences than elderly men and that it is valuable to focus attention on the unique health experiences of older women.

In light of these issues, the purpose of this study is to examine the factors that influence the health of elderly women in Canada, using a life course theoretical perspective integrated with the concept of "social capital". In particular, attention is focused on differences between rural and urban women and the inter-relationships of socio-economic status, social capital and health status, as social determinants of health. This will entail an investigation of an apparent paradox that while urban women (who tend to have higher incomes) have better objective health, rural women tend to have better subjective health. It is proposed that while income may be a major health determinant for elderly women, women with rural residence may experience better subjective health due to higher levels of social capital, in spite of higher levels of poverty in rural areas. Thus, it is anticipated that this anomaly may be due to the higher levels of social and community support among older rural women, when compared to older urban women.

In order to examine these research questions, secondary data analysis is conducted using the Canadian Community Health Survey (CCHS) from 2000/01. It is through the analysis that the impact of rural-urban residence on older women's lives in relation to salient health issues will be determined, as well as the effect of low-income status. The present study is unique, in that no known research has examined both of these areas simultaneously or in relation to the paradox previously outlined. In addition, detailed rural-urban gradients, as well as the interplay of social capital and socio-economic factors have been largely overlooked in previous studies. Finally, the results

of this analysis will have important implications for future research endeavours, policy, and community programs in Canada, which will be identified and explored in the last chapter.

2. LITERATURE REVIEW

This chapter reviews literature relevant to the study, beginning with a discussion of the life course theoretical perspective. This will be followed by an overview of the prevalence of low-income levels among senior women, and the impact that this can have on health status, in addition to the influence of rural-urban residence. Additional factors which may affect the health of elderly women will also be considered. Finally, the hypotheses will be presented, which are based upon this literature review.

2.1 Life Course Theory

The life course perspective is a useful framework for examining health-related issues of elderly women. It is a multidisciplinary approach that is well-suited to the study of individual lives within structural contexts and amidst social and economic change (Elder, 1985; Hagestad, 1990; Hareven, 1994). Of particular relevance to this study is its focus on the interaction of socio-demographic, socio-structural, cultural (Hareven) and geographic factors. As such, this theory allows consideration of a variety of factors which may impact an older adult's health, such as their degree of family and community integration, kin support, and income level (Hareven).

A fundamental tenet of this framework that we build upon in this work is the notion of heterogeneity in access to resources and how this impacts health in later life. Resources may be material (e.g. financial and household resources) or non-material (e.g. social capital). Access to resources can be seen as rooted in one's place of residence, available social support and financial capital. Specifically, both low-income levels and rural residence can affect one's access to resources and this is likely to

impact health status. It should also be noted that applying life course theory to health outcomes, as this study proposes, is a novel and practical approach. "Put simply, individuals (and their ill-health) cannot be understood solely by looking inside their bodies and brains; one must also look inside their communities, their networks, their workplaces, their families and even the trajectories of their life" (Lomas, 1998, p.1182).

Indeed, an important distinction that is made in the literature is between biomedical and behavioural health determinants (i.e. cholesterol levels, physical activity, smoking status, etc.) and "social determinants of health." The latter refers to the "economic and social conditions that influence the health of individuals, communities, and jurisdictions as a whole" (Raphael, 2004, p. 1). While definitions differ across studies, Canadian researchers recently identified 11 social determinants of health: Aboriginal status; early life; education; employment and working conditions; food insecurity; health care services; housing; income and its distribution; social safety net; social exclusion; and unemployment/employment security (Raphael). In addition, gender interacts with all of these social determinants to influence health status, which have been found to have a greater influence on the health of Canadians than biomedical and behavioural factors (Raphael).

The life course perspective is particularly useful when considering these determinants of health, as noted by Raphael (2004):

> Adopting a life course perspective directs attention to how social determinants of health operate at every level of development . . . to both immediately influence health as well as provide the basis for health or illness during following stages of the life course. (p. 16)

A related concept that is frequently integrated within the life course literature is that of "social capital". This term refers to the quality of and support from familial relationships, and can also be found in the community setting (Bowen, Richman & Bowen, 2000). This concept is similar to social support and can affect one's health and

well-being. Coleman (1988), a pioneer of social capital conceptualization, also described it as being productive, in that social capital makes certain events possible which would not have occurred in its' absence. Two related concepts are financial and human capital. Financial capital refers to a family's available economic or physical resources, whereas human capital is the knowledge and/or skills of the parents and the capabilities of the children (Bowen, et al.). In fact, Bowen, et al. assert that, "social capital is perhaps the most important of the three types, for without it, financial capital may assume little meaning and human capital may not be translated into positive outcomes for family members" (p.120).

Social capital, therefore, plays an important role in the proposed research, particularly regarding the impact on elderly women's health. For instance, a study of health districts in Saskatchewan found that communities with higher social capital (measured by associationalism and civic participation) had a lower mortality rate, fewer encounters with mental health and alcohol/drug services, and had more people 65 years of age or older (Veenstra, 2002). Lomas (1998) observed in a study examining a number of possible responses to fatal heart disease that "interventions to increase social support and/or social cohesion in a community are at least as worthy of explanation as improved access or routine medical care" (p.1184), with each intervention having at least some impact on the prevention of deaths. However, it is recognized that social capital involves a number of dimensions, such as civic engagement, civic identity, community networks and norms (Robert, 2002). Thus, it is recognized that due to its abstract nature, it is difficult to consistently define across studies (Liu & Besser, 2003).

Additionally, while much of the literature emphasizes the positive aspects and consequences of social capital, a number of negative features may also be associated with this concept, such as the exclusion of others, excessive demands and claims made on individuals, and the restriction of freedom and choice (Portes, 1998). While this

research focuses on the positive characteristics of social capital, it is essential to note that these negative aspects should also be taken into consideration.

A life course perspective is also relevant to the issue of women's late life poverty. This framework allows for the consideration of women's individual choices (e.g., regarding marriage and labour force participation), the structural contexts which these decisions are made within (e.g., the acceptance of women in the labour force, the gender gap in pay), and the various transitions many women experience in early, mid and late life (e.g., widowhood) (Vartanian & McNarmara, 2002). As will be briefly outlined, there are various causes, both individual and structural, for women's late life poverty and the life course perspective provides a framework in which to consider these, as well as the impact low-income levels may have on one's health and well-being.

Finally, Crystal and Shea (1990) discuss the concept of cumulative advantage/ disadvantage, which also has relevance for this study. This notion suggests that inequalities (e.g., gender, ethnicity, and rural residency) may be accumulated over the life course, resulting in late life poverty. Poverty among seniors has been attributed to both the current conditions faced, such as life transitions like retirement and widowhood, and the cumulative effects of the life long experiences of these seniors, including the possibility of experiencing lasting disadvantages (Glasgow & Brown, 1998). Glasgow and Brown also discuss the possible disadvantages of rural residency, such as economic constraints, limited opportunities and constraints within the social structure. However, it is also anticipated that there are advantages to rural residency, in terms of social capital and cohesion. Thus, not only is the life course perspective useful for the examination of the impact of low-income on one's health, it is also very valuable in terms of explaining the cumulative effect that rural or urban residency may have on health.

2.2 Low-Income Elderly Women

The percentage of persons aged 65 years and older below Statistics Canada's low-income cut-offs in 2000 was 16.4%, compared to 14.7% of all persons in Canada (Statistics Canada, 2001b). These low-income levels can have an important impact on seniors' health and communities. There is overwhelming international evidence that shows that those who are considered to be well off, both economically and socially, are more likely to live longer and healthier lives (Wolfson, Rowe, Gentleman & Tomiak, 1993). Low-income levels may impact an older person's health and community in a variety of ways, such as the ability to engage in social activities, access to safe and affordable housing, proper nutrition and healthcare, and much more.

Since the 1970s, there has been substantial attention paid to the "feminization of poverty". This term refers to the higher incidence of poverty that occurs for women compared to men throughout the life span. Minkler and Stone (1985) have argued that the history of women's economic dependence on men is at the foundation of this phenomenon. In fact, statistics from around the world indicate that women are disproportionately represented among those with low incomes. This disadvantage is particularly evident for older women, as 21.5% of women aged 65 and over in Canada were considered low-income in 2000, compared to 16.3% of all women in Canada and 9.8% of men aged 65 and over (Statistics Canada, 2001b).

Moreover, living arrangement, marital status (particularly widowhood), and gender are all strong predictors of poverty among older persons (Davis & Grant, 1990). In 2000, of those who were unattached, 30.8% of males compared with 43.5% of women were lower income (Statistics Canada, 2001b). The rates are slightly higher for those 65 years and older (33.3% of unattached men and 46.4% of women) (Statistics Canada). The rate for senior economic families, in comparison, was 4.6% for men and 5.4% for women (Statistics Canada). However, not all unattached women share the same marital

history. Women who never marry often have higher incomes than widowed women, who frequently have higher income levels than those women who are separated or divorced.

There is a wide range of causes for late life poverty among women. These include: women's responsibility for caregiving and domestic labour; women's history of labour market participation (or lack thereof); and a pension system that is tied to labour market earnings (Lochhead & Scott, 2000). It is also important to note that "government interventions at later ages cannot fully compensate for these longer term patterns" (O'Rand, 1996, p. 233). Also, women's longer life expectancy leads to a higher likelihood of being widowed and unattached in later life. In other words, there are a number of pathways in which elderly women can become poor – by divorce, death of a spouse or partner, and/or low-wages throughout their life course (Cohen, 1984). Both a lifetime of poverty and poverty exclusive to late life (due to widowhood, lack of pensions, etc.) can have serious consequences for women's health in later life.

2.2.1 Health Status and Low-Income Levels

One's health status has many facets, and therefore, is a difficult concept to clearly define and operationalize. Health is not just the absence of disease, but also includes one's functional status (Belanger, Martel, Berthelot, & Wilkins, 2002) and well-being, which are influenced by a variety of issues, including the presence or absence of disease. A common method to measure a respondent's health is "self-rated health", considered to be a subjective measure, as opposed to an objective measure, which may be based on a professional diagnosis (Buckley, Denton, Robb, & Spencer, 2003). However, while self-rated health is viewed as the central subjective measure used to determine the health status of older individuals, it is still unclear which factors older adults consider in order to assess their own health (Goins, Hays, Landerman & Hobbs, 2001). Clarke, Marshall, Ryff and Rosenthal (2000) found that 95% of Canadian seniors

surveyed had at least one chronic condition, although 83% indicated their health was very good or good. This emphasizes the fact that there is more to the subjective health of seniors than just the number of chronic conditions, and that these two measures together present a more complete picture of one's health status.

Given rapid population aging, it is important to not only focus on acute care, as much of today's health care does, but also to spend resources on the areas of chronic care management and health promotion in order to improve health through one's lifestyle factors. Late life health is influenced by a variety of factors, including one's experience throughout the life span, which may take into account an individual's health practices, available resources, and more. Women may live longer than men, but overall their health is not as good as their male counterparts (Belanger, et al., 2002), and this may be the result of such issues as socio-economic status, lifestyle factors, and more.

Low-income has been found to have a consistent influence on one's health, particularly in later life (Bertera, 1999; Bolig, et al., 1999; Buckley, et al., 2003; Cairney, 2000; Hirdes & Forbes, 1993). Low-income seniors not only deal with the health problems that may accompany the later years of life, but also at a higher rate than their mid to high-income counterparts. They must also deal with unique issues that affect their health or ability to deal with poor health. These issues may include: access to proper nutritional foods; issues of crime and safety; adequate and affordable housing; transportation; affordable prescription medication; the ability to participate in social activities; and much more (Chappell, 1998). In fact, "it is not money per se, but the conditions, opportunities and amenities that money makes available that are important to health" (Chappell, p.101).

Low-income seniors are twice as likely to report having poor health than those with mid to high incomes (Bertera, 1999; Buckley, et al., 2003; Cairney, 2000) and

higher income is associated with the probability of maintaining good self-rated health (Buckley, et al.; Hirdes & Forbes, 1993). Moreover, adults living in poverty are more likely to have shorter life expectancies than those not living in poverty (Bolig, et al., 1999). Belanger, et al. (2002, p.72) also observed that "nearly all additional years of life expectancy for those with higher income were disability-free years".

A study by Lokken, Byrd and Hope (2002) of low-income seniors discovered that they had a high reported fat intake and a low intake of fruits and vegetables, which increased nutritional risk. This may be due to the lower educational levels that often accompany low-income levels, in that these seniors may be less aware of what constitutes proper nutrition. Alternatively, it could indicate a lack of knowledge of available nutritional services, few financial resources to enable them to eat nutritionally, or residence in a community with little/poor access to an affordable, healthy food supply.

Those with low-income levels are often more dependent on support from one's family, friends and community services, due to a lack of financial resources, although their networks may not be more extensive than those who have higher income levels. Social support has been defined as "help offered in response to an identified need" (Pierce, Sheehan & Ferris, 2002, p. 39) and may be provided through formal or informal means. Informal support may come from a family member, a friend, neighbour or member of the community and may be in the form of instrumental, informational and emotional support. Social support is usually operationalized in three ways: (1) "measures of the existence or quantity of support; (2) measures of the structure of social relationships; and/or (3) measures of the function of the relationship" (Kersting, 2001, p. 69). It has been found that one's social support networks, can buffer against stress and decrease the risk of depression and illness in seniors, and may in fact, be an enhancer of personal health (Bothell, Fischer & Hayashida, 1999; Rogers, 1999). Rogers

documented that among a sample of frail, low-income elders, those who had good social supports were less depressed and have higher life satisfaction than those elders who have had few social supports. Conversely, a severe lack of social support was found to be positively associated with poor health for elderly women (Grundy & Slogett, 2003), while Cairney (2000) found no relationship between social support and self-rated health.

Moreover, Kersting (2001) observed that those seniors who have ties to their community and those who are involved in their community, via friends, church, recreational activities and volunteer work, have a decreased risk for nursing home utilization. Senior centres, community organizations and seniors clubs can provide an opportunity for seniors to not only obtain services (like nutritional programs), but they also serve as a gathering place for social interaction for those who may otherwise be isolated (Kirk & Alessi, 2002).

Cairney (2000) discovered that financially disadvantaged seniors suffer from more stress, are more likely to participate in riskier lifestyles, and have fewer available resources. These factors can impact one's health and social relationships. Hirdes and Forbes (1993) observed an association between self-rated health and socio-economic status, which was still found after controlling for lifestyle factors, including alcohol use, smoking and obesity.

Thus, it is generally assumed that low-income seniors have poorer subjective and objective health, and riskier lifestyles than those with higher incomes. Yet, it will be shown that rural dwelling seniors typically have better self-perceived health than urban dwelling seniors despite having lower incomes. This leads us to consider the question, do rural seniors rate their subjective health as better because of stronger community and social support, in spite of the fact that they are in poorer health in terms of objective measures? This is an interesting paradox which will be explored further.

2.3 Rural-Urban Dwelling Seniors

The distinction between rural and urban dwelling persons has often been made, in terms of the higher incidence of poverty in rural regions, the lack of health and social services and higher community integration. In 2001, 20% of Canada's population lived in rural areas (Statistics Canada, 2003b). Of those 65 years and older, 19.2% lived in rural areas of Canada in 2001, compared to 20.1% of persons age 15 to 64 (Statistics Canada, 2004c). Conversely, in 1996, 22.7% of women 65 years and older lived in rural areas, compared to 20.7% of women 15 to 64 (Statistics Canada, 1999c).

Rural-urban residence is ever-changing in Canada, and as a result, the number of seniors living in rural areas has decreased from 24% in 1996 to 19.2% in 2001 (Statistics Canada, 1999c, 2004c), while the number of Canadians, regardless of age, in rural areas decreased from 22% to 20% in that same time period (Statistics Canada, 2003b). Fluctuations in rural residence can be attributed to a number of factors, one of which is migration. While there has been an overall decrease in the number of seniors living in rural areas in recent years, there have been increases in the past, as well as specific communities and/or provinces experiencing increases.

> The growth of the seniors population in many areas is the result of a naturally aging population combined with three types of older in-migrants: urban people retiring to a rural setting; farmers and others from outlying areas coming into town to live; and people retiring to the town where they grew up. (Canadian Mortgage and Housing Corporation, 2003, p.1)

When examining migration in and out of rural and small town (population of 1,000 to 9,999) Canada between 1971 and 1996, it was noted that in-migration exceeded out-migration for those 25 to 69, with a higher number of individuals aged 70 and older moving out of these areas, compared to in-migration, although this number was relatively smaller (Rothwell, Bollman, Tremblay & Marshall, 2002). In a study of elderly mobility in Southwest Manitoba, it was revealed that among those seniors who had moved in the previous 5 years, 92% moved within the same community, resulting in

'aging near place' (Everitt & Gfellner, 1996). Regardless of the current portion of seniors residing in rural areas, it is important to note that seniors are more likely to have lived their whole lives in rural areas than persons of younger age groups.

It is important to note that many studies which examine the differences of rural and urban seniors have found contradictory results. This is primarily due to the conceptualization of, and subsequent measures used, to distinguish between rural and urban residency (Gerritsen, et al., 1990; Martin Matthews 1988; Martin Matthews & Van Den Heuvel, 1986). In other words, the way in which a researcher defines rural residence will impact both the research conducted and subsequent policies and programs implemented (Keating, 1991). Therefore, it might be important to consider aspects such as whether current residence is an appropriate measure of rural-urban residence, as opposed to measures of aspects such as a rural rearing (e.g. having spent the formative years of one's life in a rural environment, which may be measured by place of residence at the age of 16) and rural self-identity (e.g. identifying oneself as rural, regardless of current residence). In this vein, Martin Matthews (1998) asks, "*what* aspects (if any) of rural residence affect the aged? Is it current residence? Its duration? The impact of being reared in the rural environment and its associated impact on socialization? Or, is it having an identity or self concept as a rural person, thereby exhibiting a rural 'value system' or cultural identification" (p. 145)?

Most studies use current residency, either via a dichotomy (measured as rural or urban) or a continuum of rurality (typically ranging from farm or small town to large urban city), with the use of a continuous measure considered the more favourable option (Havir, 1995; Krout, 1994; Martin Matthews, 1988). However, dichotomies are used more frequently in the literature. Gillanders, Buss & Hofstetter (1996) found that when comparing an urban/rural dichotomy to a categorical measure of rurality, that the results differed greatly, and that the dichotomy conformed to the previous literature more so

than the categorical measure. Havir (1995) notes that rurality often refers to a low population density, relative isolation of communities and small settlements. The size of communities considered rural differs both between countries, such as the United States and Canada, as well as within each country. This can cause some difficulties in comparing research findings. As Keating (1991) observed, given that the majority of the Canadian population is concentrated across the southern border, some rural seniors may live in proximity to a large metropolitan centre, while others are geographically isolated. Therefore, even when using a standard measure of rurality, there are a wide variety of experiences within and among various rural communities. However, regardless of the conceptualization and measurement used, rural seniors are more likely to have lower educational and income levels, be married, own their home, but live in substandard housing, and have higher service needs than urban dwelling seniors (Kivett, 1988; Martin Matthews).

Not only has it been found that rural areas are more likely to have a higher concentration of seniors, particularly in the 85 and older age group, but this also translates into higher rates of functional limitations, cognitive impairment and chronic conditions (Chumbler, Cody, Booth & Beck, 2001). Also, rural areas are more likely to have higher low-income rates than urban areas, and this often results in lower incomes for seniors, and particularly senior women. For instance, incomes in rural regions within every province in Canada are shown to be lower than the incomes in the urban regions (Statistics Canada, 2002c). Senior rural women have lower incomes than their urban counterparts, and live in poverty for a longer period of time (McLaughlin, 1998). Not only are incomes lower in rural regions, there is a significant difference in terms of household expenditures when comparing urban and rural areas. While rural and urban households spend the same portion of their household budget on food, clothing and shelter combined, when examining expenditures individually, rural residents spend more on

food, transportation and some services, but less on shelter than do urban residents (Marshall & Bollman, 1999).

Many reasons for the lower incomes of rural seniors have been considered, such as lower paying occupations in rural areas, the higher incidence of seasonal work and few opportunities for advancement, and therefore, higher lifelong income (Jensen & McLaughlin, 1997). These same causes of late life poverty have been reviewed in relation to the higher incidence of low income among older women, as well as the lower educational levels, higher rates of part-time employment, greater likelihood to have worked without pay on family farm and the narrow range of available employment opportunities available to rural women (McCulloch, 1998; McCulloch & Kivett, 1988; McLaughlin, 1998). Indeed, McLaughlin states that the factors which place senior women at a higher risk of low income levels are exacerbated in rural areas.

Rural and urban dwelling seniors differ on a number of levels, including their income levels, health status and in terms of the quality and quantity of their social interactions (Zimmer & Chappell, 1997), as well as the type of service provision required. For instance, due to the distance between health and social services, amenities, and one's social network, transportation and accessibility are important issues for rural seniors. However, while urban seniors in the United States and Canada tend to have higher income levels, better objective health, and better access to amenities, their rural counterparts have been found to have better subjective health, in terms of such measures as life satisfaction, well-being and positive affect (Kivett, 1988; Zimmer & Chappell). It is also noted that rural seniors are more likely to value independence and attempt to limit dependence on formal services, and often have stronger social networks than urban seniors due to the frequent long-term residency in their communities (Shenk, 1998).

2.3.1 Health Status and Rural-Urban Residence

Rural dwelling seniors are more likely to be at an advantage compared to urban seniors when it comes to subjective health measures, such as life satisfaction, but in turn, are disadvantaged on objective health measures (Gerritsen, et al., 1990). As previously suggested, "rural seniors rate their health more positively than morbidity data would suggest is warranted" (Keating, 1991, p. 88). Regardless of age and sex, a study using the Canadian Community Health Survey revealed that the self-rated health of all Canadians worsened from the most urban areas to the most rural and remote regions (Mitura & Bollman, 2003). Mitura and Bollman also discovered that the prevalence rate of arthritis/rheumatism was higher in rural and small-metro areas.

Kivett (1985) documented in a study of rural and urban dwelling seniors that there were no significant differences between these groups in terms of both mental and physical health differences, including both morale and self-rated health. Clark and Dellasega (1998) also uncovered no significant rural-urban differences in terms of self-rated health. In turn, Strain and Chappell (1983) determined in their study of rural and urban seniors in Manitoba, that rural seniors reported higher perceived health scores than their urban counterparts. Yet, Shapiro and Roos (1984) and Havens, Hall, Sylvestre and Jivan (2004) found that rural Manitoban seniors reported their health as being poorer than urban seniors did. Additionally, Goins, et al. (2001) discovered in an American study that rural residents had poorer self-rated health. This conflicting evidence may be due to a variety of reasons, one of which is the notion that while rural communities typically have lower incomes than urban settings do, some rural communities may be more disadvantaged in terms of income than comparative communities are, and therefore this may contribute to the discrepant rural-urban health findings. However, it is assumed that rural residents would be better off in terms of subjective health, as they have stronger community ties and social support networks, as

will be shown. It may be argued that, due to higher levels of social capital, the impact that a lack of financial capital has on one's health and well-being is lessened.

McCulloch (1998) discovers that older rural women have a higher incidence of chronic conditions than urban women, although there is no difference in terms of mortality or acute diseases. When measuring objective health status in terms of the number of symptoms experienced, rural residents had poorer health than urban-dwelling seniors (Clark & Dellasega, 1998; Gillanders, et al., 1996). Yet, Shapiro and Roos (1984) revealed that rural Manitoban seniors were not more likely to have a serious illness diagnosed or to die within a one year time period than urban seniors were. Again, while the studies discussed here have sometimes found conflicting results, the general consensus is that the rural seniors generally have poorer objective health than urban seniors.

Kivett (1988) conducted qualitative research on rural seniors in the southwest United States and acknowledged three emergent themes: (1) the value of a network of friends and neighbours; (2) the importance of long-term associations; and (3) the sense of privacy and freedom afforded through rural residence. McCulloch (1998) also points out that rural women feel the need to be involved in community organizations and helping groups as a way to care for others, while rural men are more likely to be involved out of moral obligation.

Generally rural seniors are thought to have larger and more supportive social networks and stronger ties to their communities (Pearson Scott & Roberto, 1985, 1987; Strain & Chappell, 1983), while being worse off than urban seniors in terms of income and education (Newhouse, 1995). Even when no difference is shown in terms of the amount of contact with one's family and friends, rural residents perceive their social network as being more accessible than do urban seniors (Keating, 1991). This may be due to both the size of the communities, which allow for more intimate and frequent

interaction. Many rural seniors may also have lived in their communities for a long period of time which can build up a "stock" of social capital in the form of stronger social connections. In addition, those in farming and remote areas tend to have fewer formal services available to them, and therefore, are more likely to have to rely on family and friends for assistance (Keating). These stronger social support networks may help to buffer the impact of low-income on the health of these rural aged. However, Newhouse also documented that urban seniors were more likely to be satisfied with their informal networks of support, even though these networks were not as strong as the rural respondents.

Zimmer and Chappell (1997) propose that the higher life satisfaction that some studies have found among rural seniors may be explained by the amount and quality of social interaction that rural seniors experience. Pearson Scott and Roberto (1985; 1987) assert that rural seniors often report more contact with friends and neighbours, and more reliance on them for assistance, than urban seniors. Strain and Chappell (1983) discovered that rural seniors were more likely to be more socially integrated, in terms of reporting a greater number of friends and seeing those friends more often, than urban residents. The importance of this social interaction for rural seniors is seen in the Zimmer and Chappell study, which revealed that rural dwelling seniors were more likely to rate social interaction amenities (living near other seniors, near friends and relatives and near a senior centre) as important to live near, than urban seniors were.

It is also important to note that while rural and urban centres in Canada have similar concentrations of seniors, those who live in rural areas are much more dispersed geographically and therefore their access to care differs from urban seniors (Hodge, 1993). Many studies on seniors' access to care have used Andersen's Health Behaviour model. In Aday and Andersen's study (as cited in Porter, 1998), rural-urban residency was considered to be a predisposing factor to access to health care. Due to

the lower population base in rural areas, health services are often more costly to deliver, and therefore, fewer services are often available in rural areas. This often results in residents travelling for specialty services and surgeries, and the possibility of relocation to another community for long-term care. Hodge documented in a study of Canadian seniors that rural services were strong in the health care, home support and housing sectors, but weak in transportation and social/recreational support services. Shapiro and Roos (1984) uncovered that rural seniors in Manitoba had more access to hospitals than urban seniors, due to the higher availability of beds in rural settings. However, physicians were less available in rural areas than in urban centres, although rural seniors had higher rates of hospital usage (Shapiro & Roos).

Overall, it is assumed that seniors who live in rural areas have better subjective health, poorer objective health, more extensive social support networks, stronger ties to their community and less access to services than their urban counterparts. Further exploration is needed to directly examine the possibility that rural residency, and the social capital that often accompanies it, may act as a buffer to the impact low-income has on one's subjective health and well-being. Due to the fact that studies have often shown conflicting findings in regards to rural-urban health differentials, it is possible that there may be different sets of health predictors, depending on place of residence. Consistency with respect to rural-urban measures is also required, and use of a rural-urban continuum (rather than a dichotomy) is recommended. Also, American research often employs different criteria for rural residency than what is used in Canada. Therefore, results may not be comparable and should be viewed with caution.

2.4 Additional Determinants of Health

In addition to income levels and rural-urban residency, there are a number of other factors not previously reviewed which are expected to influence elderly women's

health status. These include: socio-demographic characteristics (age, marital status, and ethnicity); socio-economic variables, beyond low-income status (education and food insecurity); and lifestyle factors (physical activity and smoking status).

Jylha, Guralnik, Balfour & Fried (2001) revealed in their study of women 65 years and older, that as age increased the percentage of persons reporting fair or poor health also increased. However, when adjusting for multiple health indicators (i.e. walking difficulty and speed, ability to stand from chair, number of diseases, visual and hearing impairments, etc.) and socio-demographic status, higher age was found to be associated with better self-rated health (Jylha, et al.). Cairney (2000) observed that those aged 75 or older were more likely to report having poor health than those aged 55 to 64.

Turning to marital status, Grundy and Slogett (2003) discovered no self-rated health advantage for older women who are currently married, when controlling for all other variables. Older women who were single and widowed also had lower odds of reporting their health to be bad or very bad (Grundy & Slogett). Conversely, in a study using the 1994 National Population Health Survey, single seniors were more likely to report poor health than married seniors were (Cairney, 2000). Mookherjee (1997) documented that married persons had higher life satisfaction than unmarried persons, regardless of gender. Given this contradictory literature, it is expected that elderly women's marital status will serve as a form of social support, and therefore, is expected to similarly impact the health and well-being of elderly women.

There is limited Canadian research on how ethnic origin and visible minority status affects subjective and objective health status, particularly for elderly women. Nonetheless, given that visible minority seniors typically have lower incomes than their White counterparts, and that socio-economic status is an established health determinant, it is assumed that visible minority elders will also have poorer health status. Using Census data, Brotman (1998) discovered that visible minority (Chinese, Black and

Aboriginal) seniors in Canada were more likely to live in poverty than Whites. Other research using the 2000/01 CCHS documents that recent elderly immigrants (75% of whom are visible minorities) have poorer health status than those seniors who are Canadian-born, as measured by self-rated health, activity restrictions and overall functional health (Gee, Kobayashi & Prus, 2004). Yet, in a study of mid- and late-life Canadians, recent immigrants (from Asia and other countries) are found to have a decreased likelihood of having a chronic condition, in comparison to their Canadian-born counterparts (Kobayashi, 2003).

In addition, research shows that visible minority seniors may face some serious challenges in accessing and utilizing health care services, due to language barriers and other factors, which can have a negative influence on their health status (Elliot & Gillie, 1998; Oxman-Martinez & Hanley, 2005). Also, visible minorities are more likely than non-visible minorities to report discrimination and racism in many sectors of society (Statistics Canada, 2003d), which can also have a detrimental effect on health.

Despite limited generalizability to the Canadian visible minority population, American research finds contradictory results in terms of the impact of visible minority status on health status. Jylha et al. (2001) for example, revealed that non-white elderly women were more than two times as likely to rate their health as fair or poor than white elderly women were, even though they were at equal levels of illness and functioning. On the other hand, Robert and Lee (2002) uncovered that older Blacks were significantly advantaged on self-rated health measures despite the fact that they were worse off in terms of both their individual and their community socioeconomic contexts. Thus, given that overall, research establishes that poverty and health are related, and that visible minority groups are prone to poverty and other challenges, it is expected that visible minority elderly women will be more likely to report poorer subjective and objective health compared to non-visible minority elderly women.

Furthermore, given that income and education are correlated, education is expected to have a similar association with elderly women's' health. To support this assumption, Grundy and Slogett (2003) observed that among older women, having no formal education qualifications is associated with bad or very bad self-rated health. In addition, lower education levels are associated with a higher likelihood of reporting poor health among community-dwelling older adults (Goins, et al., 2001). Moreover, food is considered one of the three basic needs of life (in addition to shelter and clothing); therefore food insecurity is an additional measure of socio-economic status. A study by Nord (2000) revealed that as one's income increased, food insecurity decreased, however, even the most vulnerable income category were considered to be food secure. In terms of rural-urban residence, food security was shown to be higher in metro households, at almost every income level (Nord).

Various lifestyle factors have been studied in relation to one's objective and subjective health, including physical activity and smoking status. Physical activity has many benefits to elderly persons' health status, and has been associated with better subjective health and well-being (Gregg, Kriska, Fox, & Cauly, 1996; Ruuskanen & Ruoppila, 1995; Stathi, Fox, & McKenna, 2002). Regardless of the benefits of physical activity, O'Brien Cousins (2000) found in a study of females, aged 70 and older, that two-thirds of the respondents were below healthy activity levels, and they generally believed that various activities and exercises had the potential to harm them. "Smoking is one of the major causes of morbidity and mortality in Canada" (Little, 2002, p. 9), and as expected, there is also a link between smoking and lower subjective health in late life. Elderly women who report having ever smoked are also more likely report having poor health (Gregg, et al., 1996).

Overall, it is assumed that elderly women's health will be affected by the various factors reviewed here. Specifically, older respondents are expected to report poorer

subjective and objective health, while those who are currently married, compared to single, are predicted to have better health. In addition, it is proposed that those who are a visible minority will have poorer subjective and objective health status, compared to non-visible minority older women. It is also expected that those who report higher levels of education, are food secure, and are physically active will have better health status. Conversely, those who currently smoke are anticipated to report poorer health.

2.5 Hypotheses

Based on the previous review of the theoretical and empirical research, five hypotheses have been developed and will be tested in this study. These are:

1) Lower levels of income will be associated with lower subjective and objective health among elderly women.
2) Lower levels of social and community support ("social capital") will be associated with lower subjective and objective health among elderly women.
3) It is expected that elderly rural women will have higher subjective health compared to urban women, but lower objective health.
4) The relationship between rural residence and objective health will be accounted for by income.
5) The relationship between rural residence and subjective health will be accounted for by social and community support.

3. METHODOLOGY

In this section, the data source employed to test the hypotheses, as well as the specific variables used, will be described. The methods used for filtering and weighting these data will be detailed, in addition to the manner in which variables are recoded. Descriptive statistics will also be provided for each variable utilized.

3.1 Data Source

In order to test the study's five hypotheses, secondary data from Statistics Canada's Canadian Community Health Survey, Cycle 1.1 (2000/2001) are used. The objective of the CCHS is to provide 'timely cross-sectional estimates of health determinants, health status, and health system utilization at a sub-provincial level" (Statistics Canada, 2003c, p. 1). It includes some common content asked of all respondents and optional content selected by the health regions. Therefore, not all data are available for the entire sample.

This cycle of the survey used an area frame (originally designed for the Canadian Labour Force Survey) as its primary sampling frame, and dwellings were then sampled using a multistage stratified cluster design (Beland, 2002). In addition, a random digit dialling frame was used in some health regions (Beland). Overall, this provides a random sample of 130,880 Canadians using both in person and computer-assisted telephone interviews (Beland). One household member of private dwellings was randomly selected for interviewing. Household residents, 12 years of age or older were eligible for selection, although, those persons living on Indian Reserves, Canadian Forces Bases, in institutions and some remote areas were excluded. "Selection of individual respondents

was designed to ensure over-representation of youths (12 to 19) and seniors (65 or older)" (Beland, p. 2). The resulting sample represents 98% of the Canadian population 12 or older (Beland). The response rate was 84.7% and 6.3% of interviews were obtained by proxy (Statistics Canada, 2002a). Proxy interviews were conducted with another household resident, on behalf of the respondent, if the respondent was unavailable after a number of attempts (Beland).

The confidential master microdata file was accessed at the British Columbia Interuniversity Research Data Centre, located at the University of British Columbia. In order to access these data, an application to the Social Sciences and Humanities Research Council was reviewed and approved by an adjudication committee. Subsequently, and after receiving security clearance, I was sworn in as an employee of Statistics Canada, to legally ensure protection of the confidentiality of survey respondents both during and after completion of the research project. These data are deemed confidential because the public-use microdata file (PUMF) has some variables (such as ethnicity and age) that were collapsed into larger categories to protect the confidentiality and personal information of respondents. Moreover, the rural-urban measure appropriate for this research is only available in the confidential file.

A sub-sample was selected from the original 130,880 respondents. Only the responses of those respondents who are female (n=70,366 respondents) and 65 years of age or older (n=24,233) are analyzed, resulting in 14,611 respondents. In addition, this sub-sample was further reduced because variables included in the hypotheses were not included in all health regions across Canada. The CCHS survey allowed for each health region to choose optional content to be included in the survey, in addition to the common content asked of all respondents. Of the optional content, social support was included in the survey in 86 out of 136 health regions across Canada. However, the

inclusion of the social support variables was deemed essential to the current study. Therefore, a sub-sample is created to include those respondents who are female, 65+, and asked the social support portion of the survey. This results in a final sample size of 8,684 respondents. The health regions excluded from this research are 37 of the 38 health regions of Ontario, all 10 health regions in Manitoba, and 3 of 11 in Saskatchewan. In spite of this limitation, the remaining cross-section of elderly women in Canada provides a unique opportunity to examine the research questions identified in this thesis.

A sampling weight coefficient created by Statistics Canada is used "in order for estimates produced from survey data to be representative of the covered population" (Statistics Canada, 2004a, pg.7). The sample is subsequently rescaled back to the original sub-sample size of 8,684 by using a multiplier, in order to conduct the analysis.

This research will include a number of health-related variables from the common content portion of the survey, in addition to the social support portion of the optional content. These include: self-rated health; chronic conditions; socio-demographic variables (age, marital status and visible minority status); rural-urban residence; socio-economic status (household income, educational level and food insecurity); social/community support (affection, emotional/informational, and positive social interaction and sense of belonging to local community); and lifestyle factors (physical activity index and smoking status).

3.2 Measurement

The CCHS data set provides us with a number of dependent and independent variables to test the five hypotheses. These variables are described in detail below.

3.2.1 Dependent Variables

Six dependent variables (see Table 3.1) are used to measure elderly women's health status. Of these six, there is one subjective health measure (self-perceived health) and five objective health measures (having any chronic condition; arthritis/rheumatism; high blood pressure; diabetes; and heart disease). For ease of interpretation, the six dependent variables are coded to predict lower subjective and objective health.

3.2.1.1 Subjective Health

Taken from the general health section of the CCHS survey, self-perceived health is obtained from the question posed: "In general would you say your health is (excellent, very good, good, fair or poor)?" These five possible responses are dichotomized, resulting in a category of those who rated their health more favourably ("excellent", "very good" and "good") and those who rated their health as "fair" or "poor". This is based on the need to have a dichotomous variable for logistic regression, and is a widely accepted method for grouping, as it assumes that those who rate their health as fair or poor are comparable to one another. More than a quarter (n=2,484, 28.6%) of the sample respondents rated their health as "fair" or "poor". For variables with a small number of missing cases (less than 5%), modal substitution is used to deal with these missing data, an appropriate method in these circumstances. The missing cases for self-perceived health (n=2, .02%) are recoded into the "excellent/very good/good" category. The ordering of this dichotomy (0 = excellent/v. good/good, 1 = fair/poor) is to ensure the prediction of fair/poor health, which compliments the prediction of having a number of chronic conditions.

3.2.1.2 Objective Health

Five objective health measures are derived from the chronic conditions section of the questionnaire. Respondents were asked: "We are interested in 'long-term conditions' that have lasted or are expected to last 6 months or more and that have been diagnosed by a health professional. Do you have: food allergies; other allergies; asthma; fibromyalgia; arthritis or rheumatism; back problems; high blood pressure; migraine headaches; chronic bronchitis; emphysema or chronic obstructive pulmonary disease; diabetes; epilepsy; heart disease; cancer; stomach or intestinal ulcers; effects of a stroke; urinary incontinence; bowel disorder; cataracts; glaucoma; thyroid condition; chronic fatigue syndrome; multiple chemical sensitivities; and any other long-term condition?" A derived variable is created in the data set to indicate whether the respondent reported having any chronic condition. The majority of respondents (n=7,653, 88.1%) reported having at least one chronic condition. Missing cases (n=128, 1.5%) were recoded as "yes".

In order to further examine the impact of chronic conditions, four common conditions considered to greatly impact elderly women's overall health status are also included in the analysis. These conditions are: arthritis/rheumatism; high blood pressure; diabetes; and heart disease. Nearly half of respondents report having arthritis/rheumatism (n=4,114, 47.4%) and high blood pressure (n= 3,628, 41.8%). In addition, a small minority reported being diagnosed with diabetes (n=974, 11.2%) and heart disease (n=1,527, 17.6%). To deal with the small number of missing cases for each of these variables, arthritis/rheumatism (n=14, .2%), high blood pressure (n=20, .2%), diabetes (n=18, .2%) and heart disease (n=14, .2%), all were recoded into the modal category of "no", as the majority of respondents reported not having these specific conditions.

Table 3.1: Dependent Variable Frequencies

Dependent Variables				
Subjective Health	**Excellent/Very Good/Good**		**Fair/Poor**	
	n	**%**	**n**	**%**
Self-perceived Health	6,200	71.4	2,484	28.6
Objective Health	**No**		**Yes**	
	n	**%**	**n**	**%**
Chronic Condition	1,032	11.9	7,653	88.1
Arthritis/Rheumatism	4,571	52.6	4,114	47.4
High Blood Pressure	5,056	58.2	3,628	41.8
Diabetes	7,711	88.8	974	11.2
Heart Disease	7,157	82.4	1,527	17.6

3.2.2 Independent Variables

Eleven independent variables are chosen for analysis and are organized into five categories/blocks for comparison purposes: socio-demographic; place of residence; socio-economic status; social/community support; and lifestyle factors. As will be shown, these variables have been recoded for a number of reasons. Firstly, variables are recoded to deal with both a small number of missing cases (recoded into mean for interval variables and mode for nominal and ordinal variables) and larger percentages of missing cases (greater than 5%), which are imputed into the mean category appropriate for each individual variable. Also, some variables have had categories grouped for comparison purposes. This is because some individual categories may have had a relatively small number of cases and analysis is such that it made sense to combine some of these categories (such as grouping those who are married and common-law). In addition, due to the restrictions inherent in the use of confidential data, some variables (particularly interval variables) have been recoded so that no one category has less than 5 cases. Thus, descriptive data with less than 5 cases in a cell can not be presented. However, when appropriate, the original (ungrouped) variable was used in multivariate

analysis (e.g. interval variables were used in interval form during logistic regression). The recoding strategy for each variable will be indicated below.

3.2.2.1 Socio-Demographic Characteristics

Age, marital status and visible minority status are used to measure elderly women's socio-demographic characteristics. Age is grouped for bivariate analysis into 5 year intervals: 65-69 (n=2,589, 29.8%); 70-74 (n=2,367, 27.3%); 75-79 (n=1,753, 20.2%); 80-84 (n=1,202, 13.8%); 85-89 (n=566, 6.5%); and 90 or older (n=209, 2.4%), but is used in interval form for multivariate analysis (mean = 74.2, median = 73, mode = 65, standard deviation = 6.80, range = 35). It is predicted that older age will be associated with poorer subjective and objective health.

Marital status has been recoded into a five category variable, combining those "married" with "common-law" unions. Nearly half of respondents are married or common-law (n=3,978, 45.8%, reference category), followed by those who were widowed (n=3,734, 43.0%), single (n=434, 5.0%), divorced (n=415, 4.8%), and separated (n=125, 1.4%). A small number of missing cases (n=12, .1%) are recoded as the modal category, "married/common-law" and the median category was "widowed". During bivariate analysis, a dichotomy of "not currently married" (n=4,708, 54.2%) and "married/common-law" (n=3,978, 45.8%) is employed. It is expected that those who are not currently married will have poorer health than their married/common-law counterparts.

Visible minority status is obtained by asking respondents the question: "People living in Canada come from many different cultural racial backgrounds. Are you: White; Chinese; South Asian; Black: Filipino; Latin American; Southeast Asian; Arab; West Asian; Japanese; Korean; Aboriginal; other?" Due to the small number of cases in

categories other than "White" and for data release reasons, these categories were recoded into "White" or "non-visible minority" persons (n=8,165, 94.0%, reference) and "visible minority" persons (n=520, 6.0%). Missing cases (n=101, 1.2%) are recoded into the modal category of "White". It is anticipated that those who identify themselves as a visible minority would have poorer health status than White persons.

3.2.2.2 Place of Residence

Rural-urban residence is measured by a five category continuum, based on the 1996 census data and Statistics Canada definitions. These are based on two geographic units: census metropolitan area (CMA), which has a population of 100,000 or more; and census agglomeration (CA), with a population between 10,000 and 99,999. Three of the categories combined represent the urban population of Canada and the other two make up rural Canada. For the purpose of this analysis they have been recoded to reflect increasing rurality.

The reference category, "urban core" (n=5,847, 67.3%) refers to the large area around which a CMA or CA is defined, and indicates a population of greater than 10,000 persons. "Urban fringe" (n=220, 2.5%) represents all small urban areas (a population of 1,000 to 9,999), in the CMA/CA boundary, but not adjacent to the urban core. Therefore, this municipality will have a high degree of integration with the urban core, because of the commuter flow. The third rural-urban category is "urban outside of a CMA/CA" (n=1,004, 11.6%), which represents the population which is not within the boundaries of a CMA/CA, but has a population of 1,000 to 9,999. "Rural fringe" (n=395, 4.6%) is the territory within a CMA/CA that is not classified as urban core or urban fringe (less than 1,000). Finally, "rural outside of a CMA/CA" (n=1,218, 14.0%) includes all territory outside of the previously defined geographic units. This includes places with a population less than 1,000 or population density with less than 400 persons/sq km. The

modal and median category is "urban core". It is proposed that that as rurality increases, the objective health status of the population will worsen, while those who reside in more rural regions will be more likely to report better subjective health, compared to those in the urban core.

3.2.2.3 Socio-Economic Status

Three variables are used to measure socio-economic status: total household income, education level, and food insecurity. In order to measure financial status, a series of questions were asked to obtain the "best estimate of the total income, before taxes and deductions, of all household members from all sources in the past 12 months." For analysis purposes, the ordinal variable is recoded with the following 5 groupings: "less than $15,000" (n=1,781, 20.5%); "$15,000-$29,999" (n=3,989, 45.9%); "$30,000-$49,999" (n=1,866, 21.5%); "$50,000-$79,999" (n=714, 8.2%); and "$80,000 or more" (n=334, 3.8%, reference category). These groups were chosen as the original household income variable was ordinal, with 11 categories, and thus subsequent groupings had to be based on those. In addition, these groups facilitate comparisons to other studies and are similar to the household income adequacy variable in the CCHS. The missing cases (n=1,419, 16.3%) are imputed into the mean category according to age group (65-74, 75-84 and 85+) by education level (Grade 8 or lower, some secondary or secondary graduate, and some post-secondary or higher). The modal and median category is "$15,000-$29,999".

Educational attainment of the respondent is measured by an ordinal variable, recoded into six categories. More than a third of respondents report an education level of "grade 8 or lower" (n=3,175, 36.6%), followed by those who had "some secondary" (n=1,674, 19.3%). "Secondary graduate" (n=1,293, 14.9%), "some post-secondary" (n=410, 4.7%), "trade or college certificate/diploma" (n=1,495, 17.2%), and "university

certificate/degree" (n=639, 7.4%, reference) are the remaining categories. A small number of missing cases (n=112, 1.3%) are recoded into the modal category, "grade 8 or lower", and the median category is "some secondary". The final measure of socio-economic status is "some food insecurity in the past 12 months", which reflects the possible impact income may have on nutrition, and consequently, one's health. This is derived from three questions asking: "In the past 12 months how often did you or anyone in your household: worry there would not be enough to eat; not have enough to eat because of a lack of money; and not eat the quality or variety of foods that you wanted to eat because of a lack of money?" The response set included often, sometimes and never, and if a response of often or sometimes was recorded for any of the three questions, that respondent would have experienced food insecurity. The derived variable is a dichotomy of "no" (n=8,061, 92.8%, reference), compared to "yes" (n=624, 7.2%). Missing cases (n=126, 1.4%) are recoded into the modal category, which was "no". It is expected that better income and education, and having no food insecurity, will be associated with better health.

3.2.2.4 Social/Community Support

Two variables have been selected to measure social capital: social support and sense of belonging to local community. Three of the four subscales in the social support section of the questionnaire, derived from the Medical Outcomes Social Support Survey (MOS scales), were chosen because of their relevance to this study: affection; emotional/informational support; and positive social interaction. The fourth subscale, tangible social support, is not included in the analysis, due to multicollinearity issues, which are discussed below, as well as being deemed inappropriate for testing the research questions. "Affection" was measured by three questions asking the respondent how often they had someone to: show them love; hug them; and love them and make

them feel wanted. This results in a scale ranging from 0 to 12, with higher scores indicating more affection. This scale shows a mean of 9.3, median category of 10 and modal category of 12 (n=3,834, 44.2%). Missing cases (n=575, 6.6%) are imputed into the mean category according to age group (65-74, 75-84 and 85+).

The "emotional/informational support" scale is derived from eight questions, indicating the frequency of having someone to: listen when need to talk; give advice about crisis; give information; confide in or talk to; who's advice they really want; to share most private worries and fears with; to turn to for suggestions of how to deal with a personal problems; and who understands their problems. The resulting scale has a range of 32, with a higher score indicating more support, which had a mean of 25.5, the median category is 26 and modal category is 32 (n=2,700, 31.1%). To deal with missing cases (n=692, 8.0%), they are recoded into the mean category based on age group. The final subscale used was "positive social interaction", which is based on four questions indicating whether or not someone was available to: have a good time with; get together for relaxation with; to do things to get their mind off things with; and do something enjoyable. This scale has a range of 16, with a mean score of 12.8. The median is 13 and the modal category is 16 (n=3,268, 37.6%). Missing cases (n=572, 6.6%) are recoded into mean categories based on age groups.

Before conducting multivariate analyses, a correlation matrix was examined to detect any correlations over a level of .70, which would indicate potential for multicollinearity. It revealed that the positive social interaction subscale is collinear with both the affection (r = .76) and emotional/informational scales (r = .77), and the affection and emotional/informational scales are approaching collinearity with each other (r = .68). Therefore, an additive scale was created by combining the three subscales into one scale to measure "social support". By combining the scales for one's perceived

availability of social interaction, affection and emotional/informational support, it was determined that there is good face validity, as the individual questions in each of these scales assess a level of emotional support. Combined, these scales assess the affection and positive appraisal concepts of social support, resulting in an appropriate measure of social capital. The combined scale has a range of 60, and the modal category is 60 (n=2300, 26.5%). The median is 50, with a mean score of 48.2. A reliability analysis for the total additive scale produced a Cronbach's alpha of .91, indicating that the scales have good inter-reliability.

Due to limitations in regards to releasing confidential data, cross-tabulations with this social support scale were not able to be released unless grouped. Consequently, a seven category variable was created for bivariate analysis, while the interval scale was used in multivariate analysis. The following categories were created: "less than 10" (n=76, .9%); "10 to 19" (n=243, 2.8%); "20 to 29" (n=416, n=4.8%); "30 to 39" (n=1,006, 11.6%); "40 to 49" (n=2,538, n=29.2%); "50 to 59" (n=2,106, 24.3%); and "60" (n=2,300, 26.5%). The median category is "50 to 59" and the modal category is "40 to 49".

Sense of belonging to local community is derived from the general health section of the questionnaire, which asks: "How would you describe your sense of belonging to your local community?" Respondents rated their sense of belonging as "very weak" (n=1,089, 12.5%), "somewhat weak" (n=2,528, 29.1%), "somewhat strong" (n=2,968, 34.2%) and "very strong" (n=2,100, 24.2%, reference category). The missing cases (n=612, 7.0%) are recoded into the mean category by age group. The median and modal category is "somewhat strong". It is predicted that those who have better social/community support will have better health.

3.2.2.5 Lifestyle Factors

Lifestyle context is measured by a physical activity index and smoking status. The physical activity index is based on the daily energy expenditure (kcal/kg/day) in the past 3 months, calculated by the duration and frequency of engaging in a number of leisure activities. The questionnaire asked respondents to indicate the frequency and duration of participation in 20 various activities: walking; gardening or yard work; swimming; bicycling; dancing; home exercise; ice hockey; ice skating; in-line skating; jogging or running; golfing; exercise class or aerobics; skiing or snowboarding; bowling; baseball or softball; tennis; weight-training; fishing; volleyball; basketball; and other. The reference category, "active" individuals (n=1,022, 11.8%), had an energy expenditure value of 3.0 or greater. "Moderate" individuals (n=1,607, 18.5%) had an expenditure value greater than or equal to 1.5, but less than 3.0, while "inactive" individuals' value was less than 1.5 (n=6,056, 69.7%). Missing cases (n=554, 6.4%) are recoded into the mean category by age group, and "inactive" is the median and modal category.

To determine smoking status, a series of questions were asked about current and former smoking behaviour. These include: have you smoked a total of 100 or more cigarettes (about 4 packs); have you ever smoked a whole cigarette; at the present time do you smoke cigarettes daily, occasionally or not at all; and have you ever smoked cigarettes daily? A derived categorical variable was created to indicate smoking status, with the following categories: "daily" (n=838, 9.6%); "occasional" (n=160, 1.8%), which combined those who are an occasional smoker but former daily smoker, and who were always an occasional smoker; "former daily" (n=2,308, 26.6%); "former occasional" (n=1,167, 13.4%); and the reference category, "never smoked" (n=4,212, 48.5%). Since health conditions associated with smoking can be found even after cessation of smoking has occurred, it is important to assess past smoking behaviour, as well as current. A

small number of missing cases (n=23, .3%) are recoded into the modal category, "never", and the median category is "former occasional". For the purpose of bivariate analysis, a dichotomy (current smoker and not current smoker) was created. It is anticipated that those who are active and who have never smoked will have better health status when compared to the other categories.

4. DATA ANALYSIS

This chapter presents the results from the bivariate and multivariate analyses. To perform these analyses, the CCHS data were analyzed by using the SPSS for Windows, Version 11.5 statistical package. Bivariate analysis was performed using cross-tabulations to ascertain whether any statistically significant associations exist. Logistic regression was conducted in order to determine the odds of having fair/poor self-rated health, any chronic condition, and four specific chronic conditions, while controlling for the independent variables entered into the model.

4.1 Bivariate Analysis

Cross-tabulations are conducted in order to test the hypotheses at the bivariate level, prior to multivariate analysis. This technique examines statistically significant associations between the six dependent variables and the 11 independent variables, and will be followed by multivariate analyses. It should be restated that subjective health has been coded so as to predict fair/poor health, which compliments the prediction of having chronic conditions.

The statistic chi square will be used for cross-tabulations with a nominal level variable. At the ordinal level, with equal number of categories (in both the dependent and independent variables), tau b will employed, and tau c for those with an uneven number of categories in the dependent and independent variables. Pearson's r will be used when both variables are interval or when one variable is interval and the other is a binary or dichotomous variable. It should be noted that, give the large sample size and associated level of statistical power, very weak correlations may be found to be

statistically significant. Our correspondence rule is that any correlation below .05, regardless of significance level will be deemed not substantively important.

4.1.1 Health Status and Income – Hypothesis 1

As shown in Table 4.1, weak, negative relationships were found between household income and reporting fair/poor self-perceived health (tau c=-.10, p≤.001), any chronic condition (tau c=-.02, p<.05), arthritis/rheumatism (tau c=-.05, p≤.001), high blood pressure (tau c=-.06, p≤.001), diabetes (tau c=-.06, p≤.001) and heart disease (tau c=-.04, p≤.001). While all of these bivariate associations support Hypothesis 1, it should be noted that they range from weak to very weak. In particular, the associations for any chronic conditions and heart disease are below a correlation of .05, considered to be too weak to be substantively important.

Table 4.1: Bivariate Analysis – Income

Health Status	Income
	Household Income
	tau c
Self-Perceived Health	-.10***
Any Chronic Condition	-.02*
Arthritis/Rheumatism	-.05***
High Blood Pressure	-.06***
Diabetes	-.06***
Heart Disease	-.04***

* p=≤.05; ** p=≤.01; *** p=≤.001

4.1.2 Health Status and Social/Community Support – Hypothesis 2

Inverse associations are predicted between subjective and objective health outcomes and social capital measures, as it is assumed that lower levels of social/community support will be associated with poorer health status (see Table 4.2). The social support variable used for bivariate analysis was created from a combination of the affection, emotional/informational support and positive social interaction scales,

which was then recoded into seven categories. Fair/poor self-rated health is shown to have a weak, negative association with social support (tau c=-.13, p≤.001). Very weak, negative associations with social support were also observed for having any chronic condition (tau c=-.02, p≤.01), arthritis/rheumatism (tau c=-.03, p≤.05), high blood pressure (tau c=-.04, p≤.001), and heart disease (tau c=-.03, p≤.01), but are considered not substantively important. In terms of sense of belonging to the local community, a weak, negative association was revealed with fair/poor self-rated health (tau c=-.13, p≤.001). Also, very weak, negative associations with community support were uncovered for having any chronic condition (tau c=-.02, p≤.01), and diabetes (tau c=-.02, p≤.05), but are deemed too weak to be substantively important. Thus, Hypothesis 2 is partially supported.

Table 4.2: Bivariate Analysis – Social/Community Support

Health Status	Social/Community Support	
	Social Support (7 categories)	Community Belonging
	tau c	**tau c**
Self-Perceived Health	-.13***	-.13***
Any Chronic Condition	-.02**	-.02**
Arthritis/Rheumatism	-.03*	-.01
High Blood Pressure	-.04***	-.02
Diabetes	0	-.02*
Heart Disease	-.03**	-.02

* p=≤.05; ** p=≤.01; *** p=≤.001

4.1.3 Health Status and Place of Residence – Hypothesis 3

It is expected that rural-urban residence will be positively associated with objective health, but that an inverse association will be observed between place of residence and subjective health. Yet, only one significant association is shown between rural-urban residence and the six health status variables at the bivariate level (see Table 4.3). A very weak association (tau c=.02, p≤.001) between diabetes and rural-urban

residence was uncovered, but deemed not large enough to be substantively important. Thus, we do not support Hypothesis 3 at the bivariate level, and Hypotheses 4 and 5 need to be examined in a multivariate analysis.

Table 4.3: Bivariate Analysis – Place of Residence

Health Status	Place of Residence
	Rural-Urban Residence
	tau c
Self-Perceived Health	-.01
Any Chronic Condition	.01
Arthritis/Rheumatism	-.01
High Blood Pressure	.02
Diabetes	.02***
Heart Disease	.01

* p=≤.05; ** p=≤.01; *** p=≤.001

4.2 Multivariate Analysis

Logistic regression is a statistical technique used for dichotomous dependent variables with skewed distribution (Menard, 1995 [as cited in Mitchell, 2003]; Morgan & Teachman, 1988 [as cited in Mitchell, 2003]), and allows us to further test our hypotheses. The direction and strength of any associations, along with the level of statistical significance, are presented for each independent variable, each block and the overall model. In addition, possible interaction effects among the key variables (income, residency and social/community support) are examined. This analysis identifies the effect that each independent variable or covariate, particularly income level and rural-urban residency, has on each dependent variable.

Dichotomous dependent variables are used, coded as 0 and 1. For instance, having good/very good/excellent health is coded as 0 and fair/poor health is 1, while having not having a chronic condition is coded as 0 and having any chronic condition is

1. This ensures that all analyses predict lower health status (i.e. fair/poor subjective health and the presence of chronic conditions). The equation of the log is: log (π/1- π) = $\alpha + \beta_1X_1 + \beta_2X_2 + \ldots + \beta_KX_K$, and the term ($\pi$/1- π) is the *odds*, which is the ratio of probability, representing the probability of having fair/poor health (or a chronic condition, etc.), divided by the probability of not having that fair/poor health (DeMaris, 1995). Logistic Regression provides the Beta coefficient, which is the log change in Y (the dependent variable) for a unit change in X (the independent variable), controlling for all other independent variables (DeMaris). Due to the difficulties in interpreting the log change, the exponential of the Beta is also provided, which gives an odds ratio. The odds ratio is the estimated odds of a having each of the health conditions examined here, for respondents who are a unit apart on X_K (continuous variables), or the difference between membership in one category, compared to the reference (categorical variables), after statistically controlling for all other predicators in the model (DeMaris). A positive relationship will result in an odds ratio which may range from 1 to infinity, while negative (or inverse) associations result in an odds ratio with a range between 0 and 1.

A hierarchical model was developed from the 11 independent variables into five sequential blocks that comprise specific domains based on the literature (see Table 4.4). The first block is socio-demographic characteristics, followed by place of residence, socio-economic status, social/community support, and lifestyle factors. The ordering of these blocks is based upon their causal or sequential ordering. For instance, rural-urban residence is entered before socio-economic status, social/community support and lifestyle, as it is assumed that place of residence will affect one's SES, social capital and lifestyle. However, it is entered after socio-demographic characteristics, because place of residence is unlikely to effect characteristics such as age, marital status and visible minority status.

Table 4.4: Logistic Regression – Hierarchical Model

Block 1	Block 2	Block 3	Block 4	Block 5
Socio-Demographic	**Place of Residence**	**Socio-Economic Status**	**Social/ Community Support**	**Lifestyle Factors**
1. Age - 65 to 101 2. Marital Status - Single - Divorced - Separated - Widowed - Married/ Common Law* 3. Visible Minority Status - White* - Visible Minority	1. Rural-Urban Residence - Urban Core* - Urban Fringe - Urban outside CMA/CA - Rural Fringe - Rural outside CMA/CA	1. Household Income - < $15,000 - $15,000- $29,999 - $30,000-$49,999 - $50,000-$79,999 - $80,000 or more* 2. Education Level - Grade 8 or less - Some Secondary - Secondary Graduate - Some Post Secondary - Trade or College Certificate/Diploma - University Degree* 3. Food Insecurity - No* - Yes	1. Social Support Scale - 0 to 60 2. Community Belonging - Very Weak - Somewhat Weak - Somewhat Strong - Very Strong*	1. Physical Activity Index - Inactive - Moderate - Active* 2. Smoking Status - Daily - Occasional - Former Daily - Former Occasional - Never*

* Indicates reference category selected for nominal and ordinal variables

Tables present the model chi square and statistical significance, for each individual model or the overall model. Beta coefficients, standard error, significance level and odds ratio (for statistically significant associations) for each independent variable are also included. In order to test Hypotheses 3 and 4, a correspondence rule is employed. A change of 10% or greater in the odds ratio for place of residence from one block to another will be considered substantively important. This analytic strategy allowed for testing Hypotheses 4 and 5, since we can examine the influence of the SES and social capital blocks on the rural-urban variables that is entered prior to these. Hypothesis 4 states that the relationship between rural residence and objective health will be accounted for by income. If we find that an association between place of residence and objective health status, observed prior to the inclusion of the SES block,

is no longer found or is substantively weaker when these variables are added to the model, then Hypothesis 4 is supported. Hypothesis 5 states that the relationship between rural residence and subjective health will be accounted for by social and community support. If an association is observed between self-rated health and rural-urban residence, but is no longer found or is weaker with the inclusion of the social capital measures, then Hypothesis 5 is supported.

The analyses of the subjective and objective measures of health using this analytic strategy showed that rural-urban residence affects certain health outcomes, but not others (see Table 4.5). Specifically, the likelihood of having fair/poor subjective health is higher among elderly women who reside in the urban fringe of a CMA/CA than those in the urban core (odds ratio = 1.75), when controlling for all other variables in the model. However, the likelihood of reporting any chronic condition (odds ratio = 1.30), high blood pressure (odds ratio = 1.13) and diabetes (odds ratio = 1.46) is higher among those who reside in the rural area outside of a CMA/CA, while the likelihood of having heart disease is higher among those in the rural fringe (odds ratio = 1.41), compared to those in the urban core. This indicates partial support for Hypothesis 3.

Moreover, when associations are found, none of the other variables entered in subsequent blocks influence the associations, including income and the measures of social capital. Hypothesis 4 is not supported, as the inclusion of household income does not impact the associations between place of residence and objective health. Yet, partial support is found for Hypothesis 5, since when controlling for social/community support, a previous association between having fair/poor health and residence in an urban area outside of a CMA/CA (odds ratio = .82) is no longer statistically significant. This indicates that social capital accounts for that finding that the odds of perceiving their health as fair/poor is lower for elderly women in small urban centres, compared to those

who reside in the urban core. However, the relationship between self-perceived health and residence in the urban fringe is strengthened with the inclusion of the social capital measures (odds ratio = 1.58).

Hypothesis 1 is supported, since the likelihood of having fair/poor self-perceived health, high blood pressure, diabetes and heart disease are associated with lower levels of household income. Support is also found for Hypothesis 2, as the odds of having fair/poor self-rated health (odds ratio = .98) and high blood pressure (odds ratio = .99) decrease for each unit change in social support. Also, having lower self-rated health, any chronic condition, hypertension and diabetes is associated with having lower self-perceived community belonging self-rated health.

The full analysis showing all five hierarchical models including all independent variables is provided in Appendix 7.1. Table 4.5 provides a summary of the main associations observed in the final model of logistic regression analysis, for each of the health status measures. Although Hypotheses 4 and 5 are not supported as expected, these findings suggest that there may be different predictors of health status for rural and urban older women. Therefore, it was decided to examine these differences in detailed comparative analyses to further explore the research questions presented in this study.

Table 4.5: Logistic Regression – Summary Table

	Fair/ Poor Health	Chronic Condition	Arthritis	High Blood Pressure	Diabetes	Heart Disease
	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Rural-Urban Residence						
Urban Core	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Urban Fringe	1.75***	------	------	------	------	------
Urban outside CMA/CA	------	------	------	------	------	------
Rural Fringe	------	------	------	------	------	1.41**
Rural outside CMA/CA	------	1.30*	------	1.13*	1.46***	------
Household Income						
$80,000 or more	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Less than$15,000	1.50**	------	------	1.56***	2.89***	1.47*
$15,000-$29,999	------	------	------	1.51***	2.76***	------
$30,000-$49,999	------	------	------	1.47**	2.14**	1.45*
$50,000-$79,999	------	------	------	------	------	1.55*
Social Support	.98***	------	------	.99*	------	------
Community Belonging						
Very Strong	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Very Weak	1.79***	1.35*	------	1.17*	1.37**	------
Somewhat Weak	1.34***	1.37***	------	------	------	------
Somewhat Strong	------	1.45***	------	------	------	------

* p=≤.05; ** p=≤.01; *** p=≤.001

4.2.1 Comparative Analysis – Rural/Urban Residence

As previously discussed, a rural-urban difference in terms of health status is observed during multivariate analyses, even after controlling for socio-economic status and social/community support. Although there is little support for Hypothesis 4 and 5, it was decided to examine possible interactions between rural-urban residence and the other covariates in the model. By comparing the associations for the rural and urban sub-samples to one another, it is hoped that further rural-urban differences will be identified. It is expected that SES and social capital will be stronger predictors of health for rural residents, compared to those in urban areas, as rural areas typically have lower SES but higher levels of social capital. By comparing separate analyses of rural and urban dwelling elderly women, the role that the covariates play in the prediction of health status for these women will hopefully be identified. Each of the six regression equations

are repeated among those who reside in rural areas (rural fringe and rural outside a CMA/CA, n = 1,613) and urban areas (urban core, urban fringe and urban outside a CMA/CA, n = 7,071). The same hierarchical model previously employed is used again, although, only the results from the final block (or simultaneous entry) are presented here. Again, it is noted that subjective health has been coded so as to predict fair/poor health, to compliment the prediction of having chronic conditions.

4.2.1.1 Self-Perceived Health

As Table 4.6 indicates, a greater number of the covariates in the model are associated with having fair/poor self-rated health, when examining only urban residents, as compared to those who reside in rural areas. The analysis of rural residents results in a statistically significant model chi square (179.57, df = 26, $p \leq .001$), as does the analysis for urban residents (model chi square = 706.10, df = 26, $p \leq .001$). This suggests that the model for the urban sample is stronger.

For rural residents, the likelihood of having fair/poor self-rated health is increased by a factor of 1.05 for each unit change in age, when controlling for the other variables in the model. Conversely, the odds of having fair/poor health are decreased by a factor of .64 for those who are widowed, compared to those who are married/common-law. In terms of educational attainment, the likelihood of reporting fair/poor health is increased among those with an education of grade 8 or lower (odds ratio = 2.76) and some secondary (odds ratio = 2.25), among rural residents. The odds of having fair/poor health are decreased by a factor of .98, for each unit change in the social support scale. Finally, in terms of lifestyle factors, those who are more likely to report fair/poor health are those who are inactive, compared to active (odds ratio = 2.90), daily smokers, compared to those who never smoked (odds ratio = 1.54), and former daily smokers (odds ratio = 1.51). All other comparisons do not result in statistically significant

relationships for rural residents, including visible minority status, most of the socio-economic status comparisons and community belonging.

Conversely, when examining the associations for urban residents, many more statistically significant relationships are observed between the covariates and self-rated health. The odds ratio for fair/poor self-rated health is increased by a factor of 1.03 for each unit change in age, but is decreased for those who are divorced (odds ratio = .59) and widowed (odds ratio = .79), compared to married/common-law persons. Among urban residents, the likelihood of having fair/poor health is higher for visible minority respondents (odds ratio = 1.42), compared to White respondents, and for those with a household income of less than $15,000, compared to $80,000 or more (odds ratio = 1.54).

Moreover, a higher odds ratio for reporting fair/poor health is observed among those who have lower levels of education, compared to a university degree: grade 8 or lower (odds ratio = 3.30); some secondary (odds ratio = 2.63); secondary graduate (odds ratio = 2.31); some post-secondary (odds ratio = 2.60); and trade/college certificate or diploma (odds ratio = 2.23). The likelihood of reporting fair/poor health is increased for those with some food insecurity (odds ratio = 1.42), while having fair/poor health is associated with a higher social support score (odds ratio = .98). Also, the likelihood of having fair/poor health is increased for those with very weak (odds ratio = 1.97) and somewhat weak (odds ratio = 1.38) ties to the local community, compared to very strong ties.

The odds of reporting fair/poor health are almost two times as likely for inactive persons (odds ratio = 2.99) and moderately active persons (odds ratio = 1.53), compared to active individuals. Finally, reporting fair/poor health is higher among those who are former daily smokers (odds ratio = 1.22) than those who have never smoked,

while former occasional smokers are less likely (odds ratio = .84), among urban respondents.

Overall, many of the relationships observed in the original multivariate analysis of self-rated health are not observed, or are weaker, when examining only rural-dwelling respondents. However, many of the findings are replicated among urban residents. In particular, the associations between self-rated health and household income, education, food insecurity, and community support are not found among rural respondents. These social determinants of health explain self-perceived health status much better for urban residents, than for their rural counterparts. Thus, there are other factors not measured here which evidently influence rural subjective health.

Table 4.6: Comparative Analysis – Self-Perceived Health

	Rural			Urban		
Model Chi Square	x^2=179.57, df= 26***			x^2=706.10, df=26***		
	B	**S.E.**	**OR**	**B**	**S.E.**	**OR**
Age	.05***	.01	1.05	.03***	.004	1.03
Marital Status						
Married			**1.00**			**1.00**
Single	-.58	.31	------	-.27	.14	------
Divorced	.50	.40	------	-.53***	.15	.59
Separated	.36	.57	------	-.01	.22	------
Widowed	-.45**	.15	.64	-.23***	.07	.79
Visible Minority Status	-.26	.38	------	.35***	.11	1.42
Household Income						
$80,000 or more			**1.00**			**1.00**
Less than $15,000	.22	.46	------	.43**	.17	1.54
$15,000-$29,999	-.20	.44	------	.29	.16	------
$30,000-$49,999	-.19	.46	------	.23	.16	------
$50,000-$79,999	-.38	.50	------	.29	.18	------
Education						
University Degree			**1.00**			**1.00**
Grade 8 or lower	1.01**	.34	2.76	1.19***	.15	3.30
Some Secondary	.81•	.35	2.25	.97***	.16	2.63
Secondary Grad	.63	.38	------	.84***	.16	2.31
Some Post-Sec.	.42	.45	------	.96***	.19	2.60
Trade/College Dip.	.17	.37	------	.80***	.16	2.23
Food Insecurity	.16	.24	------	.35***	.10	1.42
Social Support Scale	-.02***	.01	.98	-.02***	.002	.98
Community Belonging						
Very Strong			**1.00**			**1.00**
Very Weak	.02	.22	------	.68***	.95	1.97
Somewhat Weak	.23	.16	------	.32***	.08	1.38
Somewhat Strong	-.10	.15	------	.08	.08	------
Physical Activity Index						
Active			**1.00**			**1.00**
Inactive	1.07***	.24	2.90	1.10***	.12	2.99
Moderate	.21	.29	------	.42**	.13	1.53
Smoking Status						
Never Smoked			**1.00**			**1.00**
Daily	.43*	.21	1.54	.17	.10	------
Occasional	.11	.52	------	.13	.20	------
Former Daily	.41**	.15	1.51	.20**	.07	1.22
Former Occasional	.07	.19	------	-.18*	.09	.84

• p=≤.05; ** p=≤.01; *** p=≤.001

4.2.1.2 Any Chronic Condition

Table 4.7 presents the analysis comparing rural and urban residents. Here we observe very different relationships with respect to having a chronic condition and the

covariates of interest. Overall, the models for rural (model chi square = 52.22, df = 26, $p \leq .01$) and urban residents (model chi square = 206.26, df = 26, $p \leq .001$) are statistically significant. However, again the urban model is stronger.

Among rural residents, a lower likelihood of having a chronic condition is observed for those who are widowed compared to their married/common-law counterparts (odds ratio = .68). In terms of educational attainment, the odds ratio for having a chronic condition is lower among those who have an education of grade 8 or lower, than those with a university degree (odds ratio = .37). In addition, higher odds of having a chronic condition are found for those who are inactive (odds ratio = 2.57) or moderately active (odds ratio = 1.95), compared to active individuals. Finally, the likelihood of having any chronic condition is increased for those who are former daily smokers than those who have never smoked, among rural-dwelling persons (odds ratio = 1.60). All other comparisons examined do not result in statistically significant associations with having any chronic condition. In particular, the relationships observed in the original multivariate analysis (with both rural and urban dwelling respondents) between having a chronic condition and age, single marital status, food insecurity and community belonging, are no longer statistically significant among rural respondents. Yet, the associations with a grade 8 or lower education and physical activity index become stronger.

When examining only urban residents, the multivariate analysis results in very different associations with having a chronic condition, than those found for rural residents. The likelihood of having a chronic condition is increased by a factor of 1.05 for each unit change in age. The odds of having a chronic condition are higher for those who are single, compared to married/common-law (odds ratio = 1.74). In terms of socio-economic status, having any chronic condition is more likely among those who have an

income of $30,000 to $49,999, than those with an income of $80,000 or more (odds ratio = 1.46), and a higher odds ratio of having a chronic condition is observed for those who have experienced food insecurity than those who are food secure (odds ratio = 1.97). Among urban-dwelling respondents, increased odds of having a chronic condition is found for those with a very weak (odds ratio = 1.31), somewhat weak (odds ratio = 1.40) and somewhat strong (odds ratio = 1.55) sense of belonging to the local community, compared to very strong. A higher likelihood of having a chronic condition is observed for those who are inactive, compared to active (odds ratio = 1.33). Interestingly, among urban respondents only, the odds ratio of having a chronic condition is lower for those who are current daily smokers, compared to those who have never smoked, (odds ratio = .77), while it is higher for those who are former daily smokers (odds ratio = 1.71).

Overall, many of the observations in the original logistic regression analysis are replicated among urban dwelling residents only. However, relationships with any chronic condition and one of the household income comparisons and daily smoking status appeared, while the associations with a grade 8 or lower education and moderate activity level are no longer statistically significant. In addition, household income, food insecurity and community support predict having any chronic condition for urban residents, but not for rural elderly women.

Table 4.7: Comparative Analysis – Chronic Condition

	Rural			Urban		
Model Chi Square	x^2=52.22, df= 26**			x^2=206.26, df=26***		
	B	**S.E.**	**OR**	**B**	**S.E.**	**OR**
Age	.03	.02	------	.05***	.01	1.05
Marital Status						
Married			**1.00**			**1.00**
Single	.29	.45	------	.55**	.21	1.74
Divorced	.27	.73	------	.18	.18	------
Separated	18.93	9943	------	.06	.30	------
Widowed	-.39*	.54	.68	.24**	.09	------
Visible Minority Status	.09	.54	------	-.21	.14	------
Household Income						
$80,000 or more			**1.00**			**1.00**
Less than $15,000	-.07	.78	------	.20	.20	------
$15,000-$29,999	-.49	.76	------	.16	.18	------
$30,000-$49,999	-.69	.77	------	.38*	.18	1.46
$50,000-$79,999	-.76	.80	------	.22	.20	------
Education						
University Degree			**1.00**			**1.00**
Grade 8 or lower	-1.00*	.44	.37	-.23	.16	------
Some Secondary	-.69	.45	------	.05	.17	------
Secondary Grad	-.75	.48	------	-.09	.17	------
Some Post-Sec.	-.89	.56	------	-.02	.22	------
Trade/College Dip.	-.18	.48	------	.12	.16	------
Food Insecurity	.11	.35	------	.68***	.18	1.97
Social Support Scale	.01	.01	------	.00	.00	------
Community Belonging						
Very Strong			**1.00**			**1.00**
Very Weak	.53	.35	------	.27*	.13	1.31
Somewhat Weak	.25	.23	------	.34***	.10	1.40
Somewhat Strong	.05	.20	------	.44***	.10	1.55
Physical Activity Index						
Active			**1.00**			**1.00**
Inactive	.94***	.22	2.57	.28*	.11	1.33
Moderate	.67*	.28	1.95	.18	.13	------
Smoking Status						
Never Smoked			**1.00**			**1.00**
Daily	.20	.30	------	-.26*	.12	.77
Occasional	1.01	1.06	------	-.19	.25	------
Former Daily	.47*	.22	1.60	.54***	.10	1.71
Former Occasional	.20	.26	------	.12	.12	------

* p=≤.05; ** p=≤.01; *** p=≤.001

4.2.1.3 Arthritis/Rheumatism

This next regression analysed uses the dependent variable "has Arthritis/Rheumatism" (see Table 4.8), and when examining only rural respondents, the

overall model chi square is statistically significant (54.03, df = 26, $p \leq .001$), as it is for urban respondents (model chi square = 202.66, df = 26, $p \leq .001$), indicating that the urban model is stronger.

For rural residents, the likelihood of having arthritis/rheumatism is increased by a factor of 1.03 for each unit change in age. The odds of having arthritis among those divorced is more than two times what it is for those who are married or common-law (odds ratio = 2.15). As higher odds ratio of having arthritis/rheumatism is observed for rural residents who are former daily (odds ratio = 1.33) and former occasional (odds ratio = 1.61) smokers, than those who have never smoked. However, the associations previously observed between having arthritis/rheumatism and single marital status, food insecurity, inactive physical activity and occasional smokers are no longer found when examining only those respondents who reside in rural areas.

Conversely, when analysing only urban-dwelling respondents, having arthritis/rheumatism is associated with higher age (odds ratio = 1.03). A lower likelihood of having arthritis is found for those who are single compare to those who are married those who are married (odds ratio = .75), and the odds of having arthritis is higher for those with a trade school or college diploma, compared to respondents with a university degree (odds ratio = 1.31). Among urban-dwelling persons, a diagnosis of arthritis/rheumatism is more likely for those with some food insecurity, compared with the food secure (odds ratio = 1.38). An increased odds of having arthritis is observed among inactive individuals, than active persons (odds ratio = 1.36), and those who are occasional (odds ratio = 1.51) and former daily smokers (odds ratio = 1.32), versus those who never smoked. Overall, the observations in the original analysis are replicated among urban dwelling respondents, except the association with a trade/college diploma, which appears in the urban only analysis. In terms of the social

determinants of health, food insecurity predicts having arthritis for urban respondents, but not their rural counterparts.

Table 4.8: Comparative Analysis – Arthritis/Rheumatism

	Rural			Urban		
Model Chi Square	x^2=54.03, df= 26***			x^2=202.66, df=26***		
	B	**S.E.**	**OR**	**B**	**S.E.**	**OR**
Age	.03***	.01	1.03	.03***	.004	1.03
Marital Status						
Married			**1.00**			**1.00**
Single	-.16	.26	------	-.28*	.12	.75
Divorced	.76*	.38	2.15	-.04	.12	------
Separated	-.001	.53	------	.11	.20	------
Widowed	-.15	.13	------	.08	.06	------
Visible Minority Status	-.20	.33	------	-.13	.10	------
Household Income						
$80,000 or more			**1.00**			**1.00**
Less than $15,000	.08	.37	------	.02	.14	------
$15,000-$29,999	-.09	.36	------	-.07	.13	------
$30,000-$49,999	-.04	.36	------	-.12	.13	------
$50,000-$79,999	-.33	.40	------	-.08	.15	------
Education						
University Degree			**1.00**			**1.00**
Grade 8 or lower	-.29	.24	------	-.03	.10	------
Some Secondary	.06	.25	------	-.01	.11	------
Secondary Grad	-.46	.27	------	.04	.11	------
Some Post-Sec.	-.12	.34	------	-.24	.14	------
Trade/College Dip.	-.35	.25	------	.27**	.11	1.31
Food Insecurity	.38	.21	------	.32***	.10	1.38
Social Support Scale	.00	.01	------	-.002	.002	------
Community Belonging						
Very Strong			**1.00**			**1.00**
Very Weak	-.02	.19	------	-.02	.09	------
Somewhat Weak	-.08	.14	------	-.01	.84	------
Somewhat Strong	-.11	.13	------	-.07	.07	------
Physical Activity Index						
Active			**1.00**			**1.00**
Inactive	.19	.17	------	.31***	.08	1.36
Moderate	-.01	.20	------	.04	.09	------
Smoking Status						
Never Smoked			**1.00**			**1.00**
Daily	.22	.19	------	-.17	.09	------
Occasional	-.03	.45	------	.41*	.18	1.51
Former Daily	.28*	.13	1.33	.28***	.06	1.32
Former Occasional	.48**	.16	1.61	.05	.08	------

* p=≤.05; ** p=≤.01; *** p=≤.001

4.2.1.4 High Blood Pressure

As Table 4.9 indicates, more of the covariates in the model including only urban residents are associated with having high blood pressure, compared to those who reside in rural areas. The analysis of rural residents results in a statistically significant model chi square (68.60, df = 26, $p \leq .001$), as it does for the urban residents (model chi square = 170.11, df = 26, $p \leq .001$), suggesting that the urban model is stronger.

Among rural respondents, the likelihood of having hypertension is lower among those who are visible minorities, compared to non-visible minority respondents (odds ratio = .26). In terms of educational attainment, higher odds of having high blood pressure are observed for those who have some post-secondary education, compared with a university degree (odds ratio = 2.41). Having hypertension is more than two times as likely for those who are physically inactive (odds ratio = 2.36), as those who are active, as well as those who are moderately active (odds ratio = 2.16).

Conversely, when examining the associations for urban residents only, many more statistically significant relationships are observed between the covariates and self-rated health. Urban respondents have a lower likelihood of having high blood pressure if they are single (odds ratio = .73) and divorced (odds ratio = .74), compared to those who are married or common-law. An increased odds of reporting a diagnosis of hypertension is observed for those who have lower household incomes than those with incomes of $80,000 or more: less than $15,000 (odds ratio = 1.69); $15,000 to $29,999 (odds ratio = 1.66); and $30,000 to $49,999 (odds ratio = 1.58). The likelihood of having high blood pressure is higher for those persons with an education of grade 8 or lower (odds ratio = 1.36) and some secondary schooling (odds ratio = 1.41), than those with a university degree, and the likelihood of reporting a diagnosis of hypertension increases by a factor of .99 for each unit change in the social support scale. The odds ratio for having high

blood pressure is higher among those who are physically inactive (odds ratio = 1.52) and moderately active (odds ratio = 1.27) than those with an active lifestyle. Among urban respondents, a lower odds ratio is observed for having a diagnosis of hypertension is observed among those who are daily (odds ratio = .70) and occasional smokers (odds ratio = .48) than those who never smoked, while those who are former occasional smokers have higher odds (odds ratio = 1.17).

Overall, many of the relationships observed in the original multivariate analysis of high blood pressure are not observed, when examining only rural-dwelling respondents. And while the relationship with activity level is stronger, the association between high blood pressure and visible minority status only appears in the rural analysis. However, most of the analysis is replicated among urban residents. In particular, the associations between hypertension and household income, education, and social support are not found among rural respondents, but are shown for urban-dwelling persons.

Table 4.9: Comparative Analysis – High Blood Pressure

	Rural			Urban		
Model Chi Square	x^2=68.60, df= 26***			x^2=170.11, df=26***		
	B	**S.E.**	**OR**	**B**	**S.E.**	**OR**
Age	.02	.01	------	.002	.004	------
Marital Status						
Married			**1.00**			**1.00**
Single	.001	.26	------	-.31**	.12	.73
Divorced	.45	.37	------	-.30*	.12	.74
Separated	.26	.54	------	-.23	.21	------
Widowed	.17	.13	------	.02	.06	------
Visible Minority Status	-1.36***	.41	.26	.02	.10	------
Household Income						
$80,000 or more			**1.00**			**1.00**
Less than $15,000	-.06	.38	------	.62***	.15	1.69
$15,000-$29,999	-.11	.36	------	.51***	.15	1.66
$30,000-$49,999	-.10	.37	------	.46***	.14	1.58
$50,000-$79,999	.06	.40	------	.27	.15	------
Education						
University Degree			**1.00**			**1.00**
Grade 8 or lower	.34	.25	------	.31**	.11	1.36
Some Secondary	.34	.26	------	.25**	.11	1.41
Secondary Grad	.39	.28	------	.22	.11	------
Some Post-Sec.	.88*	.22	2.41	.09	.15	------
Trade/College Dip.	.07	.26	------	.16	.11	------
Food Insecurity	-.03	.22	------	-.10	.10	------
Social Support Scale	.003	.01	------	-.01**	.002	.99
Community Belonging						
Very Strong			**1.00**			**1.00**
Very Weak	.11	.19	------	.16	.09	------
Somewhat Weak	-.11	.14	------	.10	.07	------
Somewhat Strong	.05	.13	------	.09	.07	------
Physical Activity Index						
Active			**1.00**			**1.00**
Inactive	.86***	.18	2.36	.42***	.08	1.52
Moderate	.77***	.21	2.16	.24*	.10	1.27
Smoking Status						
Never Smoked			**1.00**			**1.00**
Daily	-.22	.19	------	-.36***	.09	.70
Occasional	.04	.45	------	-.73***	.20	.48
Former Daily	.01	.13	------	.06	.06	------
Former Occasional	-.05	.16	------	.15*	.08	1.17

* p=≤.05; ** p=≤.01; *** p=≤.001

4.2.1.5 Diabetes

Shown in Table 4.10, the analyses of rural residents (model chi square = 82.77, df = 26, p≤.001) and urban respondents (model chi square = 229.18, df = 26, p≤.001)

and having a diagnosis of diabetes result in statistically significant models. This indicates that the urban model is stronger than the rural model.

For rural residents, the likelihood of having diabetes is more than three and a half times for those who are visible minorities as those who are not of a visible minority (odds ratio = 3.60). Among rural-dwelling respondents, the odds ratio for reporting a diagnosis of diabetes is more than three times as high for those who have a grade 8 education or lower than those who are university graduates (odds ratio = 3.42). In terms of lifestyle factors, an increased odds of having diabetes is observed for those who are inactive, compared to those who are active (odds ratio = 2.43). Similarly, the odds of reporting a diagnosis of diabetes is more than three times as high for those who are occasional smokers, in comparison to those who have never smoked (odds ratio = 3.32). All other comparisons examined do not result in statistically significant associations with having diabetes. In particular, the relationships observed in the original multivariate analysis between having diabetes and age, widowed marital status, household income, and community belonging, are no longer statistically significant among rural respondents, while the association with visible minority status is stronger.

When examining only urban residents, the multivariate analysis results in very different associations with having diabetes, compared to those found for rural residents. The likelihood of having diabetes is decreased by a factor of .96 for each unit change in age, when controlling for all other variables in the model. In terms of marital status, the odds of having diabetes is higher for those who are widowed than those who are married/common-law (odds ratio = 1.25). An increased odds of having a diagnosis of diabetes is observed for those who are a visible minority than White respondents (odds ratio = 1.35). Higher odds of having diabetes is associated with a lower household income, compared to those with the highest household income: less than $15,000 (odds

ratio = 3.52); $15,000 to $29,999 (odds ratio = 3.13); and $30,000 to $49,999 (odds ratio = 2.40). Urban respondents have a higher likelihood of reporting having diabetes among those who have a grade 8 or lower education (odds ratio = 2.10) and secondary graduates (ratio = 1.78), than those with the highest education level. The odds ratio for having diabetes among urban respondents is higher for those with a very weak sense of belonging to the local community, compared to very strong (odds ratio = 1.44). Finally, a higher likelihood of reporting a diagnosis of diabetes is observed for inactive individuals, compared to active (odds ratio = 1.93), and for those who are formerly occasional smokers (odds ratio = 1.33), compared to those who have never smoked, while a lower likelihood of having diabetes is found for current daily smokers (odds ratio = .66).

Overall, many of the observations in the original logistic regression analysis are replicated among urban dwelling residents only. Yet, relationships with having diabetes and two of the education comparisons are no longer statistically significant and the association with former occasional smoking status appears. Household income and community support (measures of the social determinants of health) are associated with having diabetes for urban elderly women, but are not predictors of having diabetes for rural residents.

Table 4.10: Comparative Analysis – Diabetes

	Rural			Urban		
Model Chi Square	x^2=82.77, df= 26***			x^2=229.18, df=26***		
	B	**S.E.**	**OR**	**B**	**S.E.**	**OR**
Age	.001	.01	------	-.04***	.01	.96
Marital Status						
Married			**1.00**			**1.00**
Single	.52	.33	------	-.25	.22	------
Divorced	-.67	.80	------	-.09	.20	------
Separated	1.11	.62	------	-.44	.37	------
Widowed	.03	.18	------	.22*	.10	1.25
Visible Minority Status	1.28***	.35	3.60	.30*	.15	1.35
Household Income						
$80,000 or more			**1.00**			**1.00**
Less than $15,000	.22	.64	------	1.26***	.31	3.52
$15,000-$29,999	.36	.64	------	1.14***	.30	3.13
$30,000-$49,999	.12	.64	------	.87**	.31	2.40
$50,000-$79,999	.91	.66	------	-.27	.38	------
Education						
University Degree			**1.00**			**1.00**
Grade 8 or lower	1.23**	.47	3.42	.74***	.22	2.10
Some Secondary	.87	.48	------	.31	.23	------
Secondary Grad	.50	.53	------	.58*	.23	1.78
Some Post-Sec.	.27	.69	------	.24	.30	------
Trade/College Dip.	.56	.50	------	.38	.23	------
Food Insecurity	-.03	.31	------	-.06	.15	------
Social Support Scale	.002	.01	------	.004	.003	------
Community Belonging						
Very Strong			**1.00**			**1.00**
Very Weak	.11	.26	------	.37**	.13	1.44
Somewhat Weak	-.29	.21	------	.14	.12	------
Somewhat Strong	-.01	.18	------	.05	.11	------
Physical Activity Index						
Active			**1.00**			**1.00**
Inactive	.89**	.32	2.43	.66***	.16	1.93
Moderate	.63	.36	------	.16	.18	------
Smoking Status						
Never Smoked			**1.00**			**1.00**
Daily	-.42	.31	------	-.41**	.15	.66
Occasional	1.20*	.51	3.32	-.62	.35	------
Former Daily	.26	.18	------	.05	.10	------
Former Occasional	-.38	.26	------	.29*	.12	1.33

* p=≤.05; ** p=≤.01; *** p=≤.001

4.2.1.6 Heart Disease

The final regression analysis includes the dependent variable "has heart disease" (see Table 4.11). When examining only rural respondents, the overall model chi square

is statistically significant (82.99, df = 26, $p \leq .001$), as it is for the urban contrast (model chi square = 243.90, df = 26, $p \leq .001$). Again, this suggests that the urban model is stronger.

For the rural contrast, the likelihood of having heart disease increases by a factor of 1.06 for every increase in age. The odds ratio of having heart disease is almost two times higher for those who have some secondary education, compared to a university degree (odds ratio = 1.97). In terms of a sense of belonging to the local community, a higher odds ratio of heart disease is observed for those who rated their belonging as very weak, contrasted with very strong (odds ratio = 1.61), among rural respondents. Finally, a higher likelihood of having heart disease is found for those who are physically inactive, compared with active (odds ratio = 1.91), and who are former daily smokers, as opposed to those who have never smoked (odds ratio = 1.50). However, the association previously observed between having heart disease and visible minority status, household income, and food insecurity, is no longer found when examining only those respondents who reside in rural areas.

Conversely, when analysing only urban-dwelling respondents, the likelihood of having heart disease is associated with higher age (odds ratio = 1.04). A lower likelihood of reporting a diagnosis of heart disease is observed for those who are single compared to their married or common-law counterparts (odds ratio = .64). Among urban respondents, the odds of having heart disease are decreased for those who are identified as a visible minority, than White respondents (odds ratio = .61). In terms of household income, the likelihood of having heart disease is higher for those whose income is less than $15,000 (odds ratio = 1.63) and $30,000 to $49,999 (odds ratio = 1.58), compared with more than $80,000. Having heart disease is more likely for those respondents with some food insecurity in the last 12 months, in comparison with the food

secure (odds ratio = 1.80). Opposite from what was predicted, the odds ratio for having heart disease is lower among those who rate their sense of belonging as somewhat strong, compared to very strong (odds ratio = .83). Finally, for urban respondents the likelihood of having heart disease is higher for those who are physically inactive (odds ratio = 1.72), and are former daily smokers (odds ratio = 1.22). Overall, the observations in the original analysis are replicated among urban dwelling respondents. One exception is the association between heart disease and an income of $50,000 to $79,999, which is no longer statistically significant. Also, the relationship with having heart disease and household income and strong community belonging appear in the urban only analysis.

Table 4.11: Comparative Analysis – Heart Disease

	Rural			Urban		
Model Chi Square	x^2=82.99, df= 26***			x^2=243.90, df=26***		
	B	**S.E.**	**OR**	**B**	**S.E.**	**OR**
Age	.06***	.01	1.06	.04***	.01	1.04
Marital Status						
Married			**1.00**			**1.00**
Single	.44	.30	------	-.44*	.18	.64
Divorced	.21	.47	------	.04	.16	------
Separated	.08	.70	------	.38	.25	------
Widowed	-.15	.16	------	.15	.08	------
Visible Minority Status	-.03	.41	------	-.50***	.15	.61
Household Income						
$80,000 or more			**1.00**			**1.00**
Less than $15,000	-.26	.48	------	.49*	.21	1.63
$15,000-$29,999	-.39	.46	------	.34	.20	------
$30,000-$49,999	-.27	.47	------	.46*	.21	1.58
$50,000-$79,999	.31	.50	------	.41	.23	------
Education						
University Degree			**1.00**			**1.00**
Grade 8 or lower	.54	.33	------	.12	.14	------
Some Secondary	.68*	.34	1.97	-.003	.15	------
Secondary Grad	.46	.38	------	.03	.16	------
Some Post-Sec.	.39	.47	------	-.01	.20	------
Trade/College Dip.	-.03	.36	------	.14	.15	------
Food Insecurity	.20	.27	------	.59***	.11	1.80
Social Support Scale	.004	.01	------	-.004	.003	------
Community Belonging						
Very Strong			**1.00**			**1.00**
Very Weak	.47*	.23	1.61	.02	.11	------
Somewhat Weak	.22	.18	------	-.14	.09	------
Somewhat Strong	.11	.17	------	-.18*	.09	.83
Physical Activity Index						
Active			**1.00**			**1.00**
Inactive	.65*	.25	1.91	.54***	.12	1.72
Moderate	.24	.30	------	.17	.14	------
Smoking Status						
Never Smoked			**1.00**			**1.00**
Daily	-.48	.28	------	-.06	.12	------
Occasional	.23	.58	------	-.17	.25	------
Former Daily	.41**	.16	1.50	.20*	.08	1.22
Former Occasional	-.01	.21	------	.15	.10	------

* p=≤.05; ** p=≤.01; *** p=≤.001

5. DISCUSSION

The results of the analyses will now be discussed, reflecting upon the proposed hypotheses and the review of theoretical and empirical literature presented in Chapter 2. It will be recalled that the primary objective of this study is to determine the effects of rural-urban residence, income level and social capital on the health status of elderly women in Canada. Health status is measured by the use of subjective and objective measures, with the subjective health variable predicting fair/poor self-rated health and the objective health variables measuring the presence of chronic conditions.

5.1 Research Hypotheses

5.1.1 Hypothesis 1

Lower levels of income will be associated with lower subjective and objective health, among elderly women.

Overall, bivariate and multivariate results support this hypothesis in that elderly women with lower levels of income report lower subjective and objective health. Those who had lower incomes were found to have lower subjective health, since they were less likely to report poor/fair self-rated health. In terms of objective health, consistent support was found for the proposed association between lower income and having high blood pressure, diabetes and heart disease. Those who had lower income levels were more likely to report having these three health conditions. Partial support was found for an association between having any chronic condition and arthritis/rheumatism and income.

5.1.1.1 Bivariate Analysis

Weak, negative associations were shown for four of the six dependent variables during crosstabulations with household income. The likelihood of reporting fair/poor health, having arthritis/rheumatism, high blood pressure and diabetes decreases as household income increases, among elderly women. This finding supports the research reviewed, as it has been previously documented that those with lower incomes are more likely to report poor health (Bertera, 1999; Buckley, et al., 2003; Cairney, 2000).

5.1.1.2 Multivariate Analysis

In order to fully determine the effect income has on elderly women's health, multivariate analyses were conducted to determine if the associations observed during bivariate analysis are replicated when controlling for the other variables in the model. Overall, support was again found for Hypothesis 1. When controlling for socio-demographics, residence, social capital and lifestyle, the odds of reporting fair/poor self-rated health, high blood pressure, diabetes and heart disease increased for those with lower household incomes. Again, this supports the contention that income is a major determinant of health (Bolig, et al., 1999) for elderly women.

5.1.1.3 Multivariate Analysis with Rural-Urban Comparison

A comparative analysis of rural-urban residence was conducted using logistic regression. A key finding is that income was found to be a predictor of health for elderly urban women only. In terms of self-perceived health, when controlling for all other variables in the model, no statistically significant associations were uncovered with household income for rural respondents, while for those who are urban-dwelling persons, the likelihood of having fair/poor health was higher for those with lower incomes. Similar results were revealed for reporting any chronic condition, high blood

pressure, diabetes and heart disease, as the likelihood of having these conditions was higher for those with lower levels of income, for urban respondents only.

Overall, in each of the three separate analyses, support was shown for Hypothesis 1, as those who have lower levels of income were more likely to report fair/poor health and a number of chronic conditions. The unexpected finding that this association was primarily uncovered for only the urban-dwelling elderly women respondents is important and will be discussed further. Considering that those in rural areas are more likely to be low-income, this result conflicts with what was expected, based on the literature. This finding suggests that while rural-dwellers generally have lower incomes than urban-dwellers, among older rural women, income level was not associated with their health status, as it was for older urban women.

5.1.2 Hypothesis 2

Lower levels of social and community support ("social capital") will be associated with lower subjective and objective health among elderly women.

A major tenet of life course theory is that elderly women are assumed to display differential later-life health outcomes due to heterogeneity in access to resources (both material and non-material). In addition, place of residence can affect access to these resources, such as one's social capital. Social capital was measured in this research by a social support scale (including affection, emotional/informational support and positive social interactions) and a variable which reflected the sense of belonging to one's local community. It was predicted that lower levels of social capital would be associated with lower subjective and objective health, and this was partially supported in the research.

In addition, as a measure of the social determinants of health, it was expected that social capital would be a better predictor of health status for rural respondents. However, this was not what was observed during comparative analysis.

5.1.2.1 Bivariate Analysis

At the bivariate level, weak negative associations with self-rated health were discovered for social and community support, indicating that the likelihood of reporting fair/poor health increases as the level of social and community support decreases. However, no statistically significant associations were shown for any of the objective health measures during bivariate analysis.

5.1.2.2 Multivariate Analysis

In conducting multivariate analysis, using logistic regression, it was revealed that both social and community support were associated with subjective health, after controlling for all other variables in the model. The odds of having fair/poor health increased as social support levels decreased and were lower among those who rated their sense of belonging to the local community as weaker.

While no association was found for social support, having any chronic condition and having diabetes was associated with higher community support. Meanwhile, having high blood pressure was associated with both social capital measures. Overall, community support had a greater impact on the health of elderly women than social support. Yet, it is clear that social capital influences both the subjective and objective health of elderly women in Canada, with a greater association with self-rated health, consistent with the literature previously reviewed (Grundy & Slogett, 2003; Rogers, 1999).

5.1.2.3 Multivariate Analysis with Rural-Urban Comparison

A comparative analysis revealed that social capital was associated with the health of elderly urban-dwelling women, but not their rural counterparts. This is opposite to what was expected. In terms of subjective health, the previously observed relationship with social support was shown for both rural and urban respondents. However, subjective health was associated with community support for urban residents only.

Similar results were documented for having any chronic condition, which replicated the association with community support for urban respondents only. Conversely, an association between hypertension and social support was only found for urban-dwelling respondents and not rural respondents, while the previous relationship with community support was no longer found for both rural and urban residents. Similar to the other findings, when examining rural and urban dwelling respondents separately, having diabetes was associated with community support for urban dwellers only. Finally, while no previous relationships were observed, during comparisons, associations were shown between having heart disease and community support for those who reside in both rural and urban areas.

Overall, social capital, and particularly community support, has a larger impact on the health of urban dwelling elderly women than it does for rural respondents' health status. This may be due to the fact that rural dwelling persons have a much different community experience than urban respondents do, as evidenced by the general notion that community involvement is often more likely in rural Canada, and particularly for older women. Not only does social capital influence elderly women's health, as predicted, but the interactions between rural-urban residence revealed that lower levels of social capital had a greater effect on the health of urban respondents. This supports

the notion that, as will be discussed later, rural-urban residence is a very important consideration in regards to social determinants of health, as it appears that the health of rural elderly women is not predicted as well by these determinants.

5.1.3 Hypothesis 3

It is expected that elderly rural women will have higher subjective health compared to urban women, but lower objective health.

Partial support was found for Hypothesis 3, since it was shown that elderly rural women had lower objective health than urban women. Those in either the rural fringe or a rural area outside of a CMA/CA had lower objective health, as measured by the likelihood of having a chronic condition, hypertension, diabetes and heart disease. However, no difference was observed for subjective health. In fact, those in the urban fringe of a CMA/CA, compared to the urban core, were more likely to report having fair/poor health. However, while the relationships observed for subjective health were not as predicted, the literature in this area produced conflicting results. Therefore, this result is consistent with some studies. For instance, Kivett (1985) and Clark and Dellasega (1998) found no difference in self-rated health for rural and urban dwelling seniors.

5.1.3.1 Bivariate Analysis

All crosstabs with rural-urban residence did not result in statistically significant associations. However, as will be shown, when controlling for other variables, such as socio-economic status and social capital, a number of associations were observed. Therefore, it was only after controlling for the other variables in the model that a rural-

urban relationship with health is uncovered for elderly women, indicating a suppressor effect.

5.1.3.2 Multivariate Analysis

When controlling for all other variables in the model, it was revealed that having fair/poor health was associated with living in the urban fringe, compared with the urban core. This finding fails to support the hypothesis that rural residents would have better subjective health than those in the urban core. It is also unclear why the urban fringe had poorer health, particularly since these respondents were not found to be more likely to have poor objective health than those in the urban core. Elderly women are more likely to report having any chronic condition, hypertension and diabetes if residing in the rural area outside of a CMA/CA, compared to the urban core, while having heart disease is associated with residence in the rural fringe. This supports Hypothesis 3, and was similar to results documented in the literature (Clark & Dellasega, 1998; Gillanders, et al., 1996; McCulloch, 1998).

In regards to this rural disadvantage, it can be assumed that there was another factor involved which may account for the relationship between rural residence and poorer objective health, which was not able to be measured here. For instance, this may be attributed to a differential in access to chronic disease management in rural and urban regions, as well as education and resources aimed at the prevention of such conditions. Overall, the paradox proposed (that elderly rural women would be advantaged in terms of subjective health, but at a disadvantage on objective health measures) was not supported. While the literature reviewed clearly supported this assertion in terms of objective health, contradictory findings were identified in terms of the subjective health differentials among rural and urban dwellers, and it was proposed that this study would conclude that elderly women would be have better self-rated heath,

due to their expected higher social capital levels. As these anticipated results were not observed, it supports previous research which also found no rural-urban difference in self-rated health status (Clark & Dellasega, 1998; Kivett, 1985).

5.1.3.3 Multivariate Analysis with Rural-Urban Comparison

To determine if there are rural-urban differences in the predictors of health for elderly women, a comparative analysis was conducted, separately for rural and urban respondents. This also allowed for further examination of the research question regarding the influence socio-economic status and social capital have on the health of elderly women. Overall, for each of the six dependent variables, the model contributed much more to the urban analysis than it did to the rural contrast. In other words, the covariates examined were more likely to be associated with having poor subjective and objective health among the urban respondents, while fewer of these covariates were associated with the health status of the rural respondents.

In terms of subjective health, the analysis of rural residents resulted in a model chi square of 179.57 (df = 26, $p \leq .001$), compared to 706.10 (df = 26, $p \leq .001$) for the urban model. Associations were observed for urban respondents having fair/poor health and household income, food insecurity and community belonging, while none of these covariates were associated with having fair/poor health for rural respondents. When examining whether respondents had any chronic condition, the model chi square was 52.22 (df = 26, $p \leq .01$) for the rural contrast and 206.26 (df = 26, $p \leq .001$) for the urban model. Here, statistically significant associations were found for urban residents between having any chronic condition and household income, food insecurity and community belonging, but not for rural respondents. Conversely, for the rural contrast of the analysis of having arthritis/rheumatism, the model chi square was 54.03 (df = 26, $p \leq .001$), compared to 202.66 (df = 26, $p \leq .001$) among the urban respondents. In

addition, having arthritis was associated with having a trade/college diploma and some food insecurity, for urban respondents only.

Similarly, the model chi square for having high blood pressure was weaker for rural respondents (68.60, df = 26, $p \leq .001$), compared to the urban contrast (170.11, df = 26, $p \leq .001$). Associations between having hypertension and household income and social support were found for urban, but not rural respondents. With respect to having diabetes, the model chi square for the rural model was 82.77 (df = 26, $p \leq .001$), compared to 229.18 (df = 26, $p \leq .001$) for the urban model, indicating the urban model is stronger. Also, previously observed relationships with having diabetes and household income and community belonging were only replicated in the urban contrast. Finally, in terms of having heart disease, the model chi square was 82.99 (df = 26, $p \leq .001$) for rural residents and 243.90 (df = 26, $p \leq .001$) for the urban model. For those who reside in urban areas, associations were shown between heart disease and household income and food insecurity, but were not observed for those in rural regions of Canada.

The model examined in this study was much less successful in predicting the health of elderly rural women than it was for elderly urban residents. When examining each of the six health status measures, many of the relationships previously observed in multivariate analysis were no longer found or were weaker when examining only rural-dwelling respondents. In particular, the former associations between all three socio-economic status variables and having poor subjective and objective health were no longer observed or were weaker among rural respondents. Socio-economic status does not predict health status for rural respondents as well as it does for their urban counterparts. In addition, the associations found for social capital measures, as well as age and marital status, were no longer observed for a number of the health status measures among rural residents.

Considering that rural residents typically have lower socio-economic status and higher levels of social capital, it was expected that these social determinants of health would have a greater impact on the health of rural respondents than their urban counterparts. However, it is evident that the health of rural respondents is predicted by different covariates than the health of urban residents and that the social determinants of health differ in their impact depending on rural-urban residence. This is of great significance, as this emphasizes the need to not only examine rural and urban respondents in isolation of one another in research, but also in terms of health care issues/service delivery and health promotion/prevention programming.

5.1.4 Hypothesis 4

The relationship between rural residence and objective health will be accounted for by income.

Overall, Hypothesis 4 was not supported, as the inclusion of the socio-economic status variables in the multivariate analysis did not account for previously observed relationships between the objective health measures and rural residence. In fact, different results occurred depending on the health measure examined. For example, until socio-economic status was controlled, there was no observed relationship between having any chronic condition and rural residence. With the addition of the SES variables, an association with having a chronic condition and rural residence outside of a CMA/CA was found. Conversely, the inclusion of SES had no impact on the relationships between having arthritis/rheumatism and rural residence (no associations observed before and after inclusion of SES) and having heart disease, where the association with residence in the rural fringe in Model 2 was replicated in Model 3.

However, there were some interesting results in the multivariate analyses examining the chronic conditions of high blood pressure and diabetes. Before including SES, in Model 2, there was a relationship between having hypertension and rural residence outside of a CMA/CA. This association was not statistically significant in Model 3, with the inclusion of SES, but became significant in Model 4, when controlling for social/community support. Finally, an observed relationship between having diabetes and residence in a rural area outside of a CMA/CA in Model 2 was found to be weaker after controlling for socio-economic status. Yet overall, the inclusion of SES did not have the impact on the association between place of residence and objective health predicted.

5.1.5 Hypothesis 5

The positive relationship between rural residence and subjective health will be accounted for by social and community support.

Contradictory findings were uncovered for Hypothesis 5, since the positive relationship between those in rural areas and self-rated health was not observed as predicted, although the inclusion of the social capital variables did account for an association between self-rated health and those in the urban areas outside of a CMA/CA. Therefore, social capital did account for the finding that those in the urban areas outside of a CMA/CMA (i.e. small towns) were less likely to perceive their health as fair/poor. Yet, it did not account for, and in fact strengthened, the association between those in the urban fringe and subjective health.

In addition, the comparative analysis of rural-urban residence showed that for those in rural areas of Canada, there was no association found between subjective health and community belonging, while for those in urban regions, having fair/poor self-

rated health was associated a weaker sense of belonging to the local community. However, in terms of social support, an identical association with subjective health was observed for rural and urban residents. Therefore, it seems that sense of belonging to the local community impacts health differently for rural and urban residents, while social support had a similar effect regardless of place of residence.

5.2 Additional Determinants of Health among Elderly Women

5.2.1 Socio-Demographics

As expected, age was revealed to be positively associated with the health status of elderly women. Bivariate analysis revealed positive associations between self-rated health, any chronic condition, arthritis/rheumatism, high blood pressure and heart disease and one's age. When controlling for all other covariates in the model, multivariate analysis resulted in associations between reporting fair/poor self-rated health, any chronic condition, arthritis/rheumatism and heart disease and higher age, while a negative relationship was observed for having diabetes. Comparative analysis revealed that the association between having any chronic condition and diabetes and age was documented for only urban respondents.

In terms of marital status, those who are married/common-law were shown to have better health than their counterparts, who were not currently married. Weak, negative associations were found during bivariate analysis between having any chronic condition, arthritis/rheumatism, and heart disease and one's marital status, when marital status was measured as a dichotomy. The likelihood of having fair/poor health, any chronic condition, arthritis/rheumatism, high blood pressure and diabetes among those not married, when controlling for all other variables in the model.

While a few associations not previously observed were discovered during comparative analysis for rural respondents only, the important finding is the previously observed relationship between being single and having any chronic condition, arthritis/rheumatism, high blood pressure, diabetes and heart disease were observed for only urban-dwelling respondents. In other words, while single urban residents were more likely to have any chronic condition and diabetes, and less likely to have arthritis/rheumatism, hypertension and heart disease, the single rural counterparts were no more or less likely than married persons to have any of these conditions.

The final socio-demographic characteristic examined is visible minority status. A weak, positive association was observed between self-perceived health and visible minority status. A crosstabulation revealed that those respondents who identified themselves as a visible minority were more likely to report fair/poor health than White respondents. During multivariate analysis, this was replicated, as it was revealed that the odds of having fair/poor self-rated health and diabetes increased for visible minority respondents. However, the odds of having heart disease decreased for visible minority respondents, compared to White respondents. The previously discussed relationships between visible minority status and self-perceived health and heart disease were found for only urban respondents, during comparative analysis. Meanwhile, the relationship between diabetes and visible minority status was uncovered for both rural and urban respondents, but was stronger for those in urban areas.

5.2.2 Other Measures of Socio-Economic Status

In addition to household income, two other measures were used to determine socio-economic status: respondent's level of education and food insecurity in past 12 months. As expected, those with lower socio-economic status (less education and some food insecurity) had poorer health status. Weak, negative associations were shown

between self-rated health, high blood pressure and diabetes and the respondent's education, indicating that as education levels increase, the likelihood of having fair/poor health, hypertension and diabetes decreases. Similarly, weak, positive associations were also observed for self-rated health and heart disease and food insecurity, so that those who have experienced some food insecurity in the past 12 months were more likely to report fair/poor health and heart disease.

Multivariate analysis indicated that education was associated with self-rated health, having any chronic condition, high blood pressure and diabetes. The odds of having fair/poor health, hypertension, and diabetes increased as the level of one's education decreased, compared to having a university degree. However, it was revealed that being less likely to report having any chronic condition was associated with having a grade 8 education or less, compared to a university degree. Finally, higher odds of reporting fair/poor health, any chronic condition, arthritis/rheumatism, and heart disease was associated with having some food insecurity in the past 12 months.

Comparative analysis revealed that having fair/poor self-perceived health, arthritis/rheumatism and hypertension was associated with education level, for urban respondents only, while heart disease was better predicted by education for the rural contrast. This suggests that education, a social determinant of health, better predicts health status for urban elderly women. The previously observed relationships between self-rated health, any chronic condition, arthritis/rheumatism, and diabetes and the social determinant of health, food insecurity, were only found for urban-dwelling respondents, indicating that food insecurity was not associated with health status for rural persons. These findings support the contention that the social determinants of health model may not explain health status of rural residents, as well as it does for urban-dwellers.

5.2.3 Lifestyle Factors

As predicted, the two measures of lifestyle, physical activity index and smoking status were found to be predictors of elderly women's health. Those who were more physically active and who did not smoke had better health status. Physical activity had weak, negative associations with self-rated health, arthritis/rheumatism, hypertension and diabetes. This indicates that as physical activity level increases, the likelihood of reporting fair/poor health or these conditions decreases. Weak, negative associations were also uncovered between smoking status and having any chronic condition and high blood pressure, as those who are current smokers were more likely to have any chronic condition and hypertension than those who do not currently smoke.

Multivariate analysis revealed that having fair/poor health, any chronic condition, arthritis/rheumatism, high blood pressure, diabetes, and heart disease, was more likely for those who were physically inactive or moderately active than those who were physically active. A higher likelihood of having fair/poor health, any chronic condition, having arthritis/rheumatism and heart disease was associated with being a daily, occasional or former daily smoker, compared to those who never smoked. Opposite to what was predicted, it was observed that having hypertension was less likely for daily and occasional smokers and lower odds of reporting diabetes were found for daily smokers, compared to those who had never smoked. It is likely that this is related to a problem using cross-sectional data. Comparative analyses revealed conflicting results, dependent on the health status variable. Overall, physical activity level and smoking status were no better at predicting health status for either the rural or urban contrasts.

6. KEY FINDINGS, IMPLICATIONS, LIMITATIONS AND FUTURE RESEARCH

In this concluding chapter, the major findings of this thesis will be presented, followed by a discussion of the implications for health and social policy. Finally, the limitations of the study and the identified needs for future research will be discussed.

6.1 Key Findings

Overall, some but not unequivocal support was shown for the research hypotheses proposed and it was discovered that the health of elderly women was much more complicated than previously thought. Thus, three main findings were identified from this study and will now be elaborated on. The first of these conclusions was that: **elderly women who reside in rural areas were more likely to have any chronic condition, hypertension, diabetes and heart disease than those in urban areas. However, there was no rural advantage in regards to self-rated health.**

This research shows that for elderly women in Canada, those who reside in rural areas were worse off on a number of health measures than their urban counterparts, particularly in terms of circulatory diseases. These differences were observed even after controlling for socio-demographic characteristics, socio-economic status, social capital, and lifestyle. Clearly, this indicates a larger distinction between the health of rural and urban women than formerly thought. These health differentials indicate that not enough has been done to bridge the gap between rural and urban areas. However, the cause of such differences remains unclear. Rural women were more likely to have any chronic condition, hypertension, diabetes and heart disease. This may be attributed to

inadequate health care in rural regions of Canada, particularly in terms of chronic disease management, as well as a lack of education and resources regarding the causes and prevention of such conditions.

Essentially, while rural women were not advantaged in terms of subjective health, as was predicted, they were also not at a disadvantage, in spite of having worse objective health. That is, it was expected that among groups who are more likely to experience various chronic conditions, that they would also be more likely to report their health as fair or poor, as a reflection of these conditions. It had been predicted that rural elderly women would be advantaged on the subjective health measure, but disadvantaged in terms of objective health, and that this would be attributed to a higher level of social capital. In actuality, very modest support was found for the mediating effect of social support. Thus, support was not found for the conundrum proposed, and as such, this adds greatly to the inconsistent findings in the literature reviewed in relation to rural-urban subjective health differentials. Indeed, the strongest findings were those related to the different predictors of health for rural and urban groups.

Consequently, another major finding was that: **the health of rural elderly women was predicted by different covariates than the health of urban residents.** The comparative analysis conducted revealed that the model used was far more effective at predicting the health of urban women, while it was much less likely to do so for rural women. In particular, the socio-economic status (household income, education, food insecurity) and social capital (social and community support) variables were associated with the health status of urban elderly women much more often than for their rural counterparts. It is surprising that SES and social capital are not as important for the health of rural women, as it was expected that these factors would be better

predictors for rural residents, as their SES is usually lower, while social capital is higher, compared to urban areas.

This unanticipated finding shows that the health of rural and urban elderly women is much more complicated than previously thought, and this has implications for the applicability of the social determinants of health model identified by Raphael (2004). Overall, social determinants of health appear to predict the health of urban elderly women to a considerably better degree than for rural women. It is possible that social determinants of health vary depending on rural-urban residence, and therefore, the current model of determinants is not necessarily pertinent to rural persons. Perhaps we need to examine the social determinants model more closely to see what it is missing with regard to rural populations of older women, as these determinants evidently do not explain away the rural-urban health differences, as it was proposed they would.

Clearly there are other factors which are influencing the health of elderly women in rural regions, than what was available to be examined in this study. This may be attributed to such factors as health care utilization and access to resources which were not included in the model. For instance, there is a tendency for rural seniors to value their independence highly, and thus attempt to limit dependence on formal services available (Shenk, 1998). As such, driving status may have a large impact on rural women's health, given the lack of public transportation in rural areas and the distances which are necessary for one to cover on a regular basis. It is expected that this measure of independence and access to resources and services would be much more important to rural residents, than those in urban areas. Yet, it is also likely that rural culture impacts the health of elderly women in a manner unmeasured here.

It was expected that rural culture would be assumed within measures of socio-economic status, social capital and lifestyle; however, it seems that there are other

aspects at work not measured here. It is important to note that the lifestyle variables in the model (physical activity and smoking status) are fairly basic and the inclusion of others (i.e. diet measures, etc.) may have been beneficial. In addition, other factors previously discussed but which were unable to be included in analysis (i.e. other social capital variables, like religiosity and voluntarism; health care utilization) may have added to the findings, however, it is possible that there is a rural mindset and approach which was not captured with the variables available in the CCHS. For instance, there may be differences in rural and urban populations in terms of the diagnosing and self-reporting of health status. It may be such that rural women are less aware of whether or not they have had a professional diagnosis of health conditions and as such may misreport these conditions. Also, they may lack general health knowledge, in addition to not having an in-depth awareness of their personal health. Rural women may also be less likely to acknowledge any health problems, particularly in terms of subjective health status, due to a self-identity as "resilient". These issues could result in a degree of measurement error when depending on the self-report of health status. Also, in addition to factors like religiosity and voluntarism, there may also be a rural-urban difference in terms of a "value system" or community morals.

Turning to specific differentials, the third key finding from the research was that: **socio-economic status was associated with poorer health status, particularly among urban-dwelling older women.** As expected, socio-economic status had a great impact on the health of elderly women, particularly urban-dwelling respondents. While the fact that income was revealed to be a major social determinant of health is not surprising, it reiterates the supposition that more needs to be done to bridge the income gap in Canada. This is particularly true for elderly women, who are more likely to be in dire financial circumstances, due to the previously discussed life course causes of

poverty. However, while it has been shown that rural Canada has lower incomes than urban Canada does, socio-economic status did not predict the health status of rural elderly women to the degree that it did for their urban counterparts. Though socio-economic status, as measured here, may not have been directly associated with their health, it remains possible that the low-income levels of rural elderly women influence other aspects of one's health status, such as psychological well-being. There is clearly a need to further elucidate the economic and social differences in rural and urban Canada, particularly among elderly women.

6.2 Policy Implications

In terms of health and social policy, this research provides a number of implications. In particular, not enough has been done in terms of health policy to lessen rural-urban health differentials. Also, there is a marked difference in the availability and delivery of health care in rural Canada. There is need for more general practitioners with knowledge around the health and needs of an elderly population, specifically those in rural regions. Also, while it is impractical for specialists to be available in all communities, there should be better access to the nearest available specialists, as well as a need to determine if central communities (such as small cities surrounded by a rural population) have a need for specialists in such areas as geriatrics and those chronic diseases which are prevalent in the area.

Health care delivery in rural Canada can often involve a creative mix of formal and informal care, as well as care being provided from a variety of surrounding communities. There is an essential need to ensure that there are no gaps in service delivery for both individuals and whole communities, as well as for cost and resource effective services to be employed whenever possible. This may involve the need for rural communities to cost share programs such as home care, adult day programs, and

various health promotion programs. Health promotion programs can be particularly effective in rural communities, mostly because of the lower cost, however, it seems that these communities are often the last to be involved in these programs or some services never reach them due to limited resources and population size. The most important recommendation in terms of health care is that any health region which includes rural areas needs to properly assess the needs of their communities, and conduct a comprehensive mapping of services in each community. This will ensure that gaps are met where they are needed and that resource sharing can be conducted where appropriate. Rural Canada is ever-changing and thus health care in Canada should respond to the changing needs as effectively as possible.

As socio-economic status is clearly associated with poorer health, and elderly women are still disadvantaged in terms of income levels, social policy around the income of elderly women (both in rural and urban areas) needs to be re-examined. Not only should income replacement programs better accommodate the changing and unique life course demands of women (such as a C/QPP elder-care dropout), but more should be done to equalize men and women in terms of pay equality, educational attainment, flexible work programs, etc.

6.3 Limitations

While this research adds greatly to the literature, there were a number of associated limitations which need to be taken into account. The CCHS allowed a unique research opportunity, in that it was a large-scale survey with an emphasis on the health of Canadians. Yet, there are also some inherent limitations associated with this survey. The first of these restrictions is the fact that the survey was cross-sectional in design. While this cross-section of the health of Canadians is important and valuable, a longitudinal component would be of great use. Not only would researchers be able to

determine changes in the health of a broad cross-section of Canadians over the two-year period between surveys, but they could also track a small number of respondents to determine changes in those individuals over time. A longitudinal component would compliment the CCHS and could be incorporated easily in future cycles. Another issue which is common in many of Statistics Canada's surveys is that those residing in institutional settings, on Indian Reservations and in some remote areas of the country have been excluded. Given the topic at hand, the exclusion of those in institutions, many of whom are elderly women, may have impacted the results found, as may have the exclusion of those in remote areas, where the rural experience is often very unique.

A final limitation of the CCHS, which greatly impacted the research conducted, was the common and optional content design of the survey. By including social support in the optional content portion, it limited the scope of the research analysis conducted. In order to include social support in the study, those respondents residing in 50 of the 136 health regions had to be excluded, causing the sample size to be reduced to 8,468 from 14,611. This included most of Ontario, all of Manitoba and three health regions in Saskatchewan. Given the large population size of Ontario, and the rural makeup of Manitoba and Saskatchewan, in 2001 being 28.1% and 35.7% rural, respectively (Statistics Canada, 2002b), the exclusion of 6,143 elderly women from these areas may have greatly impacted the results found. It was determined that the need to include social support in the analysis, due to the limited number of available measures of social capital and it's importance to the topic at hand, validated the decision to exclude almost half of the available sample size from analysis. However, the impact of this study limitation should always be taken into consideration when examining the results, particularly in terms of the impact of rural-urban residence (see Appendix 7.2).

The optional content design of the CCHS also limited the possibility of other variables being included in analysis. After choosing to include social support in the analysis, it was determined that no other optional content variable was able to be used, as the sample size would be limited even further. This meant that psychological well-being, which had been intended to be used to determine not only the impact of various factors on the health of elderly women, but also their well-being, was excluded. Also excluded was spirituality, which it had been hoped would contribute to the concept of social capital and the rural-urban differences in health. However, both of these measures were chosen for inclusion in a very limited number of health regions, much more so than social support was, and therefore were not feasible for the study.

In addition to the limitations of the methodology of the CCHS, there were also a number of limitations regarding the measures used. While a distinction has been made here for subjective (self-perceived) and objective health, all of these measures were inherently self-reported. Therefore, there is some controversy as to whether self reports of chronic conditions (objective health) are actually objective. Based on the fact that these questions specifically refer to a diagnosis by a health professional of a chronic condition which must have lasted or be expected to last six months or more, it would appear that these can be considered objective health measures. In addition, socio-economic status was measured here via household income, education of respondent and food insecurity. However, other measures, such as household ownership, were not chosen for inclusion in the analyses, but may have added to the SES content and the measurement of the social determinants of health. This is also true for the lifestyle factors, as aspects such as respondents' opinion of own weight and fruit and vegetable consumption were not included, however, these measures may have enhanced the model which was analyzed, in terms of rural-urban health differentials.

A large component of this study was the rural-urban distinction. An important contribution made here was the use of a five-category continuum to distinguish rural-urban residence, rather than a dichotomy, as well as the use of the Statistic Canada's definition of rural, which allows for better comparison across studies. However, alternative distinctions may have been useful, such as separating the census agglomerations (10,000 to 99,999) from the census metropolitan areas (100,000 or more), when they are not integrated by commuter flow. This would allow for the ability to examine rural Canada (rural areas outside a CMA/CA and the rural fringe of CMA/CA), small towns (urban area outside of a CMA/CA: 1,000 to 9,999), small cities (CA and urban fringe: 10,000 to 99,999), and large cities (CMA and urban fringe: 100,000+). This distinction between small towns, small cities and large cities may provide more insight into the influence of community size and resources on the health of elderly women, as may a distinction between "rural farm" and "rural non-farm". In this vein, Joseph and Martin Matthews (1994) make the case for considering communities with 1,000 to 4,999 persons as part of the rural milieu, rather than urban settings (as they are considered by the Census definition), given that these small towns are often home to a disproportionate share of the Canadian senior population.

In addition, while rurality is typically measured by current residence, as done here, there may be value in other measures, such as rural rearing and rural self-identity. As most rural areas have limited housing and service options for seniors, many elderly persons with health concerns may either face premature institutionalization or moving to a more urban community which offers further options in terms of housing and care (Joseph & Martin Matthews, 1994). This may result in a selection/migration effect when rurality is measured by only current residence, as those with worse health will be more likely to move to an urban environment or a long-term care facility. Given the prevalence

of geographic mobility in Canada today, alternative methods to defining rurality should be explored. Moreover, while community size is measured here by a rural-urban typology, the research conducted focused on individual-level analysis, whereas community-level data may better address the issue of social inequality and social capital.

As previously discussed, the inclusion of social support and religiosity in the optional content influenced the research conducted. There were also a number of other problems associated with the measures of social capital. Due to the correlation between each of the individual social support scales, three of them were combined (affection, emotional/informational, positive social interaction) into one large additive scale, while a fourth scale (tangible social support) was excluded from analysis. However, by combining these three scales, not only does it result in a very large scale, but it eliminates the ability to distinguish types of social support. Moreover, these scales measure the perceived availability of various types of support, not the actual receipt of support. Therefore, while many people may perceive that they have such support available (and in fact 26.5% of respondents had a perfect score of 60), receipt of such support should also be measured. Furthermore, the provision of social support was not included, yet may be considered to be an important factor, particularly in regards to subjective health, given the concept of reciprocity.

The only other available social capital variable was sense of belonging to the local community, which was a subjective measure. Other measures, such as voluntarism, civic participation, and organizational membership, would have been useful to better determine actual integration within the community as, for instance, voluntarism is seen as a social activity which "ties the individual to the community and the community to the individual" (Joseph & Martin Matthews, 1994, p. 31). In addition, not only may other measures better assess social capital, but one must also consider that social

capital is not always a positive or productive resource. Social capital may be seen as a inhibiting the desired independence of some seniors, as well as acting as a form of social control, by regulating behaviours and inferring a sense of obligation to participate, rather than a sense of belonging. Also, some forms of social capital (i.e. informal social networks) may exclude some from access to services or from the benefits of such networks (Mitchell, in press; Portes, 1998).

Moreover, the spirituality measures of the CCHS were part of optional content, and thus were included in a very limited number of interviews. It had been originally intended for this variable to be included in the analysis, as it was thought that religiosity would not only add to the social capital variables, but also that active participation in the church can be considered a measure of civic participation and/or voluntarism, particularly in rural settings. It is important to mention that there is limited research linking health status and "social capital", and as a result, it is unclear what measures or aspects of social capital, both on an individual and community-level, have the greatest impact on elderly women's health.

Finally, in order to determine the impact of ethnic origins, the visible minority variable was included in analysis. However, due to limited numbers of elderly women in some of the various categories of the ethnic origins variable, and the impact this had on data release, the variable was dichotomized into non-visible minority and visible minority respondents. This measure, while widely used, does not adequately measure various ethnic origins and their cultural characteristics (e.g. immigration history, sense of belonging) and unique experiences (e.g. discrimination, availability of support networks), both in terms of health and community, and therefore should be interpreted carefully.

6.4 Directions for Future Research

In light of the findings and limitations identified, a number of future research directions can be delineated. Firstly, there is a need to ascertain whether or not this finding is exclusive to elderly women, or if it is found for rural persons of various ages and for both genders. As such, the study conducted here should be expanded to senior men, to determine if these discrepancies in health status are found across gender. It is essential to determine if similar rural-urban differences are found for elderly men, as that will ascertain if this is unique to elderly women in rural settings. It is possible that not only may the findings be exclusive to elderly women, but that there also may be a cohort effect, as considering that all the women studied here were born before 1935, and a great deal has changed in rural Canada in recent decades. This is why it would be interesting to expand the research specifically to mid-life women, to fully explore the impact of rural residence on the health of women in Canada.

As health differences were discovered for rural elderly women, even after controlling for socio-economic status and lifestyle (physical activity and smoking status), it indicates the need to further determine if there are other lifestyle factors associated with rural residence which may be at work here. In addition, the fact that rural elderly women were not advantaged or disadvantaged on the subjective health measure, as they were for the objective measures, should be further studied. It should also be investigated why lower SES, as one major social determinant of health, has a more detrimental effect on the health of elderly urban women, compared to rural-dwelling women. The findings uncovered here add substantively to the current knowledge base around rural-urban health differences, yet more questions remain unanswered, and as a result, further exploration is required.

As such, more research is needed to determine what else is at play in terms of the health of elderly women, since we are not doing very well at explaining rural health. This should include research around rural culture and which aspects of rural residence, in comparison to urban-dwelling, impact one's health status. This may include exploration of the possible "dark side" of social capital in rural communities, and how the expectations of community participation and community integration, in spite of personal preference, as well as the exclusion of certain individuals or groups, may impact health status. As such, given that the research conducted here was on the individual-level, studies linking these data to community-level analysis, to further explore issues around both social integration and social inequality, may offer a more in-depth explanation. It is still unclear what the causal factors are for rural elderly women having poorer health status, and thus, this should be explored further to determine what aspects of rurality may be attributed to this phenomenon (i.e. health care utilization, volunteerism, religiosity, additional lifestyle measures, driving status, etc.).

The social determinants of health model should be reviewed in relation to rural populations, as it appears that this model does not necessarily apply equally to rural and urban residents. As well, it is important to explore whether or not some of the other determinants (i.e. health care services, housing) may better explain rural-urban health differentials. In addition, longitudinal research to track whether or not the health of elderly women is improving would be of great value. While not longitudinal in design, it is possible to repeat this research with subsequent CCHS cycles, which are conducted every two years, to determine if there are any changes across these cross-sectional studies.

Qualitative research which attempts to identify the personal meaning and role of social capital in the lives of elderly rural and urban dwelling women would also add

substantively to the literature. For example, an in-depth qualitative study would allow for a greater understanding of experiential processes with respect to the benefits of social support and what community involvement means. Through such a study one would be able to compare the level of involvement and the perceived impact on one's health status, as well as the inter-dependence and social support rural seniors often require in order to remain active in their communities. This is in comparison to their urban counterparts, who often have a wider variety of formal services available to ensure this involvement is maintained.

And finally, a study should be conducted to examine the various rural-urban definitions currently used, as other measures such as being rural-reared or having a rural-identity may strengthen the empirical literature on rural health and result in very different findings. A measure of rural-identity, in combination with current residence, may reveal a possible selection/migration effect among elderly persons, where rural residents are forced to move to an urban community for more housing and service options when health problems worsen, and the prevalence of this should be examined. Also, the wide variety of definitions used requires a degree of agreement on appropriate measures of rurality in the social sciences. The use of a rural gradient here reveals the benefits of such as measure, as it has shown that within rural and urban Canada, experiences are different depending on the type and size of community. The use of such a gradient, as well as a measure based on Statistics Canada's definition of rural, adds greatly to the literature and allows for ease of comparison. However, the definition of a rural community being those with less than 1,000 persons may be overly simplistic in today's society and should be re-examined. Given that rural-urban differences are ever-changing in today's society, an accurate and consistent measure of rurality needs to be identified for use across studies.

In 2001, there were almost two and a quarter million women aged 65 and over in Canada (Statistics Canada, 2003a), and yet they are rarely viewed as distinct group, both in terms of research and health and social policies. Research and policy do not typically centre on elderly women. Rather, these important areas are examined among women of all ages or seniors as a whole. This research emphasizes the need to not only study elderly women exclusively, but also to consider those who reside in rural and urban areas independently as well, both in terms of research and in light of health care and health promotion programs. The health of elderly women is clearly affected by a variety of factors, one of which is rural-urban residence. And while this study makes a contribution to existing theory and research, it is imperative that additional research is conducted to address the unique needs of Canadian elderly women.

7. APPENDICES

7.1 Logistic Regression Analysis

Tables 7.1 to 7.6 present the model chi square and statistical significance, for each individual model or the overall model. Beta coefficients, standard error, significance level and odds ratio (for statistically significant associations) for each independent variable are also included. Particular attention is placed on the impact rural-urban residence and socio-economic status have on the health conditions examined, as well as the impact that social/community support may have on these associations when entered into the model. Findings will be discussed by first examining the results of the Hypotheses tested (in blocks 2, 3, and 4) and the impact on the variables when controlling for subsequent blocks, followed by any associations with the other predictors of health status, observed in the final block only. It should be restated that subjective health has been coded so as to predict fair/poor health, which compliments the prediction of having chronic conditions.

7.1.1 Logistic Regression – Self-Perceived Health

The first logistic regression analysis uses the dichotomous dependent variable self-perceived health, which predicts having fair or poor self-rated health (see Table 7.1). In Model 2, place of residence (controlling for socio-demographic characteristics) resulted in a statistically significant model chi square (165.93, df = 10, $p \leq .001$). However, fair/poor health is not associated with the rural-urban residence contrasts.

Income is introduced in the Model 3, controlling for socio-demographic characteristics, education, food insecurity and place of residence change, (model chi square = 445.36, df = 20, $p \leq .001$). Fair/poor health is found to have a statistically significant relationship with income, after controlling for the other covariates. Reporting fair/poor health is about one and half times more likely for those who have a household income of less than $15,000, compared to as those whose income was $80,000 or more (odds ratio = 1.49). This finding supports Hypothesis 1; however, no other income comparisons are statistically significant. Rural-urban residence is also associated with fair/poor health, after controlling for socio-economic status. An increased likelihood of reporting fair/poor health is shown for those who reside in the urban fringe of a CMA/CA compared to those in the urban core (odds ratio = 1.38), while a decreased likelihood of having fair/poor health is observed for those in an urban area outside of a CMA/CA have (odds ratio = .82), when controlling for all other variables in the model. This lends partial support to Hypothesis 3.

Social/community support is introduced in Model 4 of the analysis in order to test Hypothesis 2 and 5 (model chi square = 639.76, df = 24, $p \leq .001$). In addition, socio-demographic characteristics, respondent's education, food insecurity are controlled for, as well as change in place of residence and income. The odds of having fair/poor health are decreased by a factor of .98, for each unit change in the social support scale (indicating more social support), when controlling for all other variables in the model. Similarly, higher odds of reporting fair/poor health is observed for those who reported having very weak (odds ratio = 1.92) and somewhat strong (odds ratio = 1.42) ties to the local community, compared to very strong. When controlling for social/community support, the previously shown association between subjective health and residence in an urban area outside a CMA/CA is no longer statistically significant, while the odds ratio

of having fair/poor health for those in the urban fringe has increased to 1.58, lending partial support to Hypothesis 4. The association between income and self-perceived health found in Model 3 is replicated in Model 4.

The final model incorporated the lifestyle factors of physical activity and smoking status (model chi square = 868.55, df = 30, $p \leq .001$). Associations found in Model 4 are replicated with the introduction of the variables in Model 5, with small changes in the odds ratio for rural residence, income and community belonging, while social support remains the same.

Turning to the socio-demographic characteristics, after controlling for all other variables in the model, age, marital status and visible minority status are all found to be associated with having fair/poor self-rated health. The likelihood of having fair/poor health is increased by a factor of 1.03 for each unit change in age (one year), when controlling for all other variables in the model. The odds of having fair/poor self-rated health is lower for those who are single (odds ratio = .72), divorced (odds ratio = .64) and widowed (odds ratio = .77), compared to those who are married/common-law. This is relationship is opposite of what had been predicted. The likelihood of having fair/poor health is slightly higher for visible minority respondents (odds ratio = 1.37), compared to White respondents, as was expected.

In terms of the highest level of education of the respondent, the likelihood of reporting having fair or poor health for those who have an education of grade 8 or lower is more than three times as high, compared to a university degree (odds ratio = 3.23), when controlling for all other variables in the model. In addition, higher odds of having fair/poor health are found for those with some secondary education (odds ratio = 2.56), secondary graduates (odds ratio = 2.25), some post-secondary education (odds ratio = 2.41), and trade or college certificate/diploma (odds ratio = 2.01), compared to those

with a university degree. Fair/poor health is also revealed to have an association with food insecurity, as the likelihood of having fair/poor health is increased for those with some food insecurity in last 12 months (odds ratio = 1.38), compared to no food insecurity.

As anticipated, the odds of reporting fair/poor health is three times higher for those who are inactive, compared to active persons (odds ratio = 3.02), while moderately active persons have an odds ratio of 1.50. In terms of current smoking status, higher odds of having fair/poor health is observed among those who are daily smokers (odds ratio = 1.24), compared to those who never smoked, as it is for those who are former daily smokers (odds ratio = 1.25). However, no association is uncovered for current occasional smokers and former occasional smokers and subjective health.

Table 7.1: Logistic Regression – Self-Perceived Health

	Model 1			Model 2			Model 3		
Model Chi Square	x^2=156.93, df=6***			x^2=165.93, df=10***			x^2=445.36, df=20***		
	B	**S.E.**	**OR**	**B**	**S.E.**	**OR**	**B**	**S.E.**	**OR**
Age	.04***	.004	1.04	.04***	.004	1.04	.04***	.004	1.04
Marital Status									
Married/C.L.			**1.00**			**1.00**			**1.00**
Single	-.17	.12	------	-.17	.12	------	-.18	.12	-----
Divorced	-.20	.12	------	-.20	.12	------	-.27*	.20	.76
Separated	.37	.19	------	.37	.19	------	.23	.20	-----
Widowed	-.01	.06	------	-.01	.06	------	-.18**	.06	.83
Visible Minority Status	.44***	.10	1.55	.44***	.10	1.56	.36***	.10	1.43
Rural-Urban									
Urban Core						**1.00**			**1.00**
Urban Fringe				.25	.15	------	.32*	.15	1.38
Urban outside CMA/CA				-.10	.08	------	-.20*	.08	.82
Rural Fringe				-.17	.12	------	-.20	.12	-----
Rural outside CMA/CA				.09	.07	------	-.03	.07	-----
Household Income									
$80,000 or more									**1.00**
Less than $15,000							.40**	.15	1.49
$15,000-$29,999							.20	.15	-----
$30,000-$49,999							.14	.15	-----
$50,000-$79,999							.13	.17	-----
Education									
University Degree									**1.00**
Grade 8 or lower							1.41***	.14	4.09
Some Secondary							1.13***	.14	3.09
Secondary Grad							.89***	.14	2.43
Some Post-Sec.							1.03***	.17	2.81
Trade/College Dip.							.75***	.14	2.12
Food Insecurity							.42***	.09	1.53
Social Support									
Community Belonging									
Very Strong									
Very Weak									
Somewhat Weak									
Somewhat Strong									
Physical Activity Index									
Active									
Inactive									
Moderate									
Smoking Status									
Never Smoked									
Daily									
Occasional									
Former Daily									
Former Occasional									

* p=≤.05; ** p=≤.01; *** p=≤.001

Table 7.1 (Cont'd): Logistic Regression – Self-Perceived Health

	Model 4			Model 5		
Model Chi Square	x^2=639.76, df=24***			x^2=868.55, df=30***		
	B	**S.E.**	**OR**	**B**	**S.E.**	**OR**
Age	.04***	.00	1.04	.04***	.00	1.03
Marital Status						
Married			**1.00**			**1.00**
Single	-.37**	.13	.69	-.33**	.13	.72
Divorced	-.46***	.13	.63	-.45***	.14	.64
Separated	.03	.21	-----	.01	.21	-----
Widowed	-.26***	.06	.77	-.26***	.06	.77
Visible Minority Status	.30**	.10	1.35	.32**	.10	1.37
Rural-Urban						
Urban Core			**1.00**			**1.00**
Urban Fringe	.45**	.15	1.58	.56***	.15	1.75
Urban outside CMA/CA	-.12	.08	-----	-.13	.08	-----
Rural Fringe	-.09	.13	-----	-.09	.13	-----
Rural outside CMA/CA	.06	.07	-----	.04	.07	-----
Household Income						
$80,000 or more			**1.00**			**1.00**
Less than $15,000	.44**	.16	1.56	.41**	.16	1.50
$15,000-$29,999	.24	.15	-----	.21	.15	-----
$30,000-$49,999	.20	.15	-----	.17	.15	-----
$50,000-$79,999	.18	.17	-----	.19	.17	-----
Education						
University Degree			**1.00**			**1.00**
Grade 8 or lower	1.35***	.14	3.85	1.17***	.14	3.23
Some Secondary	1.09***	.14	2.97	.94***	.14	2.56
Secondary Grad	.90***	.15	2.45	.81***	.15	2.25
Some Post-Sec.	.98***	.17	2.66	.88***	.17	2.41
Trade/College Dip.	.76***	.14	2.14	.70***	.15	2.01
Food Insecurity	.32***	.09	1.37	.32***	.09	1.38
Social Support Scale	-.02***	.00	.98	-.02***	.00	.98
Community Belonging						
Very Strong			**1.00**			**1.00**
Very Weak	.65***	.09	1.92	.58***	.09	1.79
Somewhat Weak	.35***	.07	1.42	.29***	.07	1.34
Somewhat Strong	.03	.07	-----	.04	.07	-----
Physical Activity Index						
Active						**1.00**
Inactive				1.11***	.11	3.02
Moderate				.40***	.12	1.50
Smoking Status						
Never Smoked						**1.00**
Daily				.21*	.09	1.24
Occasional				.15	.18	-----
Former Daily				.22***	.06	1.25
Former Occasional				-.14	.08	-----

* p=≤.05; ** p=≤.01; *** p=≤.001

7.1.2 Logistic Regression – Any Chronic Condition

The results for the logistic regression of having any chronic condition are shown in Table 7.2. Model 2 introduces place of residence, while controlling for the three socio-

demographic variables (model chi square = 97.29, df = 10, $p \leq .001$), however no association is observed for rural-urban residence.

Income is included in Model 3, controlling for place of residence change, resulting in a statistically significant model chi square (132.81, df = 20, $p \leq .001$). No association is discovered for any of the household income categories, while controlling for rural-urban residence, socio-demographic characteristics, education and food insecurity. This finding does not support Hypothesis 1. When controlling for socio-economic status, a category of rural-urban residence becomes statistically significant. Higher odds of having any chronic condition is observed for those who reside in rural areas outside of a CMA/CA, when compared to those in the urban core of a CMA/CA (odds ratio = 1.26). This supports Hypothesis 3, but does not lend support to Hypothesis 4.

Model 4, which introduces the social/community support variables, controlling for change in residence and income, is also statistically significant (model chi square = 155.22, df = 24, $p \leq .001$). Social support does not show an association with any chronic condition, unlike community belonging. As proposed, increased odds of reporting having any chronic condition is found for those who rate their belonging to the local community as very weak, compared to very strong, (odds ratio = 1.40), as well as for those who rated their belonging as somewhat weak (odds ratio = 1.41) and somewhat strong (odds ratio = 1.46). This provides partial support to Hypothesis 2. Overall, the association previously found for rural-urban residence is replicated in Model 4.

The final model includes two measures of the respondents' lifestyle (model chi square = 219.80, df = 30, $p \leq .001$). No substantive change is observed for the associations in the previous model. In terms of socio-demographic characteristics, when controlling for all other variables in the model, both age and marital status are associated

with having any chronic condition, as predicted. The likelihood of having a chronic condition increases by a factor of 1.04 for each unit change in age. The odds ratio of having a chronic condition is higher for those who are single, compared to those who are married or common-law (odds ratio = 1.63). No association is documented for visible minority status and having any chronic condition.

While income is not shown to be associated with having any chronic condition, both education and some food insecurity are. A lower likelihood of having a chronic condition is uncovered for those who have an education of grade 8 or lower, compared to those who have a university degree (odds ratio = .73), when controlling for all other variables in the model. This relationship is opposite of what is anticipated. On the other hand, an increased likelihood of having any chronic condition is revealed among those who experienced some food insecurity (odds ratio = 1.76), compared to those with no food insecurity, as predicted.

In terms of physical activity, a higher odds ratio of reporting any chronic condition is shown for those who are inactive, compared to active, (odds ratio = 1.50), as it is for those who are moderately active (odds ratio = 1.32). The odds of having any chronic condition is increased for those who are former daily smokers (odds ratio = 1.70), compared with those who never smoked. However, none of the other comparisons for smoking status result in statistically significant associations.

Table 7.2: Logistic Regression – Chronic Condition

	Model 1			Model 2			Model 3		
Model Chi Square	x^2= 90.83, df=6***			x^2= 97.29, df=10****			x^2= 132.81, df=20***		
	B	**S.E.**	**OR**	**B**	**S.E.**	**OR**	**B**	**S.E.**	**OR**
Age	.04***	.01	1.04	.04***	.01	1.04	.05***	.01	1.05
Marital Status									
Married/C.L.			**1.00**			**1.00**			**1.00**
Single	.47**	.18	1.60	.48**	.18	1.60	.43*	.18	1.54
Divorced	.23	.16	-----	.25	.16	-----	.15	.17	-----
Separated	.22	.28	-----	.23	.28	-----	.18	.29	-----
Widowed	.12	.08	-----	.13	.08	-----	.12	.08	-----
Visible Minority Status	-.27**	.42	.77	-.24	.13	-----	-.23	.13	-----
Rural-Urban									
Urban Core						**1.00**			**1.00**
Urban Fringe				.35	.24	-----	.32	.24	-----
Urban outside CMA/CA				-.02	.11	-----	-.01	.11	-----
Rural Fringe				.13	.16	-----	.14	.16	-----
Rural outside CMA/CA				.20	.10	-----	.23*	.10	1.26
Household Income									
$80,000 or more									**1.00**
Less than $15,000							.19	.19	-----
$15,000-$29,999							.09	.17	-----
$30,000-$49,999							.25	.17	-----
$50,000-$79,999							.09	.19	-----
Education									
University Degree									**1.00**
Grade 8 or lower							-.26	.14	-----
Some Secondary							.03	.15	-----
Secondary Grad							-.11	.15	-----
Some Post-Sec.							-.09	.20	-----
Trade/College Dip.							.10	.15	-----
Food Insecurity							.54***	.16	1.72
Social Support Scale									
Community Belonging									
Very Strong									
Very Weak									
Somewhat Weak									
Somewhat Strong									
Physical Activity Index									
Active									
Inactive									
Moderate									
Smoking Status									
Never Smoked									
Daily									
Occasional									
Former Daily									
Former Occasional									

* p=≤.05; ** p=≤.01; *** p=≤.001

Table 7.2 (Cont'd): Logistic Regression – Chronic Condition

	Model 4			Model 5		
Model Chi Square	x^2= 155.22, df= 24***			x^2= 219.80, df=30***		
	B	**S.E.**	**OR**	**B**	**S.E.**	**OR**
Age	.05***	.01	1.05	.05***	.01	1.04
Marital Status						
Married			**1.00**			**1.00**
Single	.45*	.19	1.57	.49**	.19	1.63
Divorced	.13	.17	-----	.15	.17	-----
Separated	.14	.29	-----	.10	.29	-----
Widowed	.12	.08	-----	.13	.08	-----
Visible Minority Status	-.25	.13	-----	-.17	.13	-----
Rural-Urban						
Urban Core			**1.00**			**1.00**
Urban Fringe	.32	.24	-----	.37	.25	-----
Urban outside CMA/CA	.002	.11	-----	-.001	.11	-----
Rural Fringe	.18	.16	-----	.20	.17	-----
Rural outside CMA/CA	.26*	.10	1.29	.26*	.11	1.30
Household Income						
$80,000 or more			**1.00**			**1.00**
Less than $15,000	.23	.19	-----	.25	.19	-----
$15,000-$29,999	.13	.17	-----	.14	.17	-----
$30,000-$49,999	.28	.17	-----	.29	.18	-----
$50,000-$79,999	.12	.19	-----	.13	.20	-----
Education						
University Degree			**1.00**			**1.00**
Grade 8 or lower	-.30*	.14	.74	-.32*	.15	.73
Some Secondary	-.01	.15	-----	-.06	.16	-----
Secondary Grad	-.15	.15	-----	-.16	.16	-----
Some Post-Sec.	-.10	.20	-----	-.12	.20	-----
Trade/College Dip.	.09	.15	-----	.09	.16	-----
Food Insecurity	.53***	.16	1.69	.56***	.16	1.76
Social Support Scale	.00	.003	------	.00	.003	------
Community Belonging						
Very Strong			**1.00**			**1.00**
Very Weak	.34**	.12	1.40	.30*	.12	1.35
Somewhat Weak	.34***	.09	1.41	.32***	.09	1.37
Somewhat Strong	.38***	.09	1.46	.37***	.09	1.45
Physical Activity Index						
Active						**1.00**
Inactive				.40***	.10	1.50
Moderate				.28*	.12	1.32
Smoking Status						
Never Smoked						**1.00**
Daily				-.20	.11	-----
Occasional				-.06	.24	-----
Former Daily				.53***	.09	1.70
Former Occasional				.14	.11	-----

* p=≤.05; ** p=≤.01; *** p=≤.001

7.1.3 Logistic Regression – Arthritis/Rheumatism

The next analysis predicts the likelihood of having a self-reported diagnosis of arthritis or rheumatism (see Table 7.3). The second model, place of residence (model

chi square = 114.45, df = 10, p≤.001), includes the covariate rural-urban residence (while controlling for socio-demographic characteristics), which is not associated with arthritis/rheumatism.

Income is introduced in Model 3 (model chi square = 149.39, df = 20, p≤.001). When controlling for place of residence change and socio-demographic characteristics, having arthritis/rheumatism is not associated with household income. Model 4, which includes social/community support, is statistically significant (model chi square = 153.91, df = 24, p≤.001). However, neither of the measures in the model exhibits a relationship with arthritis/rheumatism.

Finally, Model 5 introduces lifestyle factors (model chi square = 217.41, df = 30, p≤.001), and when controlling for all other variables in the model, place of residence, income and social/community support continue to exhibit non-statistically significant associations with having arthritis/rheumatism. In this model, none of the hypotheses are supported. However, two of the three socio-demographic characteristics examined have a relationship with having arthritis/rheumatism. The likelihood of having arthritis/rheumatism is increased by a factor of 1.03 for each unit change in age. In terms of marital status, a lower odds ratio of reporting arthritis/rheumatism is observed for those who are single, compared to those who are married/common-law (odds ratio = .76). This is opposite to what was expected. However, the other marital status comparisons do not result in any statistically significant association, similar to visible minority status.

An increased odds ratio of having arthritis/rheumatism is discovered among those who experience some food insecurity (odds ratio = 1.39). However, no statistically significant relationship is found for education while both lifestyle factors are associated

with having a diagnosis of arthritis. Increased odds of having arthritis or rheumatism is observed among those who are inactive are, when compared to active persons (odds ratio = 1.32). A higher likelihood of reporting arthritis/rheumatism is also found for occasional smokers (odds ratio = 1.41) and former daily smokers (odds ratio = 1.31), compared to their counterparts who have never smoked. This finds support for the anticipated associations with having arthritis and food insecurity, physical activity and smoking status.

Table 7.3: Logistic Regression – Arthritis/Rheumatism

	Model 1			Model 2			Model 3		
Model Chi Square	x^2= 112.12, df= 6***			x^2= 114.45, df= 10***			x^2= 149.39, df=20***		
	B	**S.E.**	**OR**	**B**	**S.E.**	**OR**	**B**	**S.E.**	**OR**
Age	.03***	.003	1.03	.03***	.003	1.03	.03***	.003	1.03
Marital Status									
Married/C.L.			**1.00**			**1.00**			**1.00**
Single	-.24*	.10	.79	-.24*	.10	.79	-.27*	.11	.77
Divorced	.11	.10	-----	.12	.10	-----	.03	.11	-----
Separated	.20	.18	-----	.20	.18	-----	.14	.19	-----
Widowed	.09	.05	-----	.09	.05	-----	.05	.05	-----
Visible Minority Status	-.11	.09	-----	-.10	.09	-----	-.13	.09	-----
Rural-Urban									
Urban Core						**1.00**			**1.00**
Urban Fringe				.01	.14	-----	.01	.14	-----
Urban outside CMA/CA				.08	.07	-----	.08	.07	-----
Rural Fringe				.08	.11	-----	.08	.11	-----
Rural outside CMA/CA				-.03	.06	-----	-.03	.07	-----
Household Income									
$80,000 or more									**1.00**
Less than $15,000							.00	.13	-----
$15,000-$29,999							-.09	.12	-----
$30,000-$49,999							-.12	.12	-----
$50,000-$79,999							-.15	.13	-----
Education									
University Degree									**1.00**
Grade 8 or lower							-.04	.09	-----
Some Secondary							.05	.10	-----
Secondary Grad							-.01	.10	-----
Some Post-Sec.							-.17	.13	-----
Trade/College Dip.							.18	.10	-----
Food Insecurity							.33***	.09	1.38
Social Support Scale									
Community Belonging									
Very Strong									
Very Weak									
Somewhat Weak									
Somewhat Strong									
Physical Activity Index									
Active									
Inactive									
Moderate									
Smoking Status									
Never Smoked									
Daily									
Occasional									
Former Daily									
Former Occasional									

* p=≤.05; ** p=≤.01; *** p=≤.001

Table 7.3 (Cont'd): Logistic Regression – Arthritis/Rheumatism

	Model 4			Model 5		
Model Chi Square	x^2= 153.91, df=24***			x^2= 217.41, df=30***		
	B	**S.E.**	**OR**	**B**	**S.E.**	**OR**
Age	.03***	.003	1.03	.03***	.004	1.03
Marital Status						
Married			**1.00**			**1.00**
Single	-.29**	.11	.75	-.27*	.11	.76
Divorced	.01	.11	-----	.03	.11	-----
Separated	.11	.19	-----	.08	.19	-----
Widowed	.04	.05	-----	.04	.05	-----
Visible Minority Status	-.14	.09	-----	-.10	.10	-----
Rural-Urban						
Urban Core			**1.00**			**1.00**
Urban Fringe	.03	.14	-----	.06	.14	-----
Urban outside CMA/CA	.09	.07	-----	.09	.07	-----
Rural Fringe	.09	.11	-----	.09	.11	-----
Rural outside CMA/CA	-.02	.07	-----	-.03	.07	-----
Household Income						
$80,000 or more			**1.00**			**1.00**
Less than $15,000	.01	.13	-----	.001	.13	-----
$15,000-$29,999	-.08	.12	-----	-.09	.12	-----
$30,000-$49,999	-.12	.12	-----	-.12	.12	-----
$50,000-$79,999	-.15	.14	-----	-.14	.14	-----
Education						
University Degree			**1.00**			**1.00**
Grade 8 or lower	-.05	.09	-----	-.08	.09	-----
Some Secondary	.05	.10	-----	.10	.10	-----
Secondary Grad	-.003	.10	-----	-.03	.10	-----
Some Post-Sec.	-.18	.13	-----	-.20	.13	-----
Trade/College Dip.	.18	.10	-----	.17	.10	-----
Food Insecurity	.31***	.09	1.37	.33***	.09	1.39
Social Support Scale	-.003	.002	-----	-.003	.002	-----
Community Belonging						
Very Strong			**1.00**			**1.00**
Very Weak	.03	.08	-----	-.01	.08	-----
Somewhat Weak	.01	.06	-----	-.02	.06	-----
Somewhat Strong	-.06	.06	-----	-.07	.06	-----
Physical Activity Index						
Active						**1.00**
Inactive				.28***	.07	1.32
Moderate				.03	.08	-----
Smoking Status						
Never Smoked						**1.00**
Daily				-.11	.08	-----
Occasional				.35*	.17	1.41
Former Daily				.27***	.05	1.31
Former Occasional				.11	.07	-----

* p=≤.05; ** p=≤.01; *** p=≤.001

7.1.4 Logistic Regression – High Blood Pressure

The next logistic regression analysed uses the dependent variable "has high blood pressure" (see Table 7.4). The second model adds place of residence to the

analysis (model chi square = 48.33, df = 10, $p \leq .001$), and controls for socio-demographic characteristics. A higher likelihood of reporting hypertension is observed among those who live in rural areas outside of a CMA/CA, compared to those who reside in the urban core (odds ratio = 1.18). This association supports Hypothesis 3.

Three measures of socio-economic status are included in Model 3, resulting in a statistically significant model chi square (100.12, df = 20, $p \leq .001$), controlling for rural-urban residence change and socio-demographic characteristics. Lending support to Hypothesis 1, the odds ratio for reporting high blood pressure among those who have a household income of less than $15,000 is about one and a half times as high, compared to those whose income is $80,000 or more. In addition, higher odds of reporting hypertension is found for those who have incomes of $15,000 to $29,999 (odds ratio = 1.48) and $30,000 to $49,999 (odds ratio = 1.43). The previously observed association between residence and high blood pressure is no longer observed, with the addition of the SES variables, lending support to Hypothesis 4.

Social/community support is introduced in Model 4 of the analysis (model chi square = 115.18, df = 24, $p \leq .001$), which controls for the change in place of residence and household income, and for socio-demographic characteristics, education and food insecurity. The odds of having high blood pressure are decreased by a factor of .995, for each unit change in the social support scale, when controlling for all other variables in the model. Likewise, the odds ratio of reporting hypertension is higher among those who reported having very weak ties to the local community, compared to very strong ties, (odds ratio = 1.18), lending support to Hypothesis 2. Overall, the associations found in Model 3 are largely replicated, with slight changes in some of the odds ratios. However, there a notable change in terms of rural-urban residence. An association for rural-urban residence status observed in Model 2, which subsequently disappears in Model 3, has

reappeared, so that a higher likelihood of having hypertension is observed for those who reside in rural areas outside a CMA/CA (odds ratio = 1.14).

The final model incorporates physical activity and smoking status (model chi square = 199.26, df = 30, $p \leq .001$). The previously discussed associations are replicated when controlling for lifestyle. Marital status is the only socio-demographic characteristic associated with having high blood pressure, when controlling for all other variables in the model. Decreased odds of reporting hypertension are documented among those who are single, compared to those who are married or common-law (odds ratio = .77), which is opposite to what was expected.

In addition to the association with household income, education is also associated with having hypertension. As expected, those who are more likely to have high blood pressure are those who have lower levels of education, compared to a university degree: grade 8 or lower (odds ratio = 1.46); some secondary education (odds ratio = 1.48); and secondary graduates (odds ratio = 1.30). There is no association observed for food insecurity.

Finally, both lifestyle factors are associated with having hypertension. Those who are more likely to have high blood pressure are inactive respondents (odds ratio = 1.65), compared to active persons, as are those who are moderately active (odds ratio = 1.39). In terms of smoking status, decreased odds of reporting hypertension is observed among those who are daily smokers (odds ratio = .71) and currently occasional smokers (odds ratio = .53), when compared to those who have never smoked. These associations are not as predicted.

Table 7.4: Logistic Regression – High Blood Pressure

	Model 1			Model 2			Model 3		
Model Chi Square	x^2= 40.56, df=6***			x^2= 48.33, df=10***			x^2= 100.12, df=20***		
	B	**S.E.**	**OR**	**B**	**S.E.**	**OR**	**B**	**S.E.**	**OR**
Age	.01***	.003	1.01	.01***	.003	1.01	.01***	.004	1.01
Marital Status									
Married/C.L.			**1.00**			**1.00**			**1.00**
Single	-.25*	.11	.78	-.25*	.11	.78	-.24*	.11	.79
Divorced	-.22*	.11	.80	-.21	.11	-----	-.22	.11	-----
Separated	-.08	.19	-----	-.06	.19	-----	-.12	.19	-----
Widowed	.10*	.05	1.10	.10*	.05	1.11	.05	.05	-----
Visible Minority Status	-.10	.09	-----	-.08	.09	-----	-.07	.10	-----
Rural-Urban									
Urban Core						**1.00**			**1.00**
Urban Fringe				-.01	.14	-----	-.02	.14	-----
Urban outside CMA/CA				-.01	.07	-----	-.05	.07	-----
Rural Fringe				-.07	.11	-----	-.09	.11	-----
Rural outside CMA/CA				.16**	.06	1.18	.11	.07	-----
Household Income									
$80,000 or more									**1.00**
Less than $15,000							.43***	.14	1.53
$15,000-$29,999							.39**	.13	1.48
$30,000-$49,999							.36**	.13	1.43
$50,000-$79,999							.19	.14	-----
Education									
University Degree									**1.00**
Grade 8 or lower							.38***	.10	1.46
Some Secondary							.40***	.10	1.48
Secondary Grad							.26*	.10	1.30
Some Post-Sec.							.24	.13	-----
Trade/College Dip.							.18	.10	-----
Food Insecurity							-.07	.09	-----
Social Support Scale									
Community Belonging									
Very Strong									
Very Weak									
Somewhat Weak									
Somewhat Strong									
Physical Activity Index									
Active									
Inactive									
Moderate									
Smoking Status									
Never Smoked									
Daily									
Occasional									
Former Daily									
Former Occasional									

* p=≤.05; ** p=≤.01; *** p=≤.001

Table 7.4 (Cont'd): Logistic Regression – High Blood Pressure

	Model 4			Model 5		
Model Chi Square	x^2= 115.18, df=24***			x^2= 199.26, df=30***		
	B	**S.E.**	**OR**	**B**	**S.E.**	**OR**
Age	.01**	.004	1.01	.004	.004	-----
Marital Status						
Married			**1.00**			**1.00**
Single	-.28*	.11	.76	-.26*	.11	.77
Divorced	-.26*	.11	.77	-.20	.11	-----
Separated	-.16	.19	-----	-.15	.19	-----
Widowed	.03	.05	-----	.06	.05	-----
Visible Minority Status	-.07	.10	-----	-.08	.10	-----
Rural-Urban						
Urban Core			**1.00**			**1.00**
Urban Fringe	.01	.14	-----	.04	.14	-----
Urban outside CMA/CA	-.04	.07	-----	-.04	.07	-----
Rural Fringe	-.06	.11	-----	-.07	.11	-----
Rural outside CMA/CA	.13*	.07	1.14	.13*	.07	1.13
Household Income						
$80,000 or more			**1.00**			**1.00**
Less than $15,000	.42**	.14	1.52	.44***	.14	1.56
$15,000-$29,999	.39**	.13	1.48	.41***	.13	1.51
$30,000-$49,999	.37**	.13	1.44	.39**	.13	1.47
$50,000-$79,999	.20	.14	-----	.24	.14	-----
Education						
University Degree			**1.00**			**1.00**
Grade 8 or lower	.37***	.10	1.44	.31***	.10	1.37
Some Secondary	.39***	.10	1.47	.35***	.11	1.41
Secondary Grad	.26*	.13	1.30	.25*	.11	1.29
Some Post-Sec.	.23	.13	-----	.21	.13	-----
Trade/College Dip.	.18	.10	-----	.15	.10	-----
Food Insecurity	-.10	.09	-----	-.08	.09	-----
Social Support Scale	-.01**	.002	.99	-.01*	.002	.99
Community Belonging						
Very Strong			**1.00**			**1.00**
Very Weak	.17*	.08	1.18	.16*	.08	1.17
Somewhat Weak	.02	.06	-----	-.003	.06	-----
Somewhat Strong	.09	.06	-----	.08	.06	-----
Physical Activity Index						
Active						**1.00**
Inactive				.50***	.08	1.65
Moderate				.33***	.09	1.39
Smoking Status						
Never Smoked						**1.00**
Daily				-.35***	.08	.71
Occasional				-.63***	.18	.53
Former Daily				.04	.05	-----
Former Occasional				.11	.07	-----

* p=≤.05; ** p=≤.01; *** p=≤.001

7.1.5 Logistic Regression – Diabetes

As shown in Table 7.5, Model 2 introduces place of residence (controlling for age, marital status and visible minority status), resulting in a statistically significant

model chi square (65.47, df = 10, p≤.001). As proposed in Hypothesis 3, the odds of having diabetes is increased for those who reside in rural areas outside of a CMA/CA, compared to those in the urban core (odds ratio = 1.63). The other rural-urban residence comparisons are not associated with a diabetes diagnosis.

Model 3 introduces household income, controlling for change in place of residence, socio-demographic characteristics, education, and food insecurity (model chi square = 192.49, df = 20, p≤.001). An increased likelihood of reporting a diagnosis of diabetes is observed for those whose household income is less than $15,000 have (odds ratio = 2.73), as for those whose income is $15,000 to $29,999 (odds ratio = 2.64), and $30,000 to $49,999 (odds ratio = 2.04). There is a slight decrease in the odds ratio for having diabetes among those in rural areas outside a CMA/CA, when controlling for SES (odds ratio = 1.45), compared to Model 2 (odds ratio = 1.63). These results support Hypothesis 1, and lend partial support to Hypothesis 4.

The introduction of the social/community support covariates results in a statistically significant model chi square (203.01, df = 24, p≤.001), controlling for change in residence and income, and partially supports Hypothesis 2. An increased likelihood of reporting a diagnosis of diabetes is discovered for those who rate their sense of belonging to their local community as very weak, contrasted with very strong (odds ratio = 1.42). Social support does not have an observed relationship with diabetes, and previous associations are replicated in Model 4, with slight changes in some odds ratios.

The final model in analysis, Model 5, introduces lifestyle factors into the equation, resulting in a statistically significant model chi square (262.96, df = 30, p≤.001). The previously observed associations are replicated in this model, with small changes in the odds ratios. All of the socio-demographic characteristics were associated with having diabetes. Interestingly, decreased odds of having diabetes is associated with increased

age (odds ratio = .97). The likelihood of having diabetes is higher for those who are widowed, compared to their married/common-law counterparts (odds ratio = 1.23). However, none of the other marital status contrasts result in statistically significant relationships. In terms of visible minority status, having diabetes is one and a half times as likely for those who are a visible minority are for White respondents (odds ratio = 1.53). With the exception of age, these findings are as anticipated.

As expected, having diabetes is almost three times as likely for those who have an education of grade 8 or lower, as are those with a university degree (odds ratio = 2.30). In addition, higher odds of having diabetes were observed for those with some secondary schooling (odds ratio = 1.52), secondary graduates (odds ratio = 1.79), and those with a trade school or college diploma (odds ratio = 1.50). There is no statistically significant association found between food insecurity and having diabetes.

In terms of physical activity, a diagnosis of diabetes is two times as likely for those persons who are inactive, compared to those who are active (odds ratio = 2.00). Yet, there is no statistically significant association between moderate activity levels and diabetes. Finally, only one of the four contrasts for smoking status results in a statistically significant odds ratio; decreased odds of reporting diabetes is observed for those who are current smokers, compared to those who have never smoked (odds ratio = .67). While the physical activity results are as predicted, the smoking status association is not.

Table 7.5: Logistic Regression – Diabetes

	Model 1			Model 2			Model 3		
Model Chi Square	x^2= 33.61, df=6***			x^2= 65.47, df=10***			x^2= 192.49, df=20***		
	B	**S.E.**	**OR**	**B**	**S.E.**	**OR**	**B**	**S.E.**	**OR**
Age	-.02***	.01	.98	-.02***	.01	.98	-.02***	.01	.98
Marital Status									
Married/C.L.			**1.00**			**1.00**			**1.00**
Single	-.04	.17	-----	-.04	.17	-----	-.04	.18	-----
Divorced	-.20	.18	-----	-.14	.18	-----	-.16	.19	-----
Separated	.002	.30	-----	.06	.30	-----	-.07	.30	-----
Widowed	.30***	.08	1.35	.31***	.08	1.36	.17*	.08	1.19
Visible Minority Status	.39**	.13	1.48	.45***	.13	1.58	.42***	.13	1.53
Rural-Urban									
Urban Core						**1.00**			**1.00**
Urban Fringe				-.39	.27	-----	-.37	.27	-----
Urban outside CMA/CA				.10	.11	-----	-.002	.11	-----
Rural Fringe				-.07	.18	-----	-.12	.18	-----
Rural outside CMA/CA				.49***	.09	1.63	.37***	.09	1.45
Household Income									
$80,000 or more									**1.00**
Less than $15,000							1.00***	.28	2.73
$15,000-$29,999							.97***	.27	2.64
$30,000-$49,999							.71**	.27	2.04
$50,000-$79,999							.20	.31	-----
Education									
University Degree									**1.00**
Grade 8 or lower							.95***	.19	2.59
Some Secondary							.52*	.20	1.68
Secondary Grad							.63**	.21	1.87
Some Post-Sec.							.23	.27	-----
Trade/College Dip.							.45*	.21	1.56
Food Insecurity							-.07	.13	-----
Social Support Scale									
Community Belonging									
Very Strong									
Very Weak									
Somewhat Weak									
Somewhat Strong									
Physical Activity Index									
Active									
Inactive									
Moderate									
Smoking Status									
Never Smoked									
Daily									
Occasional									
Former Daily									
Former Occasional									

* p=≤.05; ** p=≤.01; *** p=≤.001

Table 7.5 (Cont'd): Logistic Regression – Diabetes

	Model 4			Model 5		
Model Chi Square	x^2= 203.01, df=24***			x^2= 262.96, df=30***		
	B	**S.E.**	**OR**	**B**	**S.E.**	**OR**
Age	-.02***	.01	.98	-.03***	.01	.97
Marital Status						
Married			**1.00**			**1.00**
Single	-.03	.18	-----	-.01	.18	-----
Divorced	-.16	.19	-----	-.08	.19	-----
Separated	-.08	.30	-----	-.06	.31	-----
Widowed	.18*	.08	1.20	.21*	.08	1.23
Visible Minority Status	.42**	.14	1.55	.44***	.13	1.53
Rural-Urban						
Urban Core			**1.00**			**1.00**
Urban Fringe	-.37	.27	-----	-.33	.27	-----
Urban outside CMA/CA	.01	.11	-----	.003	.11	-----
Rural Fringe	-.10	.18	-----	-.13	.18	-----
Rural outside CMA/CA	.50***	.09	1.48	.38***	.09	1.46
Household Income						
$80,000 or more			**1.00**			**1.00**
Less than $15,000	1.07***	.28	2.91	1.06***	.28	2.89
$15,000-$29,999	1.02***	.27	2.78	1.01***	.27	2.76
$30,000-$49,999	.77**	.27	2.16	.76**	.27	2.14
$50,000-$79,999	.24	.31	-----	.24	.31	-----
Education						
University Degree			**1.00**			**1.00**
Grade 8 or lower	.92***	.19	2.51	.83***	.20	2.30
Some Secondary	.49*	.20	1.64	.42*	.20	1.52
Secondary Grad	.61**	.21	1.84	.58**	.21	1.79
Some Post-Sec.	.21	.27	-----	.17	.27	-----
Trade/College Dip.	.44*	.21	1.55	.41*	.21	1.50
Food Insecurity	-.07	.13	-----	-.06	.13	-----
Social Support Scale	.003	.003	-----	.004	.003	-----
Community Belonging						
Very Strong			**1.00**			**1.00**
Very Weak	.35**	.12	1.42	.31**	.12	1.37
Somewhat Weak	.09	.10	-----	.05	.10	-----
Somewhat Strong	.05	.10	-----	.04	.10	-----
Physical Activity Index						
Active						**1.00**
Inactive				.69***	.14	2.00
Moderate				.23	.16	-----
Smoking Status						
Never Smoked						**1.00**
Daily				-.40**	.14	.67
Occasional				-.24	.27	-----
Former Daily				.11	.09	-----
Former Occasional				.20	.11	-----

* p=≤.05; ** p=≤.01; *** p=≤.001

7.1.6 Logistic Regression – Heart Disease

The results for having a diagnosis of heart disease are presented in Table 7.6. Model 2 introduces place of residence, controlling for age, martial status and visible

minority status (model chi square = 170.28, df = 10, $p \leq .001$), and reveals that an increased likelihood of reporting a diagnosis of heart disease is found for those who live in the rural fringe of a CMA/CA, compared to those in the urban core (odds ratio = 1.39). This supports Hypothesis 3.

Three measures of socio-economic status are included in Model 3, in addition to controlling for change in rural-urban residence and socio-demographic characteristics, and results in a statistically significant model chi square (217.72, df = 20, $p \leq .001$). A higher odds ratio of having heart disease is observed among the lowest income group, less than a $15,000 household income (odds ratio = 1.45), compared to those with an income of $80,000 or more. The rural-urban relationship from Model 2 is replicated when controlling for SES, which does not support Hypothesis 4. However, Hypothesis 1 is supported in this model.

Model 4, which introduces the social/community support variables is also statistically significant model chi square (227.84, df = 24, $p \leq .001$). Yet, as is shown, Hypothesis 2 is not support here, as neither of the social/community support covariates produces statistically significant associations. Still, when controlling for these two variables, two income categories which previously were not statistically significant, become associated with heart disease. Those who are more likely to have heart disease are those who have an income of $30,000 to $49,999 (odds ratio = 1.44) and $50,000 to $79,999 (odds ratio = 1.50), compared to those whose household income was $80,000 or more. The other associations observed in Model 3 are replicated when controlling for social/community support.

The final model incorporates two measures of the respondents' lifestyle (model chi square 286.83, df = 30, $p \leq .001$). The previously observed associations in Model 4 are largely replicated, with slight odds ratio changes. Age and visible minority status are

associated with having heart disease, while marital status is not. The likelihood of having heart disease increases by a factor of 1.04 for each unit change in age, as predicted. Opposite to what was anticipated, decreased odds of having heart disease is shown among those persons who are a visible minority, compared to White respondents (odds ratio = .62), when controlling for the other variables in the model.

Education is not revealed to be associated with having a diagnosis of heart disease, but some food insecurity in past 12 months is. As expected, an increased likelihood of having heart disease is observed for those who have experienced some food insecurity, than those with no food insecurity (odds ratio = 1.69). Similarly, in terms of physical activity, higher odds of reporting a diagnosis of heart disease is discovered among respondents who are inactive, compared to active (odds ratio = 1.77). The odds of having diabetes is increased for those who are formerly daily smokers, compared with those who never smoked (odds ratio = 1.27). However, none of the other comparisons for smoking status results in statistically significant associations.

Table 7.6: Logistic Regression – Heart Disease

	Model 1			Model 2			Model 3		
Model Chi Square	x^2= 161.52, df=6***			x^2= 170.28, df=10***			x^2= 217.72, df=20***		
	B	**S.E.**	**OR**	**B**	**S.E.**	**OR**	**B**	**S.E.**	**OR**
Age	.04***	.004	1.05	.04***	.004	1.05	.05***	.004	1.05
Marital Status									
Married/C.L.			**1.00**			**1.00**			**1.00**
Single	-.19	.15	-----	-.18	.15	-----	-.22	.15	-----
Divorced	.13	.14	-----	.15	.14	-----	.07	.15	-----
Separated	.47*	.22	1.60	.48*	.23	1.62	.41	.23	-----
Widowed	.17*	.14	1.18	.17**	.07	1.19	.10	.07	-----
Visible Minority Status	-.42**	.14	.66	-.42**	.14	.66	-.49**	.14	.61
Rural-Urban									
Urban Core						**1.00**			**1.00**
Urban Fringe				-.13	.19	-----	-.11	.19	-----
Urban outside CMA/CA				-.07	.09	----	-.10	.09	----
Rural Fringe				.33*	.13	1.39	.33*	.13	1.38
Rural outside CMA/CA				.09	.08	-----	.07	.08	-----
Household Income									
$80,000 or more									**1.00**
Less than $15,000							.37*	.19	1.45
$15,000-$29,999							.24	.18	-----
$30,000-$49,999							.35	.19	-----
$50,000-$79,999							.39	.20	-----
Education									
University Degree									**1.00**
Grade 8 or lower							.29*	.13	1.34
Some Secondary							.20	.14	-----
Secondary Grad							.12	.14	-----
Some Post-Sec.							.10	.18	-----
Trade/College Dip.							.16	.14	-----
Food Insecurity							.53***	.10	1.70
Social Support Scale									
Community Belonging									
Very Strong									
Very Weak									
Somewhat Weak									
Somewhat Strong									
Physical Activity Index									
Active									
Inactive									
Moderate									
Smoking Status									
Never Smoked									
Daily									
Occasional									
Former Daily									
Former Occasional									

* p=≤.05; ** p=≤.01; *** p=≤.001

Table 7.6 (Cont'd): Logistic Regression – Heart Disease

	Model 4			Model 5		
Model Chi Square	x^2= 227.84, df=24***			x^2= 286.83, df=30***		
	B	**S.E.**	**OR**	**B**	**S.E.**	**OR**
Age	.05***	.004	1.05	.04***	.005	1.04
Marital Status						
Married			**1.00**			**1.00**
Single	-.26	.15	-----	-.22	.15	-----
Divorced	.04	.15	-----	.08	.15	-----
Separated	.37	.23	-----	.35	.23	-----
Widowed	.09	.07	-----	.10	.07	-----
Visible Minority Status	-.50***	.14	.61	-.47***	.14	.62
Rural-Urban						
Urban Core			**1.00**			**1.00**
Urban Fringe	-.08	.19	-----	-.02	.19	-----
Urban outside CMA/CA	-.08	.09	----	-.09	.09	----
Rural Fringe	.34**	.13	1.40	.34**	.13	1.41
Rural outside CMA/CA	.08	.09	-----	.08	.09	-----
Household Income						
$80,000 or more			**1.00**			**1.00**
Less than $15,000	.38*	.19	1.47	.39*	.19	1.47
$15,000-$29,999	.25	.18	-----	.25	.18	-----
$30,000-$49,999	.37*	.19	1.44	.37*	.19	1.45
$50,000-$79,999	.41*	.20	1.50	.44*	.20	1.55
Education						
University Degree			**1.00**			**1.00**
Grade 8 or lower	.28*	.13	1.32	.20	.13	-----
Some Secondary	.19	.14	-----	.12	.14	-----
Secondary Grad	.12	.14	-----	.08	.14	-----
Some Post-Sec.	.09	.18	-----	.04	.18	-----
Trade/College Dip.	.16	.14	-----	.12	.14	-----
Food Insecurity	.51***	.10	1.66	.53***	.10	1.69
Social Support Scale	-.003	.002	-----	-.003	.002	-----
Community Belonging						
Very Strong			**1.00**			**1.00**
Very Weak	.16	.10	-----	.11	.10	-----
Somewhat Weak	-.01	.08	-----	-.05	.08	-----
Somewhat Strong	-.09	.08	-----	-.10	.08	-----
Physical Activity Index						
Active						**1.00**
Inactive				.57***	.11	1.77
Moderate				.20	.13	------
Smoking Status						
Never Smoked						**1.00**
Daily				-.12	.11	-----
Occasional				-.11	.23	-----
Former Daily				.24***	.07	1.27
Former Occasional				.12	.09	-----

* p=≤.05; ** p=≤.01; *** p=≤.001

7.2 Study Sample

Due to optional content issues, those who reside in 37 of 38 health regions in Ontario, all 10 in Manitoba and 3 of 11 in Saskatchewan were eliminated from analysis. To determine the impact this had on the studies findings (particularly in terms of rural-urban residence), analyses were re-conducted with the full sample size (14,611) and excluding the social support variable.

Frequencies showed more respondents in the urban core and urban fringe, and fewer in the urban fringe, urban outside CMA/CA and rural outside CMA/CA. This resulted in the sample being 16.5% rural. Previously, while excluding those in Ontario, Manitoba and some of Saskatchewan, 18.6% of the sample resided in rural areas. This shows that the original sample was closer to the census data, which shows 19.2% of seniors living in rural areas in 2001 (Statistics Canada, 2004c).

The bivariate analyses preformed did not result in substantively different results from those presented in this thesis. However, multivariate analysis resulted in some important differences, as shown here. In terms of fair/poor health, those in the urban area outside of the CMA/CA and rural fringe were less likely than those in urban core to have fair/poor health, while the analysis presented in this thesis showed that those in the urban fringe were more likely to report fair/poor health. Converse to what is presented in the thesis analyses; no associations were found for any of the rural-urban contrasts and having a chronic condition, high blood pressure and heart disease. Interestingly, for high blood pressure, an association was observed in block 2, but was not statistically significant with the addition of the socio-economic status variables, as was predicted. The arthritis/rheumatism and diabetes analyses found similar results to the analysis

presented in this thesis. The comparative analyses resulted in largely similar findings with a few associations becoming statistically significant.

Overall, it was determined that the differences found between these and the analyses presented in the thesis are not great enough to warrant a change in the thesis, as this would require the elimination of the social support variable. Social support was an important concept to include in the model, particularly given the theory employed, and as a case is made for its inclusion and the subsequent elimination of some of the respondents, I am confident in the results as they stand. In addition, this issue has been clearly identified in both the methods and discussion sections of the thesis.

8. REFERENCE LIST

Beland, Y. (2002). Canadian Community Health Survey – Methodological overview. *Health Reports, 13,* 9-14.

Belanger, A., Martel, L., Berthelot, J. & Wilkins, R. (2002). Gender differences in disability-free life expectancy for selected risk factors and chronic conditions. *Journal of Women and Aging, 14*(1-2), 61-83.

Bertera, E.M. (1999). Assessing health promotion needs and interests of low-income older women. *Journal of Women's Health and Gender-Based Medicine, 8*, 1323-1336.

Bolig, E.E., Borkowski, J., & Brandenberger, J. (1999). Poverty and health across the life span. In T.L. Whitman, T.V. Merluzzi, & R.D. White (Eds.), *Life span perspectives on health and illness* (pp. 67-84). Mahwah, NJ: Lawrence Erlbaum Associates

Bothell, W.L., Fischer, J., & Hayashida, C. (1999). Social support and depression among low income elderly. *Journal of Housing for the Elderly, 13*, 51-63.

Bowen, G.L., Richman, J.M. & Bowen, N.K. (2000). Families in the context communities across time. In S.J. Price, et al. (Eds.), *Families across time: A life course perspective* (pp.117-128). USA: Roxbury.

Brotman, S. (1998). The incidence of poverty among seniors in Canada: Exploring the impact of gender, ethnicity and race. *Canadian Journal on Aging, 17*, 166-185.

Buckley, N.J., Denton, F.T., Robb, A.L. & Spencer, B.G. (2003). *Socioeconomic influence on the health of older people: Estimates based on two longitudinal surveys.* Hamilton, ON: QSEP Research Institute.

Cairney, J. (2000). Socio-economic status and self-rated health among older Canadians, *Canadian Journal on Aging, 19*, 456-478.

Canadian Mortgage and Housing Corporation (2003). Housing needs of low income people living in rural areas: The implications for seniors. *Research Highlights, July,* 1-6.

Chappell, N.L. (1998). Maintaining and enhancing independence and well-being in old age. In National Forum on Health, *Determinants of Health: Adults and Seniors* (pp.89-141). Saint-Foy, QC: Editiens MultiMondes.

Chumbler, N.R., Cody, M., Booth, B.M., & Beck, C.K. (2001). Rural-urban differences in service use for memory-related problems in older adults. *The Journal of Behavioral Health Services & Research, 28*, 212-221.

Clark, D. & Dellasega, C. (1998). Unmet health care needs: Comparison of rural and urban senior center attendees. *Journal of Gerontological Nursing, 21*(2), 24-33.

Clarke, P.J., Marshall, V.W., Ryff, C.D. & Rosenthal, C.J. (2000). Well-being in Canadian seniors: Findings from the Canadian study of health and aging. *Canadian Journal on Aging, 19*, 139-159.

Cohen, L. (1984). *Small expectations: Society's betrayal of older women.* Toronto, ON: McClelland and Stewart.

Coleman, J.S. (1988). Social capital in the creation of human capital. *American Journal of Sociology, 94,* S95-S120.

Crystal, S. & Shea, D. (1990). Cumulative advantage, cumulative disadvantage, and inequality among elderly people. *The Gerontologist, 30*, 437-443.

Davis, K., & Grant, P. (1990). Alone and poor: The plight of elderly women. *Generations, 14*(3), 43-47.

DeMaris, A. (1995). A tutorial in logistic regression. *Journal of Marriage and the Family, 57,* 956-968.

Elder, G.H., Jr. (1985). *Life course dynamics, trajectories and transitions, 1968-1980.* Ithaca, NY: Cornell University Press.

Elliot, S.J. & J. Gillie (1998). Moving experiences: A qualitative analysis of health and migration. *Health and Place, 4*, 327-339.

Everitt, J. & Gfellner, B. (1996). Elderly mobility in a rural area: The example of southwest Manitoba. *Canadian Geographer, 40*, 338-351.

Gee, E.M., Kobayashi, K.M. & Prus, S.G. (2004). Examining the health immigrant effect in mid- to later life: Findings from the Canadian Community Health Survey. *Canadian Journal on Aging, 23*, S61-S69.

Gerritsen, J.C., Wolffensperger, E.W., & Van Den Heuvel, W.J.A. (1990). Rural-urban differences in the utilization of care by the elderly. *Journal of Cross Cultural Gerontology, 5*, 131-147.

Gillanders, W.R., Buss, T.F. & Hofstetter, C.R. (1996). Urban/rural elderly health status differences: The dichotomy re-examined. *Journal of Aging and Social Policy, 8*(4), 7-24.

Glasgow, N., & Brown, D.L. (1998). Older, rural and poor. In R.T. Coward & J.A. Krout (Eds.), *Aging in rural settings: Life circumstances and distinctive features,* (pp.187-205). New York: Springer Publishing.

Goins, R.T., Hays, J.C. , Landerman, L.R. & Hobbs, G. (2001). Access to health care and self-rated health among community-dwelling older adults. *The Journal of Applied Gerontology, 20*, 307-321.

Gregg, E.W., Kriska, A.M., Fox, K.M. & Cauly, J.A. (1996). Self-rated health and the spectrum of physical activity and physical function in older women. *Journal of Aging and Physical Activity, 4*, 349-361.

Grundy, E. & Slogett, A. (2003). Health inequalities in the older population: The role of personal capital social resources and socio-economic circumstances. *Social Science and Medicine, 56*, 935-947.

Hagestad, G.O. (1990). Social perspectives on the life course. In: R. Binstock & L. George (Eds.), *Handbook of aging and the social sciences.* (pp.151-168). New York: Academic Press.

Hareven, T.K. (1994). Aging and generational relations: A historical and life course perspective. *Annual Review of Sociology, 20*, 437-461.

Havens, B., Hall, M., Sylvestre, G. & Jivan, T. (2004). Social Isolation and Loneliness: Differences between Older Rural and Urban Manitobans. *Canadian Journal on Aging, 23,* 129-140.

Havir, L.M. (1995). *But will they use it? Social Service utilization by rural elderly*. New York: Garland Publishing.

Hirdes, J.P. & Forbes, W.F. (1993). Factors associated with the maintenance of good self-rated health. *Journal of Aging and Health, 5*, 101-122.

Hodge, G. (1993). *Canada's aging rural population: The role and response of local government.* Toronto, ON: ICURR Press.

Jensen, L., & McLaughlin, D.K. (1997). The escape from poverty among rural and urban elders. *The Gerontologist, 37*, 462-468.

Joseph, A.E. & Martin Matthews, A. (1994). Growing old in aging communities. In V. Marshall & B. McPherson (Eds.), *Aging: Canadian perspectives*, (pp. 20-35). Peterborough, ON: Broadview Press.

Jylha, M., Guralnik, J.M., Balfour, J. & Fried, L.P. (2001). Walking difficulty, walking speed, and age as predicators of self-rated health: The women's health and aging study. *Journal of Gerontology: Medical Sciences, 56A*, M609-M617.

Keating, N.C. (1991). *Aging in Rural Canada*. Toronto, ON: Butterworths Canada.

Kersting, R.C. (2001). Impact of social support, diversity and poverty on nursing home utilization in a nationally representative sample of older Americans. *Social Working Health Care, 33*(2), 67-87.

Kirk, A.B., & Alessi, H.D. (2002). Rural senior service centers: A study of the impact on quality of life issues. *Activities, Adaptation & Aging, 26*(3), 51-64.

Kivett, V.R. (1985). Rural-urban differences in the physical and mental health of older adults. *Journal of Applied Gerontology, 4*(2), 9-19.

Kivett, V.R. (1988). Aging in a rural place: The elusive source of well-being. *Journal of Rural Studies, 4*, 125-132.

Kobayashi, K.M. (2003). Do intersections of diversity matter? An exploration of the relationship between identity markers and health for mid- to later-life Canadians. *Canadian Ethnic Studies, 35*(3), 85-98.

Krout, J.A (1994). An overview of older rural populations and community-based services. In J.A. Krout (Ed.), *Community-based services to the rural elderly*, (pp. 3-18). Thousand Oaks, CA: Sage Publications.

Little, D. (2002). Review of smoking in the elderly. *Geriatrics and Aging, 5*(9), 9-12.

Liu, A.Q. & Besser, T. (2003). Social capital and participation in community improvement activities by elderly residents in small towns and rural communities. *Rural Sociology, 68*, 343-365.

Lochhead, C., & Scott, K. (2000). *The dynamics of poverty in Canada.* Ottawa, ON: Status of Women Canada.

Lokken, S.L., Byrd, S., & Hope, K.J. (2002). Assessing nutrition risk and sociodemographic characteristics of low-income older adults living in Mississippi. *Journal of Nutrition for the Elderly, 21*(4), 21-37.

Lomas, J. (1998). Social capital and health: Implications for public health and epidemiology. *Social Science & Medicine, 47*, 1181-1188.

Marshall, J. & Bollman, R.D. (1999). Rural and urban household expenditure patterns for 1996. *Rural and Small Town Canada Analysis Bulletin, 1*(4), 1-11.

Martin Matthews, A. (1988). Variations in the conceptualization and measurement of rurality: Conflicting findings on the elderly. *Journal of Rural Studies, 4*, 141-150.

Martin Matthews, A., & Van Den Heuvel, A. (1986). Conceptual and methodological issues in research on aging in rural versus urban environments. *Canadian Journal on Aging, 5*, 49-60.

McCulloch, B.J. (1998). Introduction. In B.J. McCulloch (Ed.), *Old, female and rural* (pp.1-5). Binghamton, NY: Haworth Press.

McCulloch, B.J., & Kivett, V.R. (1998). Older rural women: Aging in historical and current contexts. In R.T. Coward & J.A. Krout (Eds.), *Aging in rural settings: Life circumstances and distinctive features* (pp.187-205). New York: Springer Publishing.

McLaughlin, D.K. (1998). Rural women's economic realities. In B.J. McCulloch (Ed.), *Old, female and rural* (pp. 41-65). Binghamton, NY: Haworth Press.

Minkler, M., & Stone, R. (1985). The feminization of poverty and older women. *The Gerontologist, 25*(4), 351-357.

Mitchell, B.A. (2003). Would I share a home with and elderly parent? Exploring enthnocultural diversity and intergenerational support relations during young adulthood. *Canadian Journal on Aging, 22,* 69-82.

Mitchell, B.A. (in press). Social capital and intergenerational coresidence: How ethnic communities and families shape transitions to adulthood. In R. Johnston & F. Kay (Eds.), *Diversity, social capital and the welfare state*. Vancouver: University of British Columbia Press.

Mitura, V. & Bollman, R.D. (2003). The health of rural Canadians: A rural-urban comparison of health indicators. *Rural and Small Town Canada Analysis Bulleting, 4*(6), 1-23.

Mookherjee, H.N. (1997). Marital status, gender, and perception of well-being. *The Journal of Social Psychology, 137,* 95-105.

Newhouse, J.K. (1995). *Rural and urban patterns: An exploration of how older adults use in-home care.* New York: Garland Publishing.

Nord, M. (2000). Does it cost to live in rural areas? Evidence from new data on food security and hunger. *Rural Sociology, 65*(1), 104-125.

O'Brien Cousins, S. (2000). 'My heart couldn't take it': Older women's beliefs about exercise benefits and risks. *Journal of Gerontology: Psychological Sciences, 55B*, P283-P294.

O'Rand, A.M. (1996). The precious and precocious: Understanding cumulative disadvantage and cumulative advantage over the life course. *The Gerontologist, 36*, 230-236.

Oxman-Martinez, J. & Hanley, J. (2005). *Health and social services for Canada's multicultural population.* Discussion paper presented at Canada 2017: Serving Canada's Multicultural Population for the Future, March 22-23 2005, Gatineau, Quebec, pp. 17-29. Retrieved April 16, 2005 from http://www.myschool.gc.ca/events/archives/canada2017/index_e.html

Pearson Scott, J., & Roberto, K.A. (1985). Use of informal and formal support networks by rural elderly poor. *The Gerontologist, 25*, 624-630.

Pearson Scott, J., & Roberto, K.A. (1987). Informal supports of older adults: A rural urban comparison. *Family Relations, 36*, 444-449.

Pierce, M.B., Sheehan, N.W. & Ferris, A.M. (2002). Nutrition concerns of low-income elderly women and related social support. *Journal of Nutrition for the Elderly, 21*(3), 37-53.

Porter, E.J. (1998). "Staying close to shore": A context for older rural widows' use of health care. In B.J. McCulloch (Ed.), *Old, female and rural* (pp. 25-39). Binghamton, NY: Haworth Press.

Portes, A. (1998). Social capital: Its origins and applications in modern sociology. *Annual Review of Sociology, 24*, 1-24.

Raphael, D. (2004). Introduction to the social determinants of health. In D. Raphael (Ed.) *Social Determinants of Health: Canadian Perspectives* (pp. 1-18). Toronto: Canadian Scholars' Press.

Robert, S.A. (2002). Community context and aging. *Research on Aging, 24,* 579-599.

Robert, S.A., & Lee, K.Y. (2002). Explaining race differences in health among older adults: The contribution of community socioeconomic context. *Research on Aging, 24*, 654-683.

Rogers, A. (1999). Factors associated with depression and low life satisfaction in the low-income, frail elderly. *Journal of Gerontological Social Work, 31*, 167-194.

Rothwell, N., Bollman, R.D., Tremblay, J. & Marshall, J. (2002). Migration to and from rural and small town Canada. *Rural and Small Town Canada Analysis Bulletin, 3*(6), 1-24.

Ruuskanen, J.M. & Ruoppila, I. (1995). Physical activity and psychological well-being among people aged 65 to 84 years. *Age and Ageing, 24*, 292-296.

Shapiro, E., & Roos, L.L. (1984). Using health care: Rural/urban differences among the Manitoba elderly. *The Gerontologist, 24*, 270-274.

Shenk, D. (1998). Subjective realities of rural older women's lives: A case study. In B.J. McCulloch (Ed.), *Old, female and rural* (pp.7-24). Binghamton, NY: Haworth Press.

Stathi, A., Fox, K.R. & McKenna, J. (2002). Physical Activity and dimensions of subjective well-being in older adults. *Journal of Physical Activity, 10*, 76-92.

Statistics Canada (1999a). Health among older adults. *Health Reports, 11*, 47-61.

Statistics Canada (1999b). Health in mid-life. *Health Reports, 11*, 35-46.

Statistics Canada (1999c). *Portrait of seniors in Canada* (Catalogue No. 89-519-XPE). Ottawa, ON: Ministry of Industry and Supply.

Statistics Canada (2001a). Geographic Units: Urban Area (UA). *Data Dictionary: 2001 Census.* Retrieved August 10, 2004, from http://www12.statcan.ca/english/census01/Products/Reference/dict/geo

Statistics Canada (2001b). *Income in Canada* (Catalogue No. 75-202-XIE). Ottawa, ON: Ministry of Industry and Supply.

Statistics Canada (2002a). Annex (Canadian Community Health Survey – 2002 Annual report). *Health Reports, 13,* 113-114.

Statistics Canada (2002b). Population Counts, for Canada, Provinces and Territories, and census divisions by urban and rural, 2001 census – 100% data. Retrieved September 14, 2004, from http://www12.statcan.ca/english/census01/products/standard/popdwell/Table-UR-D.cfm?PR=46

Statistics Canada (2002c). Rural income disparities in Canada: A comparison across the provinces (Catalogue No. 21-006-XIE). *Rural and Small Town Canada Analysis Bulletin, 3*(7), 1-18.

Statistics Canada (2003a). Age Groups (12) and Sex (3) for Population, for Canada, Provinces and Territories, 2001 Census – 100% Data. Retrieved August 23, 2004, from http://www12.statcan.ca/english/census01/products/standard/themes

Statistics Canada (2003b). *Canada at a glance* (Catalogue No. 12-581-XPE). Ottawa, ON: Communications Division.

Statistics Canada (2003c). *The Canadian community health survey (CCHS): Extending the wealth of health data in Canada.* Retrieved January, 30, 2003, from http://www.statcan.ca/english/concepts/health/cchsinfo.htm

Statistics Canada (2003d). *Ethnic diversity survey: Portrait of a multicultural society* (Catalogue No. 89-593-XIE). Ministry of Industry.

Statistics Canada (2004a). Canadian Community Health Survey. Retrieved September 9, 2004, from http://statcan.ca/english/sdds/3226.htm

Statistics Canada (2004b). Population projections for 2001, 2006, 2011, 2016, 2026, at July 1. Retrieved September 14, 2004, from http://www.statcan.ca/english/Pgdb/demo23c.htm

Statistics Canada (2004c). Statistical Area Classification: Highlight Tables, 2001 Counts, for Canada, Provinces and Territories. Retrieved September 14, 2004, from http://www12.statcan.ca/english/census01/products/highlight/SAC

Strain, L.A., & Chappell, N.L. (1983). Rural-urban differences among adult day care participants in Manitoba. *Canadian Journal on Aging, 2,* 197-209.

Vartanian, T.P. & McNamara, J.M. (2002). Older women in poverty: The impact of midlife factors. *Journal of Marriage and Family, 64,* 532-548.

Veenstra, G. (2002). Social capital and health (plus wealth, income inequality and regional health governance). *Social Science & Medicine, 54,* 849-868.

Wolfson, M., Rowe, G., Gentleman, J.F., & Tomiak, M. (1993). Career earnings and death: A longitudinal analysis of older Canadian men. *Journal of Gerontology: Social Sciences, 48,* S167-S179.

Zimmer, Z. & Chappell, N. (1997). Rural-urban differences in seniors' neighbourhood preferences. *Journal of Housing for the Elderly, 12*, 105-124.