RURAL-URBAN DIFFERENCES IN SELF-CARE BEHAVIOURS OF OLDER CANADIANS: THE EFFECTS OF ACCESS TO PRIMARY CARE

by

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ABSTRACT

This thesis explores effects of access to primary care on the self-care of older Canadians, across 5 residential categories. Previous research indicates persons living in rural environments experience profound barriers to primary care, compared to their urban counterparts. Further, self-care is influenced by health knowledge, often acquired through the formal health care system. It was hypothesized that the association between residential status and self-care will be partially explained by access to primary care.

Data from the CCHS – Cycle 1.1 (2001) were used. The research sample consisted of 24,281 Canadians, aged 65 and older. Logistic regression results evidenced several predictors of self-care. However, none of the independent variables fully explained the association between access to primary care and self-care. Since previous research employs dichotomous rural/urban comparisons, these findings provide an important and unique contribution to the literature. The results suggest need for research identifying factors mediating group differences in self-care.

To my grandparents,
Granny, Poppie,
Grandma G. and Grandpa Jimmy.

Wisdom: the final virtue...
"Yes, My Child!"
"What Odds?!"

ACKNOWLEDGEMENTS

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1 INTRODUCTION

Population aging has become a well-recognized socio-demographic

phenomenon. Attributable, in part, to both the aging of the "baby boomers" and

increases in longevity, this demographic shift will reflect continued growth in the

number of older adults over the next few decades (Gee & Gutman, 2000). By

2031, the boomer generation, in its entirety, will be age 65 years or older (Wister,

2005). It is projected that those 65 and over will account for approximately one

out of every four persons in Canada's population, almost twice the current

proportion (Denton & Spencer, 2000). As policy-makers, practitioners, and

society-at-large confront such prospects, the notion of self-care has been

increasingly posited as a necessary response to the expected increase in health

care demands exhibited by the growing older adult population (DeFriese &

Konrad, 1993). This is because self-care involves both preventative and

rehabilitative practices and behaviours in which individuals take on greater

control over their own health and compliments the formal health care system

(DeFriese and Konrad, 1993). The importance of self-care will likely gain added

significance as growing numbers of older adults strive to maintain

independence, and as policy-makers consider ways to reduce health care costs.

Self-care has been defined by many researchers, although no single

definition has been universally accepted. One inclusive and widely recognized

definition is:

> Self-care in health refers to the activities individuals, families, and
> communities undertake with the intention of enhancing health,
> preventing disease, limiting illness, and restoring health. These
> activities are derived from knowledge and skills from the pool of
> both professional and lay experience. They are undertaken by lay
> people on their own behalf, either separately or in participative
> collaboration with professionals (World Health Organization,
> 1983).

For example, self-care can include, among others, behaviours such as

regular exercise, proper nutrition, regular breast self-examinations and blood

pressure checks, not smoking, and limiting alcohol consumption. The salience of

self-care is particularly apparent when considering the formal health care system

challenges faced by rural-dwellers. This notion is supported by Mockenhaupt

and Muchow (1994) who write: "Self-care as a strategy for health

promotion...would seem to be a 'natural' for rural elders. The common physical

and economic barriers to health care in rural areas demand a self-reliance of

residents that is often a source of great pride" (p. 196-197). The current practice of

"down-scaling" urban policies and programs and applying them in rural areas

displays a disregard for unique rural health service needs (Rosenthal and Fox,

2000; Krout, 1998; Zimmer and Chappell, 1997; Joseph and Fuller, 1991; Joseph

and Martin-Mathews, 1993; Koff, 1992; Keating 1991). It also reflects a lack of

understanding of the characteristics of rural life and residents. In addressing

these deficits, more regionally appropriate policies and programs can be implemented and the potential for health benefit can be optimised. In light of these issues, the purpose of this thesis is to explore the influence of access to primary care services on the self-care practices of older Canadians.

Despite the growing body of literature focusing on rural issues, no standardized definition of "rural" has been established. In essence, there are two genres for defining rural. The first is a social representation resulting from subjective interpretations of rurality and bolstered by predominant rural ideologies. Research indicates that rural residents, especially long-time dwellers, have developed a specific rural identity that predominates rural values, beliefs, and practices (Ministerial Advisory Council on Rural Health, 2003; McDonald et al., 2000; Mockenhaupt and Muchow, 1994; Abraham and Neese, 1993; Muchow, 1993; Johnson, 1991; Joseph and Cloutier, 1990). Keating (1991) refers to this dogma as the "rural ideology". For Canada, this ideology is characterized by an "emphasis on interdependence of family, friends and neighbours, a spirit of self-determination and self-reliance, and a negative attitude toward charity"(Keating, 1991, 17). It is important to note that this social representation is not meant to indicate homogeneity of rural seniors. Rather, they are a heterogeneous group and ideologies are locale-specific and influenced by regional, social, cultural, occupational, and population density differences, among others.

The second genre for defining "rural" is geographic which, in and of itself, carries a variety of classifications. Depending on the geographic definition used,

Canada's rural population varies between 22 and 38 percent of the total

population (Canadian Housing Observer, 2003). The Ministerial Advisory

Council on Rural Health (2003) indicates a more modest range of 21 to 30

percent. For the purposes of this study, in accordance with the definitions used

in the Canadian Community Health Survey – Cycle 1.1, "rural" will be defined

using the 1996 census geography (Statistics Canada, 1996): "Rural areas are

sparsely populated lands lying outside *urban areas*" (58). The following 1996

census definition of "urban" will be used: "Urban areas have minimum

population concentrations of 1,000 and a population density of at least 400 per

square kilometre, based on the previous census population counts. All territory

outside urban areas is considered rural. Taken together, urban and rural areas

cover all of Canada" (61).

According to the 1996 Census Dictionary (Statistics Canada, 1996), urban

and rural areas can be further divided based on population and census

designation. The urban core, urban fringe and rural fringe identifiers distinguish

between central and peripheral urban and rural areas within a census

metropolitan area (CMA). Canada consists of 25 CMAs, each containing "a very

large urban area (known as the urban core) plus adjacent urban and rural areas

that have a high degree of social and economic integration with the urban core"

(CIHI, 2002, 14). A CMA has an urban core population of at least 100,000,

including all neighbouring municipalities (CSDs) where: (1) 50% or more of the

employed labour force living in the neighbouring CSDs commutes to work in the

urban core; or (2) 25% or more of the employed labour force working in the neighbouring CSDs commutes to work from the urban core (CIHI, 2002). "Urban fringe" is the urban area within a CMA that is not contiguous to the urban core while "rural fringe" is all territory within a CMA not classified as urban core or urban fringe (Statistics Canada, 1996). The terms "urban outside census metropolitan area" (urban-O/CMA) and "rural outside census metropolitan area" (rural-O/CMA) refer to all urban and rural areas, respectively, that lie outside a CMA. These sub-definitions have been used to categorize some urban-rural status variables of the CCHS – Cycle 1.1 and will be employed, accordingly, in this research.

1.1 Research Questions

Several correlates of self-care (e.g., age, sex, education, socio-economic status, ethnicity, perceived health status, health beliefs, perceived control, and knowledge about health) have been identified from relevant literature (Morrongiello and Gottlieb, 2000). However, the influence of these factors across residential status has not been adequately investigated. Indeed, Chappell (1987) writes: "While we know self-care dominates personal health care, details about particular practices, by whom, in what circumstances, and related to what outcomes are lacking. It is an area in need of much research, both in its own right and as a component of the total care system" (161). Exploration of factors contributing to disparities in self-care behaviour is essential for the development

of regionally appropriate health policies and service strategies that optimise

health benefits for all Canadians, regardless of residential status.

Among factors contributing to rural-urban differentials in self-care, the

accessibility of primary care services has been suggested as a significant

mediating factor (Mockenhaupt & Muchow, 1994). Several researchers have

identified a lack of access to health care services in rural areas (Ministerial

Advisory Council on Rural Health, 2003; Rosenthal and Fox, 2000; Krout, 1998;

Joseph and Martin-Mathews, 1993; Koff, 1992; Joseph and Fuller, 1991; Keating,

1991). Coward and colleagues (1994) argue that: "In most rural communities,

with some notable exceptions, elders simply do not have access to as many or as

large a range of formal services as do their counterparts in more urban and

suburban settings...Although significant improvements in the number and kinds

of services available for rural elders occurred...these advances have *not*

eliminated completely the significant differences that exist between rural and

urban health and human service networks" (25). The authors suggest that the

lack of access to health services by rural residents results in lower levels of

service utilization.

In turn, lower rates of health service utilization among rural-dwellers,

compared to their urban counterparts, may be associated with diminished access

to health information, including self-care information. Stoller and colleagues

(1993) for example, found that physicians are the most common sources of health

information for those with primary care contact in the formal system. The

salience of self-care in health promotion and the inadequacy of many existent policies and programs (Muchow and Mockenhaupt, 1994) suggests further study of factors that mediate differences in the self-care behaviours of rural and urban seniors. In recognition of this fundamental need, the following exploratory research question has been developed: *What principal factors contribute to differences in the self-care behaviours of older rural Canadians, compared to their urban counterparts?* In addressing this question, findings from this research may be used to facilitate the development and implementation of more regionally appropriate policies and programs that optimise potential benefits for older adults in Canada and, particularly, rural Canada.

Considering the salience of the primary care system in disseminating health information, differentials in self-care between rural and urban older Canadians may be attributable, in part, to residential differences in access to primary healthcare services. In recognition of this potential influence, a second research question has been included to guide this research: *To what extent does access to primary care services influence rural-urban differences in self-care behaviour?* Addressing this question will contribute fundamentally to the existent body of self-care correlates and may act as an impetus for improved provision of services in Canada, particularly in rural regions.

2 REVIEW OF LITERATURE

2.1 Theoretical Orientation

Relevant literature indicates that health education and information can significantly influence self-care behaviour. This thesis extends this work by examining the role of the primary care system in disseminating health knowledge, including self-care information. Three prominent theoretical approaches will be used to guide the examination of the relationship between accessibility of primary care services and self-care behaviour. First, a social ecological perspective will be used to explain how socio-environmental conditions affect behaviour. Specifically, this perspective will be used to explicate how access to resources (e.g., primary care services) and disparities in access can differentially affect self-care behaviour. Second, a social determinants of health approach will be used to examine how social-environmental conditions (e.g., community resources) influence the health of individuals and populations. Finally, Social Learning Theory will be used to explain how social processes at the individual level affect behaviour. Specifically, the theory will be used to elucidate how access to primary care services can influence self-care behaviour through interpersonal relationships coupled with exchange of health information.

2.1.1 Social Ecological Perspective

The social ecological perspective is a broad paradigm, focusing primarily on social, institutional, and cultural contexts of the person-environment dynamic (Stokols, 1996). As a paradigm, it provides a framework upon which a number of theories can be integrated. It, therefore, may be useful for understanding rural-urban differences in self-care and may be integrated with a social determinants of health approach and with social learning theory. This paradigm (also termed perspective) is rooted in core principles concerning the interrelations among environmental conditions, human behaviours, and well-being. First, the social ecological perspective holds that physical, mental, and social well-being are affected by a variety of environmental factors. Second, it holds that personal characteristics (e.g., age, sex, etc.) and environmental conditions (e.g., accessibility of primary care services) often have interactive as well as direct effects in terms of well-being. Third, the social ecological perspective proposes that the degree of fit between people's biological, behavioural, and socio-cultural needs and the environmental resources available to them (e.g., availability of primary care services) is a key determinant of health and well-being. Finally, the perspective maintains that, within organized community settings, certain behaviours and roles (e.g., physician's demonstrative role) exert pivotal influence on well-being (e.g., influence through teaching and/or acquisition of health knowledge) (Gryzywacz & Fuqua, 2000; Stokols, 1992). Generally, the social ecological perspective considers the

"cumulative impact of conditions within multiple settings and life domains on individual and collective well-being..." (Stokols, 1996, 287). Specifically, "the physical and social facets of settings are assumed to be closely interlinked and capable of exerting independent as well as joint effects on occupants' well-being. Also, the multiple domains of human activity (e.g., one's residence, neighbourhood, workplace, and surrounding community) are viewed as nested structures in which local settings and organizations are embedded within larger and more remote regions" (Stokols, 1996, 286).

2.1.1.1 Social Ecological Perspective and Self-Care Behaviour:

The social ecological perspective provides a comprehensive view of health and offers conceptual linkages with individual health practices (Gryzwacz & Fuqua, 2000). This approach emphasizes the dynamic role of people and groups in modifying their personal health behaviours. Individuals are considered as maintaining the active ability to adjust their personal health behaviours in relation to their socio-environmental conditions and experiences (Whittemore et. al., 2004). According to Whittemore and colleagues (2004), individual behaviour is supported and influenced by both intrapersonal and interpersonal processes as well as by institutional factors, community contexts, and public policy. The authors hold that the capacity of individuals to change their behaviours to optimise health is primarily influenced by relevant knowledge and skills. They emphasize the salience of community influences on health behaviours. The

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authors write: "characteristics of neighbourhoods and communities, such as

business, recreation, and educational opportunities, are associated with the

health and health behaviours of individuals" (92). In a study on social and

community resource utilization in illness-specific self-care, Strycker and Glasgow

(2002) found that support from physicians and the health care team was

perceived as the most important source of support in making positive self-care

changes (e.g., changes to dietary behaviour). Thus, based on this literature, it

becomes evident that access to health-related resources may influence health

behaviours, including self-care behaviours.

2.1.1.2 Community 'Resource' Variability and Access to Health Services:

Taking into account the effect of access to resources on health behaviours,

it is important to consider that such resources and other environmental

conditions will vary among communities. In turn, this influence will

differentially affect residents' health behaviours, depending on the resources

available within a given community context (Whittemore et al., 2004).

Considering the salience of knowledge and skills in shaping health behaviours

and considering the variability of community characteristics in providing such

knowledge, the social-ecological perspective addresses the issue of access to

resources and disparities in resource across residential status. For the purposes of

this research, the "resources" in consideration are primary care services.

2.1.2 Social Determinants of Health

In close connection with the social-ecological perspective, this section will present the social determinants of heath approach to health. It is well established that health is affected by a myriad of factors acting interdependently. Beyond traditional biologic, genetic, and pathological interpretations, a breadth of evidence continues to emerge in support of a more socio-economic perspective of health and its determinants. According to Frank and Mustard (1994), poverty, employment status, education, living and working conditions, families, friends, social support, workplaces, and other social environments all significantly affect health. Shaw and colleagues (1999) emphasize the cumulative impact of social and economic disadvantage, across the lifespan, as contributing to differential health outcomes among individuals and populations. Further, the Canadian Public Health Association (1997) stresses the "major influence" of social circumstance on health inequities across societies. Building on such notions, a 'social determinants of health' approach holds that the socio-economic environment is a modifiable health-determining factor that plays an important role in influencing individual lifestyles and health behaviours (CPHA, 1997). Health Canada (2002) has identified and accepted nine social determinants of health including: early childhood education and care; education; employment and job security; food security; housing; income equality; social inclusion; social policy; and working conditions (see Fig 2.1).

The Canadian Public Health Association (1997) reminds us that focusing on such socio-economic elements of health does not discount the contribution of other health moderators such as genetics, lifestyles, and health care. Instead, a 'social determinants of health' approach acknowledges a breadth of contributing factors but with overt understanding that such factors are strongly mediated by social and physical environments. The social determinants of health "have a direct impact on the health of individuals and populations, are the best predictors of individual and population health, structure lifestyle choices, and interact with each other to produce health" (Health Canada, 2002, 2).

2.1.2.1 Social Determinants of Health and Access to Primary Care

Although access to health care is not discussed as a primary social determinant of health (SDOH), Health Canada (2002) reminds us of the undeniable importance of access to services in maintaining health, writing: "...universal access to medical care is an important aspect of the SDOH. Without this, Canadians who become ill or injured would be forced to spend a large share of their income on treatment, leaving little money for other SDOH, such as housing and food" (Health Canada, 2002, 1). This position can be extended to the rural-urban issue of differential access to primary services whereby rural-dwellers are often forced to travel long distances for consultations and treatment. The issue of differential access is discussed later in this chapter.
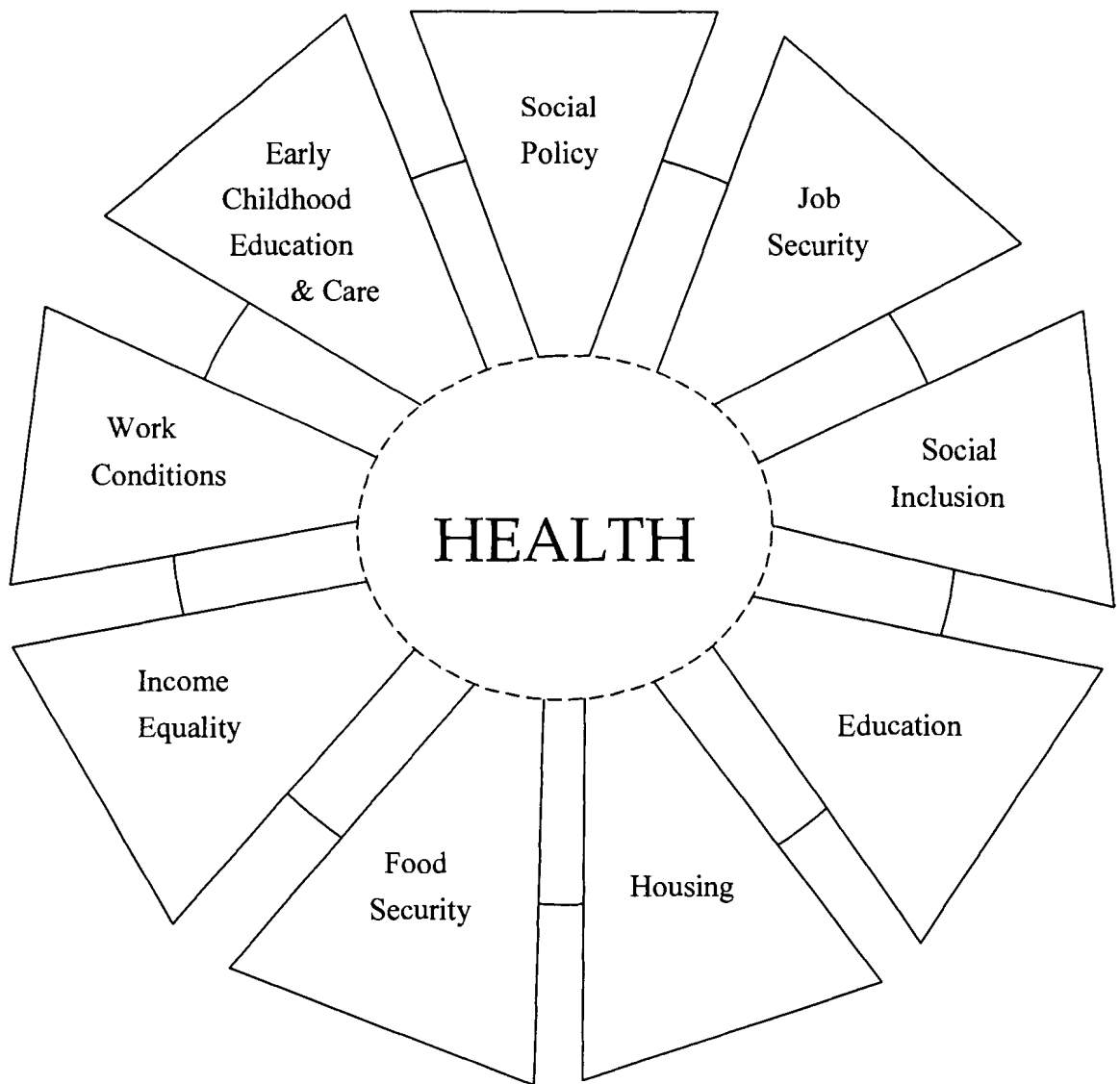
Fig. 2.1 A Representation of the Social Determinants of Health (Adapted from Health Canada, 2002).

2.1.2.2 Social Determinants of Health and Self-Care

The social determinants of health philosophy diverges from popular concentration on "lifestyle factors" as independent health moderators. Instead, it is held that social determinants of health act to moderate lifestyle behaviours, including self-care behaviours. Frank and Mustard (1991) offer the issue of smoking as an example in support of this position. The authors write: "...the presumption that users rationally and voluntarily 'choose' to smoke as a 'lifestyle' is particularly inappropriate...the observation that smoking behaviour is very sharply graded by socio-economic class undercuts the argument that it represents an individual choice, and indicates instead a powerful form of social conditioning" (Frank and Mustard, 1991, 8). Considering this ideology, it is evidenced that self-care behaviours are a product of social and economic circumstances and are modifiable through improvement of those circumstances.

2.1.3 Social Learning Theory

Social learning theory is a cognitively oriented theory that emphasizes the prominence of vicarious, symbolic, and self-regulatory processes in explaining human behaviour (Bandura, 1977). Human behaviour is considered in terms of continuous reciprocal interactions among cognitive, behavioural, and environmental determinants whereby "...people are neither driven by inner forces nor buffeted by environmental stimuli" (Bandura, 1977, ii). Essentially, learned behaviours are mediated through social processes and, thus, "human

thought, affect, and behaviour can be markedly influenced by observation and

direct experience" (Bandura, 1977, vii). According to social learning theory, the

capacity to use symbols and to learn by observation enables people to engage in

foresightful action because they are able to anticipate probable consequences and

can alter their behaviour accordingly (Bandura, 1977). This ability to mediate

behaviour through observation and social experience is termed self-regulation.

In social learning theory, self-regulation involves "arranging environmental

inducements, generating cognitive supports, and producing consequences

for...actions" (Bandura, 1977, 13). Thus, through self-regulation, "people are

able to exercise some measure of control over their own behaviour" (Bandura,

1977, 14). Self-regulation is reflective of the behavioural repertoires one acquires,

experientially, through social learning.

2.1.3.1 Modelling and Behaviour in the Context of Social Learning

Many human behaviours are acquired observationally, by means of

"modelling". In the context of social learning theory, modelling is considered

both an "indispensable" aspect of learning and a "powerful means" for

establishing behaviour (Bandura, 1977). Through observing others, one forms

ideas of how new behaviours are performed and he/she interprets the modelling

symbolically as a guide for appropriate future performances (Bandura, 1977). A

major function of modelling is to impart knowledge concerning the transmission

of personal-environmental responses into new patterns of behaviour (Bandura,

1977). Information can be conveyed through physical demonstration, pictoral representation, or verbal description (Bandura, 1977). According to Bandura (1977), the basic modelling process is consistent, regardless of whether the behaviour is expressed through live action, pictures, or words. However, models, themselves, may differ in their respective effectiveness in conveying information. With regard to the characteristics of models, those who have high status, competence, and power are more effective in promoting others to behave similarly than are models of lower status (Bandura, 1977). Accordingly, a physician may exert greater influence in altering one's health behaviours (e.g. self-care) than would a lay consultant, assumed to be of lesser competence regarding health information and appropriateness of health practices.

Modelling is not only indispensable in terms of establishing behaviour, but also in the dissolution of conventional behavioural inclinations. Bandura (1977) writes: "Modelling influences can strengthen or weaken inhibitions over behaviour that observers have previously learned" (49). Thus, modelling imparts knowledge that enables observers to both derive and refine behaviours beyond those of their existent behavioural and experiential repertoires (Bandura, 1977). For the purposes of this research, modelling (e.g., physical demonstration, pictoral representation, verbal persuasion) is considered in context of primary care services, whereby health information is disseminated in the conveyance of self-care directives. It should be emphasized that this research does not focus specifically on theory-testing and, thus, social learning theory is used here as a

rationale explaining the intermediary function of modelling in the transmission of health information to health behaviours.

2.1.3.2 Social Learning Theory and Self-Care Behaviour

Social Learning Theory has been applied in an array of self-care paradigms. Easom's (2003) conceptual model of self-care, based on the principles of social learning theory and specific to older adults, depicts the influence of both self-efficacy and perceived barriers on engagement in self-care. According to Easom (2003), an important predictor of health behaviour is one's perception of barriers to a given behaviour. The author indicates that: "when perceived barriers are low, self-care activities are high" (12). In a study by Kinne and colleagues (1999), individuals with lower perceived barriers were found to have a higher probability of engaging in specific self-care activities. Barriers are considered "blocks to undertaking and conducting a given behaviour" (Easom, 2003, 12). For instance, in a study by Tapler (1996), findings revealed that perceived barriers had the strongest association with health behaviours ($r = -.56$, $p < .01$). Janz and Becker (1984) also found that barriers outweighed benefits as predictors of engagement in self-care activities. Lack of health information has been considered to be a barrier to self-care. In a study on the effects of immunization information and health counselling among older adults, Peters (1995) found that lack of knowledge was an important perceived barrier. Similarly, Easom (2003) emphasizes lack of knowledge as a barrier to self-care

among older adults. The author emphasizes that the imparting of self-care

knowledge through education, training, verbal persuasion, and counselling is a

necessary pathway to self-care. In terms of social learning theory, imparting

knowledge relies heavily on the health information obtained from interactions

with the primary care system.

An Application of Social Learning Theory to
Primary Care Services and Self-care Behaviour
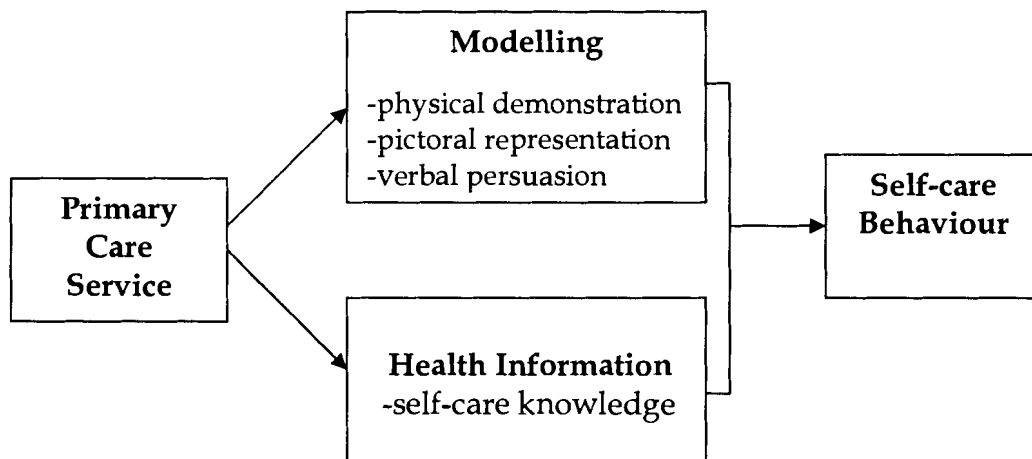
Fig. 2.2 An Application of Social Learning Theory to Primary Care Services and
Self-care Behaviour

Although Social Learning Theory elucidates the influence of accessibility

of primary care services on individual health behaviours, the theory does not

address the issue of access to resources or the influence of disparities in resources

on health behaviours. These deficits, however, are addressed above in relation to the social ecological perspective. Figure 2.3 provides an integrated representation of Social Learning Theory and Social Ecological Perspective in terms of access to health resources and self-care behaviour.
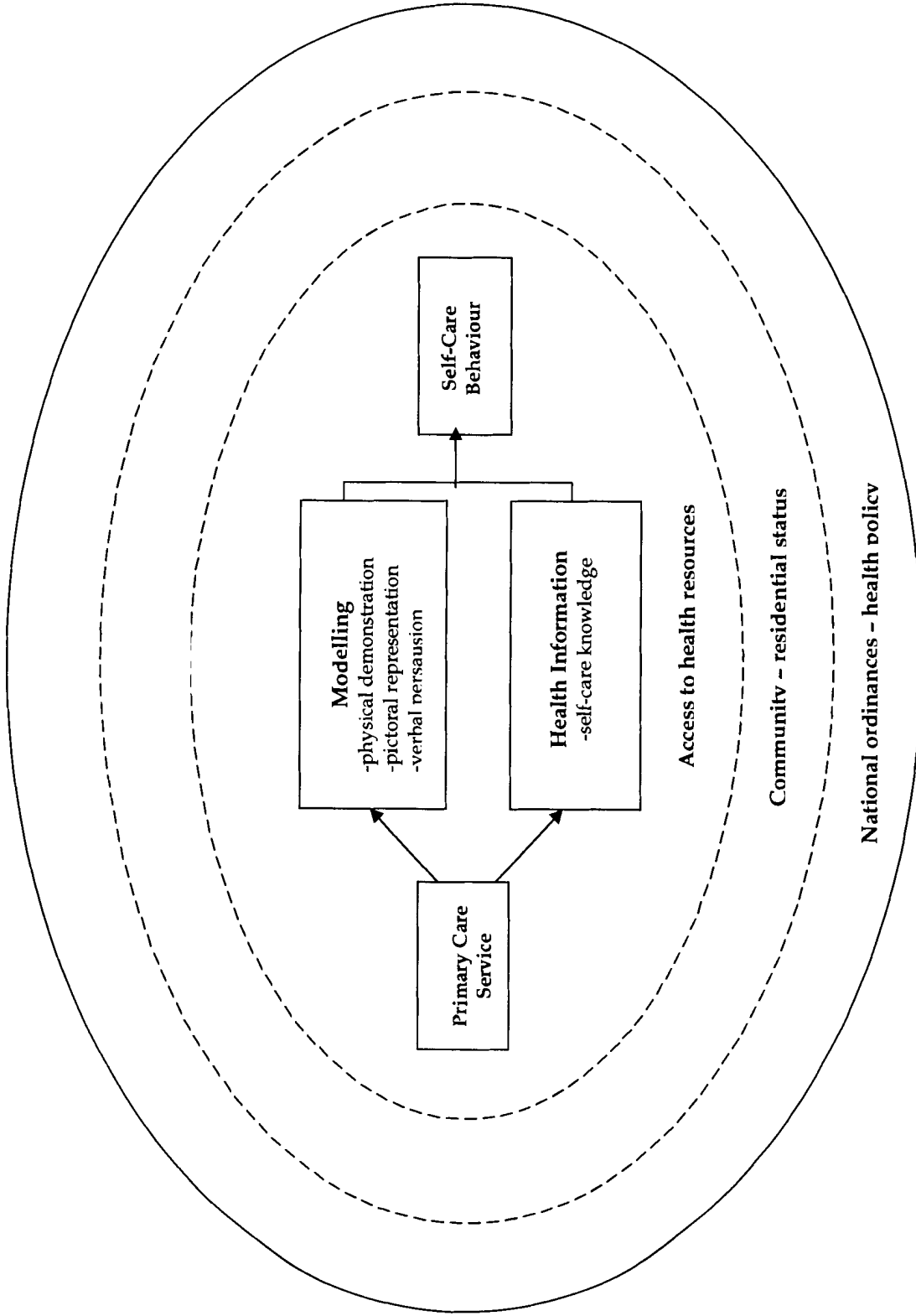
Fig. 2.3 An Integrated Application of Social Learning Theory and Social Ecological Perspective to Access to Health Resources and Self-Care Behaviour.

2.2   The Importance of Self-Care Behaviours for Older Canadians

According to DeFriese and Konrad (1993), self-care is an "important adjunct" to the care provided by health care professionals and organizations. A number of benefits of self-care for older adults have been identified in research. Such benefits include increased quality of life, fewer hospitalisations, fewer days spent in acute care, improved symptom management, decreased social/role activity limitations, and healthcare cost-containment, to name a few (Lorig et al., 2001; Morrongiello & Gottlieb, 2000; Lorig et al., 1999, Vickery et al., 1988). The importance of self-care is further substantiated in its prolongment of functional independence among older adults (Rabiner et al., 1997). Thus, self-care is a logical and increasingly salient complement to primary care, particularly considering the blatant and widespread shortage of health care human resources and barriers to health promotion strategies in many parts of Canada (Ministerial Advisory Council on Rural Health, 2003; Mockenhaupt & Muchow, 1994).

2.3   Rural-Urban Differences in Formal Services

In recognizing the prominence of health service provisionary challenges for seniors living in rural areas, it is important to understand the demography of Canada's aging rural population. According to the Canada Mortgage and Housing Corporation (Canadian Housing Observer, 2003) 14.3 percent of Canadian seniors are living in rural and small town areas. Current

demographics imply continued increases in this trend as rural-dwellers age-in-place and as baby boomers congregate in rural and smaller town areas (Joseph and Bryant, 2001; Halseth and Rosenberg, 1995; Joseph and Martin Mathews, 1993; Joseph and Fuller, 1991).

The provision of primary care services and health promotion strategies have manifested differentially in rural and urban regions of Canada. Canada's Ministerial Advisory Council on Rural Health (2003) states that: "There is a fundamental mismatch between the health care needs of people living in rural Canada and the availability of health care providers and health services...With regard to rural health care services, there is an underdevelopment of health promotion programs, a lack of diagnostic services, poor access to emergency and acute care services, a lack of non-acute health care services and under-servicing of special needs groups, like seniors..." (4).

A significant health service challenge for rural residents is the widespread shortage of health care providers in rural areas. Rosenthal and Fox (2000) indicate that although programs have been developed to train generalists to practice in rural communities, they have experienced limited capacity for placement as many general practitioners simply do not want to practice in rural areas. In 2000, only 4 percent of medical specialists in Canada practiced in rural areas. This may be especially problematic for older adults. Seniors who require specialized diagnoses and treatments are forced to travel long distances to receive the care they require. There is also an uneven distribution of general

physicians and nurses within Canada. In 2000, only 17 percent of family physicians and 18 percent of registered nurses practiced in rural, remote, or northern areas, where up to 30 percent of the nation and 14.3 percent of seniors live (Canadian Housing Observer, 2003).

Considering the myriad of barriers that can hinder access to and utilization of primary care services, self-care emerges as a logical complement to the formal system (DeFriese & Konrad, 1993; Lorig et al., 2001; Morrongiello & Gottlieb, 2000; Lorig et al., 1999). Muchow (1993) holds that self-care can reduce the impact of access and availability barriers to health and related services by offering symptom relief and by reducing unnecessary trips for care. Self-care is important to the promotion and maintenance of health for older adults and will foster as such with continued growth of the older adult population (DeFriese & Konrad, 1993). Thus, factors that influence self-care behaviour warrant investigation to ensure development of regionally appropriate and practical health policies and programs for older adults in Canada.

2.4 Rural-Urban Differences in Health Status

Barriers to the provision of and access to primary care services in rural areas can adversely affect health status. Health Canada information on rural health indicates that "health status declines with distance from urban centres" (Ministerial Advisory Council on Rural Health, 3). It has also been substantiated that risks for chronic illness and age-related health declines are associated with

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advancing age. Thus, rural seniors are in a "double-jeopardy" situation in terms of their risk for poor health.

Research has repeatedly demonstrated that the health of seniors living in rural communities is poorer than that of their urban counterparts (Ministerial Advisory Council on Rural Health, 2003; Johnson, 1996; Mockenhaupt and Muchow, 1994; Abraham and Neese, 1993; Muchow, 1993; Koff, 1992; Johnson, 1991). Rural seniors experience higher rates of both chronic disabling conditions and fatal injuries. Muchow (1993) cites higher rates of chronic diseases like arthritis, hypertension, diabetes, and cardiovascular disease as contributing to the increased levels of disability in rural areas. The relatively poorer health of rural Canadians is also reflected in shorter life expectancies and higher death rates of rural-dwellers, compared to their urban counterparts (Ministerial Advisory Council on Rural Health, 2003).

The comparatively poor health status of rural-dwellers is associated with a range of personal, social, economic, and environmental conditions that influence personal health. These determinants include income, education, employment and working conditions, personal health practices, and the environment (Ministerial Advisory Council on Rural Health, 2003). Turning to the older population, rural seniors tend to have lower average incomes and higher rates of poverty compared to urban seniors (Mockenhaupt and Muchow, 1994). They also tend to work more often in conditions that pose serious health hazards and they tend to have fewer years of formal education, compared to their urban

counterparts. The Ministerial Advisory Council on Rural Health (2003) indicates that health promotion and education services are underdeveloped in most rural communities in Canada. Rural residents often lack access to information on a variety of health-related topics such as nutrition and fitness as well as lacking preventative services like mammography and prostate screening (Ministerial Advisory Council on Rural Health, 2003). In turn, this lack of access can have detrimental effects on both the health status and preventative health practices of rural-dwelling seniors (Ministerial Advisory Council on Rural Health, 2003; Mockenhaupt and Muchow, 1994). We now turn to differences in preventative health behaviours.

2.5 Rural-Urban Differences in Preventative Health Practices

Health promotion and education inadequacies common in many rural areas can adversely influence the health behaviours of rural residents (Mockenhaupt and Muchow, 1994). In Canada, significant differences in health practices exist between rural residents and other Canadians. For example rural residents demonstrate higher rates of smoking, obesity, sedentary lifestyle, and heavy alcohol consumption compared to the national averages (Ministerial Advisory Council on Rural Health, 2003). They also have fewer contacts with physicians and other health services (Muchow, 1993). In a study on the frequency with which health screening practices are used, Johnson (1991) found that most rural seniors did not use or were not aware of screening practices. For example,

73.2 percent or rural-dwelling older women never engaged in breast self-examination, while 81.6 percent of rural-dwelling men and women were not physically active, and 61.2 percent never wore a seat belt. Additionally, 45 percent of respondents never ate food from each of the four food groups daily, and 70.8 percent did not limit caffeine intake to three cups daily. Evidently, lower levels of education and a lack of access to health information can negatively influence the health and self-care practices of older rural Canadians. However, most research either overlooks the older population or uses a simple urban/rural dichotomy. Therefore, it is also necessary to document a full range of patterns in self-care practices among older adults.

2.6 Hypotheses

Literature indicates that lack of access to primary care services may hinder exposure to both health and self-care information as well as related learning processes, and that those lacking access will also be less likely to engage in self-care. One may posit that urban-dwellers, having better access to health and related services, will have increased opportunities to learn about and be supported in self-care practices. As a result, they may be more inclined to engage in such health behaviours. Substantiating this notion, Segall (1987) found a "supplemental relationship" between self-care and formal care among older adults. The author notes that rather than being mutually exclusive, self-care and formal care coexist complementarily. This position, however, has been

challenged. For example, Rabiner and colleagues (1997) in their study of rural-urban differences in self-care among older adults found that older participants from non-metropolitan areas were more likely to report performing self-care both as treatment and prevention of disability. For the purposes of this research, it is held that lack of access to primary care services will act as a barrier to self-care, rather than as an impetus for it. Further, it is held here that accessibility of formal services will be a primary contributor to rural-urban differentials in self-care behaviour. Based on this position and on the above review of literature, the following hypotheses have been postulated and comprise the focus of this research:

1. Canadians, age 65 and older, living in rural environments will report more unhealthy self-care behaviours than those living in more urban ones.

2. The association between residential status and self-care behaviour will be partially explained by the inclusion of access to primary care variables (having a regular doctor, consulting any health professional, and perceiving care needs as being met), after controlling for other important variables.

3. Canadians, age 65 and older, living in rural environments will report decreased access to primary care services compared to those living in more urban ones.

3   METHODOLOGY

This chapter discusses methodological aspects of the present research including a description of the data source and explanations of the variable recoding, filtering, and weighting procedures employed in preparation of the data for statistical analyses. Further, a description of the sample is provided in context of each variable selected to test the hypotheses.

3.1 Data Source

The following analyses use data derived from The Canadian Community Health Survey (CCHS) – Cycle 1.1 (2000). The CCHS, conducted by Statistics Canada, consists of two surveys, each providing a cross-sectional examination of health determinants, health status, and health system utilization patterns of Canadians. The first survey provides sub-provincial-level data from 136 designated health regions (HRs) across Canada. The second survey provides provincial-level data on a specific health topic. A primary goal of the CCHS is the collection of information on issues of particular relevance to the HRs. In order to achieve this goal, the questionnaire was divided into two parts: (1) a common content section lasting 35 minutes in duration; and (2) a 10-minute optional content section consisting of questions selected by each health region to

meet their respective needs. Both surveys comprising the CCHS were conducted over a two-year, repeating cycle with data for Cycle 1.1 being collected between September 2000 and September 2001 (Beland, 2002).

The CCHS targeted all household residents, aged 12 years or older who live in a private residence Persons in all provinces and territories were included; however, those living on Indian Reserves or Crown lands, those living in private institutions, full-time members of the Canadian Armed Forces, and those dwelling in certain remote areas were not included. In total, the CCHS represents approximately 98% of Canada's population, aged 12 year or older. A combination of area and random digit dialling sampling frames was employed to generate a representative sample of households in each health region. Cycle 1.1 of the CCHS consists of survey data collected in 133 HRs across the 10 provinces. Each territory was designated as a single HR, resulting in a total of 136 HRs across Canada. In selecting individual respondents, youths (12 to 19) and older adults (65 or older) were over-represented. Proxy interviews were conducted on behalf of selected individuals in cases where the selected respondent was unavailable after repeated contact attempts. The response rate for Cycle 1.1 was 84.7% with 6.3% of interviews being conducted by proxy (Perez, 2002).

The CCHS-Cycle 1.1 sample included 130,880 respondents age 12 years and older. The following analyses are based on survey responses provided only by those age 65 and older. Therefore, a sub-sample of 24, 281 respondents is used for the present analyses.

A population sampling weight coefficient, provided by Statistics Canada, was used in weighting selected cases to equal known population distributions by age and sex across Canada. The weight coefficient was employed to counter the unequal probability of selection and of over- and under-representation of certain sub-groups within the population. Following application of the weight coefficient, the resultant sample size used for these analyses is 3,647,791, representing all persons aged 65 years and older. All results are reported based on the population-weighted values. Access to confidential residential status data for this research has been granted through application to the British Columbia Interuniversity Research Data Centre (BCIRDC). Not all variables included in the CCHS – Cycle 1.1 were asked in all communities, as optional content modules were included at the discretion of each health region, respectively. In order to make the analyses comparable, only common content variables for Canada are included for statistical analysis.

3.2 Measurement

The following is a description of the specific dependent and independent variables included for statistical analyses in testing the hypotheses.

3.2.1 Dependent Variables

Five dependent variables were selected to represent respondents' self-care behaviours. These include: (1) daily fruit and vegetable consumption; (2) frequency of engagement in physical activity; (3) daily participation in physical

activity; (4) smoking status; and (5) weekly alcohol consumption. In terms of

daily fruit and vegetable consumption, respondents were asked to indicate their

daily consumption of each of fruit/vegetable juice, fruit, salad, potatoes, carrots,

and vegetables, respectively. Responses were then combined to produce a

"Consumption – total fruit and vegetable" variable. The derived variable,

categorizes respondents' average consumption as "<5" servings, "5-10" servings,

or ">10" servings, daily (CCHS-Cycle 1.1, 2000). For the purposes of logistic

regression analysis, the original categories were collapsed to create a

dichotomous dependent variable with the following classifications: (1)

'<5'servings; and (2) '5 or more' servings. This dichotomy was categorized based

on Health Canada's recommended intake of at least 5 servings of fruits and

vegetables, daily (2005).

Engagement in physical activities was determined by asking respondents

to indicate, from a given list, their participation in various activities including

walking for exercise, gardening or yard work, swimming, bicycling, popular or

social dance, home exercises, ice hockey, ice skating, in-line skating or

rollerblading, jogging or running, golfing, exercise class or aerobics, downhill

skiing or snowboarding, bowling, baseball or softball, tennis, weight-training,

fishing, volleyball, basketball, any other, or no physical activity . Respondents

were then asked to specify the duration and frequency of their participation in

each activity indicated. These responses were used to derive the following

variables: "Frequency of all physical activity – lasting more than 15 minutes" and

"Participant in daily physical activity lasting over 15 minutes" (CCHS-Cycle 1.1, 2000). The former classifies respondents' average monthly frequency of physical activity as "regular", "occasional", or "infrequent" while the later indicates (categorized as "Yes" or "No") whether the respondent participated daily in physical activity (CCHS-Cycle 1.1, 2000). For the purposes of logistic regression analysis, the original frequency of physical activity categories were collapsed to create a dichotomous dependent variable with two classifications: 'regular' and 'occasional/infrequent' engagement in physical activity.

Respondents' smoking status was determined by asking a series of questions regarding both past and present smoking behaviours. Responses were used to derive a "Type of smoker" variable including the following classifications: "Occasional smoker but former daily smoker", "Always an occasional smoker", "Former daily smoker, non-smoker now", and "Never smoked a whole cigarette, non-smoker" (CCHS-Cycle 1.1, 2000). Due to small frequencies of respondents in various categories and for the purposes of logistic regression analysis, these classifications were collapsed to two categories as follows: 'smoker' and 'non-smoker'.

Average weekly alcohol consumption was derived from a series of questions regarding respondents' alcohol consumption habits over the twelve months immediately prior to the interview as well as during the week immediately prior to the interview. The derived "Weekly consumption" variable, ranging between 0 and 100, represents the sum of numbers of drinks

consumed on all days, in the week prior to the interview. This derived variable was only calculated for those respondents who had at least one drink in the last twelve months. Responses were initially grouped as follows: '0 drinks per week', 'between 1 and 7 drinks per week', 'between 8 and 12 drinks per week', and '13 or more drinks per week'. These categorizations are based on literature indicating that more than 12 and 14 drinks per week is considered "heavy" consumption for women and men, respectively (Wister, 2005). For this research, consuming 0 drinks classes one a 'non-drinker', while consuming between 1 and 7 drinks represents 'light' drinking across both sexes (e.g., male and female). Consuming between 8 and 12 drinks is considered to represent 'moderate' drinking, while consuming 13 or more drinks per week indicates 'heavy' alcohol consumption across both sexes. For the purposes of logistic regression analysis, the initial groupings were collapsed create a dichotomous dependent variable with the following categories: '≤ 12' drinks, weekly; and '13 or more' drinks per week.

Table 3.1 shows frequencies and percentages by category for each of the dependent variables. Of the total sample population (n=3,647,791), over half (55.5%) of respondents indicated that they do not consume the recommended daily minimum of fruits and vegetables while 44.5% indicated consuming 5 or more servings of fruits and vegetables each day. Further, over half (58.1%) of respondents were considered to engage regularly in physical activity while 41.9% were classed as engaging occasionally or infrequently. Less than a third

(27.9%) of respondents indicated engaging daily in physical activity while most (72.1%) indicated that they do not engage in physical activity each day. The majority of respondents (88.5%) were classed as non-smokers, while 11.5% were classed as smokers. Of respondents, 95.0% indicated drinking 12 or fewer drinks each week while 5.0% were classed as heavy drinkers, consuming 13 or more drinks, weekly.

Table 3.1 Dependent Variable Frequencies and Percentages by Category

	Daily Fruit & Vegetable Consumption	Frequency (n)	Percent (%)	Frequency of Physical Activity	Frequency (n)	Percent (%)
Categories	<5	2,024,525	55.5	Regular	2,118,721	58.1
	5 to 10	1,499,831	41.1	Occasional	443,316	12.2
	>10	123,435	3.4	Infrequent	1,085,753	29.8
Total		3,647,791	100.0		3,647,791	100.0
	Daily Physical Activity	Frequency (n)	Percent (%)	Smoking Status	Frequency (n)	Percent (%)
Categories	Yes	1,017,568	27.9	Smoker	420,509	11.5
	No	2,630,223	7.1	Non-Smoker	3,227,282	88.5
Total		3,647,791	100.0		3,647,791	100.0
	Number of Drinks Weekly	Frequency (n)	Percent (%)			
Categories	"0"	1,041,541	28.6			
	1 to 7	2,320,402	63.6			
	8 to 12	105,093	2.9			
	13 or more	180,755	5.0			
Total		3,647,791	100.0			

3.2.1.1 Missing Data

Modal substitution was used to substitute missing data for nominal

dependent variables. Accordingly, missing cases for 'daily fruit and vegetable

consumption' (n=61,589) were recoded as '<5' servings. Missing cases for

'frequency of engagement in physical activity' (n=34,450) were recoded as

'regular' while missing cases for 'daily participation in physical activity'

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(n=34,450) were recoded as 'no'. In terms of 'smoking status', missing cases (n=10,924) were recoded as 'non-smoker'. Mean substitution was used to replace missing data for the 'weekly alcohol consumption' (x=3.4) variable. Here, missing cases (n=1,306,011), recoded as '1 to 7' drinks per week, were collapsed to the '≤12' drinks per week category to create a dichotomous dependent variable for logistic regression analysis.

3.2.2   Independent Variables

The following thirteen independent variables were included for statistical analysis: (1) residential status; (2) age; (3) sex; (4) marital status; (5) highest level of education; (6) total household income from all sources; (7) race/colour; (8) self-perceived health status; (9) health utility index score; (10) number of chronic conditions; (11) having/not having a regular doctor; (12) consulting any health professional; and (13) self-perceived unmet health care needs. The independent variables were organized into four contextual categories including: (1) residential status; (2) socio-demographics; (3) health status; and (4) access to primary care services.

3.2.2.1 Residential Status

Respondents' residential status (e.g., rural versus urban) was determined from previous census data and included the following geographic classifications: "urban core", "urban fringe", "urban outside census metropolitan area" (urban-

O/CMA), "rural fringe", and "rural outside census metropolitan area" (rural-O/CMA) (see Chapter 1 for category-specific definitions). The 'urban core' (n=2,535,052) classification was set as the reference category for comparisons with the 'urban fringe' (n=81,514), 'urban-O/CMA' (n=367,096), 'rural fringe' (n=199,246), and 'rural-O/CMA' (n=464,882) categories. It was expected that rural-dwellers will demonstrate higher levels of engagement in unhealthy self-care behaviours (e.g., smoking, heavy alcohol consumption), compared to rural-dwellers.

3.2.2.2 Socio-demographics

Age, sex, marital status, level of education, household income, and race/colour were the variables selected to represent the socio-demographic context. Five-year age groups were created from the continuous age variable provided in the data set. The 65-69 (n=1,152,250) age group was set as the reference category and was compared to the 70-74 (n=1,004,254), 75-79 (n=740,951), 80-84 (n=458,226) and 85 and older (n=292,109) age groups. This categorization was used, rather than leaving age as an interval variable, in order to examine possible non-linear associations. For the sex and marital status variables, females (n=2,053,425) were compared to males (n=1,594,366) while respondents who were classed as widowed, separated or divorced, or never married, collectively (n=1,443,221) were compared to those who were married or living in a common-law arrangement (n=2,204,570). Missing cases (n=2,787) for

the marital status variable were recoded as 'married', employing modal substitution. In terms of highest level of education, respondents classed as 'post-secondary graduates' (n=1,036,691) were set as the reference category compared to those with 'less than secondary' education (n=1,850,613), 'some secondary' education (n=576,259), and those who graduated with a secondary-level education (n=184,229). For cases where the respondent's level of education was not indicated (n=43,866), the modal response of 'less than secondary' was imputed. Household income was organized into 5 groups with '≥ $80,000' (n=233,197) as the reference category. The comparison groups included the following income ranges: '< $15,000' (n=509,449); '$15,000 to $29,999' (n=1,639,254); '$30,000 to $49,999' (n=807,065); and '$50,000 to $79,999' (n=458,826). Missing cases for household income were recoded as the modal response in the '$15,000 to $29,999' category. For the 'visible minority status' variable, respondents categorized as 'non-white' (n=256,086) were compare to those classed as 'white' (n=3,391,705). Missing cases (n=32,383) for this variable were recoded as 'white', using modal substitution. It was expected that engagement in positive self-care behaviours will be associated with younger age, female sex, being married/common-law, higher education, greater income, and non-visible minority status.

3.2.2.3 Health Status

Self-perceived health, health utility index score, and number of chronic conditions were the variables included in these analyses to represent the 'health status' context. In terms of self-perceived health, those respondents rating their health as 'excellent' (n=435,476) were set as the reference group, compared to those rating their health as 'very good' (n=895,374), 'good' (n=1,233,491), 'fair' (n=788,723), or 'poor' (n=294,728). Missing cases for this variable were recoded as the modal response, 'good'. Higher self-rated health status was expected to be positively associated with self-care.

In order to include a more objective measure of respondents' health status, health utility index scores were used. The health utility index (HUI) is a generic health status index that synthesizes both qualitative and quantitative aspects of health. The HUI provides a description of respondents' respective overall functional health based on eight attributes including vision, hearing, speech, mobility, dexterity, cognition, emotion, and pain and discomfort. The HUI score is a single numeric value, ranging from –0.36 to1.00, for any combination of levels of these eight health attributes. Within this range, a score of 1.00 is considered indicative of 'perfect health' and a score of 0.00 represents death. Negative scores represent a health status that is considered to be 'worse than death' (CCHS-Cycle1.1, 2000b). The HUI scores were categorized into five groups with the following ranges: 0.96-1.00 (n=1,293,097); 0.82-0.95 (n=982,506); 0.55-0.81 (n=788,643); 0.14-0.54 (n=433,872); and –0.36-0.13 (n=149,672). Again,

the categorizations were used rather than maintaining the interval-level variable in order to examine any possible non-linear associations. The '0.96-1.00' group was set as the reference category for comparison with the other variable groupings. Modal substitution was used to impute missing scores (n=87,124) into the '0.55-0.81' group based on the initial mean health utility index score of 0.7805 for the sample. It was expected that higher HUI scores would be associated with engagement in positive self-care behaviours.

Chronic conditions were defined in the CCHS as "long-term conditions", that have lasted or are expected to last six months or longer and that have been diagnosed by a health professional. Respondents were asked to indicate whether or not they experience a series of chronic health conditions including food and other allergies, asthma, migraine headaches, glaucoma, cataracts, a thyroid condition, Alzheimer disease or any other dementia, cancer, incontinence, effects of stroke, bowel disease, Parkinson disease, multiple sclerosis, chronic fatigue syndrome, chronic bronchitis, emphysema, chronic obstructive pulmonary disease, fibromyalgia, epilepsy, arthritis or rheumatism, back problems, diabetes, hypertension, heart disease, and any other chronic condition. The 'number of chronic conditions' variable was derived from respondents' indicated experiences with each of the conditions listed. For the purposes of this research, four categories were created to represent respondents' number of chronic conditions in order to examine possible non-linear associations. Respondents with '0' (n=473,408) chronic conditions were used as a comparison reference for

those with '1' (n=710,581), '2' (n=802,112), or '3 or more' (n=1,661,689) chronic

conditions. Missing cases were recoded as the modal response of '2'. An inverse

association is expected in terms of number of chronic conditions and engagement

in self-care.

3.2.2.4 Access to Primary Care Services

In terms of access to primary care services, three representative variables

were selected: (1) having a regular doctor; (2) consultation with any health

professional during the past twelve months; and (3) self-perceived unmet health

care needs. In terms of the first variable, respondents were asked if they had a

regular medical doctor and responses were categorized as "Yes" and "No".

Respondents who indicated that they did not have a regular doctor (n=204,609)

were compared to those who did have a regular doctor (n=3,443,182). The modal

response 'yes' was imputed for missing cases. A positive association was

anticipated in terms of having a regular doctor and engagement in self-care.

To determine consultations with any health professional, respondents

were asked to indicate their contacts with a given list of health professionals over

the year immediately prior to the interview. Responses were used to derive a

"Consultations with any health professionals" variable, categorized as "Yes" or

"No", describing whether or not the respondent consulted with any health

professionals during the past twelve months. Those who responded 'no'

(137,998) were compared to those responding 'yes' (n=3,509,793). Missing cases

(n=6,629) were recoded as the modal response, 'yes'. A positive association is expected for consulting any health professional and healthy self-care behaviour.

Finally, 'self-perceived unmet health care need' was determined by asking respondents the following: "During the past twelve months, was there ever a time when you felt that you needed health care but you didn't receive it?" Responses were categorized as "Yes" or "No", indicating whether or not the respondent felt that he/she failed to receive primary care services they perceived to be needed. For this variable those responding 'no' (n=3,344,416) were compared to those responding 'yes' (n=303,375). Modal substitution was used to recode missing cases (n=4,508) as 'no'. Self-care was expected to be positively associated with having no unmet health care needs.

Table 3.2 shows the independent variable frequencies and percents by category. Of the total sample (n=3,647,791), 69.5% of respondents lived in an urban core area at the time of the interview, while 2.2% and 10.1% lived in urban fringe and urban-O/CMA areas, respectively. In terms of rural-dwelling respondents, 5.5% lived in a rural fringe area at the time of the interview, while 12.7% were designated as rural-O/CMA residents. In terms of age, 31.6% of respondents were between 65 and 69 years of age at the time of the interview while 27.5% were in the '70 to 74' age group. Further, 20.3% and 12.6% of respondents were classed in the '75 to 79' and '80 to 84' age groups, respectively. The remaining 8.0% of the weighted sample were age 85 years or older. Over half (56.3%) of respondents were female while 43.7% were male. Most

respondents were classed as 'married/common law' while the remaining 39.6% of the weighted sample were classed as 'not married'. Over half (50.7%) the respondents had less than a secondary-level education while 15.8% and 5.1% of respondents were 'secondary graduates' or had 'some post-secondary' education, respectively. Less than one third (28.4%) of respondents were classified as 'post-secondary graduates'. In terms of household income, 14.0% of the weighted sample earned less than $15,000, 44.9% earned between $15,000 and $29,999, 22.1% of respondents indicated an annual household income of between $30,000 and $49,999 while 12.6% and 6.4% respectively earned '$50,000 to $79,999' or $80,000 or more per year, respectively. The majority (93.0%) of respondents were 'white' while 7.0% were classed as 'non-white'.

In terms of self-perceived health status, 11.9% of the weighted sample rated their status as 'excellent', 24.5% rated their health as 'very good', 33.8% indicated a rating of 'good', 21.6% had a rating of 'fair', and 8.1% perceived their health to be 'poor'. For the HUI, 35.4% of respondents received scores between 0.96 and 1.00 while 26.9% were categorized in the '0.82 to 0.95' score range. A score range of '0.55 to 0.81' was achieved by 21.6% of the weighted sample while 11.9% and 4.1% received scores in the '0.14 to 0.54' and '-0.36 to 0.13' ranges, respectively. In the number of chronic conditions categories, 13.0% of respondents had no chronic conditions while 19.5% and 22.0% indicated having '1' or '2' chronic conditions, respectively. Nearly half (45.6%) of respondents had '3 or more' chronic conditions.

Of respondents, 94.4% indicated that they had a regular medical doctor at the time of the interview, while 5.6% did not have a regular doctor. Of the total sample (n=3,647,791), most respondents (96.2%) had contact with a health professional in the year prior to the interview. Only 3.8% of respondents did not have contact with any health professional. Most respondents (91.7%) indicated that they received care when they felt it was needed, while 8.3% of respondents felt that they did not receive care when they perceived the need.

Table 3.2 Independent Variable Frequencies and Percentages by Category

Residential Status	Frequency (n)	Percent (%)
Categories		
Urban Core	2,535,052	69.5
Urban Fringe	81,514	2.2
Urban-O/CMA	367,096	10.1
Rural Fringe	199,246	5.5
Rural-O/CMA	464,882	12.7
Total	3,647,791	100.0

Marital Status	Frequency (n)	Percent (%)
Categories		
Married	2,204,570	60.4
Not Married	1,443,221	39.6
Total	3,647,791	100.0

Race/Colour	Frequency (n)	Percent (%)
Categories		
White	3,391,705	93.0
Non-White	256,086	7.0
Total	3,647,791	100.0

Age	Frequency (n)	Percent (%)
Categories		
65-69	1,152,250	31.6
70-74	1,004,254	27.5
75-79	740,951	20.3
80-84	458,226	12.6
85 and older	292,109	8.0
Total	3,647,791	100.0

Highest Level of Education	Frequency (n)	Percent (%)
Categories		
< Secondary (2')	1,850,613	50.7
2' Grad.	576,259	15.8
Some Post-2'	184,229	5.1
Post-2' Grad.	1,036,691	28.4
Total	3,647,791	100.0

Self-Perceived Health	Frequency (n)	Percent (%)
Categories		
Excellent	435,476	11.9
Very Good	895,374	24.5
Good	1,233,491	33.8
Fair	788,723	21.6
Poor	294,728	8.1
Total	3,647,791	100.0

Sex	Frequency (n)	Percent (%)
Categories		
Male	1,594,366	43.7
Female	2,053,425	56.3
Total	3,647,791	100.0

Household Income	Frequency (n)	Percent (%)
Categories		
< $15,000	509,449	14.0
$15,000 - $29,999	1,639,254	44.9
$30,000 - $49,999	807,065	22.1
$50,000 - $79,999	458,826	12.6
$80,000 or more	233,197	6.4
Total	3,647,791	100

HUI	Frequency (n)	Percent (%)
Categories		
0.96 - 1.00	1,293,097	35.4
0.82 - 0.95	982,506	26.9
0.55 - 0.81	788,643	21.6
0.14 - 0.54	433,872	11.9
(-)0.36 - 0.13	149,672	4.1
Total	3,647,791	100.0

Table 3.2 (Continued) Independent Variable Frequencies and Percentages by Category

		Frequency (n)	Percent (%)			Frequency (n)	Percent (%)			Frequency (n)	Percent (%)
	Number of Chronic Conditions				**Has Regular Doctor**				**Consulted Any Health Professional**		
Categories	"0"	473,408	13.0		Yes	3,443,182	94.4		Yes	3,509,793	96.2
	"1"	710,581	19.5		No	204,609	5.6		No	137,998	3.8
	"2"	802,112	22.0								
	3 or more	1,661,689	45.6								
Total		3,647,791	100.0			3,647,791	100.0			3,647,791	100.0

		Frequency (n)	Percent (%)
	Self-Perceived Unmet Need		
Categories	Yes	303,375	8.3
	No	3,344,416	91.7
Total		3,647,791	100.0

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4   ANALYSIS AND RESULTS

This chapter describes the bivariate and multivariate statistical analyses employed to test the hypotheses guiding this research. The results of these analyses are also presented. All statistical analyses of the CCHS-Cycle1.1 data were made using SPSS 13.0 software. Bivariate analyses were first conducted in order to test the hypotheses without controlling for other variables. Effects of the independent variables on the self-care behaviours of older Canadians are estimated using logistic regression. In particular, this multivariate technique produces the likelihood of specific self-care behaviours (e.g., fruit and vegetable consumption, frequency of engagement in physical activity, daily participation in physical activity, smoking status, and alcohol consumption) for older Canadians with differential residential statuses, while controlling for all other variables. Hierarchical ordering of other variables, such as those measuring primary care, can show their effects on this association. A significance level of $p<0.05$ was set for all statistical measures.

4.1   Bivariate Analysis

The bivariate analyses described in this chapter provide a preliminary exploration of the research hypotheses. Basic associations between the

dependent and independent variables are examined; however, bivariate analysis

includes only two variables, and thus, elaboration of the causal nature of the

associations is limited. For tests involving nominal-level variables, the 'chi-

square' (χ^2) statistic is reported. This statistic and its significance level indicate

whether the observed table departs significantly from what is expected with no

association (e.g., null hypothesis). In order to analyse the nominal-level bivariate

results tables, the absolute percent differences among variable categories are

compared. Differences across categories of the independent variable for those of

dependent variables that are less than a 5 percent difference were not considered

significant; differences between 5 and 19 percent difference indicate a weak

association; differences between 20 and 49 percent indicate a moderate

relationship; and differences of 50 percent or greater indicate a strong

association. This is important because very weak associations will be statistically

significant due to the use of large weighted sample sizes in this research.

For analytic purposes, dichotomous nominal variables (e.g., 'yes/no') are

treated as interval-level variables. This treatment is possible because

dichotomies can be described as percentages and, in turn, can be interpreted at

the interval level of measurement. The 'Pearson's r' statistic is used to describe

the strength of association for interval-level variable pairs. The 'tau b' variable

will be used for associations between ordinal-level variables with equal numbers

of categories, while the 'tau c' statistic is used to describe associations between

ordinal-level variables having unequal numbers of categories. Since the

weighted data were used in this analysis, very weak associations may be statistically significant. Thus, for this research, a correlation magnitude of less than 0.05 is considered as indicating no relationship while ranges from '0.05 to 0.19', '0.20 to 0.39', and '0.40 or greater' represent weak, moderate, and strong relationships, respectively, for bivariate results at the ordinal- or interval-level.

The bivariate phase of analysis consisted of three main sets of crosstabulations: (1) self-care by residential status; (2) access to primary care services by residential status; and (3) access to primary care services by self-care. In terms of the first and second sets, 'residential status' is considered to be the independent variable while the 'self-care' and 'access to primary' care indicators are consider, respectively, to be the dependent variables. For the third set of crosstabular tests, the 'access to primary care' variables are independent while the self-care indicators are the dependent variables. Table 4.1 shows the strength, direction (where possible), and significance level of the association between independent and dependent variables.

Table 4.1 Crosstabulation: Independent Variables by Dependent Variables

Dependent Variables	Independent Variables			
	Residential Status	Having a Regular Doctor	Consulting any Health Professional	Perceived Unmet Care Needs
Daily Fruit & Vegetable Consumption	$\chi^2=$ 4562.94***	tau c= -0.11***	tau c= -0.009***	tau c= 0.001***
Frequency of Physical Activity	$\chi^2=$ 9351.32***	tau c= -0.004***	tau c= 0.001***	tau c= -0.030***
Daily Physical Activity	$\chi^2=$ 2477.23***	r= -0.003***	r= 0.004***	r= -0.034***
Smoker Status	$\chi^2=$ 2032.56***	r= -0.067***	r= -0.096***	r= 0.017***
Weekly Alcohol Consumption	$\chi^2=$ 7654.19***	tau c= -0.003***	tau c= 0.006***	tau c= 0.005***
Having a Regular Doctor	$\chi^2=$ 4381.96***	-----	-----	-----
Consulting any Health Professional	$\chi^2=$ 4713.35***	-----	-----	-----
Perceived Unmet Care Needs	$\chi^2=$ 758.51***	-----	-----	-----

***$p<.001$

4.1.1 Self-Care and Residential Status

Table 4.2 shows the percentages, by category, for each self-care behaviour by residential status. This table shows the column percentages (adding to 100%) for residential status by each self-care practice, in order to examine the chi square associations shown in table 4.1. Residential status categories with the largest

percent differences occur for the given dependent variable category are

highlighted. Interestingly, Table 4.2 demonstrates a pattern wherein the largest

percent differences occur most frequently between the urban fringe and either

rural fringe or rural-O/CMA categories for most of the dependent variables.

Table 4.2 Crosstabluation: Percentages for Residential Status by Dependent Variables

Dependent Variables		Independent Variables				
DVs by Category		Residential Status by Category				
		Urban Core	Urban Fringe	Urban O/CMA	Rural Fringe	Rural O/CMA
Daily Fruit & Vegetable Consumption	<5 servings	55.00%	54.50%	55.20%	54.90%	58.80%
	5-10 servings	41.50%	41.90%	42.50%	40.60%	38.20%
	>10 servings	3.50%	3.60%	2.40%	4.50%	2.90%
Frequency of Physical Activity	Regular	59.30%	62.40%	54.20%	58.80%	53.20%
	Occasional	11.70%	9.70%	13.70%	12.60%	13.70%
	Infrequent	29.00%	27.80%	32.10%	28.60%	33.10%
Daily Engagement in Physical Activity	Yes	28.20%	32.00%	26.70%	29.50%	25.70%
	No	71.80%	68.00%	73.30%	70.50%	74.30%
Smoker Status	Smoker	11.10%	10.50%	12.70%	11.70%	13.00%
	Non-smoker	88.90%	89.50%	87.30%	88.30%	87.00%
Weekly Alcohol Consumption	No drinks	20.50%	23.00%	29.10%	30.00%	20.00%
	1-7 drinks	63.60%	67.60%	65.30%	59.80%	63.40%
	8-12 drinks	2.70%	4.30%	2.70%	4.20%	3.10%
	13 or more	5.20%	4.30%	3.00%	5.90%	4.70%
Has a Regular Doctor	Yes	94.50%	97.00%	94.00%	96.10%	92.90%
	No	5.50%	3.00%	6.00%	3.90%	7.10%
Consulted any Health Professional	Yes	96.60%	95.70%	96.20%	95.50%	96.20%
	No	3.40%	4.30%	3.80%	4.50%	3.80%
Has Self-perceived Unmet Care Needs	Yes	8.50%	7.50%	8.00%	9.10%	7.50%
	No	91.50%	92.50%	92.00%	90.90%	92.50%

Categories between which largest % difference occurs for the given category

4.1.1.1 Daily Fruit and Vegetable Consumption and Residential Status

Contrary to expectation, none of the percent differences for fruit and vegetable consumption across residential status (see table 4.2) met the minimum strength reference of 5 percent even though the chi square is statistically significant.

4.1.1.2 Frequency of Engagement in Physical Activity and Residential Status

In terms of frequency of engagement in physical activity, a weak association (χ^2=9351.322, df=8, p<.001) was found between residential status and 'regular' engagement. A difference of 9.2% was found between the 'urban fringe' and 'rural-O/CMA' residential designations for this dependent variable category. 'Regular' engagement in physical activity was reported by 59.3% (n=1,504,052) of 'urban core' dwellers, compared to 62.4% (n=50,896) of 'urban fringe' dwellers, 54.2% (n=199,039) of 'urban-O/CMA' residents, 58.8% (117,210) of 'rural fringe' residents, and 53.2% (n=247,524) of 'rural-O/CMA' residents. A weak association was also found for 'infrequent' engagement in physical activity. Here, the largest percent difference (5.3%) occurred between 'urban fringe' (27.8%) and 'rural-O/CMA' (33.1%) residential categories. Conversely, 'infrequent' engagement in physical activity was indicated by 29.0% (n=734,498) of 'urban core' residents, by 27.8% (n=22,696) of 'urban fringe' residents, by 32.1% (n=117,786) of 'urban-O/CMA' dwellers, by 28.6% (57,004) of 'rural fringe' residents, and by 33.1% (n=153,770) of 'rural-O/CMA' residents.

4.1.1.3 Daily Engagement in Physical Activity and Residential Status

Table 4.2 shows a weak association (χ^2=2477.231, df=4, p<.001) for daily engagement in physical activity and residential status. Again, the largest percent differences (6.3%) for this variable were found between the 'urban fringe' and 'rural-O/CMA' residential categories. It was found that 28.2% (n=715,204) of respondents living in an 'urban core' area engaged daily in physical activity, compared to 32.0% (n=26,099) in 'urban fringe' areas, 26.7% (n=97,958) in 'urban-O/CMA' zones, 29.5% (n=58,874) in 'rural fringe' areas, and 25.7% (n=119,432) in 'rural-O/CMA' zones.

4.1.1.4 Smoking Status and Residential Status

Percent differences for smoking in terms of residential status did not meet the minimum reference (χ^2=2032.555, df=4, p<.001) even though the chi square is statistically significant. Unexpectedly, smoking status was not associated with residential status. It is noteworthy that the majority of respondents were classed as 'non-smokers' across all residential status categories (see table 4.2). Specifically 'non-smoker' status was reported by 88.9% (n=2,253,518) of 'urban core' residents, compared to 89.5% (n=72,947) of 'urban fringe' residents, 87.3% (n=320,309) of 'urban-O/CMA' dwellers, 88.3% (n=175,997) of 'rural fringe' dwellers, and 87.0% (n=404,512) of 'rural-O/CMA' residents.

4.1.1.5 Weekly Alcohol Consumption and Residential Status

Examination of Table 4.2 indicates weak associations (χ^2=7654.185, df=12, p<.001), for only the 'no drinks' and '1 to 7' drinks per week categories, in relation to residential status. Specifically, a difference of 6.2% was found between the 'urban fringe' and 'rural fringe' residential categories for consuming 'no drinks', while a difference of 7.8% was found between the 'urban fringe' and 'rural fringe' residential categories for consuming '1 to 7' drinks each week.

It was found that 28.5% (n=721,954) of 'urban core' dwellers consumed 'no drinks' each week, compared to 23.8% (n=13,393) of 'urban fringe' residents, 29.1% (n=106,647) of 'urban-O/CMA' residents, 30.0% (n=59,860) of 'rural fringe' dwellers, and 28.8% (n=13,688) of 'rural-O/CMA' dwellers. Further, results indicated that 63.6% (n=1,611,563) of 'urban core' residents consumed '1 to 7' drinks each week, compared to 67.6% (n=55,123) of 'urban fringe' residents, 65.3% (n=239,583) of 'urban-O/CMA' dwellers, 59.8% (n=119,246) of 'rural fringe' residents, and 63.4% (n=294,866) of 'rural-O/CMA' residents. Thus, the only associations to meet the minimum 5 percent difference to be considered substantive were those for consumption of 'no drinks' and '1 to 7' drinks.

4.1.2 Self-Care and Access to Primary Care

This section will present the bivariate results for self-care behaviours and access to primary care independent variables. These have been summarized in Table 4.1. We do not analyse percent differences, here, because all associations

are interval (Pearson r) or ordinal (tau b/c). Thus, the correlation magnitudes presented in section 4.1 are used to determine the significance of these associations.

4.1.2.1 Self-Care and Having a Regular Doctor

Examination of Table 4.1 indicates a weak negative (r=-0.067, p<.001) relationship between smoker status and having a regular doctor. As expected, respondents are more likely to smoke if they do not have a regular doctor. Unexpectedly, however, no significant relationship for daily fruit and vegetable consumption (tau c=-0.011, p<.001), frequency of engagement in physical activity (tau c=-0.004, p<.001), daily engagement in physical activity (r=-0.003, p<.001), or weekly alcohol consumption (tau c=-0.003, p<.001) in terms of having a regular doctor were found, based on the correspondence rule of a minimum of 0.05 for the statistic, regardless of statistical significance. In relation to smoking status, almost three times the number of respondents without a regular doctor (27.0%, n=37,206) were classed as smokers, compared to those who had a regular doctor (10.9%, n=383,303) (table not shown).

4.1.2.2 Self-Care and Consulting any Health Professional

Table 4.1 shows a weak negative (r=-0.096, p<.001) relationship for consulting any health professional and smoking status. As expected, respondents who consulted a health professional are less likely to smoke. It was

found that 10.9% (n=383,303) of respondents who consulted a health professional, smoked, compared to 27.0% (n=37,206) of those who did not have a consultation. Based on the minimum correlation magnitude set at 0.05, no significant relationship for daily fruit and vegetable consumption (tau c=-0.009, p<.001), frequency of engagement in physical activity (tau c=0.001, p<.001), daily engagement in physical activity (r=0.004, p<.001), or weekly alcohol consumption (tau c=0.006, p<.001) were found in terms of consulting with any health professional.

4.1.2.3 Self-Care and Perceived Unmet Need

Unexpectedly, no significant relationship was found for daily fruit and vegetable consumption (tau c=0.001, p<.001), frequency of engagement in physical activity (tau c=-0.030, p<.001), daily engagement in physical activity (r=-0.034, p<.001), smoking status (r=0.017, p<.001) or weekly alcohol consumption (tau c=0.005, p<.001) in terms of self-perceived unmet care need, based on the minimum correlation magnitude set at 0.05.

4.1.3   Access to Primary Care and Residential Status

Unexpectedly, Table 4.2 shows that none of the associations for access to primary care and residential status reached the minimum strength reference of 5 percent difference between categories. It was found that 94.5% (n=2,395,774) of 'urban core' dwellers had a regular doctor, compared to 97.0% (n=79,080) of

'urban fringe' residents, 94.0% (n=345,194) of 'urban-O/CMA' dwellers, 96.1%

(n=191,472) of 'rural fringe' dwellers, and 92.9% (n=431,662) of 'rural-O/CMA'

residents. Further, 96.6% (n=2,448,689) of 'urban core' dwellers consulted a

health professional, compared to 95.7% (n=78,013) of 'urban fringe' dwellers,

96.2% 9n=353,118) of 'urban-O/CMA' residents, 95.5% (n=190,221) of 'rural

fringe' residents, and 94.6% (n=439,752) of 'rural-O/CMA' residents. Finally,

91.5% (n=2,535,052) of 'urban core' dwellers had all of their care needs met,

compared to 92.5% (n=75,419) of 'urban fringe' residents, 92.0% (n=337,832) of

'urban-O/CMA' residents, 90.9% (n=181,052) of 'rural fringe' dwellers, and

92.5% (n=429,849) of 'rural-O/CMA'-dwelling older Canadians. A

4.1.4 Changes Made to Improve Health

In addition to the main sets of crosstabulations, an additional bivariate

analysis was conducted. The additional set of crosstabulations examines the

basic associations between: (1) changes made to self-care by residential status;

and (2) changes made to self-care by access to primary care. The variables

examined in this additional analysis were derived from a set of questions (e.g.,

self-care module) that were asked optionally in the CCHS - Cycle 1.1, at the

discretion of respective health regions. Thus, large amounts of data were

missing for these variables in the national scope, rendering them unsuitable for

statistical analysis in the main set of bivariate tests. However, these additional

analyses were included because the variables specifically reflect self-care

behaviours and changes in self-care among respondents. Thus, the analyses may provide important insight as to the general mediating effects of access to primary care on the self-care behaviours of older Canadians within specific health regions. Since these analyses were not a main focus of this thesis, results are shown in Appendix A.

4.2 Logistic Regression Analysis

Logistic regression statistical analysis was employed to test a series of models predicting self-care behaviours including: daily fruit and vegetable consumption; frequency of engagement in physical activity; daily engagement in physical activity; smoking status; and weekly alcohol consumption. Using logistic regression, it is possible to examine the influence of a particular independent variable, or group of variables on dichotomous dependent variable outcomes. This technique provides statistics indicating the direction, strength, and statistical significance of the relationships. The analyses in this thesis use a series of hierarchically ordered independent covariates, which may be either categorical or continuous. The logistic regression coefficients are converted to a more easily interpretable, standardized odds ratio. This value falls between 0 and infinity and indicates the estimated odds of engaging in a self-care behaviour, compared to not engaging in that behaviour, after controlling for all other independent variables. An odds ratio ranging between 1 and infinity

indicates a positive association, while odds ratios ranging between 0 and 1 represent inverse associations (DeMaris, 1995).

For these analyses, the dependent variables are coded such that healthy self-care behaviours (e.g., engaging regularly in physical activity) are designated a code of '0' and unhealthy self-care behaviours are coded as '1'. This coding was used in order to be consistent with the hypotheses. A hierarchical model was created to represent four contexts ordered as follows: (1) residential status; (2) socio-demographics; (3) health status; and (4) access to primary care (see Table 4.3). Thirteen independent variables identified in the literature as influencing self-care behaviour have been organized within these four contexts. The hierarchical model was organized based on the following rationale. Variables that are contextually related to one another were grouped into individual blocks. The residential status block was ordered first in order to examine the effects of residential status both before and after the inclusion of additional contexts, represented in models 2 through 4. The socio-demographic contextual model was entered next based on the notion that these variables may predispose health status, which was the next ordered context. The access to primary care variables were entered last in order to observe the overall effect of access to primary care on self-care, after controlling for all other independent variables in each of the previous models. This hierarchical logistic regression model was replicated for each of the dependent variables.

Tables 4.4 to 4.8 indicate the model chi square value and significance level for each context in the hierarchical model. The beta coefficient, standard error, significance level, and odds ratio for each independent variable are also shown. A correspondence rule was developed in order to interpret the odds ratio for residential status across each context, since we have hypothesized that the inclusion of access to primary care will mediate these values. For the purposes of these analyses, a relative change of 20% or greater between odds ratios for the residential status categories was considered significant. This is a conservative approach to evaluating the mediating effects of access to primary care on self-care behaviour, across residential status.

Table 4.3 Logistic Regression for Dependent Variables			
Model 1: Residential Status	**Model 2: Demographics**	**Model 3: Health**	**Model 4: Access to Primary Care**

1. Residential Status
- *Urban Core**
- *Urban Fringe*
- *Urban Outside CMA*
- *Rural Fringe*
- *Rural Outside CMA*
	1. Age
	2. Sex
	  - *Male**
	  - *Female*
	3. Marital Status
	  - *Married/*
	    *Common Law**
	  -*Not Married*
	4. Education
	  - *< Secondary**
	  - *Secondary Grad.*
	  - *Some Post-secondary*
	  - *Post-secondary Grad.*
	5. Income
	  - *<$15,000**
	  - *$15,000-$29,999*
	  - *$30,000-$49,999*
	  - *$50,000-79,999*
	  - *≥$80,000*
	6. Visible Minority Status
	  -*White**
	  -*Non-White*
		1. Self-Perceived Health
		  - *Excellent**
		  - *Very Good*
		  - *Good*
		  - *Fair*
		  - *Poor*
		2. Health Utility Index (HUI)
		  - *0.96-1.00**
		  - *0.82-0.95*
		  - *0.55-0.81*
		  - *0.14-0.54*
		  - *(-)0.36-0.13*
		3. Number of Chronic Conditions
		  - *0**
		  - *1*
		  - *2*
		  - *3 or more*
			1. Regular Doctor
			  - *Yes**
			  - *No*
			2. Consultation with any Health Professional
			  - *Yes**
			  - *No*
			3. Self-Perceived Unmet Need
			  - *Yes**
			  - *No*

*Indicates the reference category for nominal- and ordinal-level data

4.2.1 Logistic Regression for Daily Fruit and Vegetable Consumption

The results of logistic regression analysis for 'daily fruit and vegetable consumption' will be reported first (see Table 4.4). For this logistic regression analysis, consuming '≥5' servings was coded as '0' while consuming '<5' servings was coded as '1'. This coding reflects a minimal level of daily consumption as established in Canada's Food Guide (Health Canada, 2005) and is in accordance with the hypotheses. The residential status context, represented in model 1 was

statistically significant (Model Chi Square=2408.82, p<.001). Residential status was found to be weakly negatively associated with daily fruit and vegetable consumption. Contrary to the hypothesis, the odds of consuming less than five servings of fruits and vegetables each day are slightly lower for 'urban fringe' dwellers (OR=0.981), compared to 'urban core' residents (reference category). Unexpectedly, the odds of consuming less than five servings, daily, are slightly higher for both 'urban-O/CMA' (OR=1.007) and 'rural-O/CMA' residents (OR=1.169), compared to 'urban core' dwellers. No statistically significant association was found for the 'rural fringe' category in terms of daily fruit and vegetable consumption.

The socio-demographic context was introduced in model 2 (Model Chi Square=86,148.113, p<.001) where statistically significant associations were found for all six variables. The likelihood of consuming less than the minimum recommended daily intake of five servings of fruits and vegetables are slightly lower for individuals living in 'urban fringe' (OR=0.969), 'urban-O/CMA' (OR=0.971), and 'rural fringe' (OR=0.967) areas, compared to those living in 'urban core' areas. Conversely, the odds of consuming at least five servings, daily, are slightly higher (OR=1.075) for 'rural-O/CMA' residents, compared to their 'urban core'-dwelling counterparts. Notably, the association for the 'rural fringe' residential category became statistically significant in this model. Further, the positive association indicated for the 'urban-O/CMA' category in the

previous model was rendered inverse in the present model. All other

associations identified in model 1 were replicated in model 2.

For the age variable, statistically significant associations were found for

each age category in terms of daily fruit and vegetable consumption. As noted in

Chapter 3, age groupings were used, rather than leaving age as an interval

variable, in order to examine possible non-linear associations. Here, the odds of

consuming less than five servings each day decrease as age increases.

Specifically, the odds are lower for those age '70 to 74' (OR=0.895), '75 to 79'

(OR=0.828), '80 to 84' (OR=0.789), and '85 or older' (OR=0.715), compared to

those in the '65 to 69' age category. Further, Table 4.4 shows that the odds of

consuming less than five servings of fruits and vegetables each day are higher for

males (OR=1.560), compared to females and for unmarried individuals (1.196),

compared to their married/common-law counterparts. In terms of level of

education, the odds of consuming less than five servings, daily are higher for

individuals with less than secondary education (OR=1.517) and secondary level

graduates (OR=1.331), compared to those who completed post-secondary

studies. The association for the 'some post-secondary' education category was

not statistically significant. In terms of income, the odds of consuming less than

the minimum recommended daily intake of fruits and vegetables increase down

the income gradient: '$50,000 to $79,999' (OR=1.140), '$30,000 to $49,999'

(OR=1.164), '$15,000 to $29,999' (OR=1.252), and '<$15,000' (OR=1.455),

compared to those earning $80,000 or more, annually. The odds of consuming

less than five servings, daily are also higher for persons of visible minority status

(OR=1.181), compared to those classed as 'white', net of all other variables.

Table 4.4 Logistic Regression for Daily Fruit and Vegetable Consumption

	Model 1 2408.82 4df***			Model 2 86148.113 18df***			Model 3 117589.149 29df***			Model 4 119624.005 32df***		
Model Chi Square												
Independent Variables	B	S.E.	O.R	B	S.E.	O.R	B	S.E.	O.R	B	S.E.	O.R
Residential Status												
Urban core			1.000			1.000			1.000			1.000
Urban fringe	-0.019**	0.007	0.981	-0.032***	0.007	0.967	-0.032***	0.007	0.969	-0.030***	0.007	0.970
Urban-O/CMA	0.007*	0.004	1.007	-0.029***	0.004	0.971	-0.020***	0.004	0.980	-0.020***	0.004	0.980
Rural fringe	-0.004	0.005	---	-0.034***	0.005	0.967	-0.033***	0.005	0.968	-0.030***	0.005	0.970
Rural-O/CMA	0.156***	0.003	1.169	0.072***	0.003	1.035	0.079***	0.003	1.082	0.076***	0.003	1.079
Age												
65 to 69						1.000			1.000			1.000
70 to 74				-0.111***	0.003	0.895	-0.135***	0.003	0.874	-0.135***	0.003	0.874
75 to 79				-0.189***	0.003	0.828	-0.241***	0.003	0.786	-0.240***	0.003	0.787
80 to 84				-0.237***	0.004	0.789	-0.331***	0.004	0.718	-0.331***	0.004	0.718
85 or older				-0.336***	0.004	0.715	-0.469***	0.004	0.626	-0.471***	0.004	0.624
Sex				0.445***	0.002	1.560	0.430***	0.002	1.537	0.426***	0.002	0.653
Marital Status				0.179***	0.003	1.196	0.185***	0.003	1.203	0.180***	0.003	1.197
Level of Education												
<Secondary (2')				0.417***	0.003	1.517	0.361***	0.003	1.435	0.356***	0.003	1.036
2' Grad.				0.286***	0.003	1.331	0.261***	0.003	1.298	0.257***	0.003	1.293
Some Post-2'				-0.006	0.005	---	-0.026***	0.005	0.974	-0.026***	0.005	0.974
Post-2' Grad.						1.000			1.000			1.000
Household Income												
<$15,000				0.375***	0.005	1.455	0.317***	0.005	1.373	0.312***	0.005	1.366
$15,000 to $29,999				0.225***	0.005	1.252	0.188***	0.005	1.207	0.186***	0.005	1.204
$30,000 to $49,999				0.152***	0.005	1.164	0.139***	0.005	1.149	0.139***	0.005	1.149
$50,000 to $79,999				0.131***	0.005	1.140	0.126***	0.005	1.134	0.128***	0.005	1.137
$80,000 or more						1.000			1.000			1.000
Race/Colour				0.166***	0.004	1.181	0.123***	0.004	1.131	0.127***	0.004	1.135

*p<.05, **p<.01, ***p<.001

Table 4.4 Logistic Regression for Daily Fruit and Vegetable Consumption

Independent Variables	Model 1			Model 2			Model 3			Model 4		
Model Chi Square	2408.82 4df***			86148.113 18df***			117589.149 29df***			119624.005 32df***		
	B	S.E.	O.R	B	S.E.	O.R	B	S.E.	O.R	B	S.E.	O.R
Self-perceived Health												
Excellent									1.000			1.000
Very good							0.272***	0.004	1.313	0.276***	0.004	1.318
Good							0.357***	0.004	1.429	0.365***	0.004	1.441
Fair							0.494***	0.004	1.639	0.504***	0.004	1.655
Poor							0.322***	0.006	1.380	0.335***	0.006	1.398
Health Utility Index												
0.96 to 1.00									1.000			1.000
0.82 to 0.95							0.053***	0.003	1.054	0.056***	0.003	1.058
0.55 to 0.81							0.224***	0.003	1.251	0.227***	0.003	1.255
0.14 to 0.54							0.332***	0.004	1.394	0.337***	0.004	1.401
-0.36 to 0.14							0.391***	0.006	1.478	0.400***	0.006	1.492
Chronic Conditions												
'0'									1.000			1.000
'1'							-0.054***	0.004	0.947	-0.030***	0.004	0.970
'2'							-0.135***	0.004	0.874	-0.104***	0.004	0.901
3 or more							-0.207***	0.004	0.813	-0.171***	0.004	0.843
Has a Regular Doctor										0.155***	0.005	1.168
Consult Health Prof.										0.131***	0.006	1.140
Perceived Unmet Need										-0.065***	0.004	0.937

*p<.05, **p<.01, ***p<.001

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The health status context, introduced in model 3 was also statistically significant (Model Chi Square=117,589.149, p<.001). In this model, the odds of consuming less than servings of fruits and vegetables each day are higher for individuals who perceive their health to be 'very good' (OR=1.313), 'good' (OR=1.429), 'fair' (OR=1.639), and 'poor' (OR=1.380), compared to those who self-rate their health as 'excellent'. Interestingly, those who rate their health status as 'poor' have slightly lower odds of consuming less than five servings, daily, than those rating their health as 'good' or 'fair', compared to the reference category, suggesting a curvilinear association. In terms of the HUI variable, the odds of consuming less than the recommended minimum number of servings each day are increased for each unit decrease in HUI score. Those scoring '0.82 to 0.95' (OR=1.054), '0.55 to 0.81' (OR=1.251), '0.15 to 0.54' (OR=1.394), and '-0.36 to 0.14' (OR=1.478) have higher odds, compared to those scoring '0.96 to 1.00', after controlling for all other variables. Interestingly, the odds of consuming less than five servings of fruits and vegetables daily are lower for individuals reporting having any number of chronic conditions, compared to those with no condition. Specifically, the odds are decreased by factors of 0.947, 0.874, and 0.813 for those with '1', '2', and '3 or more' chronic conditions, respectively. Notably, the association for the 'some post-secondary' category became statistically significant in the present model. All other associations observed in the previous models were replicated in model 3 with only slight changes in the odds ratios.

Model 4 (Model Chi Square=119,624.005, p<.001) introduced the access to primary care context. Statistically significant associations were found for each variable. As expected, the odds of consuming less than five servings of fruits and vegetables, daily, were higher for persons without a regular doctor (OR=1.168), compared to those with a regular physician. Also as expected, the odds are increased by a factor of 1.140 for persons who did not consult a health professional, compared to those that did. However, contrary to the hypothesis, those that report having unmet care needs are less likely (OR=0.937) to consume less than the minimum recommended number of servings, compared to those with no unmet need. All of the associations indicated in previous models were replicated in model 4, with only slight changes to the odds ratios. In particular, the associations between residential status categories and consuming a less than minimal level of fruits and vegetables were not substantively changed with the inclusion of the access to primary care variables. Thus, the access to primary care variables do not appear to mediate the noted associations.

4.2.2 Logistic Regression for Frequency of Engagement in Physical Activity

Turning to the logistic regression results for frequency of engagement in physical activity, the residential status context (model 1) was statistically significant (Model Chi Square=8,975.588, p<.001) (See Table 4.5). Consistent with the hypothesis, 'regular' engagement in physical activity was coded as '0' while 'not engaging regularly in physical activity' was coded as '1'. As hypothesized,

the odds of not engaging regularly in physical activity are higher for persons

living in 'urban-O/CMA' (OR=1.232), 'rural fringe' (OR=1.021), and 'rural-

O/CMA' (OR=1.281) areas, compared to the reference category. The odds of not

regularly engaging in physical activity are lower for 'urban fringe' dwellers

(OR=0.878), compared to their 'urban core'-dwelling counter parts.

Model 2 (Model Chi Square=197,838.741, p<.001) introduced the socio-

demographic context and statistically significant associations were found for

each of the context variables. Table 4.5 shows increased odds of not regularly

engaging in physical activity for those age '70 to 74' (OR=1.144), '75 to 79'

(OR=1.435), '80 to 84' (OR=1.483), and '85 or older' (OR=1.796), compared to the

reference category, after controlling for all other variables. Males are less likely

to avoid engaging in regular physical activity than are females (OR=0.651), while

those who are married are more likely to be below regular exercise levels

(OR=1.134). Individuals with a '< Secondary' level of education (OR=1.371),

'secondary graduates' (OR=1.105), and those with 'some post-secondary'

education (OR=1.147) are more likely to avoid engaging in regular physical

activity, compared to those who are post-secondary graduates. Table 4.5 also

shows that those with annual household incomes of '<$15,000' (OR=1.621),

'$15,000 to $29,999' (OR=1.306), and '$30,000 to $49,999' (OR=1.040) are more

likely not to engage regularly in physical activity, compared to those earning

'$80,000 or more' each year. However, those with an annual household income

between $50,000 and $79,999 have lower odds (OR=0.833) of not engaging

regularly, compared to those in the '$80,000 or more' category, net of all other variables. Persons who are classed as members of a visible minority are less likely to avoid engaging in regular physical activity (OR=0.762) than are individuals classed as 'white'. The associations observed across residential status in model 1 were replicated in model 2 with only slight variations in the odds ratios.

The health status context was introduced in model 3 (Model Chi Square=320,307.82), p<.001) and statistically significant associations were identified for each variable. Here, the odds of not engaging in regular physical activity were increased for persons rating their health as 'very good' (OR=1.331), 'good' (OR=1.729), compared to the reference category. As expected, those rating their health as 'fair' (OR=2.063) and 'poor' (OR=2.728) were over twice a likely not to engage in physical activity on a regular basis, compared to those with an 'excellent' rating. For the HUI, individuals with lower scores were more likely to avoid engaging in physical activity on a regular basis. Specifically, persons with HUI scores of '0.82 to 0.95' (OR=1.117) '0.55 to 0.81' (OR=1.334), '0.14 to 0.54' (OR=1.883), and '-0.36 to 0.14' (OR=1.243) are more likely not to engage regularly in physical activity, compared to those with the highest HUI scores (0.96 to 1.00). For chronic conditions, persons with '1' (OR=0.951) and '2' (0.938) conditions, respectively, are slightly less likely not to engage regularly than are persons with no condition. Conversely, the likelihood of not engaging regularly is increased by a factor of 1.033 for individuals with '3 or more' chronic

conditions, compared to those with no condition, net of all other variables. All

the associations from previous models were replicated in model 3 with the

exception of two associations. The association for the '$30,000 to $49,999' annual

household income category, the positive association observed in model 2

(OR=1.040) was rendered not statistically significant in model 3. In addition the

association between race and frequency of engagement in physical activity was

rendered not statistically significant in the present model.

The access to primary care context was introduced in model 4 (Model Chi

Square=322,563.808, p<.001), where statistically significant associations occurred

for each covariate. Individuals without a regular doctor were more likely to

avoid engaging regularly in physical activity, compared to those with a regular

doctor (OR=1.022). The odds of being below regular exercise levels were

increased by a factor of 1.293 for persons who did not consult a health

professional, compared to those who did have a consultation (OR=1.293).

Respondents whose care needs went unmet were also more likely to avoid

engaging in physical activity on a regular basis, compared to those with no

unmet needs (OR=1.073). Contrary to the hypothesis, only minimal changes in

the odds ratios for the access to primary care variables and residential status

were found. The associations for other variables, identified in the previous

models, were also replicated in model 4 with the exception of that for

respondents having '2' chronic conditions. In model 4, the previously inverse

association for reporting '2' chronic conditions gained a positive direction

(OR=1.013). Of particular interest is that the associations between residential

status categories and non-regular frequency of engagement in physical activity

were not increased with the addition of the access to primary care variables.

	Model 1			Model 2			Model 3			Model 4		
Model Chi Square	8975.588 4df***			197838.741 18df***			320307.082 29df***			322563.808 32df***		
Independent Variables	B	S.E.	O.R	B	S.E.	O.R	B	S.E.	O.R	B	S.E.	O.R
Residential Status												
Urban core			1.000			1.000			1.000			1.000
Urban fringe	-0.131***	0.007	0.878	-0.177***	0.008	0.838	-0.186***	0.008	0.830	-0.187***	0.008	0.829
Urban-O/CMA	0.208***	0.004	1.232	0.104***	0.004	1.109	0.139***	0.004	1.149	0.139***	0.004	1.149
Rural fringe	0.021***	0.005	1.021	0.068***	0.005	1.070	0.084***	0.005	1.088	0.082***	0.005	1.085
Rural-O/CMA	0.248***	0.003	1.281	0.190***	0.003	1.209	0.229***	0.003	1.258	0.227***	0.003	1.254
Age												
65 to 69						1.000			1.000			1.000
70 to 74				0.135***	0.003	1.144	0.072***	0.003	1.074	0.073***	0.003	1.075
75 to 79				0.361***	0.003	1.435	0.245***	0.003	1.277	0.249***	0.003	1.283
80 to 84				0.394***	0.004	1.483	0.208***	0.004	1.232	0.213***	0.004	1.237
85 or older				0.586***	0.004	1.796	0.354***	0.005	1.424	0.359***	0.005	1.432
Sex				-0.429***	0.002	0.651	-0.456***	0.002	0.634	-0.459***	0.002	0.632
Marital Status				0.125***	0.003	1.134	0.136***	0.003	1.146	0.132***	0.003	1.142
Level of Education												
<Secondary (2')				0.316***	0.003	1.371	0.216***	0.003	1.242	0.213***	0.003	1.237
2' Grad.				0.100***	0.003	1.105	0.072***	0.004	1.074	0.071***	0.004	1.074
Some Post-2'				0.138***	0.005	1.147	0.097***	0.005	1.102	0.098***	0.005	1.103
Post-2' Grad.						1.000			1.000			1.000
Household Income												
<$15,000				0.483***	0.006	1.621	0.360***	0.006	1.433	0.354***	0.006	1.425
$15,000 to $29,999				0.267***	0.005	1.306	0.185***	0.005	1.203	0.183***	0.005	1.201
$30,000 to $49,999				0.039***	0.005	1.040	-0.002	0.005	---	-0.002	0.005	---
$50,000 to $79,999				-0.182***	0.006	0.833	-0.203***	0.006	0.816	-0.202***	0.006	0.817
$80,000 or more						1.000			1.000			1.000
Race/Colour				-0.272***	0.004	0.762	-0.345***	0.005	0.708	-0.341	0.005	---

*p<.05, **p<.01, ***p<.001

Table 4.5 Logistic Regression for Frequency of Engagement in Physical Activity

Independent Variables	Model 1 B	S.E.	O.R	Model 2 B	S.E.	O.R	Model 3 B	S.E.	O.R	Model 4 B	S.E.	O.R
Model Chi Square	8975.588 4df***			197838.741 18df***			320307.082 29df***			322563.808 32df***		
Self-perceived Health												
Excellent									1.000			1.000
Very good							0.286***	0.004	1.331	0.291***	0.004	1.337
Good							0.547***	0.004	1.729	0.554***	0.004	1.740
Fair							0.724***	0.005	2.063	0.729***	0.005	2.073
Poor							1.003***	0.006	2.728	1.002***	0.006	2.724
Health Utility Index												
0.96 to 1.00									1.000			1.000
0.82 to 0.95							0.111***	0.003	1.117	0.110***	0.003	1.116
0.55 to 0.81							0.288***	0.003	1.334	0.287***	0.003	1.333
0.14 to 0.54							0.633***	0.004	1.883	0.627***	0.004	1.873
-0.36 to 0.14							0.217***	0.006	1.243	0.214***	0.006	1.239
Chronic Conditions												
'0'									1.000			1.000
'1'							-0.051***	0.004	0.951	-0.028***	0.004	0.972
'2'							-0.017***	0.004	0.983	0.012**	0.004	1.013
3 or more							0.032***	0.004	1.033	0.063***	0.004	1.066
Has a Regular Doctor										0.022***	0.005	1.022
Consult Health Prof.										0.257***	0.006	1.293
Perceived Unmet Need										0.071***	0.004	1.073

*p<.05, **p<.01, ***p<.001

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4.2.3 Logistic Regression for Daily Engagement in Physical Activity

The residential status context, represented in model 1 was statistically significant (Model Chi Square=2,476.349, p<.001) (see Table 4.6). In this regression analysis, 'daily engagement' was coded as '0' while 'not engaging daily' was coded as '1'. For 'urban-O/CMA' (OR=1.080) and 'rural-O/CMA' (OR=1.137) residents, the odds of not participating in physical activity each day are higher, compared to the reference category. Those living in 'urban fringe' (OR=0.834) and 'rural fringe' (OR=0.937) are less likely not to engage, daily, in physical activity.

In model 2 (Model Chi Square=102,949.151, p<.001), statistically significant associations were observed for each of the socio-demographic variables. Individuals age '70 to 74' (OR=1.041), '75 to 79' (OR=1.335), and '80 to 84' (OR=1.421) are more likely not to engage in physical activity each day, compared to younger respondents age '65 to 69'. Persons in the '85 or older' age group are over twice as likely not to engage, daily in physical activity, compared the reference group. The odds of daily engagement for males is decreased by a factor of 0.728, compared to females, while unmarried persons are slightly less likely (OR=0.958) not to engage in physical activity each day, compared to those in a married/common-law relationship.

For the education variable, persons with lower levels of education are more likely not to engage, daily, in physical activity, compared to persons who

completed post-secondary studies. The odds are increased by factors of 1.685, 1.190, and 1.233 for the '< secondary', 'secondary graduate' and 'some post-secondary' level of education categories, respectively. Table 4.6 shows that individuals with annual household incomes of '<$15,000' (OR=0.983), '$30,000 to $49,999' (OR=0.939), and '$50,000 to $79,999' (OR=0.919) are slightly less likely to engage in physical activity on a daily basis, compared to individuals earning '$80,000 or more'. However, the odds of daily engagement for the '$15,000 to $29,999' category are increased by a factor of 1.005, while the odds for persons of visible minority are increased by a factor of 1.132, compared to those of non-visible minority status. The associations observed in model 1 were replicated in model 2 with minor changes in the odds ratios.

In model 3 (Model Chi Square=224,042.630, $p<.001$) each of the health status variables were statistically significant in their associations with the dependent variable. As self-reported health status declines, the likelihood of not engaging in physical activity each day increases. Persons reporting a health status of 'very good' are more likely (OR=1.160) not to engage in physical activity each day, while persons reporting 'good' (OR=1.499) and 'fair' (OR=1.842) health are also more likely not to engage, daily, compared to those reporting 'excellent' health. The odds of not engaging in physical activity each day are over twice as high for individuals rating their health as 'poor' (OR=2.644), compared to the reference status of 'excellent'. Table 4.6 shows a weak inverse association for daily engagement in physical activity and HUI score where, as the HUI score

decreases, the likelihood of not engaging in physical activity each day increases. Specifically, the likelihood of not engaging daily in physical activity increases by a factor of 1.065 for persons scoring '0.82 to 0.95' on the HUI and by a factor of 1.222 for those scoring '0.55 to 0.81', compared to the reference category score range of '0.96 to 1.00'. The odds of not engaging in physical activity each day are over twice as high for persons scoring '0.14 to 0.54' (OR=2.028) on the HUI while the likelihood of not engaging each day is over four times higher for persons in the lowest HUI score category of '-0.36 to 0.14' (OR=4.047). Table 4.6 also indicates that persons with chronic conditions are less likely not to engage, daily, in physical activity than persons with no conditions. Specifically, those with '1' (OR=0.860), '2' (OR=0.849), and '3 or more' (OR=0.898) chronic conditions have lower odds of not engaging each day, compared to persons reporting no conditions. Some of the observed associations in model 2 were not replicated in model 3. The positive association for the '70 to 74' age category became inverse in model 3 (OR=0.958), while the odds of not engaging in physical activity each day decreased by a factor of 0.518 for the '85 and older' age category from model 2 to model 3 (OR=1.567). Also, the positive association for the '$15,000 to $29,999' income category, observed in model 2 was rendered inverse in model 3 (OR=0.916). All the other associations identified in model 2 were replicated in model 3 with slight variations to the odds ratios.

Model 4 (Model Chi Square=225,179.580, p<.001) introduced the access to primary care context wherein statistically significant associations were observed

for each variable. As hypothesized, persons who demonstrate decreased access to primary care services are less likely to engaging in physical activity each day. Persons without a regular physician are more likely (OR=1.060) not to engage in exercise, daily, compared to those with a regular doctor. The odds of not engaging daily are increased by a factor of 1.210 for individuals who did not consult a health professional, compared to those that had a consultation, while those who reported having unmet care needs are more likely (OR=1.002) not to participate in physical activity each day. All of other associations were maintained between model 2 and model 3, with only slight changes in the odds ratio. Of particular interest is that the associations between residential status categories and not engaging daily in physical activity were not substantively changed with the addition of the access to primary care variables. Thus, hypothesis 2 was not supported.

Table 4.6 Logistic Regression for Daily Engagement in Physical Activity

Independent Variables	Model 1 B	S.E.	O.R	Model 2 B	S.E.	O.R	Model 3 B	S.E.	O.R	Model 4 B	S.E.	O.R
Model Chi Square	2476.349 4df***			102949.151 18df***			224042.630 29df***			225179.580 32df***		
Residential Status												
Urban core			1.000			1.000			1.000			1.000
Urban fringe	-0.181***	0.008	0.834	-0.178***	0.008	0.837	-0.176***	0.008	0.838	-0.177***	0.008	0.837
Urban-O/CMA	0.077***	0.004	1.080	0.013**	0.004	1.013	0.047***	0.004	1.048	0.047***	0.004	1.048
Rural fringe	-0.065***	0.005	0.937	-0.040***	0.005	0.960	-0.034***	0.005	0.967	-0.034***	0.005	0.966
Rural-O/CMA	0.128***	0.004	1.137	0.092***	0.004	1.096	0.129***	0.004	1.137	0.125***	0.004	1.134
Age												
65 to 69						1.000			1.000			1.000
70 to 74				0.041***	0.003	1.041	-0.015***	0.003	0.985	-0.015***	0.003	0.985
75 to 79				0.289***	0.003	1.335	0.175***	0.003	1.191	0.177***	0.003	1.194
80 to 84				0.351***	0.004	1.421	0.148***	0.004	1.160	0.152***	0.004	1.164
85 or older				0.735***	0.005	2.085	0.449***	0.006	1.567	0.451***	0.006	1.570
Sex				-0.317***	0.003	0.728	-0.349***	0.003	0.706	-0.352***	0.003	0.703
Marital Status				-0.043***	0.003	0.958	-0.036***	0.003	0.965	-0.040***	0.003	0.961
Level of Education												
<Secondary (2')				0.522***	0.003	1.685	0.423***	0.003	1.526	0.418**	0.003	1.519
2' Grad.				0.174***	0.004	1.190	0.142***	0.004	1.153	0.140***	0.004	1.150
Some Post-2'				0.209***	0.006	1.233	0.177***	0.006	1.193	0.177***	0.006	1.193
Post-2' Grad.						1.000			1.000			1.000
Household Income												
<$15,000				-0.017**	0.006	0.983	-0.173***	0.006	0.841	-0.179***	0.006	0.836
$15,000 to $29,999				0.005	0.005	1.005	-0.088***	0.005	0.916	-0.091***	0.005	0.913
$30,000 to $49,999				-0.063***	0.005	0.939	-0.106***	0.005	0.900	-0.106***	0.005	0.899
$50,000 to $79,999				-0.084***	0.006	0.919	-0.097***	0.006	0.908	-0.095***	0.006	0.909
$80,000 or more						1.000			1.000			1.000
Race/Colour				0.124***	0.005	1.132	0.065***	0.005	1.067	0.069***	0.005	1.072

*p<.05, **p<.01, ***p<.001

Table 4.6 Logistic Regression for Daily Engagement in Physical Activity

	Model 1			Model 2			Model 3			Model 4		
Model Chi Square	2476.349 4df***			102949.151 18df***			224042.630 29df***			225179.580 32df***		
Independent Variables	B	S.E.	O.R	B	S.E.	O.R	B	S.E.	O.R	B	S.E.	O.R
Self-perceived Health												
Excellent									1.000			1.000
Very good							0.149***	0.004	1.160	0.152***	0.004	1.164
Good							0.405***	0.004	1.499	0.410***	0.004	1.507
Fair							0.611***	0.005	1.842	0.616***	0.005	1.520
Poor							0.972***	0.007	2.644	0.977***	0.007	2.656
Health Utility Index												
0.96 to 1.00									1.000			1.000
0.82 to 0.95							0.063***	0.003	1.065	0.064***	0.003	1.066
0.55 to 0.81							0.201***	0.003	1.222	0.201***	0.003	1.223
0.14 to 0.54							0.707***	0.005	2.028	0.707***	0.005	2.027
-0.36 to 0.14							1.398***	0.011	4.047	1.400***	0.011	4.056
Chronic Conditions												
'0'									1.000			1.000
'1'							-0.151***	0.004	0.860	-0.132***	0.004	0.876
'2'							-0.164***	0.004	0.849	-0.138***	0.004	0.871
3 or more							-0.108***	0.004	0.898	-0.079***	0.004	0.924
Has a Regular Doctor										0.058***	0.005	1.060
Consult Health Prof.										0.190***	0.007	1.210
Perceived Unmet Need										0.002***	0.005	1.002

*p<.05, **p<.01, ***p<.001

4.2.4 Logistic Regression for Smoking Status

Logistic regression results for smoking status will be presented next (see Table 4.7). For this logistic regression analysis, 'non-smoker' status was coded as '0' while 'smoker' status was coded as '1'. Model 1 (Model Chi Square=1,990.545, p<.001) demonstrated statistically significant associations for each of the residential status variable categories. The likelihood of smoking is decreased for 'urban fringe' (OR=0.940) residents, compared to the 'urban core' reference group, while the odds are increased for 'urban-O/CMA' (OR=1.169), 'rural fringe' (OR=1.058), and 'rural-O/CMA' (1.192) residents.

Model 2 (Model Chi Square=135,342, p<.001) introduced the socio-demographic context and statistically significant associations were observed for each of the contextual variables. Here, the likelihood of being a smoker decreases with increasing age. Specifically, persons age '70 to 74' (OR=0.623), '75 to 79' (OR=0.505), '80 to 84' (OR=0.289), and '85 or older' (OR=0.160) are less likely to be smokers, compared to persons age '65 to 69'. Males (OR=1.517) and unmarried individuals (OR=1.791) are more likely to be smokers, compared to females and persons in married/common-law relationships, respectively. Table 4.7 shows that individuals with less than secondary-level education (OR=1.468), secondary graduates (OR=1.408) and those with some post-secondary education (OR=1.531) are more likely to be smokers than those who completed post-secondary studies. As expected, the odds of smoking increase with decreases in

annual household income. Persons earning '<$15,000' (OR=1.972) are almost twice as likely to smoke, compared to the '$80,000 or more' reference category, while those earning '$15,000 to $29,999' (OR=1.766), '$30,000 to $49,999' (OR=1.423), and '$50,000 to $79,999' (OR=1.038) are also more likely to smoke than persons earning '$80,000 or more'. The odds of smoking are decreased by a factor of 0.459 for members of a visible minority (OR=0.459), compared to non-visible minority members, after controlling for all other variables. All of the associations indicated in model 1 were replicated in model 2 with the exception of the association for the 'rural fringe' residential status category. This association was rendered inverse (OR=0.969) from model 1 to model 2.

The health status context was introduced in model 3 (Model Chi Square=157,232.688, p<.001). In terms of self-perceived health status, persons who reported 'very good' (OR=0.866) health are less likely to be smokers, compared to those reporting 'excellent' health. However, the odds of smoking are higher for individuals rating their health as 'good' (OR=1.132), 'fair' (OR=1.346), and 'poor' (OR=1.605), compared to those with a rating of 'excellent'. Table 4.7 indicates that persons with HUI scores of '0.82 to 0.95' (OR=1.057), '0.55 to 0.81' (OR=1.433), '0.14 to 0.54' (OR=1.362) and '-0.36 to 0.14' (OR=1.335) are more likely to smoke than persons in the highest HUI score category of '0.96 to 1.00'. Further, Table 4.9 shows that the likelihood of being a smoker is lower for individuals with '1' (OR=0.815), '2' (OR=0.672), and '3 or more' (OR=0.575) chronic conditions, compared to those with no condition. All other associations,

observed in model 2 were maintained in model 3, with small changes to the odds ratios.

In model 4 (Model Chi Square=175,866.941, p<.001), statistically significant associations were found for each of the access to primary care contextual variables. As expected, individuals without a regular doctor are more likely to be smokers (OR=1.471), compared to those with a regular doctor. The odds of being a smoker are over twice as high for persons who did not consult a health professional (OR=2.188), compared to those that had a consultation. Table 4.7 shows that persons with unmet care needs (OR=1.079) are also more likely to smoke compared to those whose needs were fully met, after controlling for all other covariates. Each of the other associations indicated in the previous models were replicated in model 4 with only slight changes in the odds ratios. Once again, the associations between residential status categories and smoking were not substantively decreased with the addition of the access to primary care variables.

Table 4.7 Logistic Regression for Smoking Status

Independent Variables	Model 1 1990.545 4df***			Model 2 135342.975 18df***			Model 3 157232.688 29df***			Model 4 175866.941 32df***		
Model Chi Square	B	S.E.	O.R	B	S.E.	O.R	B	S.E.	O.R	B	S.E.	O.R
Residential Status												
Urban core			1			1			1			1
Urban fringe	0.062***	0.012	1.064	0.132***	0.012	1.141	0.139***	0.012	1.149	0.137***	0.012	1.147
Urban-O/CMA	-0.156***	0.005	0.855	-0.060***	0.005	0.942	-0.071***	0.006	0.931	-0.072***	0.006	0.931
Rural fringe	-0.056***	0.007	0.946	0.031***	0.007	1.032	0.032***	0.007	1.033	0.028***	0.007	1.028
Rural-O/CMA	-0.176***	0.005	0.837	-0.016***	0.005	0.984	-0.030***	0.005	0.971	-0.010*	0.005	0.99
Age												
65 to 69						1			1			1
70 to 74				0.473***	0.004	1.605	0.473***	0.004	1.605	0.475***	0.004	1.608
75 to 79				0.684***	0.005	1.981	0.700***	0.005	2.013	0.689***	0.005	1.993
80 to 84				1.240***	0.007	3.455	1.290***	0.007	3.631	1.282***	0.007	3.602
85 or older				1.832***	0.01	6.244	1.905***	0.01	6.718	1.900***	0.01	6.685
Sex				-0.417***	0.004	0.659	-0.342***	0.004	0.71	-0.315***	0.004	0.73
Marital Status				-0.583***	0.004	0.558	-0.584***	0.004	0.557	-0.588***	0.004	0.572
Level of Education												
<Secondary (2')				-0.384***	0.004	0.681	-0.312***	0.004	0.732	-0.288***	0.004	0.75
2' Grad.				-0.342***	0.005	0.71	-0.304***	0.006	0.738	-0.290***	0.006	0.748
Some Post-2'				-0.426***	0.008	0.653	-0.415***	0.008	0.661	-0.421***	0.008	0.657
Post-2' Grad.						1			1			1
Household Income												
<$15,000				-0.679***	0.009	0.507	-0.617**	0.009	0.54	-0.577***	0.009	0.562
$15,000 to $29,999				-0.569***	0.009	0.566	-0.538***	0.009	0.584	-0.521***	0.009	0.594
$30,000 to $49,999				-0.353***	0.009	0.703	-0.354***	0.009	0.702	-0.351***	0.009	0.704
$50,000 to $79,999				-0.037***	0.01	0.964	-0.050***	0.01	0.951	-0.054***	0.01	0.948
$80,000 or more						1			1			1
Race/Colour				0.778***	0.009	2.177	0.838***	0.009	2.312	0.819***	0.009	2.269

*p<.05, **p<.05, ***p<|=.001

Table 4.7 Logistic Regression for Smoking Status

	Model 1			Model 2			Model 3			Model 4		
Model Chi Square	1990.545 4df***			135342.975 18df***			157232.688 29df***			175866.941 32df***		
Independent Variables	B	S.E.	O.R	B	S.E.	O.R	B	S.E.	O.R	B	S.E.	O.R
Self-perceived Health												
Excellent									1			1
Very good							0.144***	0.006	1.155	0.117***	0.006	1.124
Good							-0.124***	0.006	0.884	-0.164***	0.006	0.849
Fair							-0.297***	0.007	0.743	-0.338***	0.007	0.713
Poor							-0.473***	0.008	0.623	-0.505***	0.008	0.603
Health Utility Index												
0.96 to 1.00									1			1
0.82 to 0.95							-0.055***	0.004	0.946	-0.061***	0.004	0.941
0.55 to 0.81							-0.036***	0.005	0.964	-0.046*****	0.005	0.955
0.14 to 0.54							-0.309***	0.006	0.734	-0.309***	0.006	0.734
-0.36 to 0.14							-0.289***	0.01	0.749	-0.305***	0.01	0.737
Chronic Conditions												
'0'									1			1
'1'							0.204***	0.006	1.227	0.088***	0.006	1.092
'2'							0.397***	0.006	1.488	0.243***	0.006	1.275
3 or more							0.553***	0.006	1.738	0.381***	0.006	1.464
Has a Regular Doctor										-0.386***	0.006	0.68
Consult Health Prof.										-0.783***	0.007	0.457
Perceived Unmet Need										-0.076***	0.006	0.927

*p<.01, **p<.05, ***p</=.001

4.2.5 Logistic Regression for Weekly Alcohol Consumption

Results for logistic regression in terms of weekly alcohol consumption will now be presented (see Table 4.8). In model 1 (Model Chi Square=4,561, p<.001) the odds of being a 'heavy drinker', defined as consuming '13 or more' drinks per week, are increased by a factor of 1.136 for 'rural fringe' dwellers, compared to those living in 'urban core' areas. However, the odds of heavy drinking are lower for persons living in 'urban fringe' (OR=0.817), 'urban-O/CMA' (OR=0.551), and 'rural-O/CMA' (OR=0.889) areas, compared to those in 'urban core' areas.

Model 2 (Model Chi Square=149,663, p<.001) introduced the socio-demographic context in which statistically significant associations occurred for all variables. Here, the odds of being a heavy drinker decreased with increasing age. The odds of consuming '13 or more' drinks each week are lower for persons age '70 to 74' (OR=0.899), '75 to 79' (OR=0.617), '80 to 84' (OR=0.547) and '85 or older' (OR=0.293), compared to persons age '65 to 69'. Table 4.8 shows that males are over four times as likely to drink heavily (OR=4.508), compared to females, while those who are unmarried are more likely to be heavy drinkers (OR=1.174) than those classed as 'married/common-law'. Persons with less than a secondary-level education are less likely (OR=0.786) to consume thirteen or more drinks per week than those who completed post-secondary studies, while those who are secondary-level graduates are slightly more likely (OR=1.021) to

be heavy drinkers, compared to post-secondary graduates. No statistically significant association for the 'some post-secondary' level of education category was found. Table 4.8 also indicates that persons with lower annual incomes are less likely to drink heavily. Specifically, the odds of consuming thirteen or more drinks each week are lower for persons with annual household incomes of '< $15,000' (OR=0.345), '$15,000 to $29,999' (OR=0.372), '$30,000 to $49,999' (OR=0.589), and '$50,000 to $79,999' (OR=0.614), compared to those earning '$80,000 or more', annually. Members of a visible minority were found to be less likely to drink heavily (OR=0.244) than non-visible minority members, net of all other variables. The associations observed in model 1 were replicated in model 2, with small variations in the odds ratios.

In model 3 (Model Chi Sqaure=155,249.552, p<.001), statistically significant associations occurred for each of the health status contextual variables. Table 4.8 shows that the odds of drinking heavily decrease as self-rated health declines. Those who rate their health as 'very good' (OR=0.753), 'good' (OR=0.800), 'fair' (OR=0.640) and 'poor' (OR=0.477) are less likely to consume thirteen or more drinks, weekly, compared to those who rate their health as 'excellent'. Conversely, the odds of being a heavy drinker are increased for persons with HUI scores of '0.82-0.95' (OR=1.153), '0.55 to 0.81' (OR=1.148), and '0.14 to 0.54' (1.047), compared to those scoring '0.96 to 1.00. However, the odds of drinking heavily are decreased by a factor of 0.867 for persons in the lowest HUI score range of '-0.36 to 0.14', compared to those in the highest score

category (0.96 to 1.00). Table 4.8 also indicates that persons with '1' chronic condition are slightly less likely to be heavy drinkers (OR=0.992), compared to persons with no condition, while those with '2' (OR=1.156) and '3 or more' (OR=1.095) chronic conditions are more likely to drink heavily compared to persons reporting '0' chronic conditions. The associations, observed in models 1 and 2 were replicated in model 3, with slight changes in the odds ratios.

Model 4 (Model Chi Square=156,566.631, p<.001) introduced the access to primary care context and statistically significant associations were found for each variable. As hypothesized, individuals without a regular physician were less likely (OR=0.898) to be heavy drinkers, compared to persons with a regular doctor. Further, the odds of being a heavy drinker are increased by a factor of 1.540 for persons who did not consult a health professional, compared to those that had a consultation. Table 4.8 shows that the likelihood of heavy alcohol consumption is slighter greater for individuals who report having unmet care needs (OR=1.030), compared to those whose needs were met, after controlling for all other variables. All of the associations, observed in the previous model were replicated in model, with small changes in the odds ratios. Notably, the associations between residential status categories and heavy alcohol consumption were not substantively changed with the addition of the access to primary care variables, failing to evidence support for the hypothesis.

Table 4.8 Logistic Regression for Weekly Alcohol Consumption

Independent Variables	Model 1 B	Model 1 S.E.	Model 1 O.R	Model 2 B	Model 2 S.E.	Model 2 O.R	Model 3 B	Model 3 S.E.	Model 3 O.R	Model 4 B	Model 4 S.E.	Model 4 O.R
Model Chi Square	4561.291 4 df***			149663.437 18 df***			155249.552 29 df***			156566.631 32 df***		
Residential Status												
Urban core			1.000			1.000			1.000			1.000
Urban fringe	-0.203***	0.017	0.817	-0.228***	0.018	0.796	-0.217***	0.018	0.805	-0.221***	0.018	0.802
Urban-O/CMA	-0.597***	0.010	0.551	-0.513***	0.010	0.599	-0.520***	0.010	0.595	-0.521**	0.010	0.594
Rural fringe	0.128***	0.010	1.136	0.042***	0.010	1.042	0.030**	0.010	1.031	0.025*	0.010	1.025
Rural-O/CMA	-0.117***	0.007	0.889	-0.123***	0.008	0.884	-0.128***	0.008	0.880	-0.134***	0.008	0.874
Age												
65 to 69						1.000			1.000			1.000
70 to 74				-0.106***	0.006	0.899	-0.092***	0.006	0.912	-0.092***	0.006	0.912
75 to 79				-0.484***	0.007	0.617	-0.455***	0.007	0.634	-0.450***	0.007	0.637
80 to 84				-0.604***	0.010	0.547	-0.572***	0.010	0.564	-0.568***	0.010	0.567
85 or older				-1.229***	0.016	0.293	-1.185***	0.016	0.306	-1.177***	0.016	0.308
Sex				1.506***	0.006	4.508	1.526***	0.006	4.600	1.520***	0.006	4.572
Marital Status				0.161***	0.006	1.174	0.157***	0.006	1.170	0.152***	0.006	1.164
Level of Education												
<Secondary (2')				-0.240***	0.006	0.786	-0.213***	0.006	0.808	-0.228***	0.006	0.796
2' Grad.				0.021**	0.007	1.021	0.033***	0.007	1.034	0.027***	0.007	1.027
Some Post-2'				0.016	0.011	1.016	0.006	0.011	1.006	0.005	0.011	0.664
Post-2' Grad.						1.000			1.000			1.000
Household Income												
<$15,000				-1.063***	0.012	0.345	-0.991***	0.012	0.371	-1.008***	0.012	0.365
$15,000 to $29,999				-0.989***	0.008	0.372	-0.945***	0.008	0.389	-0.950***	0.008	0.387
$30,000 to $49,999				-0.513***	0.008	0.598	-0.484***	0.008	0.617	-0.481***	0.008	0.618
$50,000 to $79,999				-0.488***	0.009	0.614	-0.486***	0.009	0.615	-0.481***	0.009	0.618
$80,000 or more						1			1			1
Race/Colour	-1.410***	0.016	0.244	-1.410***	0.016	0.244	-1.397***	0.016	0.247	-1.389***	0.016	0.249

*p<.05, **p<.01, ***p<.001

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Table 4.8 Logistic Regression for Weekly Alcohol Consumption

	Model 1			Model 2			Model 3			Model 4		
Model Chi Square	4561.291 4df***			149663.437 18df***			155249.552 29df***			156566.631 32df***		
Independent Variables	B	S.E.	O.R	B	S.E.	O.R	B	S.E.	O.R	B	S.E.	O.R
Self-perceived Health												
Excellent									1.000			1.000
Very good							-0.283***	0.008	0.753	-0.278***	0.008	0.757
Good							-0.223***	0.008	0.800	-0.217***	0.008	0.805
Fair							-0.447***	0.009	0.640	-0.438***	0.009	0.645
Poor							-0.741***	0.014	0.477	-0.741***	0.014	0.477
Health Utility Index												
0.96 to 1.00									1.000			1.000
0.82 to 0.95							0.143***	0.006	1.153	0.144***	0.006	1.154
0.55 to 0.81							0.138***	0.007	1.148	0.143***	0.007	1.154
0.14 to 0.54							0.046***	0.010	1.047	0.045***	0.010	1.046
-0.36 to 0.14							-0.143***	0.020	0.867	-0.139***	0.020	0.870
Chronic Conditions												
'0'									1.000			1.000
'1'							-0.008	0.008	0.992	0.019*	0.008	1.019
'2'							0.145***	0.008	1.156	0.183***	0.008	1.200
3 or more							0 091***	0.008	1.095	0.132***	0.008	1.141
Has a Regular Doctor										-0.108***	0.011	0.898
Consult Health Prof.										0.432***	0.011	1.540
Perceived Unmet Need										0.030**	0.01	1.030

*p<.05, **p<.01, ***p<.001

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4.2.6 Access to Primary Care and Relative Change in Self-Care Across Residential Status

Table 4.9 summarizes the relative change in the odds ratios between models 3 and 4, across residential status for each self-care behaviour, after controlling for all other variables. None of the odds for engaging in the self-care behaviours changed significantly, as compared to the established correspondence rule of 20% relative change, across any of the residential status categories. Indeed, the changes are below 2.0% in all cases and the hypothesis is therefore unsupported in terms of relative change across residential status categories.

Table 4.9 Access to Primary Care: Relative Change in Self-Care Behaviours Across Residential Status					
Dependent Variables	**Independent Variables**				
	Residential Status by Category				
	Urban Core	**Urban Fringe**	**Urban O/CMA**	**Rural Fringe**	**Rural O/CMA**
Daily Fruit & Veg. Consumption	-----	0.10%	0.00%	0.21%	-0.28%
Frequency of Physical Activity	-----	-0.12%	0.00%	-0.28%	-0.32%
Daily Engagement in Physical Activity	-----	-0.12%	0.00%	-0.10%	-0.26%
Smoker Status	-----	0.23%	0.09%	0.00%	-1.94%
Weekly Alcohol Consumption	-----	-0.37%	-0.17%	-0.59%	-0.69%

5 DISCUSSION

This chapter relates the results of the research to the hypotheses, summarizes the findings, acknowledges several limitations, and discusses the implications of this research. The principal purpose of this thesis was to explore factors that contribute to the self-care behaviours of Canadians, age 65 and older. Of particular interest was the investigation of the influence of access to primary care on self-care behaviour, across five rural and urban geographic designations: urban core, urban fringe, urban outside census metropolitan areas, rural fringe, and rural outside census metropolitan areas. The results of the bivariate and multivariate analyses are summarized and discussed below, in relation to the hypotheses and previous research findings.

5.1 Hypotheses

5.1.1 Hypothesis 1

> Canadians, age 65 and older, living in rural residential environments will report more unhealthy self-care behaviours than those living in more urban ones.

In general, the results offer limited support for Hypothesis 1. In terms of the bivariate analysis results, the only substantive differences in self-care

behaviour across residential status occurred for frequency of engagement in physical activity and daily engagement in physical activity. In terms of the former, the rate of occasional engagement in exercise is slightly higher in both the urban-O/CMA and rural-O/CMA categories than it is in the residential category with the lowest rate (urban fringe) of occasional engagement. Further, the rate of infrequent engagement in physical activity is over twice as high in the rural-O/CMA residential category, compared to the category with the lowest rate (urban fringe) of infrequent engagement. In terms of the latter, the rate of not engaging daily in physical activity is slightly higher in both the urban-O/CMA and rural-O/CMA categories than in the residential category with the lowest rate (urban fringe) of avoiding regular engagement in physical activity. Overall, a general pattern emerges wherein the largest percent differences occur most frequently between the urban fringe and either the rural fringe or rural-O/CMA categories for most of the dependent variables; however, the differences tend to be minor in substantive terms. In addition, increases in unhealthy self-care are not consistent across all rural-urban comparisons and are not isolated to rural residential environments only. Considering the bivariate analysis results, only partial support for Hypothesis 1 is evidenced. Thus, except for physical activity, self-care behaviours among older Canadians do not differ across rural and urban residential environments.

Turning to the logistic regression results for self-care in terms of residential status, no further support for Hypothesis 1 is provided. For daily

fruit and vegetable consumption, the likelihood of older Canadians consuming less than five servings each day was higher for both urban-O/CMA and rural-O/CMA residents but was lower for urban fringe dwellers, compared to urban core residents. Again, the results are not evidenced for both rural residential designations and the increased rates of unhealthy self-care are not isolated to rural residential environments only. Thus, Hypothesis 1 remains only partially supported.

For frequency of engagement in physical activity and residential status, the likelihood of not engaging regularly is somewhat higher for urban-O/CMA, rural fringe, and rural-O/CMA residents, compared to urban core residents. The odds are slightly decreased only for urban fringe (OR=0.878) dwellers. Here, the increase in unhealthy self-care is evidenced for both rural residential categories; however, an increase is also demonstrated for some urban residents. Notably, the increased rate of unhealthy self-care found for the urban-O/CMA category is higher than that for the rural fringe category. Thus, Hypothesis 1 remains only partially supported.

In terms of daily engagement in physical activity and residential status, the logistic regression results indicate a higher likelihood of not engaging daily for urban-O/CMA and rural-O/CMA dwellers, while decreased odds occur for urban fringe and rural fringe dwellers, compared to those living in urban core areas. Here, increases in unhealthy self-care are evidenced for some rural and some urban residents. Notably, the evidence of increased rates of unhealthy self-

care is not proved across rural residential designations and is not isolated to rural residents only. Considering the results, Hypothesis 1 gains no further support, in terms of daily engagement in physical activity.

Turning to smoking status, the results of logistic regression analysis indicate that the odds of being a smoker are higher for older Canadians in urban-O/CMA, rural fringe, and rural-O/CMA environments, compared to urban core environments. In fact, the odds for the urban-O/CMA category are higher than those for the rural fringe category. Conversely, the odds of smoking are decreased for urban fringe residents, compared to their urban core-dwelling counterparts. As with the previous behaviour indicators, increased unhealthy self-care is not isolated to the rural residential categories and, here, is actually higher in some urban areas. No further support for Hypothesis 1 is provided in terms of smoking status.

Finally, the logistic regression results for weekly alcohol consumption in terms of residential status indicate that the odds of being a heavy drinker are highest for older rural fringe dwellers but are lower for all other rural and urban residents included in this research, compared to their urban core-dwelling counterparts. Although higher rates of unhealthy self-care are indicated for one rural residential designation, they are not evidenced for any other designation and Hypothesis 1 remains only partially supported.

The fact that self-care behaviour did not change substantively across residential status was unexpected. In terms of fruit and vegetable consumption

specifically, the Ministerial Advisory Council on Rural Health (2003) indicates that rural-dwelling Canadians often lack information on topics such as nutrition and, consequently, may experience detrimental effects on nutritional self-care. Findings from a study by Johnson (1991) indicate that most rural seniors do not consume food from each of the four main food groups each day. Further Mockenhaupt and Muchow (1994) discuss the barriers to acquiring fresh produce and, in turn, of practicing healthy nutritional self-care in some rural and remote areas where transport of fruits and vegetables is made geographically challenging. Although the literature demonstrates nutritional barriers for rural residents, the specific issue of fruit and vegetable consumption is not considered. Further, the literature examines the issue of self-care in terms of a dichotomous rural-urban comparison, unlike the more narrow geographical designations used in this research.

In addition, the findings challenge current literature indicating that rural-dwelling Canadians demonstrate a more sedentary lifestyle than their urban counterparts (Ministerial Advisory Council on Rural Health, 2003). We find an absence of consistent differences in levels of engagement in physical activity across rural and urban residential environments. The results of this thesis may have emerged as a function of examining self-care differences across five different geographic designations as opposed to the standard rural-urban dichotomy. Thus, these findings may provide new insight as to the specific self-

care behaviours of older Canadians, within and among more narrowly defined geographic environments.

Further, these results challenge current literature indicating that rural residents demonstrate higher rates of smoking, and heavier alcohol consumption, compared to their urban counterparts (Ministerial Advisory Council on Rural Health, 2003). Notably, however, the literature discusses self-care differentials for all rural and urban residents and does not focus on the older adult population, specifically. Again, the literature uses a rural-urban dichotomous comparison to discuss self-care differentials, unlike the present research that examines such differentials across five residential designations.

Finding that self-care differentials were not substantively evidenced across residential status, and recognizing that these anomalies can be partially rationalized using gaps in relevant literature, we turn now to a discussion of the implications of the present findings. Considering the minimal variation in self-care behaviours across residential status, it may be reasoned that older Canadians in rural residential environments are receiving the same self-care information as those in urban environments and are engaging in those behaviours at similar rates.

Another potential explicator for the relatively minimal changes in self-care behaviour across residential status is the possibility of an age cohort effect among respondents. Morrongiello and Gottlieb (2000) suggest the possibility of an age cohort effect in studies where older adult samples are stratified by age.

The authors write: "...findings may represent a cohort effect due to greater emphasis on survival than health when these individuals were growing up during the Great Depression" (39). In a review of literature on perceived self-efficacy and barriers to self-care, Easom (2003) found that perceived barriers for older adults differ from those of younger adults. The author emphasizes the perception of barriers to self-care as a salient predictor of health behaviour, writing: "when perceived barriers are low, self-care activities are high" (12). Considering such findings, the potential for age cohort effects in the present research emerges where aging and its effect on self-care may mask differentials in health behaviours that are actually initiated earlier in adulthood, or where historical effects influence the self-care behaviours of older adults in the sample. However, since age was statistically controlled, it is unlikely that this factor explains the non-support for Hypothesis 1.

5.1.2   Hypothesis 2

> The association between residential status and self-care behaviour will be partially explained by the inclusion of access to primary care variables (having a regular doctor, consulting any health professional, and perceiving care needs as being met), after controlling for other important variables.

In general, the results fail to support Hypothesis 2. It was hypothesized that access to primary care would partially explain the relationship between residential status and the five self-care behaviours. Accordingly, in logistic

regression analysis, a decrease in the odds ratios associated with each residential

status category was expected after the addition of the access to primary care

variables. In order to determine the substantiality of the decrease in the odds

ratios across residential status categories, a correspondence rule was established,

whereby a relative change of 20% or larger was considered substantial.

The logistic regression analysis results did not support Hypothesis 2. The

odds ratios for residential status changed minimally with the addition of the

access to primary care variables, and all of the relative changes were small (less

than 2%). Thus, the results indicate that access to primary care does not explain

the association between self-care behaviour and residential status among older

Canadians. These findings may challenge current literature emphasizing the

potential negative impact of lack of access to health care services on self-care

behaviour (Ministerial Advisory Council on Rural Health, 2003; Morrongiello

and Gottlieb, 2000; Johnson, 1991). The literature, although demonstrative of the

effects of differential access to health care, uses a general rural-urban

comparison, unlike the more specific designations used in this research. Thus,

where the literature suggests certain associations between access to primary care

and residential status, the results of the present research may differ due to more

narrowly defined residential designations. Further, the notably limited evidence

of self-care differentials across residential status (see discussion for Hypothesis 1)

can be used in rationalizing the minimal changes found with the inclusion of the

access to primary care variables. For example, if little difference in self-care

exists across residential status, there is little opportunity for a mediating effect with the inclusion of access to primary care variables.

It is also noteworthy that the relationships between access to primary care and self-care behaviours are inconsistent, in that having a regular doctor appeared to be beneficial for diet and physical activity, but the opposite for smoking and alcohol consumption. It is possible that there is a reciprocal pattern that is not detected using cross-sectional data, for instance smokers may need to see doctors more frequently. Further research is needed to examine these associations.

5.1.3 Hypothesis 3

> Canadians, age 65 and older, living in rural residential environments will report decreased access to primary care services, compared to those living in more urban ones.

In general, the results fail to support Hypothesis 3 and challenge current literature indicating that older adults, living in rural areas, lack access to primary care services, compared to their urban counterparts (Coward et al., 1994). The bivariate analysis results show decreased access, in terms of not having a regular doctor, among rural-O/CMA residents; however, the percent change across residential status did not meet the established 5% standard. Lack of access was further demonstrated in terms of perceiving care needs to be unmet for both rural fringe and rural-O/CMA residents. Again, however, the percent change

across residential status did not meet the minimum standard to be considered substantive.

Current literature argues that persons in rural residential environments experience profound barriers and lack of access to health care services, compared to their urban counterparts (Ministerial Advisory Council on Rural Health, 2003; Lorig et al., 2001; Rosenthal and Fox, 2000; Lorig et al., 1999; DeFriese and Konrad, 1993; Muchow, 1993). The results of this research challenge the predominant literature. Notably, the literature is not specific to older adults and discusses issues of accessibility in terms of general rural-urban dichotomies, failing to compare and contrast more narrowly defined residential designations such as those used in the present research. Perhaps examining the issue in relation to older adults across the five residential categories provides a more candid indication of the accessibility of services for older Canadians.

Alternatively, the issue of lack of access to primary care services may be masked as a facet of the compensatory pattern of self-care, described below. Indeed, Rabiner and colleagues (1997), in their study of rural-urban differences in self-care among older adults, found a compensatory pattern of self-care among older adults in non-metropolitan areas. If this compensatory pattern reflects the actual situation in rural Canada, then the issue of lack access to primary care, as it relates to acquisition of self-care information, may be masked by virtue of positive associations identified among successful engagement in self-care, increased self-efficacy, and increased engagement in the given self-care

behaviour resulting from the increased self-efficacy (Easom, 2003). Easom (2003) emphasizes successful performance of self-care tasks as the primary source for acquiring and enhancing self-efficacy. The author extends this notion, stating: "Self-efficacy is a critical factor in the development of favourable health practices in both well and ill older adults" (13). What emerges is a compensatory pattern of self-care that influences reports of engagement in self-care and that may mask the issue of actual barriers to primary care services experienced by rural-dwelling older Canadians.

Rooted in the writings of Mockenhaupt and Muchow (1994), self-care can bridge barriers to primary care and, in turn, may reduce care needs (e.g., actual or perceived) and may dilute issues of lack of access to primary care services. In practical application to the present research, an older Canadian living in a rural residential environment where lack of access to primary care is predominant may participate in the noted compensatory pattern of self-care. If he/she is successful, then his/her self-efficacy will increase, reinforcing engagement in the behaviour and acting as a motivator for continued engagement. Subsequently, the rural resident's need for primary care services may decrease, thus masking the issue of lack of access evidenced in many rural areas (Ministerial Advisory Council on Rural Health, 2003). Further research is needed to examine this pattern.

5.2 Theoretical Linkages

The results both provide support for, and identify limitations of, the theories used to guide this research. Both the social ecological perspective and the social determinants of health approach emphasize the interdependent influence of multiple social and environmental conditions on health and self-care behaviours. This is borne out in the results of this research. A notable limitation of both theories, however, is that causal relationships between the interacting social-environmental conditions and behaviour outcomes (e.g. self-care behaviour) are not theoretically understood (e.g., *how* do these contributing conditions influence behaviour?). An application of this limitation to the present research is the issue of access to resources and disparities in resource across communities. Although the potential influences of both differential access and disparities in access has been substantiated using relevant literature, the actual causal pathway by which access or lack thereof influences self-care outcomes in relation to other resources (e.g., social support) and as one of several identified interacting conditions (e.g., within the larger theoretical context), is not easily demonstrable. Here, access to resources and disparities in resource are considered elements of a community's or region's economic circumstances. However, the personal and community phenomenologies related to accessibility issues are considered elements of social circumstance. Where the balance of the relative importance of each (economic and social circumstances) in shaping individual self-care is unclear, the value of the social context is undeniable

(Basford et al., 2003; Miller and Iris, 2002; Granello, 2001; Morrongiello and Gottlieb, 2000; Edwardson and Dean, 1999; Potts et al., 1992; Hawley and Klauber, 1988; Evans, 1979). The salience of the social context and its exclusion from the present research are discussed later in this chapter (see section 5.4). Without understanding the causal pathways of interaction between contributing factors and without the subsequent ability to examine those factors in terms of their relative salience on individual behaviour outcomes, the results can be difficult to interpret, theoretically.

In terms of the social-ecological perspective, specifically, the dynamic ability of individuals and groups to adjust their personal health behaviours is a key underpinning of the theory. One's capacity to change his/her self-care behaviour is held as being primarily influenced by relevant knowledge and skills, which, for the purposes of this research, are considered to be acquired from interactions with primary care professionals and services in the formal health care system. In the broader social-environmental context, however, personal social supports are of undeniable importance to the acquisition and development of self-care knowledge (Basford et al., 2003). Further, relevant literature presents a myriad of other factors (e.g., age, culture, health beliefs) that contribute, individually and collaboratively, to the development and refinement of self-care regimes (Morrongiello and Gottlieb, 2000). Although this research assumes that self-care information is acquired through contact with the formal care system, it is possible that it does not exert influence on self-care independent

of other factors. This raises the question: can the influence of access to primary

care services on self-care behaviour be understood in isolation from the breadth

of other resources (e.g. social support) when the social-ecological perspective is

grounded in considering the "cumulative impact of conditions within multiple

settings and life domains..."(Stokols, 1996, 287)? Further research in this area is

required.

In terms of Social Learning Theory, results of this research cannot

conclusively refute or support the intermediary function of social modelling in

the transmission of health information to health behaviours. Relatively minimal

differentials in both access to primary care services and engagement in self-care

behaviours across residential status were found. As noted in section 5.1.1, it may

be reasoned that the lack of substantive differentials in self-care behaviours

reflects that older Canadians, living in rural residential environments, are

receiving the same health information as those living in urban residential

environments. However, one could argue that, since associations were found

between access to primary care and self-care behaviour, then social modelling is

likely occurring, regardless of residential status. The results therefore provide

indirect support for Social Learning Theory's emphasis on the role of the model

in the transmission of behavioural information. However, the lack of attention to

the roles of emotion and phenomenology in influencing self-care behaviours has

been noted as a specific limitation (Ory and DeFriese, 1998) and requires further

research.

5.3 "Other" Predictors of Self-Care Among Older Canadians

The regression analyses identified other predictors of self-care. Since none of the variables are consistent predictors across the five self-care indicators, the predictors for each self-care behaviour will be discussed separately below.

5.3.1 "Other" Predictors of Daily Fruit and Vegetable Consumption

The likelihood of consuming less than five servings each day decreases as age increases, is higher for males than females, and is higher for those who are not married, compared to those who are married or living common-law. Conversely, the tendency to consume less than five servings of fruits and vegetables each day is inversely associated with education. The likelihood of consuming less than the recommended number of servings increase as household income decreases, while the likelihood of consuming less than five servings, daily is greater for those who are members of a visible minority, compared to older Canadians who are considered white. Further, the tendency to consume less than the recommended daily minimum are greater for older Canadians who rate their health as very good, good, fair, or poor, compared to those who self-rate their health status as excellent. Daily fruit and vegetable consumption is positively associated with HUI score. The likelihood of consuming less than the recommended daily minimum is lower for older Canadians who have any number of chronic conditions, compared to those with no condition, while the likelihood is higher for those without a regular doctor

and those who do not consult a health care professional, compared to older

Canadians who have a regular doctor or who consult a health professional,

respectively. Finally, the tendency to consume less than five servings of fruits

and vegetables, daily, is lower for older Canadians who have some unmet care

needs, compared to those who have no unmet needs. We turn, now, to the

predictors for frequency of engagement in physical activity.

5.3.2 "Other" Predictors of Frequency of Engagement in Physical Activity

In terms of age, the tendency to avoid engaging regularly in physical

activity decreases with advancing age, is increased for males compared to

females, and is decreased for older Canadians who are not married, compared to

those who are. The likelihood of not engaging regularly in physical activity is

positively associated with level of education. In terms of household income,

older Canadians are less likely to avoid regular engagement if they earn $29,999

or less per year, compared to those who earn $80,000 or more each year, while

the likelihood of avoiding engagement is higher for older Canadians who earn

between $50,000 and $79,999 per year compared to those in the $80,000 annual

earnings category. The tendency avoiding regular engagement is positively

associated with health status. Specifically, persons rating their health as fair or

poor are over twice as likely to avoid regular engagement than those with a

rating of excellent. Older Canadians are less likely to avoid regular engagement

in physical activity if they score anything less than 0.96 on the HUI, compared to

those scoring in the highest range of 0.96 to 1.00. Older Canadians have an increased likelihood of not engaging in physical activity on a regular basis if they have 1 chronic condition, compared to those with no condition. However, the likelihood of avoiding regular engagement is lower for Older Canadians with 2 or more chronic conditions, compared to those with no condition. Not having a regular doctor, not consulting a health professional, and having unmet care needs are associated with a decreased likelihood of avoiding regular engagement in physical activity, compared to older Canadians who have a regular doctor, who have consultation with a health care professional, or who have no unmet care needs, respectively. Predictors of daily engagement in physical activity will be reported next.

5.3.3 "Other" Predictors of Daily Engagement in Physical Activity

The likelihood of not engaging daily in physical activity is lower for persons aged 70 to 74 years, compared to those aged 65 to 69 years, while the odds are higher for all older age categories, compared to the 65 to 69 category. Older male Canadians are less likely not to engage in physical activity each day, compared to their female counterparts, while those who are not married are less likely to avoid daily engagement, compared to those who are married. Those with a household income of $79,999 or less, annually, are less likely to avoid daily engagement, compared to those earning $80,000 or more each year. Those who are members of a visible minority are more likely to avoid daily

engagement, compared to those who are classed as white, while individuals who rate their health as very good, good, fair, or poor are more likely not to engage in physical activity each day, compared to those who rate their health as excellent. Specifically, those who rate their health as poor are over twice as likely to avoid daily engagement, compared to those with a rating of excellent. Notably, those who rate their health as poor are over twice as likely not to engage daily, compared to those with an excellent rating. In terms of HUI, older Canadians who score anything less than 0.96 have lower odds of avoiding daily engagement, compared to those with scores in the highest range of 0.96 to 1.00. Notably, those who score 0.14 to 0.54 are over twice as likely to avoid daily engagement in physical activity each day, while those who score in the lowest range of –0.36 to 0.14 are over four times as likely to avoid daily engagement, compared to those scoring in the 0.96 to 1.00 range. Older Canadians with any number of chronic conditions are less likely to avoid engagement in physical activity each day, compared to those with no chronic conditions. Those without a regular doctor, those who do not consult a health care professional, and those who have unmet care needs are more likely to avoid engaging in physical activity each day, compared to those with a regular doctor, those who do consult a health care professional, and those who have no unmet care needs, respectively. We turn now to predictors of smoking status among older Canadians.

5.3.4 "Other" Predictors of Smoking Status

The likelihood of smoking is lower for all older Canadians, aged 70 years and older, compared to those aged 65 to 69 years. The odds of smoking are higher for males and for those who are not married, compared females and those who are married, respectively. Older Canadians who have less than a post-secondary education are more likely to smoke, compared to those who completed post-secondary studies. Individuals with an annual household income of $79,999 or less have an increased likelihood of smoking than those with an annual income of $80,000 or more. Older Canadians who are members of a visible minority are less likely to smoke, compared to those who are not members of a visible minority, while those who rate their health as good, fair, or poor are more likely to smoke, compared to those who rate their health as excellent. However, older Canadians who rate their health as very good are less likely to be smokers, compared to those with a rating of excellent. Individuals scoring anything less than 0.96 on the HUI have higher odds of smoking compared to those scoring in the highest range of 0.96 to 1.00. Older Canadians who have any number of chronic conditions are less likely to smoke, compared to those who have no condition and those without a regular doctor are more likely to smoke, compared to those with a regular doctor. Older Canadians who do not consult a health professional are over twice as likely to smoke, compared to those who have a consultation, while those with unmet care needs have higher

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odds of smoking, compared to those with no unmet care needs. The predictors of weekly alcohol consumption will be reported next.

5.3.5 "Other" Predictors of Weekly Alcohol Consumption

The likelihood of consuming 13 or more drinks per week is inversely associated with age. Males are over four times as likely to drink heavily, compared to females, while those who are not married are more likely to be heavy drinkers, compared to those who are married. Older Canadians who did not complete a secondary-level of education and those who completed some post-secondary studies are less likely to drink heavily, compared to post-secondary graduates. However, those who are secondary-level graduates are more likely to be heavy drinkers, compared to those that completed post-secondary studies. The tendency to consume 13 or more drinks per week is lower for older Canadians with annual household incomes of $79,999 or less, compared to those who earn $80,000 or more, each year, while those who are members of a visible minority are less likely to drink heavily, compared to those who are classed as white. In terms of self-rated health status, those with ratings of very good, good, fair, and poor are less likely to drink heavily, compared to those who rate their health as excellent. As for the HUI, the likelihood of consuming 13 or more drinks per week is higher for older Canadians who score between 0.14 and 0.95, compared to those in the highest score range of 0.96 to 1.00, while those scoring in the lowest range (-0.36 to 0.14) are less likely to drink

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heavily, compared to those with the highest scores. Individuals with any number of chronic conditions have higher odds of being heavy drinkers, compared to those with no condition. In terms of access to primary care, older Canadians without a regular doctor are less likely to consume 13 or more drinks per week, compared to those with a regular doctor, while those who do not consult a health professional and those who perceive their care needs to be unmet are more likely to drink heavily, compared, respectively, to those who do have consultation and to those with no unmet needs.

5.4 Limitations

Several limitations of this research must be acknowledged. First, the definitions used to categorize residential status reflect only the geographic representation of rural and urban as measured in the CCHS-Cycle 1.1. Notably, the census definitions used are relatively crude measures of residential status and fail to reflect social perceptions of the relative rural or urban nature of respondents' community. As a result, associations identified in this research may not be accurate in terms of social-phenomenological relevance, despite their geographic-definitional validity. For example, respondents in some areas classed as 'urban' may not feel that they reside in an urban centre, relative to other communities in their region or province, based on both personal and group ideologies about the given community's social, cultural, environmental, and occupational contexts. Inclusion of a more robust measures of residential status

such as using distance from a central locale (e.g., urban core) or resource (e.g. physician's office, hospital) may provide more accurate representations of residential status that capture multiple dimensions. Further, inclusion of questions addressing social representations of rural and urban residency would be useful in optmizing the social relevance (e.g., perceptions of social inclusion) for Canadians beyond geographic definitions of residential status.

Another limitation of this research is the fact that the access to primary care variables may not have provided the most accurate indication of accessibility of health care services for older adults possible. Although having a regular doctor may make health care seem more accessible, knowing whether or not an individual has a regular doctor does not offer any direct indication of how accessible the doctor or his/her office is for that individual. For example, a rural resident may have a regular doctor in the closest community but that community may not be in close proximity or transportation issues may hinder accessibility. Further, an older adult living in a rural residential environment may have a regular doctor who visits the rural area once a month. In being available only once a month or by virtue of having a large number of patients to see in a short time, it may be difficult to arrange an appointment when needed or at the most convenient time, thus hindering accessibility. Likewise, reporting consultation with a health professional does not provide a direct indication of the accessibility of either the place of consultation or the health professional. Although perceiving care needs as unmet may have some relation to accessibility of

services, this association is assumed for the purposes of this study. In addition to accessibility issues, there may be other inherent issues that keep an individual from having his/her care needs met. For example, an individual's perceived unmet need may be a result of personal issues like family responsibilities or work obligations whereby the individual does not have sufficient time to tend to his/her personal care needs. One question in the CCHS-Cycle 1.1 attempted to address issues of accessibility by asking respondents to indicate from a list the reasons why he/she did not receive care when the need was perceived. Of the listed reasons, seven options were related to access while six options addressed personal reasons and one option was 'other'. Specifically the list included the following: (1) Not available – in the area; (2) Not available – at the time required (e.g., doctor on holidays, inconvenient hours); (3) waiting time too long; (4) Felt would be inadequate; (5) Cost; (6) Too busy; (7) Didn't get around to it/didn't bother; (8) Didn't know where to go; (9) Transportation problems; (10) Language problems; (11) Personal or family responsibilities; (12) Dislikes doctors/afraid; (13) Decided not to seek care; and (14) other. This question was explored in relation to residential status; however, the number of cases in each residential category was repeatedly low and would not meet the standard '5 cases per cell', which is the minimum requirement for release from the British Columbia Interuniversity Data Centre as per the governing regulations of Statistics Canada. Further, this question addresses accessibility only in terms of perceived health care need and does not deal with access issues in terms of actual need.

It is also important to acknowledge the inherent limitations of self-reported and proxy-reported data. Of particular importance, here, are reports of chronic conditions, health status, and nutritional intake. In terms of chronic conditions, respondents were asked if their conditions had been diagnosed by a health care professional. However, no source of confirmation was used to verify the diagnoses. Further, an individual's self- or proxy-report may be influenced by their area of residence, either by the culture, language, or health and personal beliefs predominant in their community. Although translated versions of the survey were provided, differential interpretation of the questions across cultures may have influenced the reports. Further, predominant health or personal beliefs of a community may deter some persons from providing honest reports due to fear of rejection within the community. Also, ideas about what constitutes "good" health can differ by person and place of residency, affecting self-reports. Indeed, Keating (1991) emphasizes that rural seniors in Canada hold specific beliefs about what defines "good health" and consider particular aspects of health as important. Notable aspects include productivity, maintaining a sense of competence, and having a sense of meaning. Continued productivity relates to the older adults' ability to continue to be involved in traditional tasks of rural living, predominant in their area of residence, such as gardening and maintaining personal property. A sense of competence results from involvement in a variety of activities as well as remaining independent and taking responsibility for personal health and related practices. Finally, a sense of

meaning involves maintaining a sense of self-worth and experiencing feelings of happiness and contentment. What emerges is a perception of health that is oriented in personhood and ability, rather than physical capacity and chronic problems (Keating, 1991). Evidently, personal and group perceptions of "health" may influence self-reports. Beyond the limitations associated with both personal and community-oriented perceptions of health, it is widely established that in self-reports of health, respondents tend to over-rate their personal health.

Further to the proxy-reporting issues inherent in relation to chronic conditions and health status, Schoeller (1995) emphasizes the common reporting errors of underestimating intake of "bad" or unhealthy foods (e.g., high in fat products) and of overestimating consumption of "good" or healthy foods (e.g., fruit and vegetables). Also related to fruit and vegetable consumption, respondents were asked how many servings they consumed; however, no example of standard sample sizes was provided. Thus, if a respondent eats a given item 3 times a day but consumes a large amount of that item, then estimation of serving consumption may be inaccurate.

Finally, a notable limitation of the dataset for this research was the inclusion of optional content modules that were not asked of respondents across all health regions. For example, 36 of the 136 health regions opted not to ask questions related to self-care changes made by respondents to improve their health. Although a sub-analysis including the 'changes made to improve health' variable was included for interest, the variable could not be included in the

national scope of analysis (See Appendix A). This and other optional content

variables such as social support would have been useful in determining a

broader range of self-care predictors for older Canadians across residential

status.

Indeed, the fact that questions related to social support were optional

content in the CCHS-Cycle 1.1 and were included at the discretion of the health

regions, respectively, is a limitation of the data set since social support has been

substantiated as a key mediator of self-care behaviour across populations. The

fundamental importance of one's social support system has been widely

discussed with researchers such as Lomas (1998). He contends that, in order to

fully understand a person and his/her motivations and actions, one must

consider his/her community, social network, work and social environments,

family structure and life course. Lomas (1998) holds that health within a

community's social system consists of three related elements: physical structure,

social structure, and social cohesion. Social cohesion is synonymous with "social

capital," a termed coined by Robert Putman (1995). Social capital is defined as

"features of social organization such as networks, norms and trust, that facilitate

coordination and cooperation for mutual benefit" (Putnam, 1995, 66). According

to Lomas (1995), this capital or cohesion is the product of a community's physical

and social structure which, collaboratively, facilitate or discourage mutual

support, caring, self-esteem, sense of belonging, and enriched social

relationships. Basford and colleagues (2003) emphasize social supports and

networks as "chief" sources of empowerment for increasing one's knowledge and understanding about health behaviours and treatment compliance in optimizing health and well-being. Future research in the area of social cohesion and self-care is needed.

In relation, a qualitative study of the attitudes and beliefs of older adults regarding wellness and self-care, demonstrated a relevant social support theme (Miller and Iris, 2002). Specifically, social support was deemed by participants to be a critical motivator for self-care participation. In fact, in this study, social support and the social dimension of participation in self-care were deemed equally important to the physical and health benefits. Similar findings of the benefits and motivations of social support have been noted by several other researchers (Granello, 2001; Morrongiello and Gottlieb, 2000; Edwardson and Dean, 1999; Potts et al., 1992; Hawley and Klauber, 1988; Evans, 1979).

In addition to acting as agents of motivation, social support network members also act as lay consultants who may teach and reinforce self-care behaviours and patterns, validate or change symptom interpretation, encourage or discourage professional consultation, or support personal esteem by simply listening to health complaints and concerns (Stoller, 1998). Considering the salience of the influence of social support on self-care behaviour, the non-inclusion of questions related to social support across all health regions results in a definite limitation to analysis and development of a comprehensive list of self-care predictors for older Canadians. This is an area requiring further research.

5.5 Conclusion and Directions for Future Research

This thesis adds to an existent body of literature focusing on factors influencing self-care among older adults in general, and on the effects of residential status and access to primary care in relation to self-care behaviour, specifically. As Canada's policy-makers, health care professionals, and residents face the challenges of population aging, self-care gains undeniable salience. Further, as demographic shifts in the congregation of older adults in rural residential areas continue, differentials in both access to primary care and in self-care behaviours, across residential status emerge as particularly salient issues, yet they remain under researched.

The most interesting finding is the absence of differences in access to primary care services and differentials in self-care behaviour across rural and urban residential environments. It may be concluded, therefore, that either self-care behaviour is similar across rural and urban residential environments for older adults, or factors beyond residential status, socio-demographics, health status, and access to primary care are responsible for self-care behaviour differentials among older Canadians. Also, there may be other self-care behaviours not examined in this thesis for which residential patterns exist.

Several directions for future research may be identified from this study. First, studies exploring the causal pathways by which social-environmental factors influence individual and group health behaviour among older adults and across residential status are essential. Also, as several of the variables tested in

this research had limitations, it would be valuable to re-explore the theoretical

orientations and hypotheses with a more comprehensive set of measures. For

example, the issue of access to primary care and its influence on self-care may be

better understood if self-care measures were linked to specific illnesses (e.g.,

hypertension, arthritis). Since most chronic conditions require some level of self-

care (e.g., illness management), respondents selected on the common basis of

having a chronic condition would provide a more clear indication of differentials

in self-care across residential status and in terms of access to primary care.

Further, examination of the present research at the health region or provincial

level (as opposed to the national level) may provide interesting insight as to

regional differences in accessibility of resources (e.g., primary care) and their

effect on self-care behaviour among older Canadians.

In addition, studies that identify factors mediating group differences in

self-care behaviour are required. This could be accomplished with a two-phased

research initiative. First, there is a need to develop models that account for

specific outcomes (e.g., specific health behaviours) within each group (e.g., across

residential status) as well as interactions among variables. Second, there is a

great need to identify the factors and patterns of factors responsible for specific

differentials in self-care behaviour across groups. Thus, the need for further

cross-sectional and longitudinal studies comparing the self-care behaviours of

older Canadians and tracing the changes in those behaviours (relative to

personal changes in health status and beliefs over time), reflecting changing

patterns in residential environments over time. An example of a plausible design

for such research is National Survey of Self-Care and Aging used in the United

States (Kincade et al., 1996).

In addition, the collection of qualitative data, through focus groups,

personal interviews, and participatory research, is necessary for developing an

understanding of how social representations of health (e.g., rural ideology), and

both economic and social circumstance affect self-care, across residential

environments. Such qualitative research may also provide valuable information

pertaining to the emotional and phenomenological influences of personal

experience, residential status, and social cohesion on self-care behaviour among

older Canadians.

Continued research related to patterns of self-care among older adults and

across residential environments is imperative as personal characteristics, social-

environmental conditions, and both personal and group social representations

(e.g., representations of community circumstance, resource availability, and

provision of care within the formal healthcare system) vary temporally in

response to changes in public policy. Since rural Canada is a vast area and

considering both the increasing congregation of older adults in rural residential

environments and the myriad of potential barriers to primary care predominant

in many rural areas, an understanding of self-care differentials as a function of

interactions with both lay and professional health consultants and across

residential status is essential for the development and implementation of

regionally appropriate policies and programs that optimise potential benefits for all older Canadians.

APPENDIX A

A.1 Changes Made to Improve Health

This section shows the results of the exploratory crosstabular analyses

discussed above (See Chapter 4, section 4.14). This set of crosstabulations

examines the basic associations between: (1) changes made to self-care by

residential status; and (2) changes made to self-care by access to primary care.

As part of an optional content module, some health regions asked residents to

indicate whether or not they had made any self-care changes over the past year

to improve their health. Further, respondents in the participating health regions

were asked to identify, from a list of 7 options, the "single most important"

change they had made including: (1) increased exercise, sports or physical

activity; (2) lost weight; (3) changed diet or eating habits; (4) quit

smoking/reduced amount smoked; (5) received medical treatment; (6) took

vitamins; and (7) other changes made to improve health. Of the 136 health

regions designated for CCHS-Cycle 1.1 data collection, 100 health regions opted

to asked residents about the self-care changes they made. Since the above

questions were not asked across all health regions and considering that

interviews by proxy did not include these questions, there are large number of

missing cases for these variables. Table A.1 shows the frequencies and

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percentages by category for each of the self-care variables included in this

supplementary bivariate test of the hypotheses.

A.1.1   Changes Made to Improve Health and Residential Status

Table A.3 shows the percents, by category, for each self-care behaviour

change across residential status. Residential status categories with the largest

percent differences for the given dependent variable category are highlighted.

Examination of Table 4.3 indicates weak associations for doing something to

improve health (χ^2=7598.900, df=4, p<.001), increasing exercise (χ^2=10,135.952,

df=28, p<.001), losing weight (χ^2=10,135.952, df=28, p<.001), changing eating

habits (χ^2=10,135.952, df=28, p<.001), and receiving medical treatments (χ^2

=10,135.952, df=28, p<.001) in terms of residential status. The largest percent

difference (8.0%) across residential status for the 'did something to improve

health' occurred between the 'urban core' and 'rural-O/CMA' categories. A

difference of 10.6% was found between the 'urban fringe' and 'urban-O/CMA'

residential categories in terms of increasing exercise. The largest percent

difference for 'losing weight' (6.8%) occurred between the 'urban core' and 'rural

fringe' categories, while the largest difference for 'changing eating habits' (7.0%)

was found between the 'urban-O/CMA' and 'rural fringe' residential categories.

For the 'medical treatment' self-care change category, a difference of 6.8%

occurred between the 'urban fringe' and 'urban-O/CMA' categories. Contrary to

expectation, the percent differences for smoking less/quitting (χ^2=10,135.952,

df=28, p<.001), reducing alcohol consumption (χ^2=10,135.952, df=28, p<.001), taking vitamins (χ^2=10,135.952, df=28, p<.001), or any making any other change (χ^2=10,135.952, df=28, p<.001) to improve health did not meet the minimum strength reference of 5 percent. Looking across residential status, 39.6% (n=620,892) of 'urban core' dwellers reported doing something to improve their health, compared to 35.1% (n=19,932) of 'urban fringe' residents, 34.2% (n=76,191) of 'urban-O/CMA' residents, 39.0% (n=52,758) of 'rural fringe' dwellers, and 31.6% (n=77,795) of 'rural-O/CMA' residents who reported making self-care changes to improve their health.

A.1.2   Changes Made to Improve Health and Access to Primary Care

Examination of Table A.2 shows a weak positive association for 'did something to improve health' and 'consultation with any health professional. No relationship for 'did something to improve health' and either 'having a regular doctor' or 'perceived unmet need' was identified, based on the minimum correlation magnitude of 0.05. Of respondents who indicated consulting a health professional, 38.5% (n=830,066) also reported 'doing something to improve health', compared to 24.2% (n=17,501) of respondents who did not consult a health professional.

Table A.1 Changes Made to Improve Health - Weighted Frequencies and Percentages by Category

Did Something to Improve Health	Frequency (n)	Percent (%)	Most Important Change to Improve Health	Frequency (n)	Percent (%)
Categories					
Yes	847,567	23.2	More Exercise	417,659	11.4
No	1,382,484	37.9	Lost Weight	123,427	3.4
Missing	1,417,740	38.9	Eating Habits	97,895	2.7
			Smoke Less/Stop	38,608	1.1
			Less Alcohol	4,016	0.1
			Medical Treatment	106,498	2.9
			Took Vitamins	25,288	0.7
			Other	33,858	0.9
			Missing	2,800,541	76.8
Total	3,647,791	100		3,647,791	100

Table A.2 Crosstabulation Independent Variables by Changes Made to Improve Health

Dependent Variables	Residential Status	Having a Regular Doctor	Consulting any Health Professional	Perceived Unmet Care Needs	Having a Regular Doctor	Consulting any Health Professional	Perceived Unmet Care Needs
statistic:	$x2$	r	r	r	$x2$	$x2$	$x2$
Did Something to Improve Health	7598.900***	0.039***	0.052***	0.029***	----	----	----
Most Important Change Made to Improve Health	10135.952***	----	----	----	2255.993***	2444.279***	8930.891***

***$p<.001$

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Table A.3 Crosstabluation: Percentages for Residential Status by Changes Made to Improve Health

Dependent Variables		Independent Variables				
DVs by Category		Residential Status by Category				
		Urban Core	Urban Fringe	Urban O/CMA	Rural Fringe	Rural O/CMA
Did Something to Improve Health	Yes	39.60%	35.10%	34.20%	39.00%	31.60%
	No	60.40%	64.90%	65.80%	61.00%	68.40%
Most Important Change Made						
More Exercise		51.00%	52.80%	42.20%	46.80%	43.10%
Lost Weight		13.40%	14.30%	14.80%	20.20%	20.00%
Eating Habits		11.00%	14.00%	16.60%	9.60%	11.60%
Smoke Less/Stop		4.40%	3.50%	4.60%	5.30%	5.90%
Less Alcohol		0.50%	0.60%	0.30%	0.40%	0.40%
Medical Treatment		12.90%	7.20%	14.00%	10.40%	11.80%
Took Vitamins		2.80%	4.30%	3.20%	2.00%	4.30%
Other		4.00%	3.40%	4.30%	5.40%	2.90%

Categories between which largest % difference occurs for the given variable

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