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Measuring Differences in the Effect of Social Resource Factors on the Health of Elderly Canadian Men and Women

Steven G. Prus and Ellen Gee

SEDAP Research Paper No. 58

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Measuring differences in the Effect of Social Resource Factors on the Health of Elderly Canadian Men and Women

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Summary

Background It is well-documented that differences in the exposure to social resources play a significant role in influencing gender inequalities in health in old age. It is less clear in the literature if social factors have a differential impact on the health of older men and women. This paper examines gender differences in the patterns of social predictors of health among elderly persons.

Methods Separate multivariate linear and logit regression analyses of the relationship between social resource variables and the health of males and females age 65 and older are conducted using data from the 1998-1999 Canadian National Population Health Survey. A multi-dimensional approach is used to measure health, and the social forces that influence it.

Results The findings show that differences in socio-economic/demographic, health behaviour, and psychosocial factors contribute to variation in the health status of elderly persons in terms of self-rated health and functional and chronic health. Many of these predictors of health, however, differ in their effect on health between elderly males and females. The impact of age and exercise on health is larger for older women compared to older men, yet income, smoking, level of social support, and distress have a greater effect on health for older men than they do for older women.

Conclusions These gender differences have important policy implications for health-care promotion and delivery services. Health policy needs to reflect the underlying social determinants of health, and their differential influence on the health of elderly men and women.

Keywords Gender; Morbidity; Disability; Self-rated Health; Psychosocial; Lifestyle; Old age; Canada

Introduction

Improvements in health behaviours, nutrition, disease prevention, medicine and technology, housing, and health care have combined to significantly increase life expectancies over the last century. In 2000, 12.5% of Canadians were age 65 and over, with the percentage of elderly Canadians increasing to about 14% by 2006 and over 20% by 2026. Moreover, the majority (57.3%) of Canadian seniors today are women. Canada's very old population is also growing: persons age 85 and older will constitute over 16% of the aged population in 2026, compared to 10.8% today. [1]

A higher probability of health problems in later life means that health status becomes more important with age. Research shows that Canadian seniors tend to be in poorer health and, consequently, larger consumers of health care services compared to other age groups. [2] The change in population structure (i.e., the aging population) is having an impact on many of Canada's welfare institutions, one of the most important being health care. As the population ages, and public health care expenditures increase, debate on the sustainability of Canada's social security systems has mounted.

While people generally experience a decline in health with old age, health status is more than a function of age alone. Research shows that the decline in health with age is not experienced at the same rate or way by all older individuals. That is, older persons are not a homogeneous population, with some individuals more likely to experience poorer health and higher levels of health care use than others. Such findings have important implications for health-care policies. Because some individuals are better able to maintain their relative physical health, there is the potential for postponing morbidity and disability

among entire cohorts, helping to reduce future health-care demand and expenditures in light of an aging population.

Of the various sociodemographic-based inequalities in health, gender differences are among the most well, and consistently, documented. [3-7] Research shows that women are generally more likely than men to experience morbidity and disability, yet paradoxically have lower rates of mortality. Since gender is a measure of both social and biological differences, it is likely that health inequalities between men and women reflect both sex-related biological/genetic and social factors. [8-9] In terms of the latter, gender disparities in health are linked to differences in experiences across the life course related to socio-economic, lifestyle, and psychosocial factors between men and women.

With respect to socio-economic factors, women's greater domestic responsibilities, lower labour force participation rates, and hence less financial independence are often cited as mediating factors in the relationship between gender and health. [10-12]

Gender differences in health status have also be attributed to gender-specific health behaviours over the life course. [13] It is well documented that health- and longevity-related behaviours differ between men and women, notably that women are more likely to describe themselves as non-drinkers and non-smokers, yet are less physically active. [14] Stemming from cultural expectations, women also tend to be more concerned about health matters and to use the health-care system for treatment compared to men. [15]

Research on the social production of health further shows that psychosocial factors such social support, self-esteem, chronic stress, and stressful life events influence health. For instance, low levels of social integration/support can gravely influence a

person's morale and adjustment and, hence, their mental and physical health. [16] Because of their higher life expectancy, women are more likely than men to live without a partner, and their support. While this does not mean that older unattached women are without social networks (i.e., they can receive social support from other family members, friends, etc.), living with a spouse is an important source of informal care giving (and financial support) for many older women.

Research Question

While gender differences in the *exposure* to social (i.e., socio-economic, lifestyle, and psychosocial) resources play a significant role in influencing gender inequalities in health in old age, it is less clear in the literature if social factors have a differential impact on the health of older men and women. For example, do elderly men and women with similar levels of chronic stress in their lives, or who have experienced the same stressful life event, have comparable health status? Or, as socio-economic status (e.g., income) increases, does health status change (i.e., improve) at the same rate for older men and older women?

This paper looks at gender differences in the *vulnerability* to the health consequences of high/low socio-economic status, good/bad health behaviours, and high/low psychosocial resources. Because research shows that quality of life, living arrangements, social and economic life course (e.g., work and family roles), and so on, of men and women are considerably different, we hypothesize that the influence of social determinants of health varies by gender. By focusing on gender differences in the effect

of social factors on health, we provide insight and answers about healthy/successful aging, and the potential for postponing morbidity and disability for both men and women. These issues are particularly important in light of Canada's aging population and increasing health-care costs.

Methods

Data This paper compares the influence of social resource variables on the health status of elderly (65 and older) men and women. This is accomplished by carrying out separate multivariate (linear and logit regression) analyses of the relationship between socio-economic, lifestyle, and psychosocial variables and the health of older males and of older females using data from the Canadian National Population Health Survey (NPHS).

Produced by Statistics Canada, the NPHS collects information on health and illness, use of health services, determinants of health, and demographic and economic characteristics of individuals. The NPHS used Statistics Canada's Labour Force Survey (LFS) sampling frame to draw a sample of about 20,000 Canadian households. The basic LFS sampling design is a multi-stage stratified probability sample. The target population of the NPHS includes household residents in all Canadian provinces, except for people residing in First Nations communities, institutions, and Canadian Forces bases.

The NPHS produces data for both longitudinal and cross-sectional purposes. The first cycle of data collection began in 1994 and data will be collected every second year over a 20-years span. This analysis is based on the cross-sectional component of the 1998-1999 (Cycle 3) NPHS. While limited data is collected from all household members

in the NPHS, one person over 12 years of age in each household is randomly selected for a more in-depth interview. For the 1998-1999 NPHS, approximately 49,000 respondents answered the general portion of the questionnaire while approximately 17,000 answered the more detailed health portion. The data used here are based on these in-depth interviews.

The findings in this paper are based on weighted data. While the original sample weights take into consideration sampling design and population representation, they are re-scaled so that the average weight is equal to one (i.e., survey weights are rescaled to sum to the sample size). This method produces generalizable results (in terms of interval estimation and hypothesis testing) since it takes into consideration the unequal probabilities of selection of the sample's design.

Dependent Variables A multi-dimensional approach is used here to measure an individual's overall health status. Global health status is measured on a subject level and on a more objective one (i.e., self-reported indicators of physical health). Subjective health status, which provides a respondent's global assessment of his/her overall health, is based on the question "In general, how would you say your health is?" and has a five-point scale: poor, fair, good, very good, and excellent. It can be assumed that self-perceived health is based on a respondent's information concerning his/her functional/chronic health status, hence providing an indicator of how an individual *perceives* his/her overall physical health. It is also reasonable to collapse self-perceived health in to two divergent categories: "positive" health perception (good, very good, or excellent) and "negative" health perception (fair or poor). This dichotomy is used here.

Objective health status is more tangible, and is based a respondent's answers to questions about chronic health, long-term activity limitation and dependence (i.e., disability), and functional health.

In terms of chronic health, the respondent was asked to list all long-term chronic health problems, such as arthritis, high blood pressure, heart disease, that have lasted or are expected to last 6 months or more and that have been diagnosed by a health professional.

We combine responses to activity limitation/restriction and activity dependence items, which are often considered very broad measures of individual health, to provide a measure of disability. Restriction of activities is measured in the NPHS by asking respondents, "Because of a long-term physical or mental condition or a health problem, are you limited in the kind or amount of activity you can do at home, school, work, and/or in leisure time activities?" Again, "long-term" conditions are those that have lasted or are expected to last 6 months or more. Respondents answered either yes or no to health limitations which affect daily activities. To measure activity dependence respondents are asked, "Because of any condition or health problem, do you need the help of another person in: preparing meals? shopping for groceries or other necessities? doing normal everyday housework? doing heavy household chores (such as washing walls or yard work)? personal care (such as washing, dressing or eating)? moving about inside the house?" Respondents answered either yes or no to needing help with each of these tasks. Overall, respondents are classified as having a disability if they have an activity limitation (i.e., answered yes to the activity limitation/restriction item) and/or an

activity dependence (i.e., answered yes to any of the "need for help" items). Those with no disability answered "no" to all of these items.

It is well know that Canadians live much longer today than in the past, yet it is less well known the extent to which these added years of life are spent in perfect health. To address this question, the Health Utility Index (HUI) was created to synthesize both quantitative and qualitative aspects of health (i.e., a description and a valuation of health attributes). The HUI is based on a combination of eight self-reported characteristics of a respondent's health - vision, hearing, speech, mobility, dexterity, cognition, emotions, and pain and discomfort. HUI scores range from -0.360 (completely unfunctional) to 1 (perfect functional health) in increments of 0.001. A score of 0.80 or greater is typically used to indicate a high level of overall functional health. [17] The HUI is used here as the third measure of global physical health.

Independent Variables Social determinants of health are often categorized into three general groups: lifestyle/health behavioural, psychosocial, and socio-economic. Multiple indicators are used here to measure unhealthy lifestyle/behaviours. First, physical activity level is based on the amount of energy expended doing different forms of exercise/physical activity in the 3 months prior to the interview. A person defined as "active" expends a minimum of 3.0 calories per kilogram of body weight per day in activity during their leisure time. A person will achieve cardiovascular health benefit from active physical activity. A person at the "moderate" level expends between 1.5-2.9 calories. This person gets some health benefits, but little cardiovascular benefit, from physical activity. "Inactive" persons are those who have relatively low energy

expenditure values (<1.5 calories per kilogram of body weight per day), and derive no health benefits from physical activity.

Second, the Body Mass Index (BMI) is used to identify conditions of excess weight. We calculated the BMI by dividing weight in kilograms by height in meters squared. Based on Health Canada guidelines, those with a BMI sore of <20 are categorized as underweight, 20-27 acceptable weight, and >27 overweight. BMI is further collapsed into two groups in this study: acceptable weight and unacceptable weight (i.e., underweight or overweight).

The final measure of unhealthy lifestyle is number of years smoked. It refers to those who currently or who ever smoked cigarettes daily only. Those who do, or who did, smoke cigarettes occasionally or those who never smoked are assigned a value of 0 years smoked.

Again, multiple indicators are used to measure psychosocial (i.e., social support and psychological well-being) factors. First, we measure social support by computing a composite index based on the sum of a respondent's scores on multiple questions regarding four different types of support that is available to a respondent from family and friends: emotional/informational support, affection, positive social interaction, and tangible social support. The overall range of scores is 0 to 128, with higher scores indicating more social support. The items used to create the social support index are internally consistent: Cronbach's Alpha is .87.

Second, distress and sense of coherence are used to gauge mental and emotional well-being. In the NPHS, an overall distress score is derived from the following questions: "During the past month, about how often did you feel so sad that nothing could

cheer you up?" "During the past month, about how often did you feel nervous? restless/fidgety? hopeless? and worthless?" and "During the past month, about how often did you feel that everything was an effort?" The answers to each of the items in the index are coded on a five-point range from "none of the time" to "all of the time." The range of scores is 0 to 24, and higher composite scores indicate more distress.

A 13-item sense of coherence index is used in the NPHS. Sense of coherence refers to how respondents perceive life events as comprehensible (e.g., how often do you have very mixed-up feelings and ideas?), manageable (e.g., how often do you have feelings that you're not sure you can keep under control?), and meaningful (e.g., how often do you have the feeling that you don't really care about what goes on around you?). Answers to each question were provided on a seven-point Likert-type scale. Overall, higher composite scores indicate a stronger sense of coherence (the range of scores is 0 to 78).

Finally, we use Statistics Canada's income adequacy measure to gauge position in the social class structure (i.e., socio-economic status). Based on total household income divided by number of persons in the household (i.e., "per capita" income), this measure has five discrete income categories: low, low-middle, middle, upper-middle, and high. The criterion for these income groups is based on income relative to Statistics Canada's Low-income Cutoffs (i.e., poverty lines). Given the relatively small number of cases in the low and high income categories, they are collapsed with the low-middle and upper-middle income groups, respectively. Further, a category for missing values, which are considerably more common in the income variable than any other variable used here, is also created and used in the analysis. While the interpretive value of this category is

rather ambiguous, including these large number of missing cases helps to maintain a much fuller (and less biased) sample in the analysis.

Age and ethnicity/race are well-known determinants of socio-economic status and health, and, hence, included in this study. In the NPHS datafile used here, age is categorized into 5-year intervals: 65-69, 70-74, 75-79, and 80 and over; ethnicity/race is coded as non-visible minority (white) and visible minority (non-white).

In the end, daily smoking, social support, distress, and coherence indexes are treated as continuous variables in the regression analyses. All other independent variables are treated as categorical data, and therefore entered in the analysis as sets of "dummy" variables. The reference categories are those commonly assumed to be the most unfavorable position for good health; hence: physical activity level, inactive; BMI, over/underweight; income, low/low-middle; age, 80+; and visible minority status, visible minority (non-white).

Findings

Gender Differences in the Study Variables Bivariate relationships between gender and socio-economic/demographic, lifestyle, psychosocial, and health factors used in this study are described in **Table 1**. There are many significant differences in the social resources of elderly men and elderly women. First, older males in general have significantly higher levels of income, physical activity, smoking, social support, and coherence, while older females have a significantly higher level of distress than their male counterparts.

(Table 1 here)

In terms of health status, contrary to popular belief, most of the aged living outside of institutions in Canada are in good health - 77% of non-institutionalized persons aged 65+ rate their health as either good, very good, or excellent (this figure is not shown). This is a dramatic improvement since 1985, when the corresponding figure for positive self-assessed health was just over 60% (this figure is based on 1985 Canadian General Social Survey data). Further analysis reveals that the better health of today's older persons is mainly attributed to healthier lifestyles and a decrease in the prevalence of specific chronic conditions, such as arthritis, high blood pressure, and heart disease.

While the older population is healthier than it was in the past, statistically significant gender differences still remain. As shown in **Table 1**, women aged 65 and over are more likely to assess their health in a positive manner compared to their male counterparts (78.5% vs. 75.1%). The relationship between gender and self-rated health is also statistically significant at $p<.05$.

Paradoxically, elderly women are significantly more likely to experience chronic health problems than elderly men – on average, elderly women have 2.0 chronic health conditions, while the comparable rate for elderly men is 1.7. Gender differences in the number of chronic health conditions stem from a very high incidence among older women of arthritis/rheumatism (52.1% for women vs. 35.5% for men, $p<.001$), allergies (including food allergies) (24.3% and 13.0%, $p<.001$), thyroid condition (13.5% vs. 3.7%, $p<.001$), and high blood pressure (42.0% vs. 29.2%, $p<.001$). Generally speaking, older women are much more likely than older men to suffer from all major chronic health

conditions, except diabetes (9.7% for women vs. 13.8% for men, $p<.01$) and consequently heart disease (i.e., diabetes is a major cause of cardiovascular disease) (15.8% vs. 19.2%, $p<.05$) (these data are not shown in the table). Hence, older men are more likely to experience life-threatening illnesses and older women more non-life threatening ones. In other words, while older women are more likely to be physically impaired by their health problems (e.g., arthritis is a major cause of disability), older men are more likely to die from their problems.

Elderly women also have a slightly lower average HUI score compared to elderly men, and are significantly more likely to be disabled. This gender difference in the incidence of disability likely reflects the fact that many chronic health conditions (e.g., arthritis) have particularly disabling effects.

Gender Differences in the Social Determinants of Health While gender differences in health are key findings, an important question is how social factors affect the health of older men and women. To answer this question, separate multivariate regression models of self-rated health (**Table 2**), disability (**Table 3**), functional health (**Table 4**), and number of chronic conditions (**Table 5**) for older men and for older women are compared. Gender interaction terms were included in a regression model for each health measure for elderly men and women combined to determine significant gender differences in the regression coefficients. Statistically significant gender differences for each coefficient in the models are indicated in the last column of these tables.

Self-rated Health Looking at positive health perception (i.e., **Table 2**), socio-economic status, measured by income adequacy, is associated with self-rated health for both sexes even after controlling for all other available health determinants. This reflects the importance of economic adequacy and maintenance for healthy aging. Older women with the highest income are about three and one-half times (Odds Ratio 3.80, $p<.01$) more likely on average to report positive health relative to older women who fall into the lowest income category (i.e., the odds ratio for the reference category is one). Older men in the highest income category are also significantly more likely to assess their health as good or better (O.R. 2.14, $p<.05$). For both older men and women, the odds of good health are not significantly higher for those with middle income relative to those with low income.

(Table 2 here)

The findings, however, show differential patterns in the influence of age on the self-rated health of older women and men. "Younger" elderly women are much more likely to express better subjective health than "older" elderly women. That is, there is steady decline in the odds of good health with age for older women, where those aged 65-69, 70-74, and 75-79 are 1.77, 1.64, and 1.44 times more likely, respectively, to rate their health as good or better relative to those aged 80+. By contrast, there is little difference by age in the proportion of older men reporting good health.

Research shows that lifestyle is closely related to health. As expected, living a "healthy" lifestyle (measured by remaining physically active, not smoking daily, and

acceptable body weight) increases the likelihood of good/excellent health assessment among all Canadian seniors. However, level of physical activity has a more beneficial effect on health for elderly women than it does for elderly men. Older women who are either moderately or completely physically active relative to those who are not are about 3 times more likely to fall into the good/excellent self-rated health category (see **Table 2**). On the other hand, the odds of reporting good health increases by a factor of slightly more than two (O.R. 2.19, $p<.01$) from a sedentary to fully active lifestyle for older men, while older men who exercise moderately are not significantly more likely to perceive their health as good compared to those who do not exercise. The gender difference in the effect of moderate exercise on subjective health is therefore statistically significant.

While BMI has a marginally significant positive effect on the subject health assessment of both males (O.R. 1.44, $p<.10$) and females (O.R. 1.32, $p<.10$), the smoking coefficient is only significantly related to the subjective health of older men. On average, there is a 0.7% (i.e., [100 * (0.993-1)]) change in the odds of reporting positive health for each additional year of daily smoking by a man; that is, for each year, the odds of reporting good health decrease by 0.007 or 0.7%.

Of the psychosocial variables only distress is a statistically significant predictor of subjective health among older Canadians. For both older men and women, as levels of distress increase the odds of reporting good health significantly decrease. On average, for each unit increase in a respondent's distress score, the odds of reporting good health are decreased by about 0.19 or 19%.

Disability The logistic regression model of disability is even more different when gender is controlled. Looking at economic/demographic coefficients in **Table 3,** income adequacy is not significantly related with disability for older women, while age is. Almost the opposite occurs for older men.

Women aged 65-69, 70-74, and 75-79 are significantly more likely to be disability-free than women aged 80+ (O.R. 5.41, 4.47, and 3.01, $p<.001$, respectively). For men, disability is a lot less associated with age; however, men aged 65-69 and 70-74 are still 2.16 ($p<.01$) and 1.85 ($p<.05$) times more likely, respectively, to be free of disability relative to men aged 80+.

(Table 3 here)

In terms of socio-economic status, income does not have a significant effect for older women, but older men with a middle income and an upper middle/high income are about twice as likely to have no disability compared to older men in the low/low middle income group. Since age and income are generally related with disability for women only and for men only, respectively, gender differences in the income and age coefficients are statistically significant (see the last column in **Table 3**).

Odds ratios for non-visible minorities compared to visible minorities are also different in magnitude and significance in disability for older men and women. Non-visible minority older men and women are 2.23 ($p<.10$) and 1.01 ($p>.10$) times more likely, respectively, as their counterparts to be free of disability.

Lifestyle predictors of disability also vary by gender. While coefficients for BMI are similar in magnitude and predictive significance for older men and women, there are differences between the sexes in the relationship between physical activity and disability, as well as between smoking and disability. For older women, being moderately or very physically active significantly decreases the risk of having a disability - they are 1.51 ($p<.05$) and 3.25 ($p<.001$) times more likely, respectively, to be disability-free compared to older women who are physically inactive. However, the odds ratio for moderately active older men is not statistically significant, and very active elderly men are only about one and one-half times (i.e., O.R. 1.71, $p<.05$) more likely as inactive elderly men be disability-free. On the other hand, smoking is significant predicator of activity limitation and dependence for elderly men but not for elderly women – that is, smoking on a daily basis significantly increases their risk of having a disability in old age.

Differential effects of psychosocial factors on disability between older men and women are even more pronounced. It is generally assumed that social support has a positive influence on health in later life, as some of the health-related effects of aging are cushioned when a person has someone to confide in and get advice from and can count on. Interestingly, social support has a significant negative effect on disability for older men, and no significant effect for older women when holding constant all other variables in the model. On average, for each unit increase in a respondent's social support score, the odds of not having a disability decrease by 1% ($p<.01$) for older men. The gender gap between social support coefficients is also statistically significant at $p<.01$ as reflected in the last column in **Table 3**. Finally, while distress has a significant negative effect on disability (i.e., as level of distress increases, the likelihood of being disability-free

decrease) for both older males (O.R. 0.809, p<.001) and females (O.R. 0.896, p<.001), its impact is larger for males. This gender gap is also statistically significant.

HUI In terms of socio-demographic predictors of HUI, both income and age have significant effects for older persons. However, income has a larger effect on HUI for males, and age for females. For elderly men, the average absolute difference in HUI score between older respondents with a middle income and a low/low middle income is 0.0516 (p<.05); the comparable figure for those with an upper middle/upper income is 0.0953 (p<.01). The absolute gap in average HUI score between lower and higher income groups is considerably smaller for older women – 0.0442 (p<.05) between middle income and low/low middle income groups, and 0.0414 (p<.05) between the highest and lowest income groups (see **Table 4**).

(Table 4 here)

The data also reveal a steady decline in functional health with age, but for older women only. The average absolute difference in HUI score between the oldest age group (80+) and younger age groups gradually decreases from 0.164 at ages 65-69 to 0.151 at ages 70-74 to 0.108 at ages 75-79, or an overall decrease of about 35%. Not only is the average absolute difference in overall functional health between the oldest and younger age groups smaller for males, but a similar linear pattern is not observed. In fact, absolute inequalities in HUI scores are only statistically significant between the youngest (65-69) and oldest age

groups (80+) (0.0743, p<.01). As a result, gender differences in the effect of age on HUI are statistically significant (see the last column in **Table 4**).

Interestingly, the only lifestyle factor that is significantly associated with HUI for either males or females is physical activity. Moderate exercise has a similar positive effect on HUI score for older men and women (0.0601, p<.01 and 0.0771 p<.001, respectively), as does intense exercise (0.0571, p<.01 and 0.0720, p<.01).

This is not the case for psychosocial factors. Social support does not have a significant effect on HUI for elderly women, yet it has a significant and negative effect for elderly males. That is, as level of social support increases, functional health decreases for older men. Although distress has a highly significant negative effect on overall functional health for both older males and older females, the effect is larger for males. On average, for every unit increase in the distress index, HUI score decreases by 0.035. The comparable figure for older women is 0.021. Finally, the magnitude and predictive significance of coherence also varies by gender (0.0020, p<.05 for older men and 0.00311, p<.001 for older women), but unlike social support and distress, the gender difference in the effect of coherence on functional health is not large enough to be statistically significant (see the last column in **Table 4**).

Chronic Health Conditions Unlike the other measures of global health described above, number of chronic health conditions is not closely linked to income and age (except between the youngest and oldest age categories) for either older males or females. Race, on the other hand, is a strong and significant predictor of number of

chronic health conditions. As shown in **Table 5**, white men and women on average have almost one less chronic health condition than their counterparts.

(Table 5 here)

In terms of the effect of lifestyle resources on chronic health problems, the data, however, show gender differences. Generally speaking, higher levels of physical activity predict lower numbers of chronic health conditions for elderly women, but not for elderly men. Body weight, on the other hand, has a similar significant effect on number of chronic conditions for older males (-0.365, $p<.01$) and females (-0.407, $p<.01$). Hence, older men and women with acceptable body weight have, on average, just under one-half fewer chronic conditions vis-à-vis older men and women who are either over or under weight. However, older females who smoke (or who have smoked) daily have marginally significant higher numbers of chronic conditions (0.004974, $p<.10$). This is not the case for older males (0.0004078, $p>.10$).

It is no surprise that mental/emotional well-being (i.e., distress and coherence) is a significant predictor of the number of chronic health conditions for both older men and women. The magnitude and predictive significance of these variables is similar for the sexes, where individuals with lower levels of distress and higher levels of coherence have fewer chronic conditions. However, social support does not have the same effect on the number of chronic conditions for older men and women. Older women with greater social support resources have fewer chronic health conditions than do those with fewer resources (-0.003799, $p<.10$). The opposite is the case for older men – the greater the

social support resources, the greater the number of chronic health conditions (0.008076, p<.01). The difference in the size of the social support index coefficient for older males and for older females is therefore large enough to be statistically significant.

Gender Differences in the overall effect of Social factors on Health The primary research question in this study concerns the effect of *individual* social resource variables on the health of older men and older women, which is answered in the preceding tables. An associated question relates to gender differences in the relative importance of socio-economic/demographic, behavioural, and psychosocial determinants of health as a *group*, which is answered in **Table 6.**

As shown in the first column of this table, variation in social resources as a whole accounts for about 28% and 22% of the variance in self-rated health for elderly women and men, respectively. Social resources explain a similar percentage of the variance in HUI for older women (28.6%) and an even larger proportion for older men (28.9%). In terms of activity limitation/dependence and number of chronic health conditions, the variance explained by these variables as a group is somewhat smaller for both older men and women.

(Table 6 here)

The figures in the second column in **Table 6** are estimates of the proportion of variance added to the full/final model (i.e., column 1) by socio-economic/demographic factors *net* lifestyle and psychosocial influences. These estimates are produced by

subtracting the variance explained by lifestyle and psychosocial factors as a whole from the final model (i.e., variance explained by socio-economic/demographic, lifestyle, and psychosocial factors in combination).

Hence, the absolute proportion of variation added by socio-economic/demographic factors net lifestyle and psychosocial ones is: 0.046 for older women and 0.039 for older men for self-rated health; 0.088 vs. 0.038 for disability; 0.062 vs. 0.021 for HUI; and 0.007 vs. 0.011 for number of chronic health conditions. As a percentage of variance explained in the full model, the corresponding numbers are: 16.5% vs. 18.1%; 43.4% vs. 20.5%; 21.7% vs. 7.3%; and 6.9% vs. 11.2%. The proportion of variance added to the full model by lifestyle determinants net socio-economic/demographic and psychosocial influences and by psychosocial determinants net socio-economic/demographic and lifestyle influences is shown in the third and fourth columns in **Table 6**, respectively.

Generally speaking, socio-economic/demographic factors as a whole tend to play a much greater role in shaping the objective health of older women than they do for older men, yet they have a slightly larger influence on the subjective health of elderly males. Lifestyle factors as a group tend to have a larger influence on the health measures for older men compared to older women. This is even more the case with respect to psychosocial determinants. These factors acting in combination tend to do a much better job at accounting for what affects the health of older men than they do for older women. Overall, psychosocial factors are also much more important than either socio-economic/demographic or lifestyle factors in the determination of health for all (both males and females) elderly Canadians (see the last column of **Table 6**).

Discussion

Two important findings are presented in this paper. First, the results show the significance of a social production of health model in explaining health inequalities among elderly Canadians. Social resource factors as a whole account for a relatively large portion of the variation in the health of older individuals. These findings suggest that the onset of disease and illness can be postponed or prevented, reducing rates of morbidity and disability in later life, by, for example, more aggressively promoting healthier lifestyles (i.e., increasing and targeting health promotion efforts) for all Canadians. This could help reduce health-care demand and expenditures in light of an aging population.[18]

Second, the findings sled light on the importance of gender for health in two ways. Firstly, the data show that elderly women compared to elderly men have a higher positive perception of their health, yet they are more likely to suffer from physical health problems. Health-care professionals and policy-makers need to directly focus on improving the quality of life for women – that is, their higher life expectancy should not mean more years in poor physical health.

Secondly, and a similarly important finding, social predictors of health differ in their impact between the sexes. With respect to socio-economic/demographic determinants of health, age is a significant predictor of health primarily for older women - while there is steady decline in health with age for women, growing old does not necessarily mean a continuous decline in health for men. On the other hand, income adequacy has a greater effect for older men than women. Several important differences are also observed for lifestyle determinants of health. The health benefits of physical

activity are sharply divergent, with exercise (in either moderate or high amounts) having a greater positive health effect for elderly women than men. On the other hand, the adverse effect of daily smoking is generally larger for males. In terms of psychosocial determinants of health, social support has a marginally positive effect on health, but for elderly females only. It is actually a significant negative predictor of health for elderly men. Finally, while the positive effect of level of coherence on health is similar in magnitude for older men and women, distress' negative effect on health is generally stronger for older males.

This study, therefore, not only reveals the importance of considering social resources in improving the health of Canadians, but in the need for health-care planners to take into account the varied effects of social forces by gender when designing and implementing health policies, such as health and well-being promotion. Since many health problems in old age are the result of various cumulative factors throughout the life course (e.g., socioeconomic inequalities between men and women), they must be targeted for intervention early in the life course to reduce health problems and hence health care utilization among persons in old age, who are predominately female.

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Table 1: Means and Percentages[a] of Socio-economic/demographic, Lifestyle, Psychosocial, and Health factors, by Sex

Study Variables	Men	Women
Economic/Demographic		
Income****		
Low/Low Middle Income	12.6%	25.7%
Middle Income	39.2	39.1
Upper Middle/High Income	39.6	26.1
Missing	8.6	9.1
Age		
65-69	32.6%	30.8%
70-74	27.1	24.8
75-79	21.1	24.0
80+	19.3	20.5
Visible Minority Status		
White	93.8%	92.2%
Non-white	6.2	7.8
Lifestyle		
Physical Activity ****		
Inactive	54.7%	66.9%
Moderately Active	24.9	22.0
Active	20.4	11.1
BMI		
Unacceptable	47.4%	48.1%
Acceptable	52.6	51.9
Years of Daily Smoking ****	26.1	12.3
Psychosocial		
Social Support Index***	106.7	103.4
Distress Index****	2.1	3.0
Coherence Index*	64.2	63.5
Health		
Self-rated Health**		
Negative	24.9%	21.5%
Positive	75.1	78.5
No. of Chronic Conditions****	1.7	2.0
Disability****		
Yes	42.4%	52.7%
No	57.6	47.3
HUI	0.773	0.768
n	**1,108**	**1,743**

**p*<.10, ***p*<.05, ****p*<.01, *****p*<.001.

a. Percentages may not sum to 100% due to rounding.

Table 2: Logistic regression Odds of Positive Health in relation to Socio-economic/demographic, Lifestyle, and Psychosocial factors, by Sex

Independent Variables	Men Only	Women Only	Sex Gap
Economic/Demographic			
Income (Low/Low Middle = 1)			
Middle Income	1.079	1.241	
Upper Middle/High Income	2.149**	3.801***	
Missing	1.478	1.948	
Age (80+ = 1)			
65-69	1.201	1.771**	
70-74	1.225	1.648*	
75-79	0.587*	1.446*	**
Visible Minority Status			
White vs. Non-white	0.654	1.036	
Lifestyle			
Physical Activity (Inactive = 1)			
Moderately Active	1.341	3.145****	**
Active	2.191***	2.873**	
BMI			
Acceptable vs. Unacceptable	1.447*	1.326*	
Years of Daily Smoking	0.993*	1.000	
Psychosocial			
Social Support Index	0.995	1.003	
Distress Index	0.814****	0.810****	
Coherence Index	1.012	1.007	
Nagelkerke R^2	***0.216***	***0.279***	

*p<.10, **p<.05, ***p<.01, ****p<.001.

Table 3: Logistic regression Odds of No Disability in relation to Socio-economic/demographic, Lifestyle, and Psychosocial factors, by Sex

Independent Variables	Men Only	Women Only	Sex Gap
Economic/Demographic			
Income (Low/Low Middle = 1)			
Middle Income	1.839**	1.101	*
Upper Middle/High Income	1.965**	1.199	*
Missing	3.400***	1.850**	
Age (80+ = 1)			
65-69	2.160***	5.410****	***
70-74	1.857**	4.477****	**
75-79	1.361	3.010****	**
Visible Minority Status			
White vs. Non-white	2.236*	1.013	
Lifestyle			
Physical Activity (Inactive = 1)			
Moderately Active	1.377	1.514**	
Active	1.714**	3.256****	**
BMI			
Acceptable vs. Unacceptable	1.439**	1.468***	
Years of Daily Smoking	.992*	.996	
Psychosocial			
Social Support Index	.990***	1.004	***
Distress Index	.809****	.896****	**
Coherence Index	1.011	.992	
Nagelkerke R^2	***0.185***	***0.203***	

*p<.10, **p<.05, ***p<.01, ****p<.001.

Table 4: Metric coefficients for OLS regression of Health Utility Index (HUI) on Socio-economic/demographic, Lifestyle, and Psychosocial factors, by Sex

Independent Variables	Men Only	Women Only	Sex Gap
Economic/Demographic			
Income (Low/Low Middle = 1)			
Middle Income	0.0516**	0.0442**	
Upper Middle/High Income	0.0953***	0.0414**	*
Missing	0.0891**	0.0621**	
Age (80+ = 1)			
65-69	0.0743***	0.164****	***
70-74	0.0318	0.151****	****
75-79	0.0431	0.108****	**
Visible Minority Status			
White vs. Non-white	0.0280	-0.038	
Lifestyle			
Physical Activity (Inactive = 1)			
Moderately Active	0.0601***	0.0771****	
Active	0.0571***	0.0720***	
BMI			
Acceptable vs. Unacceptable	0.0175	0.0122	
Years of Daily Smoking	-0.00046	0.000179	
Psychosocial			
Social Support Index	-0.00078**	0.000261	**
Distress Index	-0.035****	-0.021****	***
Coherence Index	0.00201**	0.00311****	
Adjusted R^2	***0.289***	***0.286***	

*p<.10, **p<.05, ***p<.01, ****p<.001.

Table 5: Metric coefficients for OLS regression of Number of Chronic Health Conditions on Socio-economic/demographic, Lifestyle, and Psychosocial factors, by Sex

Independent Variables	Men Only	Women Only	Sex Gap
Economic/Demographic			
Income (Low/Low Middle = 1)			
Middle Income	0.143	-0.114	
Upper Middle/High Income	0.234	-0.06628	
Missing	0.297	-0.08356	
Age (80+ = 1)			
65-69	-0.498***	-0.384**	
70-74	-0.267	-0.262	
75-79	-0.306	-0.156	
Visible Minority Status			
White vs. Non-white	-0.837**	-0.826***	
Lifestyle			
Physical Activity (Inactive = 1)			
Moderately Active	0.02309	-0.414***	**
Active	0.02356	-0.525***	**
BMI			
Acceptable vs. Unacceptable	-0.365***	-0.407***	
Years of Daily Smoking	0.0004078	0.004974*	
Psychosocial			
Social Support Index	0.008076***	-0.003799*	***
Distress Index	0.144****	0.103****	
Coherence Index	-0.01480**	-0.01372**	
Adjusted R^2	***0.098***	***0.101***	

*p<.10, **p<.05, ***p<.01, ****p<.001.

Table 6: Decomposition of Variance Explained (R^2) by Socio-economic/demographic, Lifestyle, and Psychosocial factors, by Sex

Health Measures	1	2	3	4
Self-rated Health				
Women	**0.279**	0.046 (16.5%)[a]	0.036 (12.9%)	0.125 (44.8%)
Men	**0.216**	0.039 (18.1%)	0.033 (15.3%)	0.095 (44.0%)
Disability				
Women	**0.203**	0.088 (43.4%)	0.039 (19.2%)	0.046 (22.7%)
Men	**0.185**	0.038 (20.5%)	0.037 (20.0%)	0.087 (47.0%)
HUI				
Women	**0.286**	0.062 (21.7%)	0.014 (4.9%)	0.151 (52.8%)
Men	**0.289**	0.021 (7.3%)	0.024 (8.3%)	0.183 (63.3%)
Chronic Health				
Women	**0.101**	0.007 (6.9%)	0.023 (22.8%)	0.044 (43.6%)
Men	**0.098**	0.011 (11.2%)	0.010 (10.2%)	0.076 (77.6%)

1-Proportion of variance explained by socio-economic/demographic, lifestyle, and psychosocial factors combined
2-Proportion of variance added by socio-economic/demographic determinants **net** lifestyle/psychosocial determinants.
3-Proportion of variance added by lifestyle determinants **net** socio-economic demographic/psychosocial determinants.
4-Proportion of variance added by psychosocial determinants **net** socio-economic demographic/lifestyle determinants.

a. Proportion of variance added as a **percentage** of the proportion of variance explained in the final model.

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