S E D A P

A PROGRAM FOR RESEARCH ON

SOCIAL AND ECONOMIC DIMENSIONS OF AN AGING POPULATION

Understanding the Relationship between Income Status and the Restrictions in Instrumental Activities of Daily Living among Disabled Older Adults

Parminder Raina
Micheline Wong

SEDAP Research Paper No. 83

For further information about SEDAP and other papers in this series, see our web site:
http://socserv2.mcmaster.ca/sedap

Requests for further information may be addressed to:
Secretary, SEDAP Research Program
Kenneth Taylor Hall, Room 426
McMaster University
Hamilton, Ontario, Canada
L8S 4M4
FAX: 905 521 8232
e-mail: qsep@mcmaster.ca

UNDERSTANDING THE RELATIONSHIP BETWEEN INCOME STATUS AND THE RESTRICTIONS IN INSTRUMENTAL ACTIVITIES OF DAILY LIVING AMONG DISABLED OLDER ADULTS

PARMINDER RAINA
MICHELINE WONG

SEDAP Research Paper No. 83

October 2002

The Program for Research on Social and Economic Dimensions of an Aging Population (SEDAP) is an interdisciplinary research program centred at McMaster University with participants at the University of British Columbia, Queen's University, Univérsité de Montréal, and the University of Toronto. It has support from the Social Sciences and Humanities Research Council of Canada under the Major Collaborative Research Initiatives Program, and further support from Statistics Canada, the Canadian Institute for Health Information, and participating universities. The SEDAP Research Paper series provides a vehicle for distributing the results of studies undertaken by those associated with the program. Authors take full responsibility for all expressions of opinion.

Understanding the Relationship between Income Status and the Restrictions in Instrumental Activities of Daily Living among Disabled Older Adults

Parminder Raina, Ph.D. [1,2]

Micheline Wong, MHSc. [2]

[1] Department of Clinical Epidemiology and Biostatistics, Faculty of Health Sciences, McMaster University, Hamilton, Ontario, Canada.

[2] British Columbia Research Institute for Children's and Women's Health, Centre for Community Child Research, L408-4480 Oak Street, Vancouver BC, Canada

ABSTRACT

The purpose of this study was to examine the restrictions in instrumental activities of daily living (IADL) among older disabled Canadian adults according to their income status, as well as describe the relationships between income, severity of disability and functional independence. Disabled individuals aged 55 years and older were identified from the 1986 and 1991 Health and Activity Limitation Surveys. The overall unweighted sample size for each survey was 132,337 in 1986 and 91,355 in 1991. Between 10.3% (men aged 65 years and older in 1986) and 23.2% (women aged 65 years and older in 1991) were classified as having low income. In both survey years and in both age groups, more females were categorized as low income compared with males. Low income respondents aged 55-64 years old were also generally less likely to be categorized as mildly disabled and more likely to be categorized as severely disabled compared with those classified as having a high income (p's < 0.003). In both 1986 and 1991, women in both age groups, whether high or low income, generally reported more IADL restrictions than men. The majority of respondents in both the high and low-income groups reported having zero IADL restrictions (41.0% and 40.6% respectively). Over 90% of both high and low income respondents indicated that they either made all or most decisions regarding their everyday activities. Our model suggests that income status negatively influences severity of disability, and in turn, severity of disability negatively influences functional independence, as defined by the number of IADL restrictions and perceived decision making control. Disabled low income seniors and senior women are vulnerable groups within the elderly population. In an aging population, strategies of the health care system and other sectors are needed to counter low-income status and improve functional independence so that older disabled Canadian adults can improve and maintain their health and independence.

INTRODUCTION

The changing population demographics of industrialised countries raise many questions about the well-being of the aging population and the ways in which health care and social security should be directed. This is particularly important as seniors face a decrease in income during retirement (Clark, 1998). Although it is clear that aging is associated with an increase in disability and use of health care services, changes in socio-economic level, particularly changes in income, may influence seniors' health status and functional independence (Raina et al., 1998; Garfein and Herzog, 1995; Jagger et al., 1993; Strawbridge et al., 1992).

Consistently, studies related to aging and health have demonstrated that increasing age is associated with decreasing health status, increasing disability, and a decrease in functional abilities associated with activities of everyday living (Krause and Baker, 1992; Nelson, 1994; Cairney and Arnold, 1996). Mor and colleagues (1994) utilized data from the Longitudinal Study on Aging, an American national survey designed to examine the health status and functional abilities of a sample of 7,527 non-institutionalised seniors 70 years and older. Over a six-year period from 1984 to 1990, the health of seniors in the study declined both in terms of self-rated health and functional status (activities of daily living). In addition, this study found that older seniors (80 years and older) were more likely than younger seniors to have impairments related to activities of daily living (ADL) and instrumental activities of daily living (IADL).

Further studies have also examined the relationship between economic status and health among older adults. In a study performed by Seeman and colleagues (1994), data on 70-79 year old seniors from the Successful Aging Community Study were used to examine the relationship between physical performance and socio-demographic variables over a three-year period. Physical performance was assessed by five measures including hand, trunk and lower extremity movements as well as balance and gait at baseline and again three years later. They found that lower income was significantly related to a decline in physical performance over the three-year period, even after controlling for gender, race, education, physical performance, body mass index, cognitive functioning, and chronic health conditions.

Trends in longitudinal studies have also suggested that a temporal relationship between economic status and health such that low economic status leads to a decrease in health status (Hirdes et al, 1986; Guralnik and Kaplan, 1989). Guralnik and Kaplan (1989) followed up data of seniors aged 65-89 years old from the Alameda County over a 20-year period. They demonstrated that after adjusting for demographic factors, chronic conditions, and health behaviour, higher family income was predictive of being in the top 20 percent of seniors with high physical functioning..

Despite numerous studies addressing this issue, the relationships between aging, income and health (including disability) has not been fully elaborated. Previous findings have suggested that income affects the health of older adults through its interaction with factors related to the social and physical environment (Dutton and Levine, 1989). Others have suggested that the key to maintaining the health and independence of older adults in the community involves preventing impairments related to activities of

daily living. However, few studies, particularly in Canada, have investigated the ways in which income and functional independence interact among disabled older adults. Therefore, this study specifically examines the restrictions in instrumental activities of daily living (IADL) among disabled Canadian older adults and its association to income status, as well as describing the relationship between income, severity of disability and functional independence.

METHODS

Survey Sample

Both the 1986 and 1991 Health and Activity Limitation Surveys (HALS) were cross-sectional surveys designed to gather information on disabilities experienced by Canadians and the impact these disabilities have on daily living. Demographic information from the 1986 or 1991 Canadian Census was used to identify a nationally representative sample of disabled Canadians 15 years and older. This sample consisted of individuals who identified themselves on the Census Long Form as having either a physical or mental disability or who originally indicated on the Census Long Form that they were non-disabled, but were subsequently classified as disabled after completing the HALS. The non-disabled sample consisted of individuals who indicated on the Census Long Form that they did not have a physical or mental disability and who were not identified as -disabled after completing the HALS.

The total response rate for the HALS was 90% in 1986 and 92% in 1991. The overall unweighted sample size was 132,337 in 1986 and 91,355 in 1991. This study sampled individuals aged 55-64 years and 65 years and older. In 1986, the unweighted (weighted) sample size for adults 55-64 years and 65 years and older was 22,386 (2,313,100) and 38,518 (2,484,800) respectively. In 1991, the unweighted (weighted) sample size was 11,507 (2,365,000) for adults 55-64 years and 5,106 (2,906,900) for adults

65 years and older. Both institutionalised and non-institutionalised Canadians were included in the survey in 1986, however; only non-institutionalised Canadians were included in the survey in 1991. Therefore, to facilitate comparability between the two surveys and for the purposes of this report, only data from non-institutionalised samples were considered.

Survey Design

The survey was conducted in two stages. The first stage consisted of determining whether individuals from the 1986 and 1991 Canadian Census Long Form (completed by every fifth household) had indicated they were limited in the kind and amount of activity they did at home, work or school because of a long-term physical condition. A list of all people aged 15 years and older (with the exception of those in penal institutions and correctional facilities) that indicated on the Census Long From that they had a physical or mental disability was identified. From this list, a stratified sampling procedure was used to select the disabled sample forming two major strata, Indian reserves and all other areas. All Indian reserves and a sample of the remaining areas were included in the survey.

The results of a small field test revealed that a proportion of persons with a mild disability and some individuals aged 65 years and older did not indicate that they were disabled on the Census Long From. To account for this reporting error, a sample of individuals 15 years and of age and older who reported that they were not disabled on the Census Long Form were also selected. Among those selected, approximately 5% were subsequently classified as disabled by HALS, and became part of the disabled sample (Statistics Canada, 1989, 1995).

Survey Instrument

Canadians who indicated on the Census Long Form that they had a disability completed the HALS in a face-to-face interview. For people unable to complete the interview themselves, usually because of a high level of disability, the interview was completed by proxy (approximately 12% of sample individuals). Canadians who indicated on the Census Long Form that they did not have a disability completed the HALS through a shorter telephone interview.

Both the 1986 and 1991 HALS had similar formats and asked similar questions. All respondents completed Section A of the survey, which included an Activities of Daily Living (ADL) Scale designed to assess whether respondents experienced any of 17 physical restrictions (Table 1). Additional questions assessed the respondents' level of cognitive functioning (Statistics Canada, 1986; Statistics Canada, 1991).

Only respondents who were classified by HALS as being disabled completed the second part of the survey, which assessed the impact their disability(ies) have on daily living such as assistance required for instrumental activities of daily living (e.g., help with housework), disability-related sources of income and expenses, and emotional well-being.

Variables used in the analyses

Demographic variables used in the analyses were available through computer link with the 1986 and 1991 Canadian Census. The variables included age (55-64 years and 65 years and older), gender, marital status, degree of urbanization, type of dwelling (single versus other), tenure of dwelling

(owned versus rented), household size, region of Canada, and total household income. Due to the relatively small unweighted sample size for the 1991 HALS, smaller groupings of individuals according to age beyond the two age groups used for this study were not provided.

Income status in this study was based on Statistics Canada's (1994) "low income cut-offs", an indicator identifying families who have a low household income according to their ability to buy basic necessities. Based on national family expenditure patterns, families who spend more than 20% of the national average on food, shelter, and clothing are classified as having low income. The low-income cut-offs take into account total household income, household size, and degree of urbanization (with more urbanized areas being associated with higher costs of living). This income status index is updated annually to reflect changes in household family expenditures based upon the consumer price index.

Disability Status

Participants whose responses on HALS indicated that they had at least one restriction in activities of daily living or a cognitive limitation were classified as disabled. Those who reported no restrictions in activities of daily living and no cognitive limitations were classified as non-disabled. Respondents classified as disabled were further categorized using HALS according to the type of physical disability(ies) they had and was based on responses to the 17 ADL items in Section A of HALS, Using this criteria, respondents were classified as having seeing, hearing, speaking, mobility, or agility disabilities.

Severity of Disability

The degree of severity of a respondent's disability(ies) was measured by HALS using a severity index developed by McDowell (1988). The severity index was based on both the number of and degree to which disabled respondents experienced restrictions in their activities of daily living. The severity index ranged from 1 to 43, with higher scores indicating greater severity. Based on the severity index, respondents were classified as having a mild (scores 1-4), moderate (scores 5-10), or severe (scores 11-43) disability.

Restrictions in Instrumental Activities of Daily Living Due to Disability

Disabled respondents were asked to indicate whether they receive assistance in performing each of the following instrumental activities of daily living (IADL): heavy household chores, grocery shopping, housework, meal preparation, personal finances, personal care, and moving around residence. For each IADL that respondents reported receiving assistance, they were asked to indicate whether they received the assistance because of their disability. For the purposes of this report, respondents were classified as having an IADL restriction only if they indicated that they received assistance for a particular IADL and that the assistance was required because of their disability.

Statistical analyses

Population Characteristics

Proportions were used to provide descriptive statistics of the sample by income status (high versus low income) for both the 1986 and 1991 HALS. Logistic regression analyses were conducted for each

population characteristic to indicate the odds and 95% confidence intervals for being classified as low income.

Severity of Disability

The severity of disability for disabled respondents was reported by gender, age, and income status for both the 1986 and 1991 HALS. Chi-square analyses were conducted by age and gender to determine if there were differences in the severity of disability between high and low income disabled respondents.

Restrictions in Instrumental Activities of Daily Living Due to Disability

The percentages of disabled respondents indicating assistance with their IADL due to disability were reported by type of IADL restriction, age, gender, and income status. For each IADL restriction reported, separate chi-square analyses at each level of age and gender were conducted comparing differences by income.

Relationship between Income Status, Severity of Disability, and Functional Independence

Variables used in the analyses were selected from the 1991 HALS according to Evan and Stoddart's Determinants of Health Model (Evans & Stoddart, 1990), which emphasizes the interplay between such factors as social and physical environment, individual behaviour, genetics, health, well-being and prosperity in understanding the determinants of disease and use of health care services. All regression analyses were adjusted for individual factors (i.e. age, gender, and smoking status), the social environmental (i.e. marital status), and the physical environment (i.e. use of physical aids,

modifications to residence and difficulty taking trips). By holding these factors constant, we were better able to isolate the associations between income status, severity of disability, and independence.

The level of independence was determined using two different measures. The first measure was the reported number of restrictions in instrumental activities of daily living (IADL) from having a disability. Level of independence was considered inversely proportional to the number of activity restrictions, with fewer restrictions reported indicating greater independence. The second measure was the amount of control respondents had over decisions affecting their everyday activities. This perceived decision making control was operationalized using an item from the 1991 HALS that asked respondents to indicate how much control they felt they had in making decisions that affect everyday activities using a four-point scale that ranged from 1 (none) to 4 (you make all the decisions). Respondents who indicated greater levels of control were considered more independent.

Although the Determinants of Health Model was used to guide the development of the regression equations, it should be noted that the analyses were not a direct test of the model. Five regression equations were used to examine the relationships between income status, severity of disability and functional independence among disabled older adults. The first equation examined the association between income status and severity of disability. The next two equations examined whether income status was associated with number of IADL restrictions or perceived decision-making control. The final two equations examined whether severity of disability had an association with either number of IADL restrictions or perceived decision-making control. All five regression equations used unweighted data and were adjusted for the following variables: age, gender, smoking status, marital status, type of

dwelling, use of physical aids, modifications to residence and difficulty taking trips. For all inferential statistics, an alpha level of less than 0.05 was considered statistically significant.

Weighting

Due to the multi-staged, stratified sampling used in HALS, it was necessary to use a weighting process for all analyses. In both surveys, every respondent was assigned a weight corresponding to the number of people the respondent represented based on the Canadian Census. These weights were used to generate all population estimates. Although this weighting procedure generates accurate estimates, significance tests and confidence intervals are inflated and the risk of Type I error is increased. Therefore, for all inferential analysis using weighted data, such as logistic regression, we rescaled the weight by dividing the weight for each respondent by the average weight of all respondents. This strategy generates more accurate summary statistics and confidence intervals (Statistics Canada, 1986; Statistics Canada, 1991).

RESULTS

Income Status

The proportion of respondents classified as high or low income based on the low-income cut-off measure is presented in Table 2. In 1986, 31.0% of adults aged 55-64 years and 12.2% of adults 65 years or greater in the high income category had total household incomes of $25,000 or more compared to 45.8% of adults aged 55-64 years and 24.9% of seniors in 1991. In 1986, the low-income category, 94.2% of 55-64 year olds and 96.7% of seniors had total household incomes of less than $10,000 compared to 82.1% of 55-64 year olds and 46.4% of seniors.

The income status by age and gender of Canadians 55 -64 years and 65 years and older for the 1986 and 1991 cross-sectional Health and Activity Limitation Surveys is presented in Table 3. For women aged 55 – 64 years, 20.1% in 1986 and 16.9% in 1991 were classified as having a low income. This percentage slightly increased for women aged 65 years and older, with 22.6% in 1986 and 23.2% in 1991 classified as having low income. In both survey years and in both age groups, a greater percentage of females were categorized as low income compared to males of similar age.

Population Characteristics

The population characteristics by income status and the unadjusted odds ratios indicating the odds of being classified as low income for each population characteristic of Canadians aged 55 years and older for the 1986 and 1991 HALS is shown on Table 4. With the exception of age, there was little difference in population characteristics between 1986 and 1991. In 1986, there were no differences in income status between 55-64 year olds and seniors (OR=0.99, 95% CI: 0.95-1.04), however in 1991, seniors were more likely to be classified as having a low income (OR = 1.52, 95% CI: 1.40-1.66).

A number of population characteristics among older adults aged 55 years and older remained consistent between 1986 and 1991. Approximately 54% of respondents were female, 67% were married, 80% lived in urban areas, 65% lived alone, and 50% lived with one other person. Men were significantly less likely to be categorized as low income than women (OR=0.52, 95% CI (0.50-0.52) in 1986 and OR=0.65, 95% CI (0.60-0.71) in 1991). Married respondents were less likely to have low income than single respondents (OR=0.23, 95% CI (0.21-0.25) in 1986 and OR=0.26, 95% CI (0.22-

0.30) in 1991). Respondents in households of two people and three or more people were less likely to have low income than single-person households (two person households: OR=0.17, 95% CI (0.16-0.17) in 1986 and OR=0.19, 95% CI (0.18-0.21) in 1991; three or more person households: OR=0.18, 95% CI (0.17-0.19) in 1986 and OR=0.15, 95% CI (0.13-0.17)in 1991). Moreover, respondents who lived in other dwellings homes were more likely to have low income than those who lived in single dwelling homes (OR=2.78, 95% CI (2.66-2.90) in 1986 and OR=3.28, 95% CI (3.02-3.56) in 1991). Similarly, those who rented their homes were more likely to have low income than those who owned their homes (OR=3.28, 95% CI (3.13-3.42) in 1986 and OR=4.81, 95% CI (4.41-5.24) in 1991).

Severity of Disability

Table 5 presents the severity of disability by income status, gender and age. In both 1986 and 1991, adults aged 55-64 years with a low income, were more likely to be categorized as severely disabled when compared with those classified as having a high income ($p < 0.003$). For example, in 1991, 43.8% of adults aged 55-64 years with high income reported mild disabilities compared with 33.8% of low-income women of the same age, and 17.8% of high-income women reported severe disabilities compared to 29.3% of low-income women (χ^2=43.01, p<0.001).

Similarly, low income women in 1991 and men in 1986 over the age of 65 years, were less likely to be categorized as mildly disabled and more likely to be categorized as severely disabled (χ^2 = 45.53, p<0.001 and χ^2 = 23.18, p<0.001, respectively). The exception to the pattern was among senior women in 1986 and senior men in 1991. Compared with high-income senior women, a smaller proportion of low-income senior women in 1986 reported being mildly (29.8% versus 31.3%) and severely (27.5%

versus 30.9%) disabled, and a larger proportion reported being moderately (42.8% versus 37.8%) disabled (χ^2 = 35.86, p < 0.001). Among senior men in 1991, a greater percentage of low income respondents reported being mildly disabled (53.5% versus 42.1%) and a smaller percentage reported being moderately (26.5% versus 35.9%) and severely (20.0% versus 21.9%) compared to high income respondents disabled (χ^2 = 10.20, p=0.006).

Restrictions in Instrumental Activities of Daily Living Due To Disability

Table 6 presents restrictions in instrumental activities of daily living caused by a disability by income status, age, and gender. In both 1986 and 1991, women in both age groups, whether high or low income, generally reported more IADL restrictions than men. In 1986, low income disabled men aged 55-64 years old were significantly more likely to report IADL restrictions (with the exception of moving around residence), than high income men of the same age (p's<0.01). However, in 1991, the only significant differences in IADL restrictions by income status among disabled 55-64 year old men were related to grocery shopping and housework (p's<0.001). In 1986, low income disabled women aged 55-64 years were significantly more likely than disabled women of the same age with a high income to report restrictions in performing heavy household chores and grocery shopping (p's<0.001) and significantly less likely to report restrictions in moving around residence (p<0.001). In 1991, low income disabled women were significantly more likely to report IADL restrictions for grocery shopping, personal finances, and personal care (p's<0.05) than similar women with a high income.

Despite income status, adults 65 years or greater tended to report having more IADL restrictions caused by a disability than adults 55-64 years. In 1986, senior women who were classified as having a

low income were significantly less likely to report IADL restrictions than high-income women (p's<0.001). For example, 29.5% of low- income senior women reported restrictions with housework compared with 40.6% of high-income senior (p<0.001). However, among disabled senior men, with the exception of heavy household chores and moving around residence, those classified as low income were more likely to report having IADL restrictions (p's<0.05). Low-income senior men were significantly less likely to report having restrictions in heavy household chores (p<0.05) than senior men classified as having a high income.

In 1991, disabled senior women classified as low income were significantly less likely to report restrictions in heavy household chores (p<0.05) and significantly more likely to report restrictions in grocery shopping, housework, personal finances, and personal care compared with senior women (p's<0.01). Similarly, low income disabled senior men were significantly less likely to report restrictions with heavy household chores (p<0.001) and more likely to report restrictions in grocery shopping, meal preparation, and personal finances (p's<0.05) compared to senior men classified as having a high income.

Relationship among Income Status, Severity of Disability and Functional Independence

Table 7 presents the level of functional independence, measured as the number of IADL restrictions and perceived decision-making control by income status. The majority of respondents in both the high and low-income groups reported having zero IADL restrictions (41.0% and 40.6% respectively). However, 27.8% of low-income respondents reported three or more IADL restriction compared with 19.8% of high-income respondents (overall χ^2=178.27, p<0.001). With regard to perceived decision-

making control, over 90% of both high and low income respondents indicated that they either made most or all of the decisions in their everyday activities. For example, 71.0% of low-income respondents reported that they make all the decisions compared with 58.9% of high-income respondents (overall χ^2=272.4, p<0.001).

Table 8 presents the results of five multiple linear regression equations used to understand how income status and severity of disability affects functional independence. All five multiple linear regression models were adjusted for individual factors (i.e. age, gender and smoking status), social environmental factors (i.e. marital status), and physical environmental factors (i.e. type of dwelling, modifications to improve access to residence, use of physical aids and difficulty taking trips). There was a significant negative relationship between income status and the severity of disability reported (Beta=-0.28, p=0.021), indicating that low-income respondents were more severely disabled than high- income respondents. There was no relationship between income status and the number of IADL restrictions (Beta=0.09, p>0.05) or perceived decision-making control (Beta=-0.01, p>0.05). Finally, there was a significant association found between the severity of the reported disability for both IADL restrictions (Beta=0.10, p<0.0001) and perceived decision-making control (Beta=-0.03, p<0.0001). However, this association should be interpreted with caution owing to the small amount of explained variance (R^2 = 0.09). Therefore, our model suggests that income status negatively influences the severity of disability, and in turn, severity of disability negatively associated with functional independence, as defined by the number of IADL restrictions and perceived decision-making control.

DISCUSSION

Both the 1986 and 1991 HALS revealed that seniors were more likely than adults 55-64 years to experience more severe disabilities and IADL restrictions, a finding that likely reflects an increasing frailty in seniors due to the aging process. Furthermore, low-income individuals generally reported more restrictions in performing everyday activities than high-income individuals. One of the ways in which high income may reduce the likelihood of experiencing IADL restrictions is by allowing disabled individuals to purchase products or services that would help reduce the impact of being disabled. Low-income older adults are a vulnerable subgroup of seniors who are limited by income to cope with their disability and often rely on family members for the financial support required for their care (Schulz, 1992; Holding and Smeeding, 1990).

Our findings indicated that senior women are consistently disadvantaged in terms of income, disability status and functional independence compared to senior men This disadvantaged state may result from a number of factors. First, women tend to live longer than men (Norland, 1994), resulting in a greater mean age difference among senior women compared with senior men. Increased disability due to the aging process alone may account for the differences in disability status between senior men and women. Second, senior women, particularly those who are widowed, are disadvantaged in terms of income since their personal incomes have traditionally been less than men, but they are often forced to rely on only one income after they are widowed. Therefore, lower income experienced by senior women may mean that these women who are experiencing a disability do not have the resources to reduce the impact of their disabilities.

Previous studies examining the relationship between income and health (including disability) have generally examined crude or adjusted odds associations. However, the relationship between income and health is a much more complex one. For example, our study found evidence suggesting that the aging process itself may serve to override the effects of income in seniors by showing that/ or demonstrated by. As well, we found that older disabled Canadians with higher income were less likely to have IADL restrictions due to their disability, possibly as a result of their ability to afford assistive devices and services. To better understand the complex relationship between income and health, we used both the Determinants of Health Model (Evans & Stoddart, 1990) and past research to guide our analyses of the relationships between income, severity of disability, and functional independence among older, disabled Canadians. Based on our results, we proposed an empirical model to explain how these factors are interrelated and mediated by each other. In this model, income status is postulated to negatively influence severity of disability and severity of disability, in turn, is postulated to negatively influence functional independence as defined by number of IADL restrictions and perceived decision-making control. This relationship may mean that low income involves higher prevalence of disability due to inequalities in the distribution of material, biochemical, and psychosocial benefits and risks. Serious illness or disability may feedback to adversely affect income by disrupting employment possibilities, earnings and productivity. This feedback effect can explain how low income engenders latent increases in mortality due to chronic diseases, namely that downward social mobility is accelerated and reinforced by chronically compromised functioning.

Research has typically treated the role of income in two ways. First, income is treated as a proxy for other epidemiological risks, such as increased consumption of tobacco or exposure to environmental

toxins. Second, income is treated as a confounder. In other words, income is not understood as a major variable, with its own specific but profound impact on health. However, the relationship we found suggests that low income *itself* involves a greater severity of disability among disabled, older Canadians even after the distribution of individual and psychosocial benefits and risks is taken into account. This finding indicates that income is more than just a proxy or confounder, but rather has its own, unique effects on severity of disability, which, in turn, is associated with lower functional independence. It should be noted, however, that our study was not able to establish the temporal properties of these associations due to the cross-sectional nature of our data. Therefore, our analyses do not represent a direct test of this empirical model rather; we present it as a hypothesis to be properly tested using longitudinal methods.

In our analyses, we statistically controlled for potentially confounding factors, such as modifications to residence and difficulty taking trips to isolate the unique associations among income, severity of disability and functional independence. We fully recognize, however, that the real world does not "control" for such factors, but rather that these factors are interrelated in a complex fashion as implied by the Determinants of Health Model (Evans & Stoddart, 1990). It is not so much any single aspect of low income that impacts the severity of disability or functional independence, but rather the entire experience of low socio-economic status with the attendant material, social and psychological disadvantages (Dutton and Levine, 1989). For this reason, future studies need to examine the specific financial situation (e.g. daily living and health expenditures) of seniors with varying disabilities and socio-economic status. By understanding the role that unequal distribution of financial resources plays in the elderly population, we are better able to determine the connections between income inequities

and health to develop appropriate social policies that recognize and account for differences in population health resulting from income inequities.

As well, future studies should continue examining the ways that income other determinants of health, such as social and physical environment, biology, and behaviour, interact with each other to produce better health and functional outcomes for the older disabled individuals. With a growing elderly population and an increasing need for financial and health care services, both the health care system and other sectors not specifically associated with health need to collaborate to keep older disabled Canadians feeling healthy and living independently.

REFERENCES

Cairney J, Arnold R. Social class, health and aging: Socioeconomic determinants of self-reported morbidity among the noninstitutionalized elderly in Canada. *Can J Public Health* 1996;87(3):199-203.

Clark C. *Canada's Income Security Programs*. Canadian Council on Social Development. Ottawa, 1998.

Dutton D. B., Levine S. (1989) Socioeconomic status and health: Overview, methodology critique, and reformation. In Bunker J. P., Gomby D. S. and Kehrer B. H. (eds*), Pathway to Health, The Role of Social Factors*, The Henry J Kaiser Family Foundation, California.

Evans RG, Stoddart GL. Producing health, consuming health care. *Soc Sci Med* 1990;31(12):1347-1363.

Guralnik JM, Kaplan GA. Predictors of healthy aging: Prospective evidence from the Alameda County study. *Am J Public Health* 1989;79(6):703-8.

Garfein A. J. and Herzog A. R. Robust aging among the young-old, old-old, and oldest-old. *Journal of Gerontology.* 1995; 50B(2): S77-S87.

Hirdes JP, Brown SK, Forbes WF, Vigoda DS, Crawford L. The association between self-reported income and perceived health based on the Ontario longitudinal study of aging. *Can J Aging* 1986;5(3):189-204.

Holden, K. C. and Smeeding, T. M. The poor, the rich and the insecure elderly caught in the middle. *The Milbank Quarterly* 1990; 68(2): 192-219.

Jagger C., Spiers N. A., and Clarke M. Factors associated with decline in function, institutionalization and mortality of elderly people. *Age and Ageing* 1993; 22: 190-197.

Krause N, Baker E. Financial strain, economic values, and somatic symptoms in later life. *Psychol and Aging* 1992;7(1):4-14.

McDowell I. *A Disability Score for the Health and Activity Limitation Survey*. Ottawa: Statistics Canada; 1988.

Mor V, Wilcox V, Rakowski W, Hiris J. Functional transitions among the elderly: Patterns, predictors, and related hospital use. *Am J Public Health* 1994;84(8):1274-80.

Nelson M.A. (1994) Economic impoverishment as a health risk: Methodological and conceptual issues. *Advanced Nursing Science*, 16(3): 1-12.

Raina P., Dukeshire S., Chambers LW., Denton M. Gafni A., et al. (1998) *Income, Disability and Functional Independence*. ISEOP Research Paper (in press): Faculty of Social Sciences, McMaster University, Hamilton, Ontario.

Schulz J. *The economics of aging*. Westport, CP: Auburn House. 1992

Seeman TE, Charpentier PA, Berkman LF, Tinetti ME, Guralnik JM, Albert M, Blazer D, Rowe JW. Predicting changes in physical performance in a high-functioning elderly cohort: MacArthur studies of successful aging. *Med Sci* 1994;49(3);M97-108.

Statistics Canada. *Health and Activity Limitation Survey, 1986*. Ottawa: Statistics Canada; 1989.

Statistics Canada. *Health and Activity Limitation Survey, 1991*. Ottawa: Statistics Canada; 1995.

Statistics Canada. *Profile of Census Divisions and Subdivisions in Ontario--Part B*. Statistics Canada: Ottawa; 1994.

Strawbridge WJ, Kaplan GA, Camacho T, Cohen RD. The dynamics of disability and functional change in an elderly cohort: Results from the Alameda County study. *J Am Geriatr Soc* 1992;40:799-806.

Table 1. Activities of Daily Living Items Used to Assess Disability Status, 1986 and 1991 Health and Activity Limitation Surveys

ADLs Used to Assess a Seeing Disability
Do you have any difficulty seeing ordinary newsprint, with glasses or contact lenses if usually worn? Do you have any difficulty clearly seeing the face of someone across a room (that is from 4 meters/12 feet), with glasses or contact lenses if usually worn?
ADLs Used to Assess a Hearing Disability
Do you have any difficulty hearing what is said in a conversation with one other person? Do you have any difficulty hearing what is said in a group conversation with at least three other people?
ADL Used to Assess a Speaking Disability
Do you have any difficulty speaking and being understood?
ADLs Used to Assess a Mobility Disability
Do you have any difficulty walking 350 meters or 400 yards without resting (about three city blocks, about half a kilometre or a quarter of a mile)? Do you have any difficulty walking up and down a flight of stairs (about 12 steps)? Do you have any difficulty carrying an object of 4.5 kg for 10 metres or 10 pounds for 30 feet (for example, carrying a bag of groceries)? Do you have any difficulty moving from one room to another? Do you have any difficulty standing for more than 20 minutes?
ADLs Used to Assess an Agility Disability
When standing, do you have any difficulty bending down and picking up an object from the floor (for example, a shoe)? Do you have any difficulty dressing and undressing yourself? Do you have any difficulty getting in and out of bed? Do you have any difficulty cutting your own toenails (That is, is it physically difficult for you to cut your own toenails)? Do you have any difficulty using your fingers to grasp or handle (such as using pliers or scissors)? Do you have any difficulty reaching in any direction (for example, above your head)? Do you have any difficulty cutting your own food?

Table 2. Percent of Canadians Aged 55 Years and Older Classified as Either High or Low Income by Total Household Income, 1986 and 1991 Health and Activity Limitation Surveys

Total Household Income	1986 Income Status			1991 Income Status		
	High Income	Low Income	Total	High Income	Low Income	Total
55-64 Years						
Less than $10,000	35.2	94.2	45.5	26.5	82.1	34.5
$10,000-$24,999	33.8	5.8	28.9	27.7	17.8	26.3
$25,000-$34,999	16.6	0.0	13.7	17.4	0.0	14.9
$35,000 and More	14.4	0.0	11.9	28.4	0.0	24.3
65 Years and Older						
Less than $10,000	46.2	96.7	54.9	25.3	46.4	29.6
$10,000-$24,999	41.7	3.3	35.1	49.8	53.6	50.6
$25,000-$34,999	6.3	0.0	5.2	10.4	0.0	8.3
$35,000 and More	5.9	0.0	4.8	14.5	0.0	11.5

Table 3. Percent of Canadians 55 Years and Older Classified as Either High or Low Income by Age and Sex, 1986 and 1991 Health and Activity Limitation Surveys

	1986 Income Status		1991 Income Status	
	High Income	Low Income	High Income	Low Income
55-64 Years				
Women	79.9	20.1	83.1	16.9
Men	85.5	14.5	88.2	11.8
65 Years and Older				
Women	77.4	22.6	76.8	23.2
Men	89.7	10.3	83.2	16.8

Table 4. Population Characteristics of Canadians 55 Years and Older, 1986 Health and Activity Limitation Survey (n = 4,721,000)

	1986				1991			
Characteristic	Percent Total	Percent High Income	Percent Low Income	Odds Ratio* (95% CI)	Percent Total	Percent High Income	Percent Low Income	Odds Ratio* (95% CI)
Age								
55-64	48.3	82.6	17.4	Referent	44.7	85.6	14.4	Referent
65+	51.7	82.7	17.3	0.99 (0.95-1.04)	55.3	79.6	20.4	1.52 (1.40-1.66)
Sex								
Women	54.3	78.5	21.5	Referent	53.9	79.5	20.5	Referent
Men	45.7	87.5	12.5	0.52 (0.50-0.55)	46.1	85.6	14.4	0.65 (0.60-0.71)
Marital Status								
Single	6.5	69.0	31.0	Referent	6.1	69.4	30.6	Referent
Married	66.6	90.6	9.4	0.23 (0.21-0.25)	66.6	89.7	10.3	0.26 (0.22-0.30)
Div/Sep/Widowed	26.9	66.2	33.8	1.13 (1.05-1.22)	27.2	67.0	33.0	1.12 (0.96-1.30)
Geographic Location								
Urban	78.1	81.4	18.6	Referent	80.3	80.8	19.2	Referent
Rural	21.9	87.3	12.7	0.64 (0.60-0.67)	19.7	88.5	11.5	0.55 (0.49-0.62)
Type of Dwelling								
Single House	65.0	88.1	11.9	Referent	65.9	88.5	11.5	Referent
Other	35.0	72.6	27.4	2.78 (2.66-2.90)	34.1	70.2	29.8	3.28 (3.02-3.56)
Tenure of Dwelling								
Owned	73.5	87.7	12.3	Referent	77.1	88.5	11.5	Referent
Rented	26.5	68.6	31.4	3.28 (3.13-3.42)	22.9	61.4	38.6	4.81 (4.41-5.24)
# Persons in Household								
One Person	20.6	58.0	42.0	Referent	20.2	57.6	42.4	Referent
Two Persons	48.3	89.3	10.7	0.17 (0.16-0.17)	51.3	87.6	12.4	0.19 (0.18-0.21)
Three or More	31.1	88.7	11.3	0.18 (0.17-0.19)	28.5	90.2	9.8	0.15 (0.13-0.17)
Region of Canada								
Atlantic	8.8	83.2	16.8	Referent	8.4	82.8	17.2	Referent
Quebec	25.2	77.1	22.9	1.47 (1.35-1.59)	24.6	76.6	23.4	1.47 (1.26-1.73)
Ontario	37.9	85.8	14.2	0.82 (0.75-0.89)	38.6	83.2	16.8	0.97 (0.83-1.14)
Prairies	16.2	84.3	15.7	0.92 (0.84-1.01)	15.4	85.2	14.8	0.84 (0.70-1.00)

Characteristic	1986				1991			
	Percent Total	Percent High Income	Percent Low Income	Odds Ratio* (95% CI)	Percent Total	Percent High Income	Percent Low Income	Odds Ratio* (95% CI)
British Columbia	11.9	81.6	18.4	1.12 (1.02-1.23)	13.1	86.5	13.5	0.75 (0.62-0.91)

*Odds ratio represents odds of having low income.

Table 5. Severity of Disability Among Disabled Canadians 55 Years and Older by Income Status, 1986 and 1991 Health and Activity Limitation Surveys

Severity of Disability	55-64 Year Olds				65 Years and Older			
	1986 Income Status		1991 Income Status		1986 Income Status		1991 Income Status	
	High Income (n = 410,200)	Low Income (n = 171,300)	High Income (n = 473,200)	Low Income (n = 140,000)	High Income (n = 786,900)	Low Income (n = 219,800)	High Income (n = 928,200)	Low Income (n = 262,600)
Women								
Mild	41.1	38.5	43.8	33.8	31.3	29.8	40.4	28.9
Moderate	38.6	37.6	38.4	36.9	37.8	42.8	36.4	31.9
Severe	20.2	23.9	17.8	29.3	30.9	27.5	23.2	39.2
	$\chi^2 = 12.98$, p=0.002		$\chi^2 = 43.01$, p<0.001		$\chi^2 = 35.86$, p < .001		$\chi^2 = 45.53$, p < .001	
Men								
Mild	45.4	35.0	48.8	39.1	43.6	41.0	42.1	53.5
Moderate	38.5	37.2	34.0	39.3	34.9	32.3	35.9	26.5
Severe	16.1	27.8	17.2	21.7	21.5	26.7	21.9	20.0
	$\chi^2 = 148.30$, p<0.001		$\chi^2 = 17.99$, p<0.001		$\chi^2 = 23.18$, p<0.001		$\chi^2 = 10.20$, p=0.006	

Table 6. Percent of Disabled Canadians 55 Years and Older Who Reported Restrictions in Instrumental Activities of Daily Living Due to Their Disability by Income, 1986 and 1991 Health and Activity Limitation Surveys

IADL Restriction	55-64 Year Olds				65 Years and Older			
	1986 Income Status		1991 Income Status		1986 Income Status		1991 Income Status	
	High Income (n = 410,200)	Low Income (n = 171,300)	High Income (n = 786,900)	Low Income (n = 219,800)	High Income (n = 786,900)	Low Income (n = 219,800)	High Income (n = 928,200)	Low Income (n = 262,600)
Heavy Household Chores								
Women	66.2	72.1***	50.4	48.8	72.5	67.1***	60.5	54.3*
Men	49.0	53.9***	32.2	33.0	50.7	47.7*	49.9	27.7***
Groceries								
Women	28.6	34.7***	23.9	34.5***	43.4	40.8**	31.8	43.5***
Men	12.8	17.2***	10.8	16.3***	19.2	25.5***	16.4	22.1*
Housework								
Women	29.6	27.4	22.0	23.2	40.6	29.5***	30.5	42.0***
Men	13.8	18.8***	10.8	16.5***	19.8	26.1***	19.8	19.8
Meal Preparation								
Women	11.9	10.7	11.5	13.1	21.0	13.6***	17.2	15.2
Men	7.1	10.4***	6.6	8.4	12.6	14.8*	14.9	20.5*
Personal Finances								
Women	11.9	12.4	8.2	11.2*	26.6	21.1***	18.1	24.2**
Men	7.3	11.1***	6.1	8.3	16.3	18.3*	15.7	22.7*
Personal Care								
Women	5.0	5.7	3.5	7.7***	11.6	8.8***	8.1	16.8***
Men	4.8	6.6**	5.6	7.2	9.3	13.1***	9.6	---
Moving Around Residence	2.9	1.6***	2.6	3.6	5.6	3.0***	6.2	6.4
Women	1.6	2.2	1.7	2.1	3.7	4.1	4.9	---
Men								

Cells denoted by "—" are based on unweighted sample sizes of less than 15 and have been suppressed as suggested by HALS release guidelines.

Chi-square analyses were conducted separately for women and men to compare differences in reported percentages between high and low income respondents.
*p<.05, **p<.01, ***p<.001.

Table 7. Percent of Canadians 55 Years and Older by Level of Functional Independence and Income Status, 1991 Health and Activity Limitation Survey

Level of Functional Independence	1991 Income Status	
	High Income (n = 786,900)	Low Income (n = 219,800)
Total Number of IADL Restrictions		
Zero	41.0	40.6
One	30.4	22.0
Two	8.7	9.6
Three or More	19.8	27.8
Perceived Decision Making Control		
None	2.5	2.7
Not Very Much	4.9	4.2
Make Most of the Decisions	33.7	22.1
Make All the Decisions	58.9	71.0

Table 8. Relationships Between Income Status, Severity of Disability, and Functional Independence Among Canadians 55 Years and Older, 1991 Health and Activity Limitation Survey

Equation	Independent Variable	Dependent Variable	R^2	Beta	Sig
A	Income Status	Severity of Disability	0.35	-0.28	0.021
B	Income Status	IADL Restrictions	0.26	0.09	ns
C	Income Status	Dec'n Making Control	0.06	-0.01	ns
D	Severity of Disability	IADL Restrictions	0.38	0.10	<.0001
E	Severity of Disability	Dec'n Making Control	0.09	-0.03	<.0001

Each multiple linear regression equation was adjusted for age, sex, smoking status, marital status, type of dwelling, use of physical aids, modifications to residence, and difficulty taking trips.

SEDAP RESEARCH PAPERS

Number	Title	Author(s)
No. 1:	Population Aging and Its Economic Costs: A Survey of the Issues and Evidence	F.T. Denton B.G. Spencer
No. 2:	How Much Help Is Exchanged in Families? Towards an Understanding of Discrepant Research Findings	C.J. Rosenthal L.O. Stone
No. 3:	Did Tax Flattening Affect RRSP Contributions?	M.R. Veall
No. 4:	Families as Care-Providers Versus Care-Managers? Gender and Type of Care in a Sample of Employed Canadians	C.J. Rosenthal A. Martin-Matthews
No. 5:	Alternatives for Raising Living Standards	W. Scarth
No. 6:	Transitions to Retirement: Determinants of Age of Social Security Take Up	E. Tompa
No. 7:	Health and Individual and Community Characteristics: A Research Protocol	F. Béland S. Birch G. Stoddart
No. 8:	Disability Related Sources of Income and Expenses: An Examination Among the Elderly in Canada	P. Raina S. Dukeshire M. Denton L.W. Chambers A. Scanlan A. Gafni S. French A. Joshi C. Rosenthal
No. 9:	The Impact of Rising 401(k) Pension Coverage on Future Pension Income	W.E. Even D.A. Macpherson
No. 10:	Income Inequality as a Canadian Cohort Ages: An Analysis of the Later Life Course	S.G. Prus
No. 11:	Are Theories of Aging Important? Models and Explanations in Gerontology at the Turn of the Century	V.L. Bengtson C.J. Rice M.L. Johnson
No. 12:	Generational Equity and the Reformulation of Retirement	M.L. Johnson
No. 13:	Long-term Care in Turmoil	M.L. Johnson L. Cullen D. Patsios
No. 14:	The Effects of Population Ageing on the Canadian Health Care System	M.W. Rosenberg

SEDAP RESEARCH PAPERS

Number	Title	Author(s)
No. 15:	Projections of the Population and Labour Force to 2046: Canada	F.T. Denton C.H. Feaver B.G. Spencer
No. 16:	Projections of the Population and Labour Force to 2046: The Provinces and Territories	F.T. Denton C.H. Feaver B.G. Spencer
No. 17:	Location of Adult Children as an Attraction for Black and White Elderly Migrants in the United States	K.-L. Liaw W.H. Frey J.-P. Lin
No. 18:	The Nature of Support from Adult *Sansei* (Third Generation) Children to Older *Nisei* (Second Generation) Parents in Japanese Canadian Families	K.M. Kobayashi
No. 19:	The Effects of Drug Subsidies on Out-of-Pocket Prescription Drug Expenditures by Seniors: Regional Evidence from Canada	T.F. Crossley P. Grootendorst S. Korkmaz M.R. Veall
No. 20:	Describing Disability among High and Low Income Status Older Adults in Canada	P. Raina M. Wong L.W. Chambers M. Denton A. Gafni
No. 21:	Parental Illness and the Labour Supply of Adult Children	P.T.Léger
No. 22:	Some Demographic Consequences of Revising the Definition of 'Old' to Reflect Future Changes in Life Table Probabilities	F.T. Denton B.G. Spencer
No. 23:	Geographic Dimensions of Aging: The Canadian Experience 1991-1996	E.G. Moore D. McGuinness M.A. Pacey M.W. Rosenberg
No. 24:	The Correlation Between Husband's and Wife's Education: Canada, 1971-1996	L. Magee J. Burbidge L. Robb
No. 25:	The Effect of Marginal Tax Rates on Taxable Income: A Panel Study of the 1988 Tax Flattening in Canada	M.-A. Sillamaa M.R. Veall
No. 26:	The Stability of Self Assessed Health Status	T.F. Crossley S. Kennedy

Number	Title	Author(s)
No. 27:	How Do Contribution Limits Affect Contributions to Tax-Preferred Savings Accounts?	K. Milligan
No. 28:	The Life Cycle Model of Consumption and Saving	M. Browning T.F. Crossley
No. 29:	Population Change and the Requirements for Physicians: The Case of Ontario	F.T. Denton A. Gafni B.G. Spencer
No. 30:	Nonparametric Identification of Latent Competing Risks and Roy Duration Models	G. Colby P. Rilstone
No. 31:	Simplified Estimation of Multivariate Duration Models with Unobserved Heterogeneity	G. Colby P. Rilstone
No. 32:	Structural Estimation of Psychiatric Hospital Stays	G. Colby P. Rilstone
No. 33:	Have 401(k)s Raised Household Saving? Evidence from the Health and Retirement Study	G.V. Engelhardt
No. 34:	Health and Residential Mobility in Later Life: A New Analytical Technique to Address an Old Problem	L.M. Hayward
No. 35:	2 ½ Proposals to Save Social Security	D. Fretz M.R. Veall
No. 36:	The Consequences of Caregiving: Does Employment Make a Difference	C.L. Kemp C.J. Rosenthal
No. 37:	Fraud in Ethnocultural Seniors' Communities	P.J.D. Donahue
No. 38:	Social-psychological and Structural Factors Influencing the Experience of Chronic Disease: A Focus on Individuals with Severe Arthritis	P.J. Ballantyne G.A. Hawker D. Radoeva
No. 39:	The Extended Self: Illness Experiences of Older Married Arthritis Sufferers	P.J. Ballantyne G.A. Hawker D. Radoeva
No. 40:	A Comparison of Alternative Methods to Model Endogeneity in Count Models. An Application to the Demand for Health Care and Health Insurance Choice	M. Schellhorn
No. 41:	Wealth Accumulation of US Households: What Do We Learn from the SIPP Data?	V. Hildebrand

SEDAP RESEARCH PAPERS

Number	Title	Author(s)
No. 42:	Pension Portability and Labour Mobility in the United States. New Evidence from SIPP Data.	V. Andrietti V. Hildebrand
No. 43:	Exploring the Effects of Population Change on the Costs of Physician Services	F.T. Denton A. Gafni B.G. Spencer
No. 44:	Reflexive Planning for Later Life: A Conceptual Model and Evidence from Canada	M.A. Denton S. French A. Gafni A. Joshi C. Rosenthal S. Webb
No. 45:	Time Series Properties and Stochastic Forecasts: Some Econometrics of Mortality from the Canadian Laboratory	F.T. Denton C.H. Feaver B.G. Spencer
No. 46:	Linear Public Goods Experiments: A Meta-Analysis	J. Zelmer
No. 47:	Local Planning for an Aging Population in Ontario: Two Case Studies	L.M. Hayward
No. 48:	Management Experience and Diversity in an Ageing Organisation: A Microsimulation Analysis	T. Wannell M. Gravel
No. 49:	Resilience Indicators of Post Retirement Well-Being	E. Marziali P. Donahue
No. 50:	Continuity or Change? Older People in Three Urban Areas	J. Phillips M. Bernard C. Phillipson J. Ogg
No. 51:	Intracohort Income Status Maintenance: An Analysis of the Later Life Course	S.G. Prus
No. 52:	Tax-Preferred Savings Accounts and Marginal Tax Rates: Evidence on RRSP Participation	K. Milligan
No. 53:	Cohort Survival Analysis is Not Enough: Why Local Planners Need to Know More About the Residential Mobility of the Elderly	L.M. Hayward N.M. Lazarowich
No. 54:	Unemployment and Health: Contextual Level Influences on the Production of Health in Populations	F. Béland S. Birch G. Stoddart

SEDAP RESEARCH PAPERS

Number	Title	Author(s)
No. 55:	The Timing and Duration of Women's Life Course Events: A Study of Mothers With At Least Two Children	K.M. Kobayashi A. Martin-Matthews C.J. Rosenthal S. Matthews
No. 56:	Age-Gapped and Age-Condensed Lineages: Patterns of Intergenerational Age Structure Among Canadian Families	A. Martin-Matthews K. M. Kobayashi C.L. Rosenthal S.H. Matthews
No. 57:	The Relationship between Age, Socio-Economic Status, and Health among Adult Canadians	S.G. Prus
No. 58:	Measuring Differences in the Effect of Social Resource Factors on the Health of Elderly Canadian Men and Women	S.G. Prus E. Gee
No. 59:	APOCALYPSE NO: Population Aging and the Future of Health Care Systems	R.G. Evans K.M. McGrail S.G. Morgan M.L. Barer C. Hertzman
No. 60:	The Education Premium in Canada and the United States	J.B. Burbidge L. Magee A.L. Robb
No. 61:	Student Enrolment and Faculty Recruitment in Ontario: The Double Cohort, the Baby Boom Echo, and the Aging of University Faculty	B.G. Spencer
No. 62:	The Social and Demographic Contours of Contemporary Grandparenthood: Mapping Patterns in Canada and the United States	C.L. Kemp
No. 63:	Changing Income Inequality and the Elderly in Canada 1991-1996: Provincial Metropolitan and Local Dimensions	E.G. Moore M.A. Pacey
No. 64:	Mid-life Patterns and the Residential Mobility of Older Men	L.M. Hayward
No. 65:	The Retirement Incentive Effects of Canada's Income Security Programs	M. Baker J. Gruber K. Milligan
No. 66:	The Economic Well-Being of Older Women Who Become Divorced or Separated in Mid and Later Life	S. Davies M. Denton

SEDAP RESEARCH PAPERS

Number	Title	Author(s)
No. 67:	Alternative Pasts, Possible Futures: A "What If" Study of the Effects of Fertility on the Canadian Population and Labour Force	F.T. Denton C.H. Feaver B.G. Spencer
No. 68:	Baby-Boom Aging and Average Living Standards	W. Scarth M. Souare
No. 69:	The Invisible Retirement of Women	L. McDonald
No. 70:	The Impact of Reference Pricing of Cardiovascular Drugs on Health Care Costs and Health Outcomes: Evidence from British Columbia – Volume I: Summary	P.V. Grootendorst L.R. Dolovich A.M. Holbrook A.R. Levy B.J. O'Brien
No. 71:	The Impact of Reference Pricing of Cardiovascular Drugs on Health Care Costs and Health Outcomes: Evidence from British Columbia – Volume II: Technical Report	P.V. Grootendorst L.R. Dolovich A.M. Holbrook A.R. Levy B.J. O'Brien
No. 72:	The Impact of Reference Pricing of Cardiovascular Drugs on Health Care Costs and Health Outcomes: Evidence from British Columbia – Volume III: ACE and CCB Literature Review	L.R. Dolovich A.M. Holbrook M. Woodruff
No. 73:	Do Drug Plans Matter? Effects of Drug Plan Eligibility on Drug Use Among the Elderly, Social Assistance Recipients and the General Population	P. Grootendorst M. Levine
No. 74:	Living Alone and Living with Children: The Living Arrangements of Canadian and Chinese-Canadian Seniors	M.A. Pacey
No. 75:	Student Enrolment and Faculty Recruitment in Ontario: The Double Cohort, the Baby Boom Echo, and the Aging of University Faculty (Revised and updated version of No. 61)	B.G. Spencer
No. 76:	Gender Differences in the Influence of Economic, Lifestyle, and Psychosocial Factors on Later-life Health	S.G. Prus E. Gee
No. 77:	Asking Consumption Questions in General Purpose Surveys	M. Browning T.F. Crossley G. Weber
No. 78:	A Longitudinal Study of the Residential Mobility of the Elderly in Canada	Y. Ostrovsky
No. 79:	Health Care in Rural Communities: Exploring the Development of Informal and Voluntary Care	M.W. Skinner M.W. Rosenberg

Number	Title	Author(s)
No. 80:	Does Cognitive Status Modify the Relationship Between Education and Mortality? Evidence from the Canadian Study of Health and Aging	J.C. Brehaut P. Raina J. Lindsay
No. 81:	Agreement Between Self-Reported and Routinely Collected Health Care Utilisation Data Among Seniors	P. Raina V. Torrance-Rynard M. Wong C. Woodward
No. 82:	Age, Retirement and Expenditure Patterns: An Econometric Study of Older Canadian Households	F.T. Denton D.C. Mountain B.G. Spencer
No. 83:	Understanding the Relationship between Income Status and the Restrictions in Instrumental Activities of Daily Living among Disabled Older Adults	P. Raina M. Wong