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THE SOCIOECONOMIC GRADIENT IN HEALTH IN ATLANTIC CANADA: EVIDENCE FROM NEWFOUNDLAND AND NOVA SCOTIA 1985-2001

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EXECUTIVE SUMMARY

Despite the relative level of affluence enjoyed by Canadians, numerous studies have identified the existence of a socioeconomic gradient in health. This gradient refers to the empirical observation that individuals of low socioeconomic status, which can be measured by income, educational attainment or occupational skill level, consistently report a greater degree of poor health, a higher incidence of chronic conditions and higher levels of health care utilization than those further up the scale. These persistent inequalities over time pose a challenge for policy-makers since their origin in the socioeconomic differences that exist between people implies that they may be avoidable. In order to remedy socioeconomic inequality in health, policy-makers require information about what components of socioeconomic circumstance matter the most for the determination of inequality in health between individuals. Traditional approaches used to study the gradient are limited in their ability to perform this task. They can describe the link between socioeconomic status and health but they cannot rank a set of socioeconomic determinants of health in terms of their importance to the determination of socioeconomic health inequality. This makes it difficult for policy-makers to establish priorities in terms of the determinants they should target and to assess realistically what results they should expect. This statement holds with even more force if the shape of the gradient is particular to the geographic context.

What does this study do?

This study builds on recent developments in the measurement and decomposition of socioeconomic inequality in health to "unpack" the gradient in Atlantic Canada. Unpacking the gradient identifies for policy-makers which health determinants make the largest contribution to measured health inequality and where efforts to reduce the slope of the gradient should be directed. This task is accomplished with the construction of a concentration index that describes the extent to which health is concentrated in groups of high or low socioeconomic status. The health concentration index is a weighted average of the inequality present in key determinants of health between individuals of high or low socioeconomic status. This information allows the health concentration index to be decomposed, and the contribution of individual health determinants expressed relative to measured inequality. The decomposition allows the identification of which health determinants matter most in the determination of socioeconomic inequality in health and the measurement of the size of their separate contributions. Thus, the methodology used here can inform policy-makers about what determinants matter the most, and where they can most effectively direct scarce resources to produce the greatest reductions in health inequalities.

The analytical framework also indicates the channels through which socioeconomic inequality in health can be addressed. For a health determinant to make a contribution to socioeconomic health inequality two conditions must hold. First, the postulated health determinant must have an effect on health so that variations in it produce variations in health status. Second, that determinant must be distributed unequally between different socioeconomic groups. If both these conditions hold, then policy-makers can seek to influence the distribution of a health determinant between groups of high or low socioeconomic status and/or they can address the effect of the determinant on health. For example, if low educational attainment is associated

with low levels of literacy which, in turn, pose barriers to the assimilation of health information, then policy-makers could initiate literacy programs towards affected individuals and/or they could provide health information in innovative ways to low literacy groups. In reality, some health determinants may only be amenable to manipulation through one of these channels.

This study uses data from four health surveys conducted in Newfoundland between 1985 and 2001 and the two GPI Atlantic Community Surveys conducted in Glace Bay and Kings County, Nova Scotia during 2001 to examine socioeconomic inequality in health in Atlantic Canada. Each of these six datasets allows the measurement and decomposition of socioeconomic inequality in health at a particular point in time and space. The three surveys conducted in 2001 allow for the comparison of the degree of socioeconomic inequality in health in Atlantic Canada with that found in other countries. The four Newfoundland datasets permit the study of how socioeconomic inequality in health has evolved in that province between 1985 and 2001, and whether the relative importance of the various determinants of that inequality has changed over time or not. They also allow for further international comparisons to be made during the same period. From the three datasets that cover the year 2001, the decomposition of measured inequality is used to identify the implications for policy efforts designed to reduce health inequality and thereby to improve overall population health.

What does this study find?

National and international comparisons of the concentration indices constructed from the 2001 data find that the degree of socioeconomic inequality in health in Newfoundland and the two Nova Scotia communities is high compared to that found in Canada as a whole and in Europe and Australia. In fact, the Newfoundland data from 1985, 1990 and 1995 show that socioeconomic health inequality in that province appears to have always been high relative to that found in Europe, Australia and the rest of Canada, and comparable to that found in the United States. Furthermore, measured socioeconomic health inequality appears to have increased over time in Newfoundland, meaning that poor health has become increasingly concentrated among individuals of low socioeconomic status.

The decomposition of measured inequality from the three 2001 datasets reveals that income is the single most important contributor to socioeconomic inequality in health in Newfoundland and in the two Nova Scotian communities. The contribution of income alone accounts for between one-third and one-half of the measured socioeconomic health inequality in the locations studied. This contribution occurs through the positive association of income with individual health status and through inequality in the distribution of income that favours high income individuals. Analysis of the Newfoundland data prior to 2001 reveals that the size the contribution made by income has remained consistent over time.

Other determinants that make a significant contribution to socioeconomic inequality in health include educational attainment and economic status. The contribution of educational attainment to socioeconomic health inequality comes primarily through those who are university educated. Higher levels of educational attainment always make a positive contribution to health status, but only a university education is concentrated in favour of higher socioeconomic groups. A university education is the only level of educational attainment, therefore, that makes a

statistically significant contribution to socioeconomic health inequality in the locations under study. Employment is the only category of economic status that makes a consistent contribution to socioeconomic inequality and it is similar in nature and size to that found for a university education.

The presence of a long-term disability or of one or more restrictions on daily activities also makes a significant contribution to socioeconomic inequality in health through a combination of a negative effect on individual health status and the concentration of either condition among low income individuals. The contribution of these two conditions to socioeconomic inequality in health is significant for each location under study and, from the Newfoundland data, it is also observed to persist over time. The data also show that the presence of one or more chronic conditions results in individuals being significantly more likely to report either long-term disability or restriction on daily activities, or both. Disability and activity limitation, therefore, represent the contribution that chronic conditions make towards socioeconomic inequality in health.

What does this study conclude?

There is sufficient evidence from this study to conclude that socioeconomic inequality in health is present in Atlantic Canada and has persisted over time. Furthermore, the degree of inequality appears to be high compared to that found elsewhere. Among all the socioeconomic health determinants studied, the effect of income on health combined with the inequality in its distribution has made the largest contribution to socioeconomic inequality in health in each of the locations under study and over time. The analytical framework indicates that the contribution of income to socioeconomic inequality in health can be reduced through a more equitable distribution of income and a focus on efforts to improve the income levels of low income individuals. Policies at both the federal and provincial levels have an important role to play in this respect. In most cases, the contribution of the other health determinants to socioeconomic inequality in health can be traced back to differences in income between individuals. Thus, the results of this study serve to underscore the importance of income for health. Efforts to encourage higher educational attainment and reduce the prevalence of chronic conditions should also be strengthened, since these factors make a considerable contribution to the socioeconomic inequality in health that has persisted over time. This study also demonstrates the importance of continued research on the socioeconomic determinants of health. In particular, a variety of policy interventions, aside from the public provision of health care, may be cost-effective in achieving improvements in population health and curtailing spiralling health care costs.

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LIST OF ABBREVIATIONS

AHS	Adult Health Survey
CHB	Community Health Board
GP	General Practitioner
GPI	Genuine Progress Index
HPRP	Health Policy Research Programme, Health Canada
HSI	Health Status Index
HUI	Health Utility Index
IRHI	Income Related Health Inequality
LHPMCUS	Lifestyle, Health Practices and Medical Care Utilization Survey
NGO	Non-government Organization
OECD	Organization for Economic Cooperation and Development
SAHS	Self Assessed Health Status
TAGS	The Atlantic Groundfish Strategy
WHO	World Health Organization

THE SOCIOECONOMIC GRADIENT IN HEALTH IN ATLANTIC CANADA: EVIDENCE FROM NEWFOUNDLAND AND NOVA SCOTIA 1985-2001

1. Policy Context

What is the Socioeconomic Gradient in Health?

At any point in time, inequality in health status exists between individuals. Some individuals are healthier than others. A portion of this inequality is due to factors, like aging, that are largely beyond the control of individuals or government. A long line of research, however, has shown inequalities in health status to be directly related to differences in the socioeconomic status of individuals, whether it is measured by income, educational attainment, or occupational skill level. The close correlation between socioeconomic status and health, where poor health is typically observed to be concentrated in those of low socioeconomic status, has come to be labelled the social or socioeconomic gradient in health.[1] The significance of this gradient to the determination of overall health inequality is not just the gap it represents in health status between the rich and the poor, or between high skilled and low skill workers, but that health status improves in a lockstep fashion as one's income, educational attainment or skill level rises.

Why is the Gradient Important?

Why should we be concerned with the existence of the socioeconomic gradient in health? If we turn to the World Health Organization's (WHO) oft-cited and broadly accepted definition of health, as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 2004) then the gradient's existence implies that individuals of low socioeconomic status experience a lower state of overall well-being than those farther up the socioeconomic scale. Thus, a lower quality of life resulting from their low socioeconomic status goes hand in hand with the higher rates of mortality and morbidity that many studies have linked to low socioeconomic status. From a strictly utilitarian point of view, where aggregate well-being in Canada is assumed to be the sum of the well-being of many individuals, the presence of socioeconomic health inequalities in Canada implies that aggregate well-being is less than what it otherwise would be.

This view of socioeconomic inequalities in health is associated with the conclusion that health inequalities are inherently unfair to those of low socioeconomic status. Any such assertion implicitly translates a finding of health inequalities into one of health inequity. However, a distinction needs to be made between the concepts of inequality and inequity. Health inequality arises whenever there are disparities between individuals in terms of their health status. As such,

[1] Throughout this report, the terms "socioeconomic gradient in health" and "socioeconomic inequality in health" are considered to be synonymous and used interchangeably.

no explicit value judgment is placed upon the observed differences in health status between individuals. Health inequity, on the other hand, is associated with a value judgment that the observed differences are unfair or unjust in nature. This normative judgment implies that the avoidable health inequality is undesirable, represents a policy problem, and should be addressed through specific policy measures. The method used in this study to measure socioeconomic inequality in health is compatible with this view. It defines an equitable distribution of health in a population as one where access to good health is not determined by socioeconomic status (Brommier and Stecklov, 2003).

The presence of socioeconomic inequality in health creates explicit and implicit costs to government, individuals, and the economy as a whole. Explicit costs to government, which represent the fiscal impact of socioeconomic inequalities in health, arise from the excess utilization of health care on the part of individuals of low socioeconomic status compared to those further up the scale. The implicit costs are represented by those opportunities lost to government and society when resources, which could otherwise be used elsewhere, are directed towards the health care system. Individuals incur explicit costs when forced to spend money on health care due to their poor health status. The implicit costs incurred by individuals stem from lost income when unable to work due to poor health, a cost that extends to the economy as a whole in terms of lost output and income. Poor health also directly impacts an individual's ability to participate in a wide range of activities outside of work, like recreation, that influence well-being. Government transfers to individuals who are unable to work for health reasons are yet another example of an explicit cost. Thus, socioeconomic health inequality that produces low health status among the population imposes costs on society and diverts resources away from other productive uses.

Interpretation of Socioeconomic Inequality in Health

The desire for action on socioeconomic inequality in health can originate with either a concern to reduce fiscal expenditures or to promote greater health equity. Either way, socioeconomic inequality in health introduces a role for government involvement since its sources suggest that differences in health status between individuals may be to some extent avoidable. Determination of which particular policy interventions are most appropriate and will lead to the greatest reduction in socioeconomic health inequality depend on the pathways through which determinants make their largest contribution.

The neomaterial interpretation for the existence of these inequalities focuses on the relationship between socioeconomic status and the access to resources that it affords (Kaplan and Lynch, 2000). These resources may include the ability to afford residence in safer neighbourhoods, access to jobs featuring health plans, knowledge of how to navigate the health care system, and/or the awareness of and ability to engage in and afford beneficial health behaviours, among other factors. The psychosocial interpretation for the presence of health inequalities emphasizes that a low rank in society, which is reflected in low socioeconomic status, results in stress that may have direct and/or indirect effects on individual health. The direct effects on health stem from biological pathways where stress stimulates a series of neuro-immunological responses on the part of the individual that over time have deleterious health consequences (Brunner and Marmot, 1999). Indirect effects include individual behaviours that are precipitated as a response

to stress and may have harmful health consequences, like smoking, drinking, or drug abuse. Based on this interpretation, individuals of low socioeconomic status are placed under greater stress by their circumstances, and their poor health is a direct consequence of their situation.

In the past, there has been great effort to distinguish these two explanations as competing hypotheses for the explanation of health inequalities. Lynch *et al.* (2000) have used the analogy of air travel to highlight the distinctions between the two hypotheses and the implications for policy measures. The neomaterial approach treats differences in health status between passengers in first class and economy class as the result of differences in the material conditions that exist between the front and the back of the airplane. Improvements in the health status of those who inhabit economy class would be improved by providing more leg room, better food, and improved access to the amenities that characterize life in first class. The psychosocial approach would attribute health inequalities to stress caused by discordant perceptions of rank and the consequent negative feelings of exclusion that the presence of first class seats creates in economy class passengers. Based on this approach, the way to reduce health inequalities would be the removal of all first class seating (or vice versa for that matter).

Identifying a Comprehensive Policy Approach

Efforts to distinguish these two explanations from one another may produce something of a false dichotomy. As Kawachi, Subramanian and Almeida-Filho (2002) note, the two interpretations may be inexorably intertwined since material conditions often have psychosocial connotations. It may not be possible to identify which mechanism is at work. More importantly, as they note, the specific mechanism at work may not be particularly important or relevant for policy purposes, if both approaches point in the same basic direction and suggest that the way to remedy health inequalities is to improve access to resources.

To continue with the airplane analogy in this context, what is important is not so much how and why the difference between first class and economy class affect health status, but rather to ensure that conditions in economy class are sufficient to prevent any adverse health consequences. Although we could seek to enable everyone in economy class to purchase a seat in first class, this option is not likely to represent a feasible course of action given fiscal constraints. A more realistic approach to deal with socioeconomic-related health inequalities lies in improving conditions in economy class where the vast majority of the population resides. In order to do so, this approach first requires the determination of the conditions upon which we should focus attention, especially when resources to improve those conditions are likely to be limited. For example, would increased leg room lead to an improvement in the health status of those in economy class? Or would the serving of food and drink more comparable to the quality or quantity of what is available in first class be more effective? In the same way, knowledge of the health determinants, like income and educational attainment, which matter most in the determination of socioeconomic-related health inequalities, helps us to direct scarce resources to the areas that will have potentially the greatest impact in reducing those inequalities and improving the health of the largest number of people.

Questions to be Addressed

This report presents the results of an investigation into the determinants of socioeconomic inequality in health. It focuses on individuals in Atlantic Canada and uses a series of datasets from Nova Scotia and Newfoundland to identify the most important contributing factors to the socioeconomic gradient in health. More specifically, the following questions are addressed in the study:

1. Is the degree of socioeconomic inequality in health in Atlantic Canada high or low relative to that elsewhere?
2. How has the degree of socioeconomic inequality in health changed over time in Atlantic Canada?
3. What are the most important contributing factors to the determination of socioeconomic inequality in health in Atlantic Canada?
4. With respect to these contributing factors, what is the nature of their effect on measured health inequality? Is it their direct effect on health, their unequal distribution, or a combination of both?
5. What are the policy implications that follow from the empirical results of this study?

The findings from this research are used to identify and formulate policy recommendations that governments can consider in addressing socioeconomic inequality in health. Funded under Health Canada's Health Policy Research Programme (HPRP),[2] this study directly addresses the design of those policies that are considered most likely to impact the health of Canadians and the performance of Canada's health care and public health systems. It provides valuable information to decision-makers on the relationship between socioeconomic conditions and health outcomes, and contributes to the promotion of informed debate and public understanding of health policy issues.

[2] See http://www.hc-sc.gc.ca/iacb-dgiac/arad-draa/english/rmdd/funding1.html

2. Consolidation of Knowledge

A vast literature now exists that documents and attempts to explain the socioeconomic gradient in health that has been observed to persist across time in many different countries. Consequently, any review within the confines of this report must be somewhat selective in nature. Based largely on the methodology used to study socioeconomic inequality in health adopted by this study, this review of the relevant literature covers three main areas. First, the evolution of the measurement of socioeconomic health inequalities is reviewed as it pertains to the methods used in this study. A summary of the findings from this literature is also presented. Second, the review examines recent Canadian studies that have either directly or indirectly explored the link between socioeconomic status and health. Third, an overview of some of the major explanations for the source of the socioeconomic health gradient is performed. This review focuses in part on identification of the pathways through which differences in socioeconomic status might affect health.

The Measurement of Socioeconomic Inequality in Health

Quantitative studies of socioeconomic inequalities in health have used a variety of different methods to measure differences in health status between socioeconomic groups. Wagstaff, Paci and van Doorslaer (1991) reviewed the measures used in the literature to date and identified three conditions that a measure of inequality should meet if it is to reflect the socioeconomic dimension of differences in health status accurately. First, the measure should relate the socioeconomic dimension to health inequalities and incorporate information about the socioeconomic status of individuals, whether measured, for example, by educational attainment, occupational skill level, or income. Second, the measure should reflect the experiences of the entire population and not just focus on the differences between any two groups. The latter approach ignores changes in health status elsewhere in the population that may have consequences that are just as important to examine. Third, the measure should be sensitive to the proportions of the population that fall into different socioeconomic groups and, thus, to changes in the distribution of the population between these groups. Wagstaff, Paci and van Doorslaer (1991) found that three measures, the slope index of inequality, the relative index of inequality, and the concentration index, satisfied these three conditions.[3]

These first two measures, the slope index of inequality and the relative index of inequality, calculate the correlation between the health status of individuals, or that of their socioeconomic group, with their relative rank in the distribution.[4] A low correlation means that good health

[3] Measures reviewed by the authors that did not meet their criteria included the range, the Gini coefficient, a pseudo-Gini coefficient, and the index of dissimilarity. The range, which examined only the differences between the top and bottom socioeconomic groups, failed to take into account the entire population. Although the Lorenz curve, on which the Gini coefficient is based, takes into account differences between individuals in the entire population, it generally fails to take into account the socioeconomic dimension of health inequality. The index of dissimilarity and the pseudo-Lorenz curve are both unreliable for the same reason: they can indicate an apparent socioeconomic inequality in health in cases where no such differences in fact exist.

[4] The degree of correlation is measured by the coefficient β from a simple linear regression of the form

$$h_j\sqrt{n} = \alpha\sqrt{n} + \beta x_j\sqrt{n_j} + \mu_j$$

outcomes are relatively equally distributed among those of different socioeconomic status. A high degree of correlation between rank and the health measure under consideration means that health status is relatively more dependent on socioeconomic status, and translates into greater differences in health between individuals of different socioeconomic status. The concentration index, on the other hand, is essentially the relative index of inequality scaled by the mean of the health measure.[5] It ranges in value between -1 and +1, where increasingly negative values reflect the distribution of a health measure in favour of those of low socioeconomic status. Increasingly positive values of the index reveal the distribution of a health measure that favours those of high socioeconomic status. In other words, markedly better health for those with higher status, income and/or education.

An important consideration in the measurement of health inequalities is the measure of health status to be used. In practice, indicators of either mortality, such as life expectancy at birth or disability-free life expectancy, or morbidity have been used. Early studies used morbidity measures like the presence of one or more chronic conditions, the number of days the individual was sick or missed work due to illness, or the presence of poor health constructed from responses to a question on self-assessed health status (SAHS). One drawback to the use of morbidity measures is that measured inequality is sensitive to the choice of measure. This sensitivity is due in part to the restricted ability of dichotomized variables to capture the severity of conditions that affect individual health (Kakwani, Wagstaff and van Doorslaer, 1997). Morbidity measures are also restricted in terms of what aspects of health they can capture in a single variable.

In this respect, the use of SAHS is both desirable and problematic. SAHS captures many different aspects of health in a single measure, but its categorical nature poses problems for analysis. Studies often dichotomize SAHS into a measure of poor health on the basis of those reporting poor or fair health. As Wagstaff and van Doorslaer (1994) note, however, measured inequality is sensitive to the choice of the threshold category that defines poor health and comparisons across time and countries can be difficult if the number of categories differ. In addition, there is no clear guidance as to which category should be treated as the appropriate cut-off point. Should it only include those in the lowest category or exclude only those in the top category? In response to these difficulties, Wagstaff and van Doorslaer (1994) develop a method whereby the different categories of self-assessed health were each assigned a numerical score based on the distribution of a latent variable thought to reflect the individuals' true health status.

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where h_j is a measure of health status for socioeconomic group j, n_j is the size of group j, x_j is the relative rank of people in group j and μ_j is the error term.

[5] More formally, the concentration index, C, is calculated as

$$C = 2\text{cov}(x, h)/\mu$$

where x is the relative rank of individual or group j, h is the measure of health status for the individual or group j, and μ is the mean of the measure of health status for all individuals or groups. The slope index of inequality is the coefficient from the regression in the previous endnote or

$$\beta = 2\text{cov}(x,h)/\text{var}(x)$$

so that

$$C = 2\text{var}(x)(\beta/\mu).$$

The advantage to this method is that it preserves the information available in the various categories of SAHS.[6]

Wagstaff and van Doorslaer (1994) applied their method to data from the Netherlands for the years 1989/90 and 1990/91. They ranked individuals by their net income and that of their partners, and the results revealed the presence of socioeconomic health inequality in favour of upper-income individuals. Wagstaff *et al.* (1997) report the results of an expanded study that included nine countries. Later studies examined the situation for Canada (Humphries and van Doorslaer, 2000), Korea (Kong and Lee, 2001) and Australia (Chotikapanich, Creedy and Hopkins, 2003). Tables 1 and 2 summarize the results of these studies for the 1980s and the 1990s, respectively. The Wagstaff and van Doorslaer method converts SAHS into a measure of ill-health so that the estimated concentration index for each country shows the concentration of ill-health in low-income groups. Conversely, the absence of ill-health concentrated in the high-income groups means that health is distributed in their favour. The results also reveal that substantial variation exists between the different countries. Since increasingly larger negative values indicate a greater concentration of ill-health among low income individuals, Canada, the United Kingdom and the United States all appear as high inequality countries. Relative to these countries, socioeconomic inequality in health in the European countries surveyed, Korea, and Australia is low.

Table 1 Health Concentration Indices for the 1980s

Country and Year	Concentration Index
Australia (1989/90)	-0.0885
Finland (1987)	-0.0566
Netherlands (1986-88)	-0.0660
Spain (1987)	-0.0732
Switzerland (1982)	-0.0696
United Kingdom (1985)	-0.1148
United States (1987)	-0.1360

Note: Index value ranges from -1 to +1. Source: Wagstaff *et al.* (1997); Chotikapanich, Creedy and Hopkins (2003).

Table 2 Health Concentration Indices for the 1990s

Country and Year	Concentration Index
Australia (1995)	-0.0976
Canada (1994/95)	-0.1214
East Germany (1992)	-0.0436
West Germany (1992)	-0.0571
Korea (1996)	-0.0552
Sweden (1990)	-0.0347

Note: Index value ranges from -1 to +1. Source: Wagstaff *et al.* (1997); Humphries and van Doorslaer (2000); Kong and Lee (2001); Chotikapanich, Creedy and Hopkins (2003).

While the method of Wagstaff and van Doorslaer (1994) is useful to describe differences in socioeconomic health inequality between countries and its change over time, it cannot tell us

[6] Kakwani, Wagstaff and van Doorslaer (1997) illustrate how confidence intervals can be constructed for a concentration index. This allows the identification of statistically significant differences in equality across time and between countries.

anything about why these differences may exist. Knowledge of why such differences exist across countries or why they change over time would be useful so that policies could be formulated that target the health determinants with the greatest impact on socioeconomic health inequality. Wagstaff, van Doorslaer and Watanabe (2003) showed that when a continuous measure of health is available, like body mass index or an objective measure of health, the concentration index could be decomposed to reveal the contribution of individual health determinants to socioeconomic inequality in health. In this model, the health concentration index is simply a weighted average of the concentration indices for each of the health determinants, where the weights represent the effect on health of the different determinants as estimated by multivariate statistical analysis.

Most health surveys, however, use SAHS rather than an objective measure of health as a measure of an individual's general state of health. Fortunately, van Doorslaer and Jones (2003) showed how the categorical responses to SAHS could be tied to more objective measures of health like the Health Utility Index (HUI) to generate a continuous variable for use in a decomposition analysis. They report results for their method using the 1994/95 wave of the National Population Health Survey. Van Doorslaer and Koolman (2004) extended the analysis to include eight of the countries previously analyzed, while Lauridsen, Christiansen and Hakkinen (2004) produced comparable estimates for Finland. Table 3 reports the estimated concentration indices for these countries. Because of differences in the methods used, the numbers in Tables 1 and 2 are not directly comparable to the numbers in Table 3. In Table 3, the positive values of the concentration index indicate that the distribution of health favours high income individuals and the larger the index value, the greater the concentration of health among high income groups. These figures confirm the result of the earlier method, where Canada and the UK still appear as high inequality countries, while the Netherlands, Germany and Spain appear to be low inequality countries. In terms of the most significant contributing factors to measured health inequality, income, education and economic status appear to make the largest contribution.

Table 3 Health Concentration Indices for Canada and Europe

Country	Concentration Index
Austria	0.0073
Belgium	0.0071
Canada	0.0150
Denmark	0.0094
Finland	0.0100
France	0.0075
Germany	0.0043
Greece	0.0119
Luxembourg	0.0104
Netherlands	0.0034
Ireland	0.0077
Italy	0.0063
Portugal	0.0218
Spain	0.0066
United Kingdom	0.0129

Note: Index value ranges from 0 to +1.
Source: Lauridsen, Christiansen and Hakkinen (2004); van Doorslaer and Koolman (2004).

A review of the literature reveals that only two studies have examined the extent of socioeconomic health inequalities in Canada using this methodology. Both of those studies indicated that income-related health inequality is high relative to that present in several European countries, but is similar to that found in Britain and the United States. The fact that both Canadian estimates come from a single year of data raises several questions. We do not know, for instance, how inequality has changed over time. Has it increased or decreased over time and what socioeconomic health determinants account for any observed changes? Other questions arise when one considers that Canada is comprised of a number of provinces and territories, each with its own health care system and set of social policies that may affect health outcomes. What does health inequality look like at the provincial or territorial level? How has it changed over time? To what extent is it present at the community level? Do socioeconomic health determinants assume the same importance across national, provincial and local levels as well as across health districts? To a certain extent, some of these issues have already been investigated, albeit with different methodological approaches. The next section reviews these studies and their findings with respect to the presence and shape of the health gradient in Canada.

The Socioeconomic Health Gradient in Canada

Quantitative studies in Canada conducted at the national, provincial and local levels have consistently identified a connection between the health status of individuals and their socioeconomic position. Recent developments using multilevel modeling techniques have allowed researchers to extend the scope of these studies to investigate what role differences in the socioeconomic characteristics of place may play in shaping the health gradient. The most frequent aspect of place investigated is that of a neighbourhood's socioeconomic context matched to the health characteristics of the individuals who reside there. Although these studies do not seek to identify and describe the gradient at the level of the individual directly, their results often do so by default.

Overall, the studies reviewed here can be classified into two different types. The first category consists of those studies that have limited their attention to an exploration of the systematic differences in health status that exist between individuals as a function of their socioeconomic status. The second category of studies is comprised of those that have sought to identify the effect of neighbourhood or community characteristics on health status. These latter studies incorporate individual socioeconomic status as a control variable.

Studies Examining Differences in Health between Individuals

The limited availability of data has been an important constraint on the number of studies that have examined the relationship between socioeconomic status and health in Canada. The first generation of studies relied on the Canada Sickness Survey conducted in 1950/51. Those studies indicated that low income groups suffered from more disability-days than higher income groups. A second generation of studies emerged with the Canada Health Survey conducted in 1978/79, which used more sophisticated measures of health status. The essential results distilled from this survey indicated a gradient in life expectancy that favoured high income individuals. In his study of males from the Canada Health Survey, Hay (1988) found that variation in family income and the educational attainment of individuals could explain observed differences in a

variety of health measures, including disability-days, the number of health problems, and the presence of certain chronic conditions.

Evidence of the gradient continued to emerge in subsequent surveys. Simple tabulations of the 1990 Health Promotion Survey by Manga (1993) revealed that the proportion of individuals reporting excellent self-assessed health status rose with income adequacy and educational attainment. Conversely, the proportion of individuals who reported fair or poor health rose as income adequacy and educational attainment fell. The same patterns were observed when the presence of an activity limitation and the average number of days lost due to illness were considered. These patterns were also observed in the 1985 Health Promotion Survey. One drawback to these analyses, however, was that they did not control for the effects of age. Health problems tend to manifest themselves with age, regardless of socioeconomic status, although the incidence may differ by socioeconomic group. Consequently, without controlling for the effects of aging, it becomes difficult to identify the proportion of individuals who report poor or fair health due to the effects of socioeconomic status rather than the effects of aging.

The analysis of the 1991 General Social Survey by Roberge, Berthelot and Wolfson (1995a, 1995b) showed the presence of a gradient across most age groups of both genders. These differences also sharpened with age. The authors used income and educational attainment to describe the socioeconomic status of individuals, and they used the Health Status Index (HSI), a predecessor of the McMaster HUI, to measure individual health status.[7] The index ranged in value from 0 to 1, where 0 indicates death and 1 indicates perfect health. Intermediate values indicate an individual's state of health relative to a state of perfect health. In their analysis, however, the authors chose not to make use of the continuous nature of the health status measure. Instead, individuals were classified into a state of high or low health status using the value of 0.8 as a cut-off. In this way, their analysis was similar to studies that dichotomized SAHS, and it suffers from the same deficiency: the distinctness of the gradient between groups will depend on the choice of the cut-off point. Nonetheless, their results showed that the proportion of individuals who reported a high level of health rose with the level of educational attainment. When individuals were separated into low, middle and high-income groups, the same finding emerged. A greater proportion of individuals in the high-income group were observed to report a higher level of health than those in the low-income group. For each measure of socioeconomic status, the difference extended across most age groupings of both genders.

The observation of the socioeconomic gradient in health is not unique to studies that have used data from surveys conducted at the national level. Roberge, Berthelot and Wolfson (1995a, 1995b) studied the link between socioeconomic status and health using the 1990 Ontario Health Survey. In their analysis, they used the HUI to measure health status and three indicators of socioeconomic status: 1) the household income tercile to which an individual belonged; 2) educational attainment; and 3) a composite measure of socioeconomic status. Mean HUI scores were computed for each gradation present in the three indicators by age group. Their results, which were reported for each gender separately, showed that while the mean level of the HUI

[7] Like the HUI, the HSI asked respondents to rate their health in several different areas of functioning. The answers were assigned preference values based on the severity of the condition, which could then be aggregated into a single index.

fell with age for each reported indicator, there was a clear gradient within each age group in which health status rose with income and educational attainment.

Further evidence of the existence of the gradient at the provincial level comes from Segovia, Edwards and Bartlett (1999) who provide a brief examination of the factors contributing to the incidence of poor health in Newfoundland. Using data from the 1995 Newfoundland Adult Health Survey, they incorporated household income, adjusted for household size and educational attainment, into a single variable that measured socioeconomic status. Health status was measured on the basis of whether the individual reported poor or fair SAHS. They found their index of socioeconomic status was inversely related to the likelihood that an individual would report poor or fair health, although the results were not reported in detail.

In a study that used the 2001 Newfoundland Adult Health Survey, Gambin (2002) explored the relationship between SAHS and a set of socioeconomic health determinants. Incorporating the effects of income and educational attainment separately into her analysis, she found that both variables displayed a positive association with the probability of reporting very good or excellent health status. Conversely, the probability of reporting poor, fair or good health status displayed a negative association with these two socioeconomic indicators.

Studies that Examine the Role of Community Factors

The presence of the gradient in Canada has also been observed to exist between neighbourhoods within a city. In a study of mortality and health care utilization in Winnipeg, Roos and Mustard (1997) assigned individuals to an income quintile based on the mean household income of their neighbourhood of residence. A clear gradient emerged between individuals of adjacent quintiles in which those in the lower quintiles faced higher mortality rates and lower life expectancies than those in the upper quintiles. The pattern that was observed for mortality rates was also observed for the incidence of heart disease, hypertension and lung cancer.

In their study, Roos and Mustard (1997) noted that socioeconomic disparities between upper and lower income neighbourhoods were not only limited to differences in household income. Neighbourhoods in the lower income quintiles also featured higher unemployment rates, lower educational attainment, and a larger proportion of female-headed households, than those representing the upper quintiles. There was also a clear gradient with respect to these differences between each quintile. These marked differences between neighbourhoods in terms of their socioeconomic characteristics have led researchers to investigate whether or not they are related to the presence of a socioeconomic health gradient. The main difference between these studies that have investigated the relationship between contextual neighbourhood or community-level influences and individual health status, and the studies reviewed above, is that they do not explicitly focus on the socioeconomic status of individuals. Instead, by focusing on neighbourhood or community-level influences, the association between individual health and socioeconomic status has been observed indirectly.

At the national level, McLeod *et al*. (2003) examined a cohort of individuals from the National Population Health Survey who resided in Census Metropolitan Areas. Their main objective was to measure the effect of income inequality on health status as measured by the HUI and SAHS.

They found little evidence of a statistical association between income inequality and their two measures of health status. Both health measures, however, displayed an inverse relationship with household income and educational attainment. In fact, the strength of the relationship observed between income and health status led them to conclude that income was the best predictor of future health.

Further evidence that contextual factors may not matter in the explanation of health inequalities at the national level comes from Tremblay, Ross and Berthelot (2002). They used the 2001 Canadian Community Health Survey to assess whether the administrative health region of residence exerted an influence on an individual's health or not. Using a dichotomized form of SAHS to measure the presence of poor health, they found that most of the variation in the incidence of poor health across health regions was accounted for by individual socioeconomic characteristics, namely income and education. That is, differences between the administrative health regions of residence did not appear to affect individual health status.

Other studies have also found little evidence of an association between individual health and contextual factors at the provincial level. With respect to Nova Scotia, Veugelers, Yip and Kephart (2001) used the 1990 Nova Scotia Nutrition Survey to examine mortality differentials among respondents over a 9-year follow up period. Contextual factors were hypothesized to have significance at the level of the neighbourhood, defined as the Census Enumeration Area in which an individual resides. Neighbourhood socioeconomic characteristics were captured by measures of average household income, average dwelling value, the unemployment rate, educational attainment, and the proportion of single mothers. Their findings revealed that these contextual factors did not matter in the determination of subsequent mortality, while individual measures of socioeconomic status, such as household income and educational attainment, did. In particular, a university degree significantly lowered the risk of mortality.

Roos *et al*. (2004) extended the above study to residents of Manitoba drawn from the 1996 wave of the National Population Health Survey. As before, Census Enumeration Areas served to define an individual's neighbourhood of residence and an expanded set of variables measuring neighbourhood socioeconomic characteristics in Manitoba was introduced into the analysis.[8] Mortality of the respondents in Manitoba was monitored over a six year period from the time of the initial survey. Like the earlier findings for Nova Scotia, neighbourhood characteristics in Manitoba were found to have no direct effect on individual mortality. Instead, mortality was higher among those with low income and low educational attainment.

Thus far, the evidence indicates that neighbourhood characteristics in Canada do not exert a significant influence on the health status of individuals. One exception to this is the study by Pampalon *et al*. (1999) that used the 1992/93 Quebec Health and Social Survey. They found that poor health, which was measured by a dichotomized SAHS, varied across Census Enumeration

[8] For consistency, the authors used the same variables for the socioeconomic characteristics of Manitoba neighborhoods as were used in the Nova Scotia study. They went on to create a socioeconomic factor index for use with the Manitoba data, using principal components analysis that initially consisted of twenty-three separate variables.

Areas even after controlling for differences in socioeconomic status across individuals.[9] One explanation they offer for their finding is that the effect of place may in fact reflect the omission of an important variable such as the individual's economic status. Another possible explanation is that a robust measure of health, like SAHS, may be more amenable to detecting the influence of neighbourhood effects.[10] However, measures of individual socioeconomic status, like educational attainment and income, still remained important in the Quebec study, and the majority of the variation in the health measure observed across individuals was due to these factors. In particular, low income and low educational attainment were found to raise the likelihood that an individual would report poor health. Subsequent analysis of the same survey by Wilson, Jerret and Eyles (2001) confirmed observation of the same relationships between income, educational attainment and health status, which they measured with a dichotomization of SAHS. They also found the same results for an earlier version of the survey conducted in 1987.

On the basis of these studies, the evidence that the socioeconomic characteristics of an individual's place of residence in Canada have a direct effect on health status is, at best, limited. Studies from Nova Scotia and Manitoba fail to find any influence of place on individual health status. The study by Roos and Mustard (1997), which classifies individuals by the socioeconomic characteristics of their neighbourhood of residence, does not provide conclusive evidence that place affects health, since it does not control for individual socioeconomic status. While the study of Pampalon *et al.* (1999) indicates some role for place, its importance is outweighed by the effect of individual socioeconomic characteristics. The only consistent set of factors found to be associated with individual health status in all the studies reviewed is income and educational attainment. One reason advanced by several studies for why place may not directly affect health is the presence of universal health care. In this respect, it makes sense to review the evidence on the link between health care utilization and socioeconomic status in Canada to see whether a socioeconomic gradient in utilization exists.

The Socioeconomic Gradient in Health Care Utilization

The study by Roos and Mustard (1997) cited earlier examined various aspects of health care utilization by Winnipeg residents across neighbourhoods in addition to several health outcomes. For services of general practitioners, there was a clear gradient across the income quintiles where poorer neighbourhoods had higher levels of utilization than those in the richer areas. By way of contrast, utilization levels for specialist services did not vary across the income quintiles. For hospital utilization, both the rate and intensity of usage displayed an inverse relationship with

[9] The Quebec Health and Social Survey was a household survey conducted using a stratified, two-stage sampling plan. The authors used a multi-level model to control for the influence of individual, household, local and regional effects on health. Regional effects corresponded to the rural/urban advantaged/urban disadvantaged strata defined for the purpose of sampling. The presence of separate effects for the family and region of residence strengthens their findings since the systematic variation in health status found to exist across local areas cannot be attributed to the omission of these two factors.

[10] A final explanation they offer for their findings is the relatively small size of the Census Enumeration Areas that constitute a "local area" compared to those used in other Quebec-specific studies. These other studies used geographic areas that were much larger than Census Enumeration Areas and found little evidence of neighbourhood effects. Given that the other studies reviewed here also used Census Enumeration Areas, this explanation cannot be readily generalized to the rest of Canada.

their measure of socioeconomic status.[11] Individuals from the lower income quintile used more hospital services than those in the higher quintiles. Utilization of surgical procedures, however, displayed no trend across the income quintiles.

Similar patterns have been observed in Nova Scotia. Veugelers and Yip (2003) matched participants of the Nova Scotia Nutrition Survey with their health care utilization records in order to examine which factors characterized heavy users of the system. Heavy users were determined to be those individuals who had greater than the median level of usage for specialist, general practitioner and hospital services. Their measure of socioeconomic status, household income, was found to be inversely related to the incidence of being a heavy user of hospital and general practitioner services. The utilization of specialist services, however, did not appear to be related to household income. In this respect, their study echoed the findings of an earlier one by Kephart, Thomas and Maclean (1998) who examined the health care utilization of the same respondents in the three years preceding the 1990 survey. In their analysis, they examined the effects of income adequacy and educational attainment on utilization. Individuals with less than high school education had physician utilization levels that were 49 percent higher than those with a university degree. Individuals of low income adequacy had utilization levels that were 43 percent higher than individuals in the upper and upper-middle income brackets. No formal explanation for these differences in use was offered, except the observation that they must reflect socioeconomic-based differences in health status. Veugelers and Yip (2003) also investigated whether heavy use of the system ameliorated differences in mortality. Although the evidence was suggestive that heavy users of the system lessened their risk of mortality, it was not conclusive and, therefore, it did not appear that public health care alone could ameliorate the effects of socioeconomic inequality in health.[12]

The gradient in health care utilization found in Nova Scotia and Winnipeg has also been observed elsewhere. In a study that focused on hospital usage by residents in the City of Toronto, Glazier *et al.* (2000) found patterns of aggregate usage similar in nature to those found by Roos and Mustard (1997) for Winnipeg. Individuals in the study were assigned to an income quintile based on the average household income of the census tract in which they resided. Individuals from the lower quintiles were found to have higher hospital admission rates than those from the upper quintiles, and those rates fell as one moved up through the income ranks. Although the authors did not speculate on the mechanism that linked low socioeconomic status with increased hospital utilization, they suggested that higher admission rates among those of low socioeconomic status could be addressed through public health measures designed to reduce morbidity in the community. Better access to community care following discharge was also advocated as a way to lower the high readmission rates present among those of low socioeconomic status.

[11] The trend in usage described here pertains to three types of hospital admission defined by Roos and Mustard (1997): 1) ambulatory sensitive, 2) avoidable, and 3) amenable. The gradient in admission was also observed with respect to the presence of chronic diseases and injuries.

[12] The confidence interval for the odds ratio with respect to the effects of utilization on the subsequent risk of dying included one. Consequently, the null hypothesis that health care utilization did not lower the risk of future mortality could not be rejected.

The gradient in health care utilization has also been found in Newfoundland. Segovia and Edwards (2001) examined the determinants of health care utilization between 1995 and 1999 using the 1995 Newfoundland Adult Health Survey and subsequent administrative data. The probability of hospitalization was inversely related to the level of educational attainment. Utilization of both specialist and general practitioner (GP) services was also inversely related to socioeconomic status. Individuals with a university degree were only half as likely to enter hospital as those with less than a high school education. Length of stay was also affected by the educational attainment, with those individuals who had less than a high school degree more likely to enter a hospital and once in, more likely to stay for longer periods, than those with a university degree. With respect to GP utilization, those with a low socioeconomic score were more likely to feature higher utilization levels in the St. John's/urban corridor region, whereas this difference was not present in the remaining areas of the province. Similar to the results found for Nova Scotia, visits to specialists in Newfoundland did not appear to be affected by socioeconomic status. Restricting attention to the very high users shows that these individuals were more likely to have low educational attainment and low income adequacy. For example, almost half of the individuals who recorded very high use of specialist, GP and hospital services did not complete high school.

From this review, socioeconomic status and health care utilization appear to be intimately related in Canada. Utilization of hospital and general practitioner services consistently displays an inverse relationship with socioeconomic status. Individuals of low income and/or educational attainment were heavier users of these services than those further up the scale. However, there was little association observed between the utilization of specialist services and socioeconomic status. As Kephart, Thomas and Maclean (1998) suggest, heavier use of the system by those of low socioeconomic status probably corresponds to greater need, as evidenced by the presence of the gradient in health status. From this perspective, it then remains to be explained why utilization patterns observed for general practitioners are not observed for specialists, despite the greater need for their services by those of lower socioeconomic status. Roos and Mustard (1997) argue that individuals of low socioeconomic status may face barriers to the utilization of specialist services that those further up the scale do not, and that these barriers may originate from the circumstances in which those of low socioeconomic status find themselves.

What Causes the Socioeconomic Gradient in Health?

The widespread observation of the socioeconomic health gradient in many countries has led to the development of a number of different explanations for its existence.[13] Although no one explanation in the literature to date has successfully identified a sole source for the gradient, researchers have focused much attention in recent years on the role of the individual's social environment. From a population health perspective, the social environment is described as a direct determinant of population health and also moderates the influence of genetic endowment, the physical environment, health care, and individual behaviours on the health of the individual. In this way, the social environment has direct and indirect effects on health and well-being. Most researchers agree that individual socioeconomic status, as a product of the social

[13] The lines of demarcation between the various explanations are not fixed in nature and depend upon the perspective of the research that is being conducted. The classification presented here represents one such categorization of the explanations that have been proposed.

environment, is an important determinant of health. There is considerable disagreement, however, over what aspects of the social environment and socioeconomic status matter most and how they affect the health of individuals. Nowhere is this disagreement more evident than in the social epidemiology literature.

Social epidemiologists have identified two mechanisms through which socioeconomic status affects health – the neomaterial and the psychosocial. The neomaterial mechanism emphasizes the role played by differences between individuals in their material circumstances. From this perspective, poor health results from a situation of deprivation, where individuals simply lack the resources necessary to invest in their health. This deprivation can have direct effects on health, when individuals lack the adequate food, clothing and shelter that are necessary to avoid ill health. The neomaterial perspective does not deny that individuals in poor socioeconomic circumstances can also be subject to greater stress. Deprivation can also have an indirect effect on health as a result of contextual influences stemming from poor socioeconomic circumstances. These influences are often represented by the socioeconomic characteristics of the community or neighbourhood in which an individual resides. Poor health can also result from individual health behaviours, like smoking and drinking, which also appear to be associated with low socioeconomic status, perhaps as a response to or consequence of material deprivation.

The neomaterial mechanism has an intuitive appeal. It is straightforward and easy to comprehend. As an explanation for how socioeconomic status affects health in high-income economies, however, it is open to debate. In particular, evidence from the Whitehall I and II studies poses a serious challenge to the neomaterial mechanism as the sole means by which socioeconomic status affects health. Both studies, which focused on a group of British civil servants, found an association between occupational grade and health status in circumstances where significant material deprivation was unlikely to exist. In this setting, the key factor thought to determine the presence and shape of the gradient was the individual's relative status or rank within the civil service. Individuals of low occupational grade were hypothesized to be under greater stress than those further up the scale, and the differential in strain experienced across the grades produced the gradient. This psychosocial mechanism, in which differences in social status translate into differences in health status, has received further support from studies on both humans and animals. In this interpretation, individual behaviours that are harmful to health, like smoking and drinking, are induced as a response to a stressful situation and can worsen health further.

Income as a marker of socioeconomic status highlights the different emphasis that the neomaterial and psychosocial perspectives place on relative versus absolute differences in status. Outside the setting of the individual workplace, proponents of the psychosocial mechanism have argued that income inequality is a key variable through which the mechanism operates. The neomaterial interpretation sees income differentials between individuals as the principal cause for the health gradient due to differential access to resources. Areas with greater income inequality will therefore display more socioeconomic health inequality as a result. The psychosocial interpretation argues that once an individual reaches a threshold income, further increases will not necessarily produce better health. Instead, it is the individual's rank in the distribution that determines his or her health status relative to others. In this way, the two explanations appear to oppose one another but, as Kawachi, Subramanian and Almeida-Filho

(2002) note, this may represent a false dichotomy. Each explanation identifies differential access to resources as a source of health inequalities, and at some level, improved access to resources would alleviate the pressures and stresses that contribute to the health gradient. In other words, the two mechanisms are complementary, rather than in opposition.

Knowledge Gaps

This brief review of relevant literature indicates the presence of a socioeconomic gradient in health that exists at the national, provincial and local levels in Canada. There is evidence that this gradient has persisted across time in the country as a whole, and that it is not unique to any one locale. Individual socioeconomic characteristics appear to be the most important source for the shape of the gradient. Evidence of a direct effect of neighbourhood characteristics on health is limited, and the presence of a public health care system in Canada may be responsible for ameliorating the effects of neighbourhood socioeconomic characteristics upon health. The socioeconomic gradient in health care utilization provides some support for this hypothesis, since individuals of low socioeconomic status use more GP and hospital services than those further up the scale. Heavier use of the health care system by individuals of low socioeconomic status may reflect greater need, but this usage appears insufficient on its own to reverse the effects of individual socioeconomic status on health.

International comparisons with other OECD countries show that Canada exhibits a high degree of income-related health inequality. We know much less about the degree of health inequality at the provincial or local level, except that it exists, and we have no idea about whether this inequality has widened or narrowed over time. There is also little quantitative evidence about what are the most important contributing factors to this inequality. The analytical framework outlined above is well-suited to the task of analyzing the socioeconomic gradient in health. It produces a summary measure for the degree of socioeconomic inequality in health and allows one to rank the importance of the various determinants of health in terms of their relative contribution to measured inequality.

The mechanism through which health is affected by socioeconomic status is open to debate and will likely remain so for some time to come. However, the substantial body of evidence indicating that socioeconomic status affects individual health status in Canada suggests that the resultant socioeconomic inequality in health is avoidable. Even in the absence of definite knowledge about causal mechanisms, policy-makers can still do much to address these inequalities. For example, they can manipulate the distribution of income across the population as a whole in order to achieve a more equitable distribution, or they can target the incomes of certain groups for support and improvement. Policy-makers can also initiate actions that encourage higher levels of educational attainment throughout the income spectrum by a variety of different means. In light of the fact that multiple indicators of socioeconomic status are correlated with health status and may each make their own separate contribution, we need to clarify and quantify their individual importance for policy-making purposes. The next section applies the concentration index methodology outlined in this review to investigate income-related inequality in health in Atlantic Canada.

3. Objectives, Methods and Results

This section presents empirical findings from the research into socioeconomic inequality in health in Atlantic Canada. The research uses six datasets unique to the region that surveyed individuals in Nova Scotia and Newfoundland. These datasets allow us to investigate the extent of health inequality, to determine what socioeconomic health determinants make the most important contribution to measured inequality and, in the case of Newfoundland, to analyze its change over time. The two datasets from Nova Scotia are GPI Atlantic's community surveys conducted in Glace Bay and Kings County in 2001 (Figure 1). The four datasets from Newfoundland include the St. John's Adult Health Survey (AHS) conducted in 1985 and the follow up survey in 1990, as well as the 1995 and 2001 Adult Health Surveys of Newfoundland. The two earliest surveys permit investigation of the evolution of health inequalities between 1985 and 2001 among residents of St. John's. The Newfoundland data is analyzed by Community Health Board (CHB) as well as for the province as a whole (Figure 2).

Each of these geographical areas has their own set of characteristics that makes them interesting to study. Situated within the Cape Breton Regional Municipality, the Town of Glace Bay experienced large negative shocks to its economic base during the 1990s with the closure of the steel plant in nearby Sydney and the shutdown of the local coal mines. These closures accented more than two decades of economic decline in Cape Breton, which resulted in substantial out-migration. Between 1981 and 2001, the Municipality's population fell from slightly more than 127,000 people to less than 106,000, with the sharpest decline between 1996 and 2001. Between those two census dates alone, the population of the region declined by slightly more than 11,000 individuals, a decrease of 10 percent.

Kings County, Nova Scotia, stands as something of a contrast to Glace Bay and the Cape Breton Regional Municipality. Although population growth between 1996 and 2001 was flat, the population of the County rose by 18 percent between 1981 and 2001. Kings County features a productive agricultural sector, as well as a strong manufacturing base and significant employment in the health care and education sectors.

The shocks experienced by the Newfoundland economy since 1985 are well known. The closure of the northern cod fishery in 1992 and the announcement of a moratorium in the ground fishery two years later directly affected approximately 28,000 workers in the province, including both harvesters and processors. In more recent years, development of offshore oil and gas projects has provided considerable impetus to the province's economy with employment now exceeding the pre-moratorium level. The current unemployment rate of 15.2% (October 2005), while still high relative to that in the rest of Canada (6.6%), has fallen and the province's economic growth rate is now among the highest in the country. Despite these improvements, the effects of the economic shocks associated with the collapse of the fisheries are evident in the population figures. Between 1991 and 2001, the province lost 10 percent of its population due to out-migration and falling fertility rates.

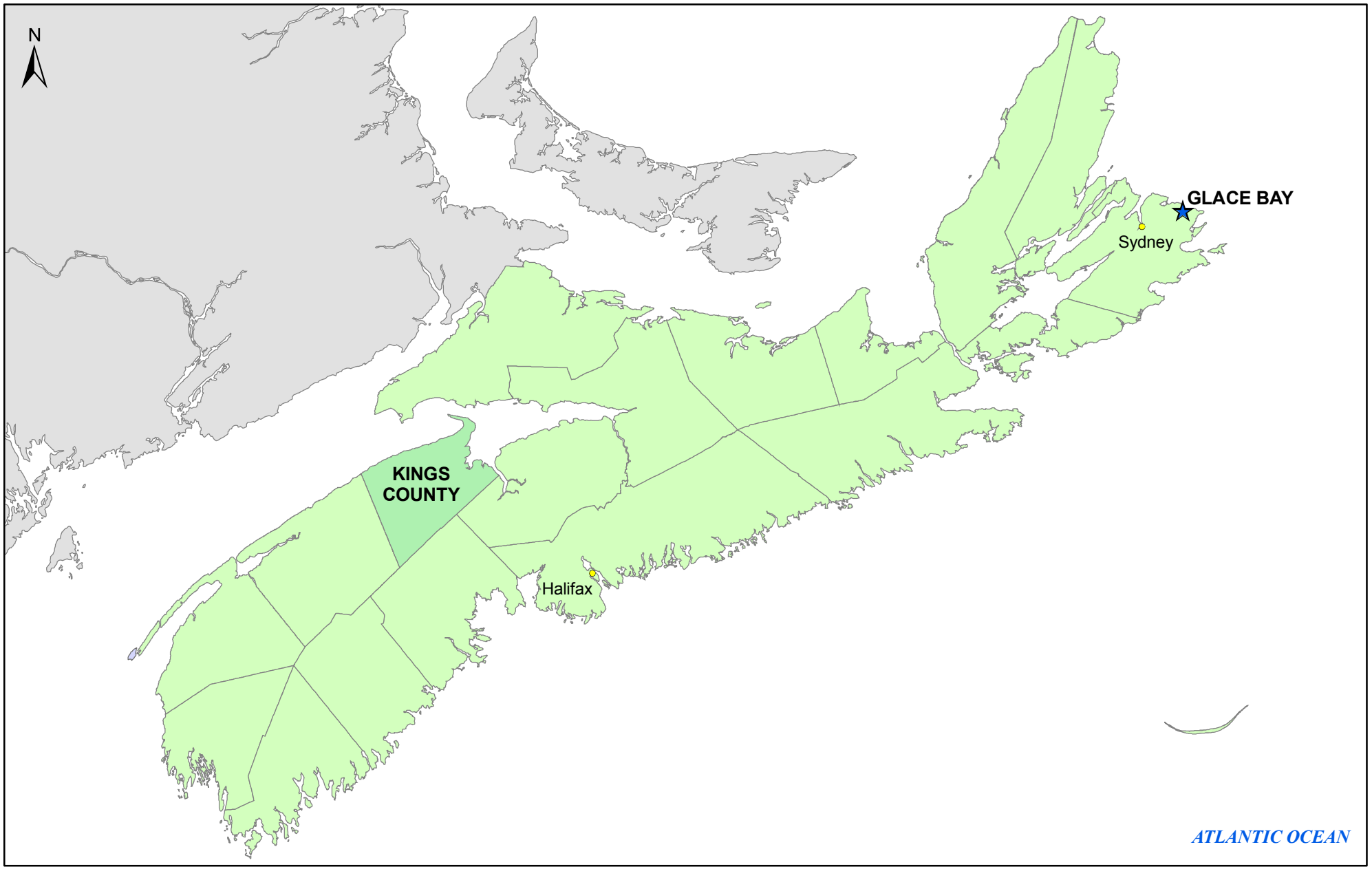


Figure 1

Nova Scotia, Showing Location of Kings County and Glace Bay

Map Parameters
Projection: UTM-NAD83-Z20
Scale 1:2,500,000
Date: August 11, 2005
Project No. SD18416

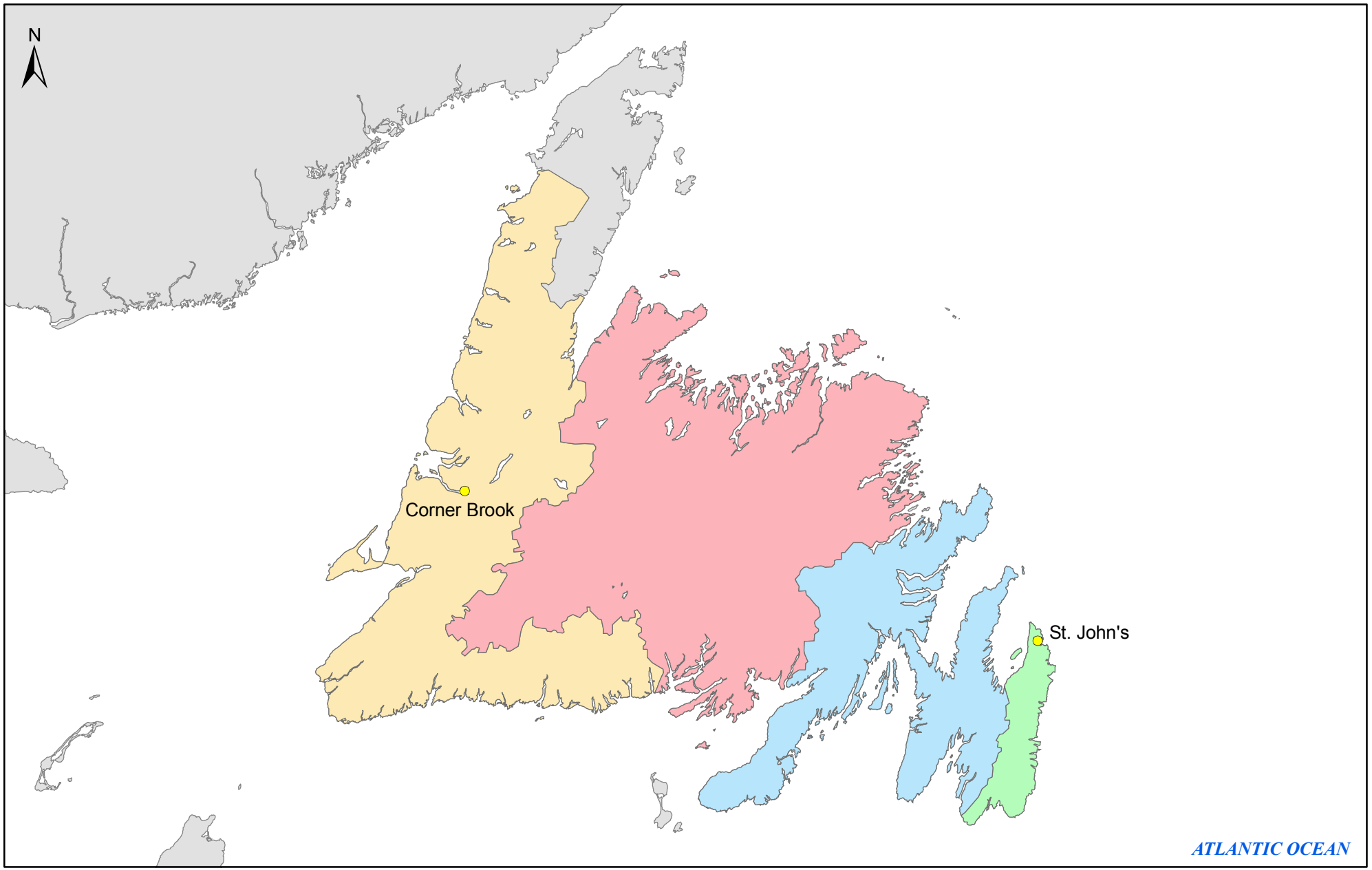


Figure 2

Newfoundland, Showing Delineation of the Community Health Boards

Map Parameters
Projection: UTM-NAD83-Z21
Scale 1:3,500,000
Date: August 11, 2005
Project No. SD18416

0 25 50 100 150 200 250
Kilometers

Community Health Boards

- St John's CHB
- Eastern CHB
- Central CHB
- Western CHB

This section begins with an overview of the concentration curve and the concentration index that are used to investigate socioeconomic health inequality in two Nova Scotia communities and in Newfoundland. The methodology for the decomposition of the concentration index is next presented, followed by a brief description of the data used in the study. A summary of the empirical results from the estimation of the concentration curves and the decomposition of the index follow. All technical details of the measures used in this section are described in Appendix A.

Measurement of Socioeconomic Inequalities in Health

The Concentration Curve

The main tools this study will use to describe and analyze socioeconomic inequality in health are the concentration curve and the concentration index. The concentration curve provides a visual description of the distribution of a health measure in the population when individuals are ranked by their socioeconomic status. The concentration curve, therefore, can discern if the measure of health status favours those of high or low socioeconomic status, or if it is evenly distributed throughout the range of the income distribution. The concentration index quantitatively measures the degree of inequality in the health measure under investigation and facilitates the comparison of distributions across groups and over time. In practice, a wide variety of measures for both health and socioeconomic status have been employed. For our purposes here, equivalent household income will be used to rank individuals by their socioeconomic status.

More formally, the concentration curve plots the cumulative proportion of a measure of health status against the cumulative proportion of the population ranked by equivalent household income. Figures 3 and 4 show two concentration curves along with a diagonal line, called the line of equality. The concentration curve in Figure 3, which lies above the above the line of equality, measures the actual distribution of unemployment in Newfoundland in 2001 by an individual's rank in the income distribution. It tells us that the incidence of unemployment is concentrated among low income individuals. For example, 40 percent of the unemployment that occurs in the sample is concentrated in the bottom 20 percent of the income distribution. The second concentration curve in Figure 4 lies below the diagonal and examines the distribution of individuals with university degrees in Newfoundland using data from the 2001 AHS. The graph indicates that less than 5 percent of the total number of university degrees is found in the bottom 20 percent of the income distribution. Similarly, the top 40 percent of income earners account for 80 percent of the university degrees observed in the sample, a distribution in favour of high income individuals. A concentration curve that lies along the line of equality reflects the equal distribution of a variable throughout individuals in the income distribution scale. Since the ranking variable is an income-based measure, the concentration curve measures income-related inequality in the distribution of the variable of interest. With a measure of health status as the variable of interest, the concentration index measures income-related health inequality (IRHI).

Figure 3 Concentration Curve for Unemployment, Newfoundland 2001

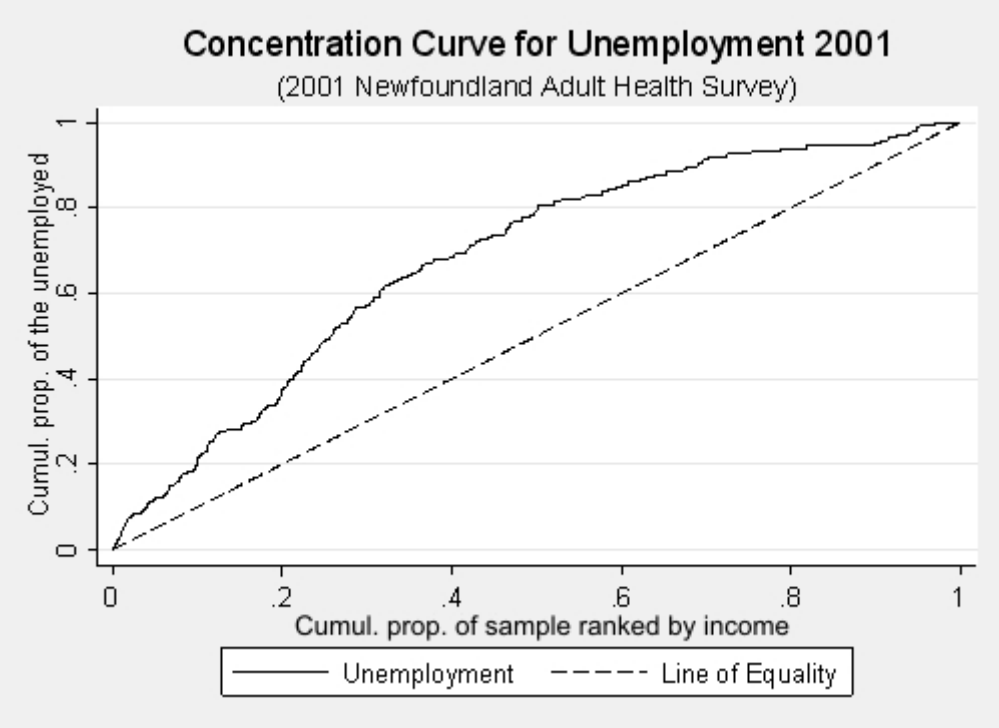
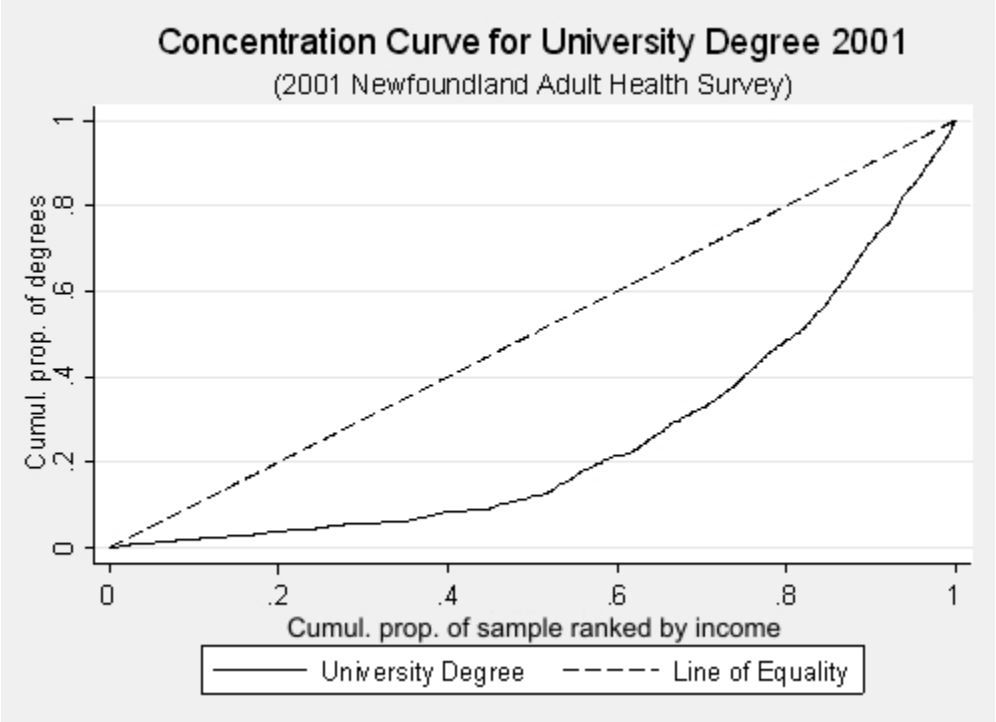


Figure 4 Concentration Curve for Possession of a University Degree, Newfoundland 2001



The distance between a concentration curve and the line of equality reflects the degree of inequality present in the distribution of a variable. The concentration index, which is defined as twice the area between the concentration curve and the line of equality, measures the degree of inequality (see Appendix A). The concentration index ranges in value from +1 to -1. Positive values of the concentration index correspond to situations where the variable of interest is distributed in favour of high-income individuals. For example, in Figure 4, with respect to the distribution of university degrees, the concentration index is 0.495. Negative values reflect the distribution of a variable concentrated among low income individuals. Accordingly, the concentration index for unemployment in Figure 3 is -0.369. When the concentration curve lies along the line of equality, the concentration index takes on a value of zero.[14]

One drawback to the use of concentration curves is that they can cross the line of equality. The concentration index associated with a curve that crosses the line of equality can be positive or negative, depending on the concentration of a variable in the lower-half versus the upper-half of the distribution. In the case where the concentration curve crosses the line of equality once at the midpoint of the distribution, the concentration index will be zero. This characteristic of the concentration curve reveals that the concentration index allows a relative disadvantage suffered by one group to be offset by a relative advantage experienced by another, since each individual is given equal weight in the measurement of inequality regardless of his or her socioeconomic status. Even in such a situation, however, the concentration curve can still indicate whether the overall distribution of a variable favours high or low income individuals on the whole.

Despite this potential difficulty, the concentration curve is still well-suited for measurement of the socioeconomic gradient in health. The concentration curve explicitly captures the socioeconomic dimension to differences in the health status of individuals through ranking them by their socioeconomic status. Concentration curves also focus on the health of all individuals in a population and do not restrict attention to disparities between particular groups. Finally, the concentration index captures changes in the distribution of the population between socioeconomic groups. For example, if better health is enjoyed by upper income individuals and more individuals move into higher income positions over time, then the concentration curve will record this improvement in the distribution of health across individuals.

The Decomposition of the Concentration Index

An important advantage in the use of a concentration curve to analyze socioeconomic health inequalities is that its associated concentration index is decomposable. This property of the concentration index allows one to identify the contribution made by a set of health determinants to the measured socioeconomic inequality in health. The effect of each health determinant on income-related health inequality is comprised of two parts. The first part represents the effect that a change in the health determinant has on the measure of health status. The second part is the income-related inequality in the distribution of that determinant. The product of these two parts represents the total contribution each determinant makes to measured health inequality. The simple sum of the contribution made by each determinant measures the total contribution of

[14] When the concentration index takes on a value of -1 or +1, the distribution of the variable in question is concentrated in favour of the poorest individual and the richest individual, respectively. The corresponding concentration curve is L-shaped.

postulated health determinants to measured socioeconomic inequality in health. In slightly different terms, the concentration index for income-related health inequality (IRHI) is a weighted average of the income-related inequality in each of the health determinants.

The implementation of the decomposition for IRHI proceeds in two stages. The first stage is to use a linear regression model to estimate the sign and size of the effect each health determinant has on the measure of health status under investigation. The parameter estimates from the regression model are used to calculate an elasticity that measures the responsiveness of the health measure to a change in each one of its determinants. The second stage consists of the calculation of a concentration index for each health determinant in the regression model. The concentration index and the elasticity for each health determinant are multiplied together and the resulting product is summed across all health determinants. Appendix A describes these steps in more formal detail.

The relative contribution made by each health determinant to measured inequality can be readily identified from the decomposition. It is simply the ratio of the contribution of each health determinant to total measured inequality. With this calculation, the various health determinants can be ranked in order of their importance to the determination of measured inequality.

The decomposition of the concentration index not only allows the importance of various health determinants to be assessed, but it also identifies the two main channels through which policy-makers can address the issue of income-related health inequality. Each health determinant makes a contribution to health inequality through its effect on the measure of health status and/or its unequal distribution between high and low income individuals. Policy-makers, therefore, can seek to influence the distribution of the variable among income groups and/or they can attempt to alter the effect of a particular health determinant on health. The decomposition identifies the avenues, with respect to the various health determinants, through which policy-makers can hope to have the greatest or most effective influence on health. For instance, policy-makers may have little influence over the effects of aging on health, whilst redistributive policies can be used to improve the socioeconomic position of seniors. Likewise, there may be little in the way of practical measures policy-makers can implement to alter the effects of a disability or educational attainment on the health of individuals. Redistributive policies, however, can prevent the beneficial or adverse health outcomes from becoming concentrated in high or low income individuals.

The Measure of Health Status

In principle, concentration indices could be constructed for a wide variety of health outcomes. In the past, studies have used the presence of one or more chronic conditions, the number of days not worked due to illness, restrictions on daily activities, and a dichotomized form of SAHS as indicators of health status. Other studies have sought to use a variety of mortality indicators to measure health inequalities between socioeconomic groups. Concentration curves constructed with various individual measures of morbidity generally agree that poor health is concentrated among low-income groups, although the degree of inequality depends on the measure of health status used (Kakwani, Wagstaff and van Doorslaer, 1997).

The measure of individual health status used to construct health concentration indices in this study is based on SAHS. The use of SAHS has several features. The SAHS question health surveys use

is often worded to encompass both physical and mental aspects of well-being, and so approximates the WHO definition of health. Information on SAHS has been routinely collected in Canada since the mid-1980s. Therefore, it is widely available and the nature of the question itself has remained largely unchanged over time, unlike the information collected on other health status measures such as chronic conditions. Although SAHS is a subjective measure of health, numerous studies have shown it to be a useful indicator of mortality (Mossey and Shapiro, 1982; Idler and Angel, 1990; Idler and Kasl, 1991; Chipperfield, 1993; Borawski, Kinney and Kahana, 1996; Idler and Benyamini, 1997). Consequently, as van Doorslaer and Jones (2003) point out, socioeconomic inequality in SAHS is equivalent to socioeconomic inequality in mortality. In addition, as Decker and Remler (2004) note, studies have also found that SAHS reflects other facets of health that include functional ability and life satisfaction (Larson, 1978; Idler and Kasl, 1991).

The use of SAHS as a measure of health status is not without drawbacks. The categorical nature of the response to the question does not readily lend itself to the construction of a concentration curve in a manner that preserves all the information available in the measure. Instead, methods that take a latent variable approach must be utilized. This latent variable, which measures the true state of health, is unobserved. Individuals are assumed to choose a response category for SAHS based on a set of internal cut-points that assigns a SAHS category to their actual state of health reflected by the value of the latent variable. This approach introduces the problem of cut-point shift in the response categories, where different groups in the population may use different thresholds with respect to the latent variable reflecting true health status to determine their response to a question on SAHS. These groups may be defined in terms of their educational attainment, economic status, age, gender or some other characteristic. Fortunately, van Doorslaer and Jones (2003) showed that the method used here to measure and decompose socioeconomic inequality does not appear to be sensitive to this issue.[15]

There are two methods by which one can use the information on SAHS to construct concentration curves and their associated indexes. Both methods involve the recovery of information from the underlying latent variable to which individuals refer in response to a question on SAHS. The first method, developed by Wagstaff and van Doorslaer (1994), assumes that the latent variable follows a particular probability distribution and calculates a score for each category of SAHS based on the proportion of the sample that falls into each category. Higher values of the score correspond to the presence of increasing ill-health, and so the method preserves the ordinal nature of the response. These scores are then used as the health measure in the construction of a concentration curve and the estimation of its associated index. The strength of this method is that it allows comparisons to be made between surveys when the number of response categories differs, as is the case with the Newfoundland data used for this study. While the use of this method allows the calculation of a concentration index for a variable that is categorical in nature, it is not well-suited for the decomposition exercise. A decomposition using the scores as the measure of health status would ignore the variation in the latent variable that exists within each category of SAHS. Instead, a better method is to define the cut-points of the

[15] The lack of sensitivity to variations in the cut-points that could occur between groups is due to the fact that the threshold values for the HUI used to separate the SAHS categories from one another do not appear to differ much between groups. In the context of the current study, the issue also arises in terms of the application of cut-points obtained from a national health survey to a sub-national group. Comparison of the cut-points from provincial level data of the 2001 Canadian Community Health Survey does not reveal any substantial deviation from those at the national level.

latent variable that classify individuals into each category of SAHS or an objective measure of health. Appropriate regression methods can then be used to recover some of the within-category variation of the latent variable, albeit in terms of the objective health measure, based on that observed between categories. Van Doorslaer and Jones (2003) first illustrated the use of such a method using the McMaster HUI.

The HUI is a summary measure of health status that ranges in value between 0 and 1 based on the level of functioning in eight different domains. It is constructed from a series of questions that ask people to rate their level of functioning in each domain. These responses are combined using a series of weights that place a value on each possible state of health. When the HUI takes on the value of 1, the individual is in a perfect state of health. A value of 0 indicates death. Intermediate values of the HUI between 0 and 1 represent the health status of the individual relative to a state of perfect health. The method that van Doorslaer and Jones (2003) developed uses a health determinant regression to convert the SAHS reported by an individual into a corresponding value of the HUI. These values of the HUI can be used to calculate a health concentration index and to decompose the sources of inequality in terms of the contribution made by each health determinant. Appendix A provides more specific details of the method.

The Data

Table 4 lists six surveys conducted in the Atlantic region between 1985 and 2001 that are used for the analysis of IRHI in Atlantic Canada. With the exception of the Lifestyle, Health Practices and Medical Care Utilization Survey (LHPMCUS) conducted in St. John's in 1985, and its follow-up survey in 1990, each survey is cross-sectional in nature. The LHPMCUS and its follow-up surveyed residents in the St. John's region, while the 1995 and 2001 AHS surveyed the island's entire population. Together, these four surveys permit the examination of how IRHI has evolved over time in Newfoundland. The two GPI Community Surveys (Kings County and Glace Bay, Nova Scotia) allow the investigation of IRHI within each community and allow comparisons to be made between them and Newfoundland in 2001. Both sets of surveys also allow comparisons to be made with other countries.

Table 4 Health Surveys used to Analyze IRHI

Province	Survey	Year	Initial Sample Size	Sample Size for Analysis	Target Population
Newfoundland	Lifestyle, Health Practices and Medical Care Utilization Survey	1985	3,300	3,070	20 and over
	Lifestyle, Health Practices and Medical Care Utilization Survey Follow-up	1990	2,630	2,447	20 and over
	Newfoundland Panel on Health and Medical Care	1995	12,194	10,253	20 and over
	Newfoundland Adult Health Survey	2001	7,949	6,340	18 and over
Nova Scotia	Glace Bay GPI Community Survey	2001	1,703	1,426	15 and over
	Kings County GPI Community Survey	2001	1,888	1,492	15 and over

Given the length of time spanned by the four Newfoundland surveys and the different data sources, some variation in their content and question format is inevitable. Fortunately, most of the questions that relate to health and socioeconomic measures necessary to investigate IRHI are similar across the different surveys. Two exceptions are of note. First, the number of response categories available for the question on SAHS increased from four to five between the 1995 and 2001 AHS. This change can be handled with an appeal to the appropriate methods outlined in Appendix A and does not affect the consistency of the results. Second, the questions used to identify the economic status of individuals vary over time. The categories that identify students and retired individuals are similar across the various surveys. The distinction between employment and unemployment, however, is not. This difference, which is described in greater detail below, will produce some variation in results across time that is unavoidable since it cannot be reconciled with the available information. Nonetheless, the degree of comparability between each of the four surveys remains high.

The longitudinal nature of the 1985 LHPMCUS survey and its follow-up raises the issue of attrition and how it might affect the results. The initial sample size of each survey reported in Table 4 shows that some attrition did occur. Between 1985 and 1990, 20 percent of the original sample left the panel for a variety of reasons: some individuals left the province, others could not be located or refused to participate in the follow-up, and a small number of individuals were deceased. Fortunately, the first three reasons for attrition accounted for over half of the total number of respondents who left the panel while only 2.4 percent of the original respondents left the panel due to death. This indicates that any selection effects stemming from attrition will be small, if not negligible.[16] In the analysis that follows, both surveys will be treated as if they were separate cross-sections.

The difference between the initial sample size and that used in the analysis given in Table 4 reflects the deletion of observations from each dataset for three main reasons. First, based on the target population of the GPI surveys and the 2001 Newfoundland AHS, some individuals fell outside the age range under study here. Second, each dataset contained observations that had missing values for variables like income and health status because individuals either refused to answer a question or said they did not know the answer. Although several methods exist for the replacement of missing values, the surveys in general did contain a sufficient amount of information for their imputation. Third, inconsistencies in the responses of some individuals were detected that could not be resolved, and so were deleted from the dataset.

The Description of Health Determinants

Table 5 enumerates the variables from each survey that were used in the health determinants models to obtain estimates of the HUI. With the exception of the 1995 Newfoundland AHS, seven different age categories were defined for each gender. On the basis of the age information available in that survey, six different age categories were used. Individual income is measured as gross household income per equivalent adult. Gross household income includes income from all sources, including government transfers, but net of taxes. The use of an equivalence scale expresses the number of individuals in a household in terms of equivalent adults to adjust for the

[16] Almost 6 percent of respondents (194 individuals) left the province while the researchers were unable to locate 5 percent of the original sample. Another 4 percent (131 individuals) from the original survey refused to participate in 1990 while only a small proportion of individuals, 2.4 percent of the original sample, were deceased (Segovia, Bartlett and Edwards, 1992).

sharing of resources that occurs within a household. Here, the number of equivalent adults is calculated as the square root of the number of individuals in the household. Educational attainment reflects the highest level of education completed by the individual. All non-university post-secondary diplomas and certificates are included in the category of community college. The categories of marital status consist of married, separated/divorced, widowed and single.

Table 5 Enumeration of Health Determinants

	Newfoundland				Glace Bay and Kings County
	1985	1990	1995	2001	2001
Males					
20-24	•	•		•	•
25-34	•	•	•	•	•
35-44	•	•	•	•	•
45-54	•	•	•	•	•
55-64	•	•	•	•	•
65+	•	•	•	•	•
Females					
20-24	•	•		•	•
25-34	•	•	•	•	•
35-44	•	•	•	•	•
45-54	•	•	•	•	•
55-64	•	•	•	•	•
65+	•	•	•	•	•
Income	•	•	•	•	•
Educational Attainment					
Less than high school	•	•	•	•	•
High School	•	•	•	•	•
Community College	•	•	•	•	•
University	•	•	•	•	•
Marital Status					
Single	•	•	•	•	
Married	•	•	•	•	•
Separated/Divorced	•	•	•	•	•
Widowed	•	•	•	•	•
Economic Status					
Employed	•	•	•	•	•
Seasonally Employed			•		
Unemployed	•	•	•	•	•
Student	•	•	•	•	•
Retired	•	•	•	•	•
Inactive	•	•	•	•	•
Health Conditions					
Long-term Disability	•	•	•	•	•
Activity Restriction		•	•	•	•
Other Variables					
Social Support			•	•	•
Stress				•	•
Financial Stress				•	
TAGS			•		

With respect to the economic status of individuals, five basic categories could be identified across the different surveys. Employed individuals are those who reported themselves working at the time of the survey, with the exception of the 2001 Newfoundland AHS. In that survey, individuals were queried about the number of months spent working and those who worked six months or more during the year were classified as employed. Unemployed individuals are those who reported themselves as such at the time of the survey, again except for the 2001 Newfoundland AHS where an individual was categorized as unemployed if he or she spent six months or more unemployed. Individuals on each of the surveys could also report themselves as being students or retired, which provided a third and fourth category of economic status. Individuals who could not be classified into one of these four categories were designated as inactive.

Information on two health conditions, the presence of a long-term disability and the presence of one or more restrictions on daily activity, were included in the set of health determinants (note that the 1985 LHPMCUS did not ask respondents about restrictions on their daily activity). Other health determinants included in the analysis are: self-reported stress levels from the two GPI surveys and the 2001 Newfoundland AHS; a measure of social support that refers to the frequency of contact with friends and neighbours; and a measure of the level of financial stress experienced by households from the 2001 Newfoundland AHS. The Atlantic Groundfish Strategy (TAGS) variable indicates whether or not the respondent was a current recipient of any fisheries compensation benefits at the time of the survey. Income support was a major feature of this program. These measures are described in greater detail below as their role in the determination of IRHI is examined.

Income Related Health Inequality in Atlantic Canada 1985-2001

Table 6 provides estimates of the health concentration index for Glace Bay and Kings County, Nova Scotia and Newfoundland in 2001 obtained from the method of van Doorslaer and Jones (2003). The positive values for each of the three indices reveal that the distribution of health in the region favours higher income individuals. The concentration index for the Province of Newfoundland as a whole places it close to the communities of Glace Bay and Kings County in terms of the degree of IRHI. Table 6 also reports estimates of IRHI by CHB in Newfoundland. The Eastern CHB records the lowest degree of IRHI, while the highest occurs within the Western CHB. IRHI in the Central and St. John's CHB differ little from one another and mirror the inequality observed at the provincial level.

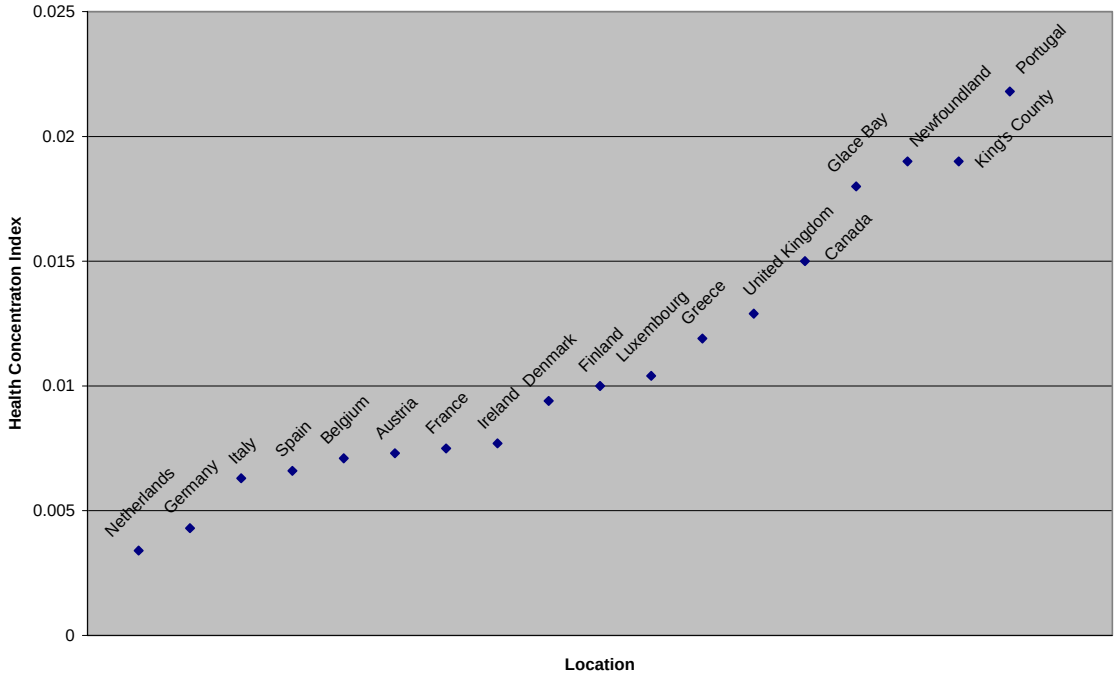
Table 6 Health Concentration Indices

Area	Concentration Index
Glace Bay	0.018
Kings County	0.019
Newfoundland	0.019
St. John's CHB	0.018
Eastern CHB	0.015
Central CHB	0.019
Western CHB	0.022

Source: 2001 Newfoundland AHS, Glace Bay GPI Community Survey, Kings County GPI Community Survey and author's calculations.

To gauge whether IRHI in the Atlantic region is high or low compared to that observed elsewhere, Figure 5 graphs estimates of the concentration index for Canada and the European countries from Table 3 along with those for Newfoundland, Glace Bay and Kings County. The figure reveals that IRHI in Canada and the Atlantic region is high compared to that observed in many European countries, with the exception of Portugal. The figure also reveals that IRHI is higher in the Atlantic region than in Canada as a whole.

Figure 5 IRHI for Glace Bay, Kings County, Newfoundland, Canada and Select European Countries



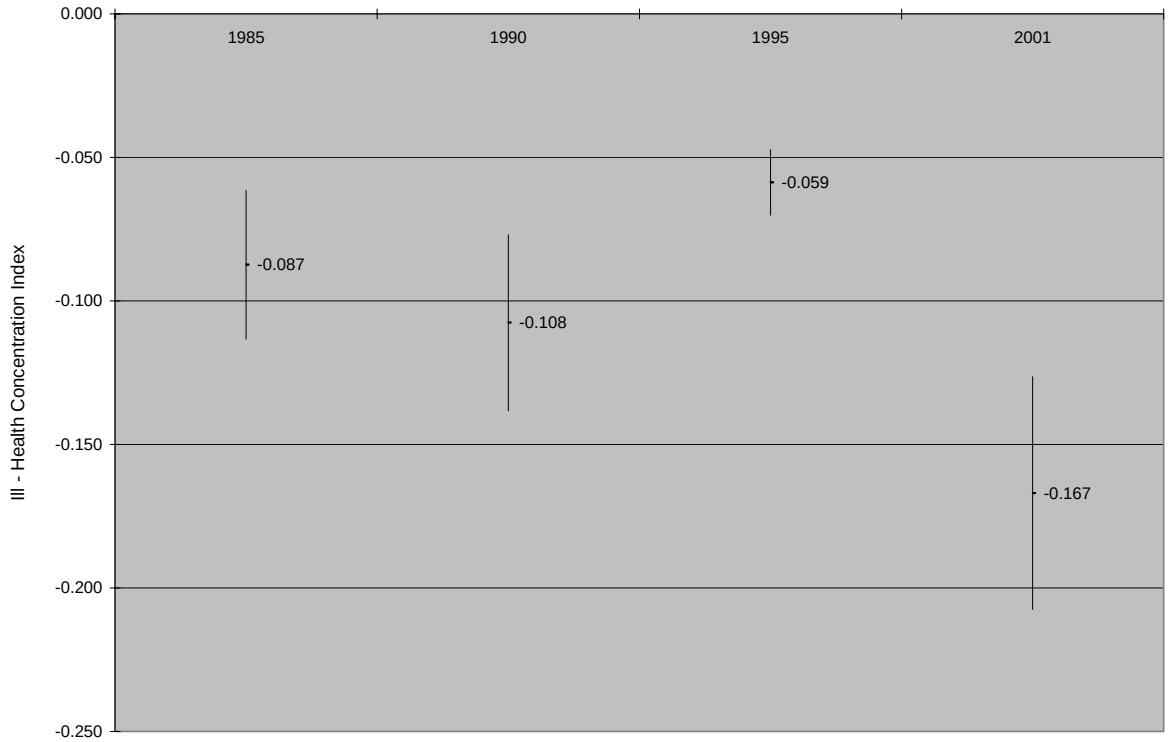
The finding that IRHI in Atlantic Canada is high relative to that observed elsewhere may be an artefact from the use of a single year's worth of data. To check its robustness, a set of health concentration indices can be computed for the St. John's region for the years 1985, 1990, 1995 and 2001. The change in these concentration indices can then be compared to see whether IRHI in Newfoundland has narrowed or widened over time. They will also allow comparison with those concentration indices obtained for other countries in the 1980s and early 1990s.

To construct these concentration indices, the methodology developed by Wagstaff and van Doorslaer (1994) was used to score the different categories of SAHS. This was for three reasons. First, the number of response categories used to capture SAHS in national health surveys conducted during the 1980s and early 1990s differed across countries. Second, the number of response categories used in the question on SAHS changed from four in the 1995 Newfoundland AHS to five in the 2001 AHS. The Wagstaff and van Doorslaer method produces a measure of individual health status comparable between surveys where the number of response categories for self-reported health differed from one another. The use of it here is essential in order to make comparisons across time and between areas using the Newfoundland data. Third, estimates of

IRHI constructed on this basis already exist for other countries (see Tables 1 and 2). Appendix A details the steps necessary to calculate the health scores for the Newfoundland data.

Figure 6 plots the estimates of the concentration index for St. John's between 1985 and 2001 along with the associated confidence interval. These indices were age-standardized using the indirect regression method. Due to the methodology employed, the measure of health status reflects the degree of ill-health present, and so the negative values of the concentration index indicate that ill-health is concentrated in lower income individuals. This is simply the converse of the statement that good health is concentrated among higher income individuals. Estimates of the concentration indices obtained via this method are not directly comparable with the previous figures and their magnitude will also differ from before. The point estimates of the concentration index suggest a trend of rising IRHI in St. John's that was briefly interrupted during the 1990s. The width of the confidence intervals for 1985 and 1990 prevent a statistically conclusive statement that IRHI increased over this five year period. It is clear, however, that IRHI in St. John's declined between 1990 and 1995, increased between 1995 and 2001 and was unequivocally higher in 2001 than it was in both 1985 and 1995.

Figure 6 Concentration Index for St. John's 1985-2001



Is the pattern observed in St. John's reflective of that for Newfoundland as a whole? Provincial estimates of the health concentration obtained using the same method are similar in value to that for St. John's. This similarity suggests that the evolution of IRHI reflects the trend at the provincial level.

Against this backdrop of increasing IRHI over time, the degree of socioeconomic health inequality also appears to be higher in Newfoundland than in other comparison countries. As Figure 7 reveals, IRHI in St. John's was at the upper end of the scale during the 1980s and, by 1990, featured the same degree of inequality as in the United States. In the 1990s, Figure 8 reveals that the situation was much the same, although the temporary decline in inequality recorded in 1995 did much to improve the relative position of St. John's. It would also appear that IRHI is comparatively high in Canada and close to that observed in the United States – a result that may surprise some observers.

Figure 7 IRHI for St. John's (1985 and 1990) and Select Countries

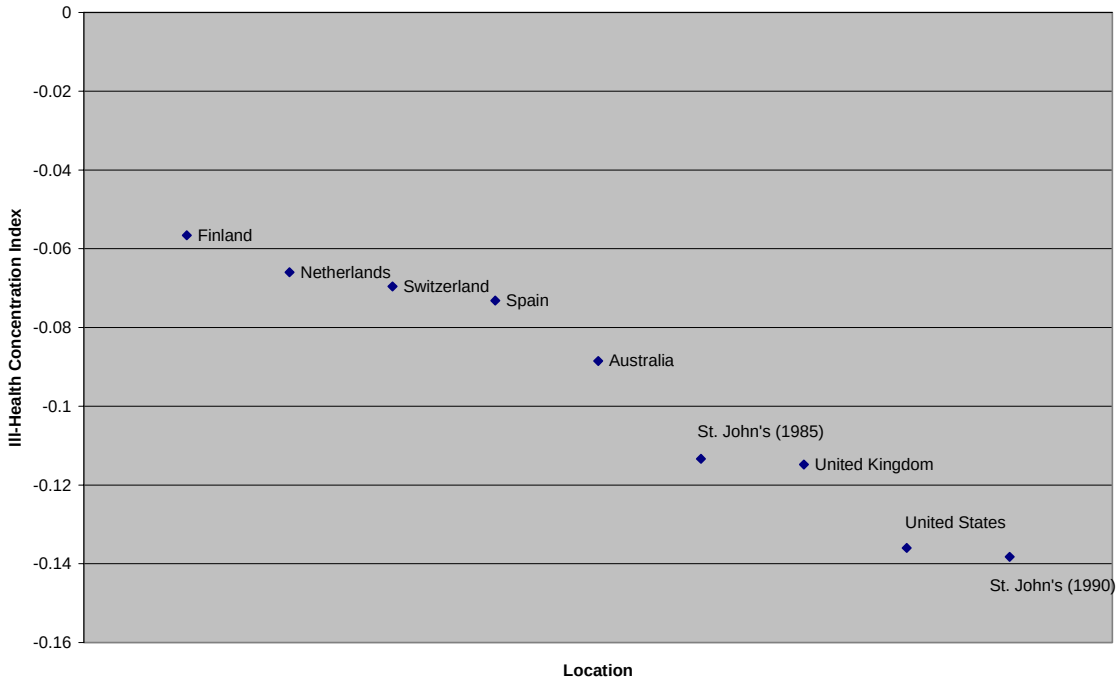
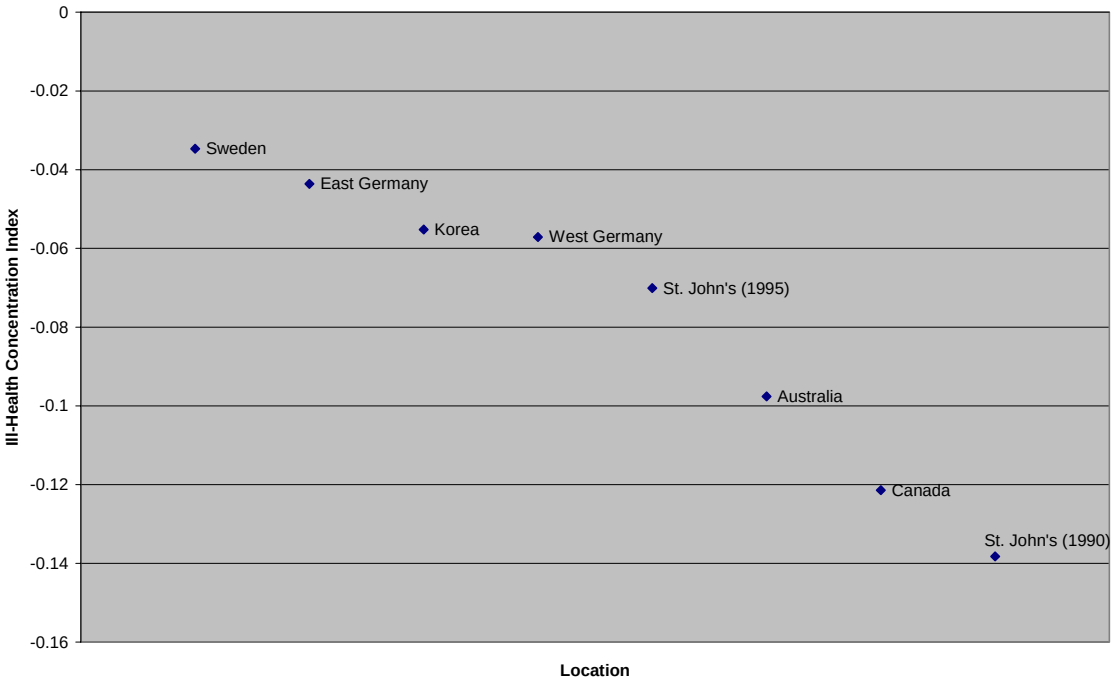


Figure 8 IRHI for St. John's (1990 and 1995) and Select Countries



Sources of IRHI in Glace Bay and Kings County

On their own, the concentration indices for Newfoundland and the two Nova Scotian communities reveal a distribution of health that favours high-income individuals. Similarly, the concentration indices tell us that poor health is concentrated among low-income individuals. If the health status of individuals is related to a set of determinants that includes education, income, marital status, and economic status, then inequality in their distribution between individuals of different socioeconomic status will contribute differentially toward the determination of IRHI. Isolation of the contribution made by each health determinant to overall IRHI can inform policy-makers as to where attention should be focused if the reduction of health inequality becomes a policy goal.

The sources of IRHI in Glace Bay and King County, Nova Scotia are first examined. Columns 2 and 3 of Table 7 report the percentage contribution made by the health determinants listed in Table 5 to IRHI for everyone aged 20 and up in the sample. Columns 3 and 4 report the contribution made by each of the health determinants when the sample is restricted to include only those aged 20 to 65, to explore what effects exclusion of those aged 65 and over may have on the results. A positive number indicates that the net effect of a health determinant makes IRHI higher than it would be otherwise, while a negative number makes IRHI less than it would be otherwise. Estimation of the health determinants model required that at least one category of age, economic status, marital status, and educational attainment be dropped, which is why there is no entry for the contribution of males aged 20-24, those who are not in the labour force (except for students and the retired), those who are single, and individuals without a high school degree. Appendix B reports the detailed statistical results used to construct the decompositions for Kings County and Glace Bay and all others that follow.

Table 7 Decomposition of IRHI in Glace Bay and Kings County

	20 and up		20 to 65	
	Glace Bay	**Kings County**	**Glace Bay**	**Kings County**
Concentration Index	0.018	0.019	0.016	0.020
Males				
25-34	-0.1%	0.6%	0.0%	0.4%
35-44	0.7%	-0.5%	1.4%	-0.4%
45-54	-5.7%	-8.7%	-8.0%	-8.9%
55-64	-2.9%	-6.1%	-5.2%	-6.5%
65+	-0.4%	-3.4%		
Females				
20-24	0.0%	0.2%	0.1%	0.1%
25-34	1.3%	1.1%	1.9%	0.1%
35-44	3.5%	1.9%	5.6%	1.1%
45-54	-6.6%	-0.7%	-8.8%	-0.6%
55-64	0.6%	0.3%	1.6%	0.3%
65+	3.3%	2.1%		
Income	44.9%	52.7%	41.4%	53.9%
Educational Attainment				
High School	-4.7%	-0.1%	-7.7%	-0.7%
Community College	3.6%	-1.5%	2.9%	-1.7%
University	17.2%	20.2%	20.3%	14.6%
Marital Status				
Married	-1.6%	3.4%	0.8%	1.1%
Separated/Divorced	2.6%	-0.5%	1.6%	-0.3%
Widowed	-1.4%	-0.6%	-3.0%	0.2%
Economic Status				
Employed	20.1%	10.3%	31.4%	13.1%
Unemployed	-5.2%	-2.4%	-9.2%	-3.3%
Student	-0.4%	0.5%	-1.2%	0.5%
Retired	0.2%	3.7%	3.0%	4.9%
Health Conditions				
Long-term Disability	8.5%	8.1%	9.1%	7.1%
Activity Restriction	22.6%	19.3%	22.3%	25.0%

The contribution of demographics to IRHI in Glace Bay and Kings County is generally mixed. In both Glace Bay and Kings County, the presence of males and females aged between 25 and 44 contributes little towards measured inequality. The presence of males aged 45-64 in Glace Bay makes a relatively minor contribution towards the reduction of IRHI, while males aged 65 and over have a neutral effect. The same result is observed for Kings County with respect to males aged 45-64. Females aged 45-54 in Glace Bay help lower IRHI, while no contribution is observed for the same group in Kings County. Females aged 55-64 make no contribution towards IRHI in both Glace Bay and Kings County. In both communities, females 65 and over make a slight contribution towards raising IRHI.

The contribution of age and sex to IRHI pales in comparison to that observed for income in both communities. In Glace Bay and Kings County, differences in equivalent household income account for almost half of the measured IRHI. In Glace Bay, IRHI would be 45 percent less if income had no effect on health and/or if there were an equal distribution of income. In Kings County, the effect was even larger, and IRHI would have been 53 percent less. As the last two columns in Table 7 reveal, this finding is insensitive to the exclusion of those aged 65 and over, since the relative size of the contribution of income remains unchanged.

The effects of educational attainment on IRHI, like those of age and gender, are mixed. In Glace Bay, the attainment of a high school degree makes a small contribution towards the reduction of IRHI, while in Kings County, it makes no contribution at all. Attainment of a community college or some other non degree post-secondary diploma also makes a relatively small contribution to IRHI in both Glace Bay and Kings County. A university education, however, does make a relatively significant positive contribution to IRHI. In Glace Bay, IRHI is 17 percent higher as a result of the effects of a university degree. The contribution in Kings County is slightly higher. As the numbers in the last two columns in Table 7 show, the size of the contribution is somewhat sensitive to the age of the population under examination, but the direction of the effect remains the same.

Compared to the effects of a university degree on IRHI, the contribution of marital status is minor. Separation or divorce in Glace Bay makes a minor contribution towards raising IRHI, while being widowed reduces IRHI slightly. In Kings County, the direction of the effect of being married or separated/ divorced is reversed, but negligible in any event. If we restrict attention to those aged 20-65, we find that differences in marital status make virtually no contribution to IRHI in either Glace Bay or Kings County.

The contribution of economic status to IRHI varies in direction and size across the different categories. The largest contribution of economic status comes from those who are employed. In Glace Bay, employment makes a positive contribution to IRHI and the size of its effect is equal to that of a university degree. In Kings County, employment also makes a positive contribution to IRHI, but the effect is half of that in Glace Bay. This may indicate that employment has a stronger effect on health and health inequality in a high unemployment area than in an area of low unemployment, where being out of a job may be more temporary and produce less stress. The presence of unemployed individuals in both Glace Bay and Kings County lowers IRHI. The effect of unemployment in Kings County is again half of that in Glace Bay, although it makes a relatively minor contribution in each place. Student status makes no contribution to IRHI in either Glace Bay or Kings County. Retired individuals appear to have little effect on IRHI in Glace Bay, while they make a minor contribution to its presence in Kings County.

The effect of economic status is somewhat sensitive to the group of individuals examined. If we again restrict attention to those aged 20-65, the effect of employment on IRHI in Glace Bay is noticeably larger than that for the population comprised of all those aged 20 and up. A smaller difference in Kings County is evident. Unemployment in Glace Bay leads to a larger reduction in IRHI with the exclusion of those over 65, and retired individuals now make a small positive contribution towards IRHI. In Kings County, the contribution of retirement to increased IRHI is slightly increased when seniors are excluded.

The presence of a long-term disability increases IRHI in both Glace Bay and Kings County. The effects in each community are similar in magnitude. In the absence of long-term disability, IRHI would be about 8 percent less than it is in the sample of individuals aged 20 and over. The size of this contribution does not appear to be particular to the inclusion of those aged 65 and over, as the size and direction of the contribution made by a long-term disability to IRHI is roughly the same for the sample of individuals aged 20-65.

The presence of a restriction on daily activities also acts to increase IRHI. Its contribution is as large as the effect of a university degree or employment on IRHI and second only to income in size. The contribution of a restriction on daily activity to IRHI is roughly the same in both Glace Bay and Kings County, and the strength of its effect is not sensitive to the presence of those aged 65 and over. In fact, in the Kings County sample aged 20-65, the presence of such a restriction serves as the second largest contributor to IRHI and is equal to the combined effect of a university education and employment. In essence, this means that activity limitations are much more likely to be associated with lower income and poor health, although the data do not allow an assessment of causal direction.

To summarize the analysis of IRHI in Glace Bay and Kings County thus far, income is the largest single contributor to IRHI in these two communities. Educational attainment in the form of a university degree, employment, the presence of a long-term disability, and the presence of a restriction on daily activity are also significant contributing factors. The effect of these latter two variables is not surprising since they directly impact upon an individual's well-being. Their contribution to increasing IRHI comes from the concentration of disabilities and activity restrictions among low-income individuals. In Glace Bay, the concentration index for the presence of a long-term disability and one or more restrictions on daily activities is -0.77 and -0.119, respectively. In Kings County, the corresponding concentration indices are -0.128 and -0.147. Thus, the negative effect on SAHS of a long-term disability or a restriction on daily activities combined with their concentration among low income individuals makes IRHI higher than what it would be if disabilities and activity limitations were more evenly spread among income groups.

The nature of the contribution of other health determinants to IRHI is not so clear cut. For example, why does the presence of unemployed individuals help lower IRHI in Glace Bay and Kings County, while employed individuals raise it? Why does a university education raise IRHI, but not the completion of a high school degree? Tables 8 and 9 answer these questions by clarifying the nature of the contribution that a health determinant makes to IRHI. Table 8 reports the regression coefficients from the health determinants regression. Those that show a statistically significant association with health status are in bold.[17] The lack of statistical significance for a given health determinant means that the determinant makes no discernable contribution towards IRHI, regardless of the value of its associated concentration index. Table 9 reports the value of the concentration index for the same health determinants. Again, bold typeface indicates which concentration indices are statistically significant in reporting the distribution of a variable that favours high or low income individuals.[18] If the distribution of a health determinant favours neither low nor high income individuals, it will make no discernable contribution towards IRHI.

[17] Appendix B details the results for all the regression coefficients and their standard errors used to construct this table.

[18] Appendix B details all the concentration indices and their standard errors used to construct this table.

Table 8 Regression Coefficients for Selected Health Determinants, Glace Bay and Kings County

	20 and up		20-65	
	Glace Bay	**Kings County**	**Glace Bay**	**Kings County**
Income	**0.018**	**0.026**	**0.014**	**0.029**
High School	**0.03**	0.022	**0.03**	**0.022**
Community College	**0.022**	**0.035**	0.015	**0.025**
University	**0.042**	**0.053**	**0.042**	**0.041**
Employed	**0.044**	**0.041**	**0.055**	**0.046**
Unemployed	**0.037**	0.017	**0.046**	0.02
Student	0.028	0.03	**0.037**	0.034
Retired	0.013	**0.047**	0.029	**0.053**
Long-term Disability	**-0.056**	**-0.05**	**-0.057**	**-0.039**
Activity Restriction	**-0.116**	**-0.114**	**-0.108**	**-0.127**

Note: Coefficients in bold are statistically significant at the 5 percent level.

Table 9 Concentration Indices for Selected Health Determinants, Glace Bay and Kings County

	20 and up		20-65	
	Glace Bay	**Kings County**	**Glace Bay**	**Kings County**
Income	**0.038**	**0.032**	**0.039**	**0.031**
High School	**-0.101**	-0.001	**-0.134**	-0.021
Community College	**0.099**	-0.023	**0.089**	-0.036
University	**0.474**	**0.269**	**0.471**	**0.25**
Employed	**0.198**	**0.073**	**0.181**	**0.072**
Unemployed	**-0.188**	**-0.448**	**-0.202**	**-0.451**
Student	-0.026	0.052	-0.043	0.056
Retired	0.01	0.054	**0.079**	**0.145**
Long-term Disability	**-0.077**	**-0.128**	**-0.077**	**-0.176**
Activity Restriction	**-0.119**	**-0.147**	**-0.118**	**-0.212**

Note: Concentration indices in bold are statistically significant at the 5 percent level.

To emphasise, the regression coefficients measure the size of the effect a given determinant has on health. A significant positive value means that the determinant has a positive association with health. A significant negative value means that the determinant has a negative association with health. Separately, the concentration indices measure whether the health determinant is concentrated among high or low income individuals. A significant positive value means that the determinant is concentrated among high income individuals. A significant negative value means that the determinant is concentrated among low income individuals. Consideration of the regression coefficients together with the concentration indices allows us to determine in what way the individual health determinants contribute to IRHI.

Comparison of the variables listed in Table 5 with those in Table 7 indicates the omission of four categories. The omission of a category for age, educational attainment, marital status and economic status, as discussed earlier, is necessary for the estimation of the health determinants model that underlies the construction of the health concentration indices. The regression coefficients reported in Table 8, then, refer to the effect of that variable relative to the omitted category. For educational attainment, therefore, the categories of high school, community college and university reflect the effect of higher educational attainment on individual health status relative to the omitted category of less than high school graduation. The coefficients for the categories of marital status refer to the effect each status has on health relative to being single. The omitted category for economic status is "inactive in the labour force" so the coefficients for the remaining categories refer to the effect of each on health relative to being inactive. The age variables represent the effect of age on health relative to that of being a young male.

Educational attainment is one example of where the distribution of a health determinant strongly influences the determination of IRHI. The attainment of a high school education or a community college diploma each has a positive effect on individual health status (Table 8). As the concentration indices (Table 9) reveal, however, both levels of educational attainment are relatively equally distributed throughout the income distribution– neither is concentrated among high or low-income individuals. Therefore, they make no significant contribution towards IRHI. Attainment of a university education also has a positive effect on health (Table 8), but its distribution is heavily concentrated among high income individuals (Table 9). Consequently, a university education raises IRHI despite its positive association with health.

Like the attainment of a university education, income makes its contribution to IRHI through a combination of two effects. In both Glace Bay and Kings County, income and the health status of individuals display a positive association with one another (Table 8). The distribution of income is also unequal in both communities and favours high-income individuals (Table 9). Together, the product of these two effects means that income makes a strongly positive contribution towards IRHI.

Examination of the concentration indices helps unravel the effects of economic status on IRHI. Employment and health status display a positive association in Glace Bay and Kings County. Employment is also distributed in favour of high income individuals, so the combination of the two effects shows how the presence of employed individuals raises IRHI. Unemployment and health status in Glace Bay display a positive association while in Kings County, unemployment shows no association at all with the health status of individuals. In Kings County, therefore, unemployment is of no real significance in the reduction of IRHI. Unemployment in Glace Bay is concentrated among low-income individuals and the presence of healthier individuals in this group relative to the omitted category (those classified as "inactive" in the labour force) helps reduce IRHI. Although this seems contrary to the finding of many studies that the unemployed generally have poorer health than those who are employed, it must be remembered that the unemployed are being compared to those who are inactive in the labour force (who also have poorer health than those with jobs). Being a student has no significant association with health status in either Glace Bay or Kings County. Finally, Tables 8 and 9 reveal the nature of the effects of retirement on health status. In Glace Bay, retirement and health status display no association, while in Kings County they do.

Sources of IRHI in Newfoundland

Newfoundland 2001

The decomposition of IRHI into its sources by health determinant for Newfoundland in 2001 reveals patterns of significance similar to those found in Glace Bay and Kings County. Table 10 reports the results of the decomposition of IRHI for the province as a whole and within each CHB. Appendix B provides the statistical results necessary to construct all the decompositions that follow.

Age and gender make a small contribution to the determination of IRHI within each CHB and the province as a whole. In sharp contrast, equivalent household income accounts for slightly more than half of the measured inequality with some variation in its importance across the four CHBs. It makes the largest contribution in the St. John's CHB, where it accounts for 60 percent of the IRHI, followed by the Central CHB at 57% and the Western CHB at 51%. Income makes the smallest contribution in the Eastern CHB. There, income accounts for one-third of measured IRHI.

The contribution of educational attainment to IRHI in Newfoundland follows a pattern similar to that observed in Glace Bay and Kings County. Within each CHB and, consequently, the province as a whole, the completion of a high school degree or a non-university post-secondary program does not significantly affect IRHI. The presence of individuals with a university education makes a relatively minor contribution to IRHI in the province as a whole, as it accounts for only 5 percent of total IRHI. The effect varies across the province's CHBs. The largest effect is observed within St. John's, where it accounts for 10 percent of the measured IRHI. In the Eastern and Western CHB the attainment of a university degree makes a contribution that is about half that observed in St. John's. In the Central CHB, it makes no significant contribution.

Marital status makes a mixed contribution to IRHI in Newfoundland. Marriage makes a relatively minor contribution towards the reduction of IRHI in the St. John's and Eastern CHBs, while the effect is negligible in the Central and Western CHBs. For the province as a whole, the effect is slight. Separation or divorce matters little in the determination of IRHI within the province. The presence of widowed individuals in the Central and Western CHBs contributes to a small reduction in IRHI in those parts of the province, with little effect observed elsewhere.

Employment is the only category of economic status observed to make a contribution to IRHI in Newfoundland. The largest contribution from employment occurs in the Eastern CHB, where it accounts for slightly more than one-quarter of measured IRHI. Employment makes the smallest contribution to IRHI in the Central CHB, where it accounts for 7 percent of measured IRHI. In the St. John's CHB, employment accounts for 10 percent of IRHI, in the Western CHB for 17 percent, and in the province as a whole for 14 percent. The remaining categories of economic status make no contribution to IRHI in Newfoundland.

Table 10 Decomposition of IRHI in Newfoundland 2001

	Newfoundland	St. John's CHB	Eastern CHB	Central CHB	Western CHB
Concentration Index	0.019	0.018	0.015	0.019	0.022
Males					
25-34	0.4%	-0.3%	0.7%	1.0%	0.5%
35-44	0.8%	1.3%	2.2%	0.6%	0.5%
45-54	-1.0%	-0.3%	1.2%	-1.8%	-1.3%
55-64	0.0%	-0.7%	1.3%	0.0%	0.4%
65+	-1.3%	-0.7%	-2.7%	-0.7%	-2.3%
Females					
20-24	-0.3%	-0.3%	-1.6%	0.2%	0.0%
25-34	-0.4%	-0.8%	-0.6%	0.1%	-0.4%
35-44	-0.3%	-0.6%	0.2%	-0.3%	-0.5%
45-54	-0.1%	-0.3%	2.6%	-0.3%	0.0%
55-64	-0.5%	-1.4%	-1.5%	0.1%	-0.4%
65+	-3.0%	-7.3%	-7.2%	0.5%	-1.3%
Income	51.3%	59.5%	33.2%	57.2%	50.6%
Educational Attainment					
High School	-0.1%	-0.2%	0.2%	-0.2%	0.0%
Community College	0.1%	-0.5%	0.0%	0.4%	0.7%
University	5.2%	10.5%	5.0%	-0.1%	4.1%
Marital Status					
Married	-2.0%	-4.1%	-6.4%	-1.6%	-0.1%
Separated/Divorced	0.4%	1.9%	-0.2%	-0.9%	2.4%
Widowed	-2.6%	-0.5%	-0.3%	-4.1%	-3.9%
Economic Status					
Employed	14.0%	9.8%	26.7%	6.7%	16.5%
Unemployed	-1.0%	-0.3%	-0.9%	-1.1%	-1.6%
Student	0.0%	-0.4%	-1.0%	0.0%	0.1%
Retired	-0.6%	0.2%	-1.5%	-1.5%	-0.1%
Health Conditions					
Long-term Disability	31.0%	26.3%	33.3%	35.1%	30.0%
Activity Restriction	10.1%	9.3%	17.4%	10.6%	6.2%

The presence of a long-term disability or one or more restrictions on daily activities makes a contribution to IRHI in Newfoundland that is similar to that observed in Glace Bay and Kings County. In Newfoundland, the presence of a disability accounts for one-third of IRHI and this proportion is roughly constant across each of the four CHBs. The largest contribution from a long-term disability is found in the Central CHB, where it accounts for 35 percent of IRHI. The smallest contribution is in the St. John's CHB, where IRHI would be 26 percent less in the absence of an effect from a long-term disability. The presence of one or more restrictions on an individual's daily activities has a similar effect on IRHI in Newfoundland as in Kings County and Glace Bay, making IRHI 10 percent greater than it would otherwise be. The size of the contribution is roughly constant across the four CHBs, with the exception of the Eastern CHB where its presence accounts for 17 percent of the measured IRHI.

To further investigate the nature of the contribution made by selected health determinants or the lack of such a contribution, Tables 11 and 12 report the corresponding regression coefficients and concentration indices for each of the health determinants examined. Income and health status show a positive association in each of Newfoundland's four CHBs and for the island as a whole. The relationship between income and health is essentially the same across the province, with the exception of the Central CHB where the effect of income on health status is smaller than that observed in the other three CHBs. The degree of inequality in equivalent household income is roughly the same across the four CHBs, and so the smaller contribution of income to IRHI in the Central CHB comes from the smaller effect of income on health rather than from any difference in income disparity itself.

The concentration indices in Table 12 reveal that individuals with a high school education tend to be concentrated in low income groups, while those who have achieved a community college diploma are concentrated in high income groups. Table 11, however, shows that these two levels of educational attainment do not appear to influence individual health status and the lack of an association between health status and these two levels of educational attainment means they have no effect on IRHI. While the attainment of a university education is distributed strongly in favour of high income groups across the province, its positive association with health status is evident only in the St. John's region. Therefore, this level of educational attainment only makes a contribution to IRHI in that region.

Table 11 Regression Coefficients for Selected Health Determinants, Newfoundland 2001

	Newfoundland	St. John's CHB	Eastern CHB	Central CHB	Western CHB
Income	**0.020**	**0.023**	**0.024**	**0.011**	**0.022**
High School	0.001	0.001	0.003	0.002	-0.002
Community College	0.000	-0.005	0.002	0.000	0.003
University	**0.011**	**0.016**	0.000	0.01	0.012
Employed	**0.018**	0.014	0.008	**0.029**	**0.026**
Unemployed	0.014	0.005	0.019	0.011	0.023
Student	0.004	0.008	0.001	0.024	-0.007
Retired	0.006	-0.003	0.011	0.013	0.002
Long-term Disability	**-0.133**	**-0.123**	**-0.134**	**-0.121**	**-0.151**
Activity Restriction	**-0.084**	**-0.1**	**-0.085**	**-0.092**	**-0.067**

Note: Coefficients in bold are statistically significant at the 5 percent level.

Table 12 Concentration Indices for Selected Health Determinants, Newfoundland 2001

	Newfoundland	St. John's CHB	Eastern CHB	Central CHB	Western CHB
Income	**0.042**	**0.041**	**0.041**	**0.041**	**0.044**
High School	**-0.048**	**-0.177**	-0.039	0.046	-0.017
Community College	**0.183**	**0.068**	**0.21**	**0.208**	**0.233**
University	**0.495**	**0.358**	**0.481**	**0.575**	**0.55**
Employed	**0.24**	**0.173**	**0.271**	**0.254**	**0.238**
Unemployed	**-0.369**	**-0.491**	**-0.285**	**-0.243**	**-0.516**
Student	**-0.047**	**-0.139**	0.195	**-0.265**	-0.091
Retired	**-0.156**	**-0.131**	**-0.252**	**-0.127**	**-0.118**
Long-term Disability	**-0.304**	**-0.329**	**-0.302**	**-0.283**	**-0.284**
Activity Restriction	**-0.307**	**-0.283**	**-0.279**	**-0.368**	**-0.287**

Note: Concentration indices in bold are statistically significant at the 5 percent level.

The influence of economic status on IRHI is also particular to the CHB involved. While employment at first appears to influence health status in the province as a whole, the regression coefficients in Table 11 indicate that the effect is only present in the Central and Western CHBs. The positive values of the concentration index reveal that employment is concentrated among higher income individuals in Newfoundland, and so raises IRHI in these two CHBs. The net effect of this contribution in these two CHBs is sufficient to show a relationship for the province as a whole. The lack of an association between employment and health status in the Eastern and St. John's CHBs means the variation between employment and health status in the two remaining CHBs is expressed as a relationship for the province as a whole. As the concentration indices for the remaining categories of economic status reveal, the unemployed, students and the retired are all concentrated in lower income groups. These categories, however, do not display a statistically significant relationship with health status. Therefore, they make no contribution to IRHI in Newfoundland.

The finding that unemployment does not affect health status may appear to be surprising given the amount of attention the subject has received in the literature. It must be noted, however, that in this case, the effects of unemployment are being compare to a reference group that consists of those outside the labour force. As a result, the lack of a statistically significant effect for unemployment on health status means that the unemployed are not any more or less healthier than this comparison group. As discussed below, the lack of such a difference combined with the association noted between employment and health status cannot be interpreted as a casual effect. We cannot tell from a single cross-section if it is unemployment that makes people less healthy or if it is a decline in the state of health that leads to unemployment. It can only serve to describe the differences in health status between the various categories.

The presence of a long-term disability and one or more restrictions on daily activities show a negative association with individual health status. The effect of either condition on heath status is roughly the same across the four CHBs, and both are concentrated among low-income individuals.

Newfoundland 1995

From the trends observed, IRHI in Newfoundland appeared to narrow over the first half of the 1990s only to widen over the remainder of the decade. A decomposition of the sources of IRHI in Newfoundland in 1995, which is reported in Table 13, reveals that income made a smaller contribution to IRHI in 1995 than in 2001. In the province as whole, the effect of income accounted for about one-third of total IRHI. Income made its smallest contribution to IRHI in the Eastern CHB, where it accounted for one-fifth of the measured inequality. In St. John's and the Central CHB, IRHI would have been 31 percent less in the absence of an effect from income, while in the Western CHB it would have been 42 percent less.

Employment and the attainment of a university education were also significant contributors to IRHI in 1995, with a university education making a significantly greater contribution in 1995 than in 2001. The presence of a long-term disability or one or more restrictions on daily activities made a marked contribution to IRHI in 1995 as they did in 2001, with contributions similar in magnitude in both datasets. Demographics played a minor role in the determination of IRHI in 1995, as did being a recipient of fisheries compensation benefits. Marital status also made very little contribution to IRHI at the provincial level in 1995 as in 2001.

Table 13 Decomposition of IRHI in Newfoundland 1995

	Newfoundland	St. John's CHB	Eastern CHB	Central CHB	Western CHB
Concentration Index	0.015	0.012	0.015	0.013	0.018
Males					
35-44	-0.2%	0.0%	-0.6%	-0.9%	-0.3%
45-54	-2.1%	-2.2%	-2.6%	-3.4%	-0.7%
55-64	-0.1%	-0.3%	0.1%	0.0%	0.9%
65+	-2.2%	-1.7%	-1.5%	-6.2%	0.1%
Females					
25-34	0.0%	0.0%	0.0%	0.3%	-0.6%
35-44	0.0%	-0.2%	-0.5%	-0.1%	0.2%
45-54	-0.8%	-0.5%	-1.6%	-2.2%	-0.8%
55-64	0.2%	0.0%	-0.5%	0.8%	1.0%
65+	-1.1%	-0.6%	1.4%	-2.7%	-0.3%
Income	28.3%	31.8%	21.2%	31.1%	42.3%
Educational Attainment					
High School	2.9%	-0.4%	4.0%	5.2%	2.5%
Community College	7.9%	2.1%	11.8%	14.1%	5.2%
University	16.1%	19.0%	10.5%	12.5%	10.5%
Marital Status					
Married	-1.2%	-0.8%	2.0%	-4.2%	-3.0%
Separated/Divorced	0.3%	0.1%	0.1%	0.9%	0.4%
Widowed	-1.7%	-1.6%	-5.1%	0.3%	-1.5%
Economic Status					
Employed	14.8%	21.0%	16.6%	4.9%	10.0%
Seasonally Employed	-1.3%	-1.7%	-1.2%	0.0%	-0.3%
Unemployed	-3.3%	-3.2%	-2.3%	-0.8%	-7.2%
Retired	3.6%	0.6%	5.6%	8.9%	2.1%
TAGS					
Fisheries Benefits	0.0%	-0.6%	0.1%	0.4%	-0.8%
Health Conditions					
Long-term Disability	24.1%	25.4%	25.7%	23.9%	24.7%
Activity Restriction	15.8%	13.8%	17.1%	17.1%	15.6%

The contribution made by selected health determinants to IRHI in Newfoundland in 1995 follows the same pattern observed for Newfoundland in 2001. For instance, from Table 14, there is a positive association between income and health for the province as a whole. This positive association coupled with the value of the concentration index for equivalent household income in Table 15 means income makes a positive contribution to IRHI. The sole exception to this contribution made by income in Newfoundland is the Eastern CHB, where the association between income and health status is not statistically significant.

For most CHBs and the province as a whole, higher levels of educational attainment have a positive effect on health. Furthermore, as educational attainment rises, it is increasingly distributed in favour of higher-income individuals. The sole exception is the Eastern CHB, where the attainment of a high school education appears to be more or less evenly spread throughout the population.

The contribution of economic status towards IRHI in 1995 shows a mixed pattern across the province as that observed in 2001. In the St. John's and Eastern CHB, employment displays a positive association with individual health status and the concentration in higher-income individuals increases IRHI. In the Central and Western CHB, employment and health status did not display a statistically significant association with each other and so this category of economic status did make a contribution to IRHI. While seasonal employment appears to raise IRHI in the province as whole, an examination of its contribution across the four CHBs reveals this to be something of a fallacy. The only CHB where seasonal employment and health show a significant association is the Eastern CHB, while the St. John CHB is the only region where the seasonal employment is markedly concentrated amongst lower income individuals. Unemployment is concentrated amongst lower-income individuals right across the province, but only displays an association with health in the Western CHB. Finally, the contribution of retired individuals towards lowering IRHI in Newfoundland appears to come solely from the Central CHB, where retirement and health status show a negative association combined with its contribution in lower income individuals.

As the concentration indices in Table 15 reveal, those who received fishery compensation benefits (TAGS) were concentrated among lower-income groups. The receipt of fisheries benefits, however, did not appear to affect individual health status (Table 14). One reason for this result is that the income variable may capture the benefits of this program for individual health status. Income support was one of the major components of TAGS designed to offset the loss of income individuals would experience. This result then suggests that the income replacement provided under the program protected affected individuals from experiencing any further adverse health consequences associated from the loss of employment through the fishery closure. This result is contrary to what might have been expected given the cultural and community upheaval in rural Newfoundland during the period.

The presence of a long-term disability and one or more restrictions on daily activities show a similar pattern in 1995 as in 2001. Their concentration among low-income individuals and adverse effects on individual health status make IRHI higher than it would otherwise be.

Table 14 Regression Coefficients for Selected Health Determinants, Newfoundland 1995

	Newfoundland	St. John's CHB	Eastern CHB	Central CHB	Western CHB
Income	**0.010**	**0.009**	0.008	**0.011**	**0.018**
High School	**0.023**	**0.012**	**0.027**	**0.031**	**0.017**
Community College	**0.025**	**0.012**	**0.028**	**0.036**	**0.02**
University	**0.036**	**0.025**	**0.04**	**0.037**	**0.03**
Employed	**0.015**	**0.018**	**0.018**	0.005	0.012
Seasonally Employed	**0.014**	0.014	**0.026**	0.001	0.011
Unemployed	**0.013**	0.011	0.01	0.004	**0.027**
Retired	**-0.015**	-0.002	-0.02	**-0.032**	-0.011
Fisheries Benefits	0.000	0.007	-0.001	-0.009	0.01
Long-term Disability	**-0.101**	**-0.101**	**-0.102**	**-0.097**	**-0.105**
Activity Restriction	**-0.131**	**-0.118**	**-0.151**	**-0.124**	**-0.126**

Note: Coefficients in bold are statistically significant at the 5 percent level.

Table 15 Concentration Indices for Selected Health Determinants, Newfoundland 1995

	Newfoundland	St. John's CHB	Eastern CHB	Central CHB	Western CHB
Income	**0.037**	**0.036**	**0.037**	**0.034**	**0.038**
High School	**0.063**	-0.011	**0.078**	**0.087**	**0.093**
Community College	**0.169**	**0.061**	**0.228**	**0.197**	**0.193**
University	**0.579**	**0.426**	**0.58**	**0.653**	**0.692**
Employed	**0.322**	**0.216**	**0.348**	**0.34**	**0.376**
Seasonally Employed	**-0.098**	**-0.192**	-0.044	-0.004	-0.027
Unemployed	**-0.307**	**-0.401**	**-0.228**	**-0.193**	**-0.343**
Retired	**-0.203**	**-0.205**	**-0.214**	**-0.181**	**-0.188**
Fisheries Benefits	**-0.19**	**-0.267**	**-0.115**	-0.057	-0.228
Long-term Disability	**-0.256**	**-0.24**	**-0.237**	**-0.232**	**-0.279**
Activity Restriction	**-0.274**	**-0.252**	**-0.213**	**-0.268**	**-0.327**

Note: Concentration indices in bold are statistically significant at the 5 percent level.

Comparison of the regression coefficients and concentration indices for income between 1995 and 2001 suggests that lower income inequality in 1995 may be the reason behind the smaller contribution of income to IRHI in that year. However, this conclusion may be an artefact of the data. Each survey used a different number of categories to record information on gross household income, and the maximum income recorded in 2001 is considerably higher than that in the 1995 survey. The different categorizations will affect estimates of mean income obtained from the data for 1995 and 2001 for reasons other than an actual change in an individual's gross household income. In turn, these differences will affect the estimated concentration index for income used in the decompositions since the concentration index is sensitive to differences in the mean. Differences in the concentration indices for 1995 and 2001 may therefore be due to differences in the response categories for gross household income, and may not reflect actual changes in the income distribution.

St. John's 1985-2001

The availability of data from four separate surveys covering the St. John's region from 1985 to 2001 permits the examination of whether or not the relative importance of various health determinants in influencing income-related health inequalities has changed over time. The decomposition results reported in Table 16 indicate that income has remained one of the most persistent sources of IRHI, along with the presence of either a long-term disability or one or more restrictions on daily activities. The contribution of income to IRHI also appears to have increased over time. The attainment of a university education was an important contributor to IRHI between 1985 and 1995, though its importance diminished in 2001. Among the different categories of economic status, only employment has made a regular contribution to IRHI over the years. Differences in marital status have never been an important source of IRHI in St. John's. Thus, the evidence suggests that the set of health determinants responsible for IRHI over time has remained roughly constant, along with their relative importance.

Table 16 Decomposition of IRHI in St. John's 1985-2001

	1985	1990	1995	2001
Demographics	0.0%	3.3%	-5.5%	-2.7%
Income	25.1%	40.0%	31.8%	59.9%
Educational Attainment				
High School	2.8%	1.5%	-0.4%	-0.2%
Community College	10.5%	1.1%	2.1%	0.5%
University	30.4%	10.2%	19.0%	10.5%
Marital Status				
Married	1.2%	-2.1%	-0.8%	-4.1%
Separated/Divorced	0.2%	1.5%	0.1%	1.9%
Widowed	-2.0%	-1.2%	-1.6%	-0.5%
Economic Status				
Employed	23.3%	16.3%	21.0%	9.8%
Seasonally Employed			-1.7%	
Unemployed	-2.8%	-2.4%	-3.2%	-0.3%
Student	-3.3%	-0.1%		-0.4%
Retired	-1.1%	-8.5%	0.6%	-0.2%
TAGS				
Fishery Benefits			-0.6%	
Health Conditions				
Long-term Disability	15.8%	28.0%	25.4%	26.3%
Activity Restriction		12.5%	13.8%	9.3%

Further Evidence on the Sources of IRHI

Thus far, exploration of the sources of IRHI in Glace Bay, Kings County, and Newfoundland has relied on a relatively standard set of health determinants used in other empirical studies.[19] There are other variables, however, that are thought to influence health status and that may therefore make a contribution to IRHI. We next explore the role of three variables in addition to those already examined. These are: 1) social support, 2) stress, and 3) financial resources.

Social Support

It has been hypothesized that access to social support makes an important contribution to individual health and well-being (Berkman and Glass, 2000). Social networks and social supports have been shown to strengthen immunity, increase compliance with behaviours that promote health, and enhance adaptation and recovery from disease. Lack of adequate social support may be as great a risk to health as poor diet, lack of physical activity, or smoking (Karch 2000).

[19] In particular, they are largely consistent with the set of variables used by van Doorslaer and Koolman (2004).

According to Health Canada (1999, 60):

> "Families and friends provide needed emotional support in times of stress, and help provide the basic prerequisites of health such as food, housing and clothing. The caring and respect that occur in social networks, as well as the resulting sense of well-being, seem to act as a buffer against social problems. Indeed, some experts in the field believe that the health effect of social relationships may be as important as established risk factors such as smoking and high blood pressure."

It has been argued that social support and social cohesion are stronger influences on cardiovascular disease than individual medical care (Lyons and Langille, 2000). Social relations, and support from family, friends and communities have been shown to contribute positively to health; to reduce the incidence of premature death, depression, mental illness, and chronic disability; to reduce adverse responses to stress; and to improve medical outcomes in high-risk populations (Health Canada, 1999; Lyons and Langille, 2000).

If this hypothesis is true, and if social support is not equally distributed throughout the population when ranked by income, then social support may make a significant contribution to IRHI among a given population. Fortunately, each of the surveys used in this study contains a question on the frequency of social contact with neighbours. This is one form of social support frequently cited as being important to the health of individuals. This allows the construction of a variable to measure social support.

Table 17 summarizes the contribution of social support to IRHI in Glace Bay, Kings County, Newfoundland and the four Newfoundland CHBs, using the frequency of contact with neighbours as a proxy for access to broad social support. In each area under study, social support contributes little to the determination of IRHI. Table 18 reveals that social support does display a positive statistical association with health status in Glace Bay, Kings County, Newfoundland and two of the four CHBs. However, its distribution generally does not favour either low or high-income individuals (Table 19).

Overall, while social support is important for individual health, it does not make a contribution towards socioeconomic inequality in health between individuals. This is because the contribution of any variable to IRHI requires both that it affects health outcomes and that it be unequally distributed among income groups. The fact that low-income groups appear to have as much access to social support as higher-income groups means that social support makes no significant contribution to IRHI.

Table 17 The Contribution of Social Support to IRHI

	Glace Bay	Kings County	Newfoundland	Saint John's CHB	Eastern CHB	Central CHB	Western CHB
Demographics	-7.0%	-13.2%	-5.4%	-11.8%	1.3%	-5.9%	-5.0%
Income	46.2%	51.7%	52.6%	59.4%	59.3%	34.4%	50.3%
Educational Attainment							
High School	-4.8%	0.0%	0.0%	0.1%	-0.1%	0.2%	0.1%
Community College	3.4%	-1.5%	0.1%	-0.5%	0.4%	0.1%	0.6%
University	17.8%	20.1%	5.3%	11.0%	-0.5%	5.0%	4.1%
Marital Status							
Married	-2.1%	3.2%	-2.4%	-4.1%	-2.6%	-6.8%	0.3%
Separated/Divorced	2.5%	-0.4%	0.6%	2.0%	-0.7%	-0.1%	2.4%
Widowed	-1.4%	-0.4%	-2.5%	-0.8%	-4.7%	0.2%	-3.5%
Economic Status							
Employed	21.2%	10.8%	13.1%	8.5%	5.8%	25.8%	15.7%
Unemployed	-5.5%	-2.5%	-1.0%	0.0%	-1.2%	-1.0%	-1.7%
Student	-0.4%	0.4%	0.0%	-0.4%	0.0%	-0.9%	0.2%
Retired	0.3%	3.5%	-0.6%	0.6%	-1.8%	-1.7%	-0.2%
Health Conditions							
Long-term Disability	8.4%	8.1%	31.0%	26.9%	33.6%	33.0%	30.9%
Activity Restriction	22.3%	19.5%	10.0%	9.8%	10.3%	18.2%	5.8%
Social Support	-0.9%	0.4%	-0.6%	-0.6%	0.9%	-0.5%	0.0%

Table 18 Regression Coefficients for Social Support and Income, 2001

	Glace Bay	Kings County	Newfoundland	Saint John's CHB	Eastern CHB	Central CHB	Western CHB
Income	**0.018**	**0.026**	**0.021**	**0.022**	**0.025**	**0.011**	**0.023**
Social Support	**0.020**	**0.014**	**0.018**	**0.017**	0.017	0.017	**0.021**

Note: Coefficients in bold are statistically significant at the 5 percent level.

Table 19 Concentration Indices for Social Support and Income, 2001

	Glace Bay	Kings County	Newfoundland	Saint John's CHB	Eastern CHB	Central CHB	Western CHB
Income	**0.038**	**0.032**	**0.042**	**0.041**	**0.041**	**0.041**	**0.043**
Social Support	-0.009	0.008	**-0.007**	-0.008	0.011	-0.004	0.000

Note: Concentration indices in bold are statistically significant at the 5 percent level.

Stress

Stress is a well-documented pathway through which an individual's environment can have deleterious effects on health (Brunner and Marmot, 1999; Evans, 2002). In a broad review of the literature, the *American Journal of Health Promotion* found stress to be the most costly of all modifiable risk factors (Goetzel, 2001).

If stress does have an effect on health, then an unequal distribution of stress across individuals ranked by income can be a potential contributor to IRHI. Fortunately, the two GPI surveys and the 2001 Newfoundland AHS each contain a question that asks individuals to rate the stress level in their lives. Respondents on the Glace Bay and Kings County surveys were provided with a four point scale, while those on the 2001 Newfoundland AHS were given a five point scale. Table 20 reports the contribution of stress to IRHI for each of these surveys.

Overall, the contribution of stress to IRHI appears negligible, except among very high-stressed individuals in Glace Bay, where IRHI is 10 percent higher than it would otherwise be if stress were not an issue. As Table 21 shows, higher levels of stress have a negative association with health in all three jurisdictions relative to the lowest reported stress level. In fact, all three jurisdictions show a clear and significant gradient in which health status deteriorates as stress increases. Although the direction of causation cannot be firmly established on the basis of the cross-sectional surveys used here, these findings support the interpretation of higher stress levels as an important risk factor for several chronic illnesses.

The concentration indices in Table 22 indicate that higher stress levels for the most part are not concentrated in one end of the income distribution. There are two exceptions. First, lower stress levels in Newfoundland's Western and Central CHB are concentrated in the upper end of the income distribution. Together, they are sufficient to show this lower stress level as concentrated among high income individuals for the province as a whole. Second, reporting of the highest stress levels in the Western CHB and Glace Bay is concentrated among low-income individuals. Thus, in these two latter areas, stress makes a contribution towards increasing IRHI because of its association with lower health status and its unambiguous concentration among lower-income individuals. With respect to the lower stress levels in Newfoundland's Western and Central CHB, their contribution to IRHI is neglible.

Table 20 The Contribution of Stress to IRHI, 2001

	Glace Bay	Kings County	Newfoundland	Saint John's CHB	Eastern CHB	Central CHB	Western CHB
Demographics	-8.1%	-14.5%	-3.4%	-9.9%	3.5%	-2.9%	-2.9%
Income	33.2%	48.5%	47.5%	54.9%	54.7%	29.5%	46.2%
Educational Attainment							
High School	-4.9%	0.0%	0.0%	0.3%	-0.1%	0.0%	0.0%
Community College	3.9%	-1.9%	0.4%	-0.4%	0.6%	1.0%	1.1%
University	18.5%	22.9%	8.0%	13.0%	1.9%	7.7%	6.2%
Marital Status							
Married	0.5%	3.9%	-1.4%	-3.0%	-0.3%	-6.5%	0.3%
Separated/Divorced	1.3%	-0.6%	-0.1%	1.4%	-1.6%	-0.5%	1.6%
Widowed	-0.8%	-0.8%	-2.8%	-0.7%	-4.3%	-0.1%	-4.5%
Economic Status							
Employed	23.3%	12.4%	16.8%	14.0%	7.0%	32.4%	18.0%
Unemployed	-5.8%	-3.4%	-1.1%	-0.6%	-1.0%	-1.0%	-1.9%
Student	-0.5%	0.6%	-0.1%	-0.5%	0.1%	-1.0%	0.1%
Retired	0.3%	3.4%	-0.2%	0.3%	-1.3%	-0.8%	0.3%
Health Conditions							
Long-term Disability	7.8%	8.1%	29.0%	25.0%	32.4%	29.9%	28.7%
Activity Restriction	21.4%	18.3%	9.4%	8.4%	9.7%	16.3%	5.8%
Stress Levels Glace Bay/Kings County							
Not very stressful	-0.9%	-1.9%					
Somewhat stressful	0.7%	1.9%					
Very Stressful	10.1%	3.1%					
Stress Levels Newfoundland							
Not very stressful			-0.7%	-0.1%	-0.2%	-1.3%	-2.1%
A bit stressful			-0.5%	-2.6%	-1.5%	2.1%	1.1%
Quite stressful			-1.9%	-0.2%	-0.8%	-3.9%	-1.8%
Extremely Stressful			1.1%	0.6%	1.0%	-1.0%	3.8%

Table 21 Regression Coefficients for Stress and Other Select Health Determinants, 2001

	Glace Bay	Kings County	Newfoundland	Saint John's CHB	Eastern CHB	Central CHB	Western CHB
Income	**0.013**	**0.024**	**0.019**	**0.021**	**0.023**	**0.010**	**0.020**
Stress Levels Glace Bay/Kings County							
Not very stressful	**-0.030**	**-0.029**					
Somewhat stressful	**-0.045**	**-0.051**					
Very Stressful	**-0.095**	**-0.085**					
Stress Levels Newfoundland							
Not very stressful			**-0.017**	-0.013	-0.011	**-0.014**	**-0.027**
A bit stressful			**-0.038**	**-0.033**	**-0.036**	**-0.038**	**-0.044**
Quite stressful			**-0.064**	**-0.045**	**-0.059**	**-0.080**	**-0.074**
Extremely Stressful			**-0.105**	**-0.089**	**-0.114**	**-0.108**	**-0.112**

Note: Coefficients in bold are statistically significant at the 5 percent level.

Table 22 Concentration Indices for Stress and Other Select Health Determinants, 2001

	Glace Bay	Kings County	Newfoundland	Saint John's CHB	Eastern CHB	Central CHB	Western CHB
Income	**0.038**	**0.032**	**0.042**	**0.041**	**0.041**	**0.041**	**0.044**
Stress Levels Glace Bay/Kings County							
Not very stressful	0.012	0.031					
Somewhat stressful	-0.005	-0.013					
Very Stressful	**-0.225**	-0.087					
Stress Levels - Newfoundland							
Not very stressful			**0.029**	0.003	0.013	**0.048**	**0.059**
A bit stressful			0.005	0.027	0.015	-0.017	-0.010
Quite stressful			0.038	0.004	0.020	0.049	0.037
Extremely Stressful			-0.061	-0.031	-0.054	0.047	**-0.259**

Note: Concentration indices in bold are statistically significant at the 5 percent level.

Although these results indicate that, overall, stress does not make a consistent contribution to IRHI in the areas under study, this does not negate the evidence that stress is a serious health problem. Rather, what the results indicate is that stress is a more pervasive problem that affects individuals regardless of where they stand in the income distribution. Different people experience different levels of stress under a wide range of conditions and circumstances, which in turn contributes to inequality in health status between individuals. The evidence here, however, indicates that these differences are not systematically related to their socioeconomic status.

Financial Circumstances

In the two Nova Scotian communities and across Newfoundland, income repeatedly emerges as the single most important contributor to IRHI. Equivalent household income, however, is an incomplete measure of the total resources that household members may have at their disposal. Household income may also fluctuate from year to year as individuals within a household change jobs, leave the labour force, become unemployed, or re-enter the labour force after a period of inactivity. Current income, therefore, may be an inadequate measure of the income a household expects to earn over time. A better measure of financial resources for the purposes of a health determinants model would include assessments of individual or household wealth. Unexpected events, like a sudden illness, death or disability of a spouse, or job loss, may leave a family dependent on accumulated assets that represent the household's wealth. So a broader measure of financial resources, which goes beyond current income, is often regarded as more appropriate to a health determinants framework.

Fortunately, the 2001 AHS in Newfoundland contains a set of questions that asks individuals about their household's financial situation. One question, in particular, asked individuals to rate their financial circumstances based on their monthly income and expenditures using one of five categories: 1) very good, 2) good, 3) satisfactory, 4) just getting by, or 5) can't cope. Although the question does not reveal financial information in monetary terms, its ordinal nature indicates the relative financial strength of the household and its ability to command resources to meet necessary expenditures. This variable also has the feature that, unlike the gross measure of household income from which equivalent household income is constructed, it implicitly takes into account the taxes that a household pays and the transfers and other income it receives, and so represents a measure of net, or disposable, income. Thus, reference to the household's expenditures in the question aids in the capture of information about all the financial resources to which a household may have access and implicitly includes savings that may be drawn on to meet extraordinary or one-time expenditures. In this way, the question indirectly asks about the wealth of the individual.

Table 23 summarizes the contribution made by financial circumstances, as assessed by the AHS question above, to IRHI in Newfoundland in 2001. Looking at the results in general, the category of "just getting by" makes the largest contribution to IRHI in Newfoundland and in each of the four CHBs examined. Tables 24 and 25 report the regression coefficients and the concentration indices, respectively, for equivalent household income and the various categories of financial circumstance. Table 24 shows the negative statistical association between individual health status and those who perceive their financial circumstances as "just getting by." As the

concentration index in Table 25 shows, this category of financial circumstances – the perception of "just getting by" – is concentrated among low-income individuals. Together, the effects of this situation of financial circumstance serve to make a substantial contribution towards IRHI in Newfoundland.

Table 23 The Contribution of Financial Circumstances to IRHI, Newfoundland, 2001

	Newfoundland	St. John's CHB	Eastern CHB	Central CHB	Western CHB
Concentration Index	0.019	0.019	0.015	0.020	0.022
Demographics	-3.9%	-8.4%	-4.0%	0.8%	-2.8%
Income	24.4%	28.9%	0.2%	28.0%	30.7%
Educational Attainment					
High School	-0.1%	0.3%	0.3%	-0.2%	0.0%
Community College	0.6%	-0.3%	1.1%	1.6%	0.9%
University	6.4%	9.8%	6.5%	1.8%	5.3%
Marital Status					
Married	-1.8%	-4.4%	-5.1%	-1.3%	0.2%
Separated/Divorced	-0.1%	1.0%	-0.5%	-1.4%	1.7%
Widowed	-3.0%	-0.5%	-1.8%	-4.0%	-4.6%
Economic Status					
Employed	13.2%	9.3%	26.0%	4.7%	15.9%
Unemployed	-1.1%	-0.3%	-0.9%	-1.6%	-1.4%
Student	0.0%	-0.2%	-0.8%	0.1%	0.0%
Retired	-0.4%	0.5%	-1.3%	-1.3%	0.0%
Health Conditions					
Long-term Disability	30.1%	25.1%	32.4%	33.6%	29.2%
Activity Restriction	10.3%	8.7%	18.1%	10.9%	6.7%
Financial Situation					
Good	-4.1%	-5.6%	-5.6%	-5.3%	-0.1%
Satisfactory	-0.9%	2.4%	-3.0%	-1.1%	-0.7%
Getting By	23.1%	27.0%	32.6%	25.5%	11.0%
Cannot Cope	7.4%	6.6%	5.8%	9.1%	7.8%

Table 24 Regression Coefficients for Income and Financial Circumstances, Newfoundland, 2001

	Newfoundland	St. John's CHB	Eastern CHB	Central CHB	Western CHB
Income	**0.01**	**0.012**	**0.012**	**0.000**	**0.014**
Financial Situation					
Good	**-0.012**	**-0.016**	**-0.014**	**-0.014**	0.000
Satisfactory	**-0.024**	**-0.028**	**-0.03**	**-0.027**	-0.011
Getting By	**-0.037**	**-0.042**	**-0.042**	**-0.043**	-0.019
Cannot Cope	**-0.104**	**-0.109**	**-0.141**	**-0.071**	**-0.095**

Note: Coefficients in bold are statistically significant at the 5 percent level.

Table 25 Concentration Indices for Income and Financial Circumstances, Newfoundland, 2001

	Newfoundland	St. John's CHB	Eastern CHB	Central CHB	Western CHB
Income	**0.042**	**0.041**	**0.041**	**0.041**	**0.044**
Financial Situation					
Good	**0.248**	**0.213**	**0.285**	**0.223**	**0.26**
Satisfactory	0.021	**-0.047**	0.02	**0.048**	0.042
Getting By	**-0.392**	**-0.466**	**-0.363**	**-0.4**	**-0.35**
Cannot Cope	**-0.661**	**-0.641**	**-0.655**	**-0.598**	**-0.697**

Note: Concentration indices in bold are statistically significant at the 5 percent level.

In Newfoundland and each CHB, the inclusion of a more accurate measure of a household's financial resources serves to reduce the contribution of current income. This result likely indicates that current income previously functioned as a proxy for wealth – it was highly correlated with wealth, but the not perfectly so. In effect, the addition of the indicator variables for the household's financial situation replaces the function that current income previously performed. As a result, income's contribution or ability to explain the variation in health status across individuals is reduced.

In the Eastern CHB, where "just getting by" makes the largest contribution to IRHI, IRHI would be one-third less if these financial circumstances had no association with individual health status or were equally distributed throughout the income distribution. The contribution of these financial circumstances to IRHI is only slightly smaller in St. John's and the Central CHB, where IRHI would be about one-quarter less in the absence of this level of financial insecurity. In Newfoundland as a whole, the presence of households that are "just getting by" also serves to increase IRHI by about the same amount as current income. The size of the effect on the population, however, is small because only a very small proportion of the individuals in the sample fall into this category.

Where a household's financial circumstances are satisfactory, little or no contribution to IRHI is made. The presence of households for which financial circumstances are good makes a small contribution towards the reduction of IRHI in Newfoundland, except in the Western CHB, where the contribution is insignificant. For the province as a whole, the category of "good" financial circumstances contributes to a 4 percent reduction in IRHI because these individuals are concentrated in the higher-income groups, and the situation displays a negative association with individual health status (recall that these variables measure the effect of increasingly worse financial circumstances on the health status relative to the category of "very good"). Current income still makes a contribution to IRHI, but it is smaller than before. The implication of this result is that while current income and its distribution matters in the determination of IRHI, other aspects of a household's financial situation also make a contribution to health and IRHI. To the extent that poor financial circumstances represent a cumulative effect of one or more adverse shocks to a household's annual income, it points towards the importance of material conditions in the determination of one's health status.

In sum, the pattern of regression coefficients and concentration indices show that worsening financial circumstances have an increasingly negative effect on individual health status and as circumstances worsen, it becomes increasingly concentrated in low income individuals. The nature of the contribution made by other variables to IRHI appears to be largely unaffected by the inclusion of the financial circumstances variable. The exception is current income. Its contribution is reduced when a broader measure of financial circumstances is added to the analysis. This pattern, therefore, points towards the importance of both current income and broader financial circumstances as key determinants of individual health status and the inequality in their distribution.

Limitations of the Analysis

The main limitation of this study concerns the issue of causality between the health determinants used to measure and decompose IRHI and individual health status. For example, we know that low income is highly correlated with poor health. But does low income lead to poor health status (due to stress and/or inadequate financial resources to purchase the requisites of good health) or is it poor health that leads to low income (through restrictions on income-earning capacity, for example)? Does employment lead to better health or does selection mean that only those who are healthy are employed? The decomposition of IRHI assumes that the direction of causality runs from the variables that reflect the different determinants of health to the health status of individuals, and not vice-versa. In reality, however, studies that use cross-sectional data are limited in their ability to assign causality definitively between two variables. This study is no exception, and the assumption that differences in income, economic status, educational attainment, and marital status cause differences in health status should be qualified by recognition of the fact that it is possible for the direction of causality to run in the opposite direction.

On the whole, the balance of evidence on the direction of causation for two of the important determinants, income and education, do not indicate the presence of reverse causality. Studies by Wolfson *et al.* (1993), Badley *et al.* (2000), Tremblay, Ross and Berthelot (2002), McLeod *et al.* (2003), and Buckley *et al.* (2004) in a Canadian setting indicate that changes in income do lead to changes in health status and that low income is a cause of poor health. In a study using data from the United States, Ettner (1996) provides further confirmation of the relationship between income and health, and provided evidence that cross-sectional data may actually underestimate the size of the effect that income has on health. With respect to education, there is a paucity of Canadian studies on the subject. A series of studies from the US, briefly reviewed in Grossman (2004), each used a "natural experiment" to sort out the direction of causality between education and health. The evidence clearly indicated that the direction of causation ran from the former to the latter. One study in a Canadian context, Buckley *et al*. (2004) concludes that education does indeed have substantial effects on the probability of remaining in good health. They also provide evidence that changes in marital status precede rather than follow changes in health status, at least for men. Wolfson *et al*. (1993) also came to the same conclusion.

The evidence surrounding the direction of causality between economic status and health is less conclusive, particularly as it concerns the relationships between unemployment, employment and health. Evidence from a number of studies cited in Kasl and Jones (2000) concludes that the

direction of causation between unemployment and health runs in both directions. Stewart (2001) presents evidence using Canadian data that the relationship between unemployment and health is the result of selection, whereby those who are in poor health run a greater risk of unemployment and, once unemployed, experience longer unemployment spells than those in better health. On the other hand, Bartley and Montgomery (1999) argue that the evidence indicates the direction of causality runs primarily from unemployment to health, although the longer term health consequences of unemployment are consistent with selection. The health effects of unemployment appear dependent to a considerable degree on the age and position of the individual in his or her life course and on employment history.

Similar evidence exists for the health effects of employment. Employment can have a beneficial effect on health through the income and the social interactions it provides. It can also have a harmful effect on health if demands are high and the control over one's work is low, or if the reward to effort ratio is low (Marmot *et al*., 1999). As well, Statistics Canada studies have demonstrated that shift work and moving to longer work hours are associated with poorer health outcomes (Shields, 1999 and 2002). These problems are in addition to the occupational hazards that some forms of work provide. In short, it is difficult to maintain the assumption that employment leads to positive health outcomes.

The issues of the direction of causality between economic status and health, and of the types of employment that are positively associated with good health and those that are not, cannot be resolved with the data in the present study. The data and methods in this study can be very useful in decomposing and ranking the health determinants that contribute the most to IRHI, but they cannot resolve issues of causality between the determinants and health outcomes. Only longitudinal data that follow the same cohort of individuals over time can establish the direction of causality. For the purposes of this study, we can only say that the results obtained for the effects of economic status on IRHI are consistent with those of van Doorslaer and Jones (2003) for Canada, and Van Doorslaer and Koolman (2004) for European countries. They are also consistent with a large body of evidence that has found that the health of those who are employed is generally better than the health of those who are not.

4. Policy and Program Implications

The empirical results in the previous section established the existence of socioeconomic inequalities in health in the Atlantic region. Income-related health inequality in Glace Bay and Kings County, Nova Scotia, as well as across Newfoundland was observed to be greater than that in Canada and elsewhere. In addition, there is evidence from Newfoundland that IRHI appears to be increasing over time. The obvious question is, "What can be done to lessen this inequality and thereby improve the health of Atlantic Canadians?" Lifestyle risk factors have long been considered to be modifiable through changes in behaviour, but it is also equally important to recognise that socioeconomic determinants of health are also modifiable, if not more so. Therefore, the key question that emerges from this study is how this evidence can assist policy-makers to take appropriate action.

Knowledge of health inequalities between individuals of different socioeconomic status is not new. Researchers, like Deaton (2002) and Marmot (2002) for instance, are often quick to point out that such health inequalities have long been with us in many different eras and societies. Some of the first modern studies that described a socioeconomic health gradient emerged in 19th century Europe, but references to them go back as far as ancient Greece and China. This lengthy experience with socioeconomic health inequality means that much is known in general about its causes and effects. In recent years, particularly, many studies in several different fields have described the links between socioeconomic status and poor health. However, despite all this attention, the abundance of knowledge it has produced and the policy measures that have been proposed to deal with the problem, the "cure" for socioeconomic health inequalities remains elusive.

In part, this elusiveness is due to the multifaceted nature of socioeconomic health inequalities. Policy-makers, faced with the knowledge that multiple determinants of health factor into the gradient, must chose one or more determinants to target and formulate appropriate measures, or they may choose not to act at all in light of the challenges faced. In the current context, for example, should one target education, income or attempt to target both with the goal of improving population health? Perhaps most importantly, since governments face real budget constraints and have limited resources with which to tackle a multitude of demands, where should resources be directed and where will they be most effective? Would income support programs reduce socioeconomic inequalities in health to a greater degree than education subsidies, for example, or vice versa? Broad knowledge of the causes of socioeconomic inequalities in health may help separate out the relevant determinants from one another, but in terms of policy formulation this general knowledge and the resulting lists of determinants can be something of a curse. As Wagstaff, Paci and Joshi (2001) note, "policy documents can end up looking like laundry lists of policies and programmes."

Table 26 provides evidence to support this criticism. It enumerates and summarizes an array of recommended policy actions for selected health determinants that have been proposed in the Netherlands, Sweden, and the United Kingdom, and that are thought to reduce health inequalities. Table 26 also lists measures advocated by the World Health Organization (WHO).

Common themes emerge across the three countries and the WHO with respect to the proposed measures for each health determinant. Some actions are more general than others and some target certain groups of disadvantaged individuals. Measures to reduce income inequality and poverty dominate recommendations concerning income and health. With respect to education, there is an emphasis on lifelong learning and early childhood education as key factors in reducing socioeconomic-based health inequalities and improving population health. Recommendations for the Netherlands include the encouragement of increased educational attainment among lower socioeconomic groups. Recommendations on employment and health include improving working conditions for low-skilled, labour intensive work, and efforts to find suitable employment for the disabled. The sources for this information (Table 26) did not provide any quantification of the benefits that these policies could be anticipated to provide.

Table 26 Recommended Actions on Reducing Health Inequalities from the United Kingdom, Sweden, The Netherlands, and the WHO

Determinant of Health	Jurisdiction	Recommended or Current Policy Actions	Upstream or Downstream
Income	**United Kingdom**	• Reduce poverty and the incidence of low income through the introduction, for example, of a national minimum wage and the reform of tax credits and welfare payments to redistribute wealth and raise the income of the poorest families.	Upstream
	Sweden	• Secure favourable economic conditions during childhood and adolescence through poverty reduction and compensation for youth in disadvantaged housing areas.	Upstream
	The Netherlands	• Reduce income inequalities through progressive tax and adequate social security policies. • Continue with the development of policies that alleviate poverty through special benefit schemes and assistance for individuals in finding paid employment. • Further develop and implement special benefit schemes for families whose financial situation threatens the health of their children. • Ensure that health care remains accessible to individuals from lower socioeconomic groups.	Upstream Downstream
	World Health Organization	• Reduce economic insecurity and income and housing inequality, which affect health. • Welfare policies that provide not only safety nets but also springboards to offset earlier disadvantages. • Reduce social exclusion through adequate national minimum wages, as well as educational and employment policies. • Redistribute income and wealth to reduce material inequalities and the scale of relative poverty.	Upstream

Table 26 Recommended Actions on Reducing Health Inequalities from the United Kingdom, Sweden, The Netherlands, and the WHO

Determinant of Health	Jurisdiction	Recommended or Current Policy Actions	Upstream or Downstream
Education	**United Kingdom**	• Improve educational opportunities through investment in 'New Deal' programs to assist people with their education and extend opportunities for lifelong learning.	Upstream
	Sweden	• Ensure that the educational system strengthens pupils' self confidence and achievements. • Ensure opportunities exist for life-long learning.	Upstream
	The Netherlands	• Continue with policies that promote the increased educational attainment of children from lower socioeconomic groups. • Continue the development of counselling schemes for school pupils with regular or long-term health related absenteeism.	Upstream Downstream
	World Health Organization	• Introduce pre-school programs not only to improve reading and stimulate cognitive development, but also to reduce behaviour problems in childhood and promote educational attainment, occupational chances, and healthy behaviour in adulthood. • Involve parents in such pre-school programs to reinforce their educational effects and reduce child abuse. • Increase opportunities for educational attainment at all ages, since education is associated with raised health awareness and improved self-care.	Upstream
Employment	**Sweden**	• Develop policies that enhance economic security through the promotion of opportunities for life-long learning, lower unemployment, and preventing discrimination against immigrants or the disabled in the job market. • Adapt the physical/mental demands of work to meet the requirements of the individual, increase the opportunities for development at work, and reduce overtime.	Upstream
	The Netherlands	• Maintain benefit levels for those with a long-term disability and who cannot work, especially those who are totally or partially disabled due to occupational health problems. • Adapt working conditions for chronically ill and disabled people to increase work participation. • Implement health interventions among long-term recipients of social benefits to remove barriers to finding paid employment. • Implement technical and organizational measures to reduce physical workload in manual occupations.	Upstream Downstream

Table 26 Recommended Actions on Reducing Health Inequalities from the United Kingdom, Sweden, The Netherlands, and the WHO

Determinant of Health	Jurisdiction	Recommended or Current Policy Actions	Upstream or Downstream
	World Health Organization	• Improved conditions of work will lead to a healthier work force; this will lead to improved productivity, and to the opportunity to create a still healthier and more productive workplace. • Work that does not provide appropriate rewards in terms of money, self-esteem, and status, damages health. So proper rewards should be provided. • To reduce the burden of musculoskeletal disorders, workplaces must be appropriate ergonomically, as well as in the organization of work. • Government management of the economy to reduce economic highs and lows (and thereby to enhance job security). • Set unemployment benefits at a higher proportion of wages.	Upstream

Sources: For Sweden, Ågren (2003); for the United Kingdom, Oliver and Nutbeam (2003); for the Netherlands, Mackenbach and Stronks (2002); and for the World Health Organization, Wilkinson and Marmot (eds.) (1998).

Contribution and Approach of this Study

The Netherlands, Sweden, and the United Kingdom have all committed themselves to lessening the socioeconomic gradient in health through comprehensive population health strategies. While the policies outlined above represent one possible model for Canada as well as other countries, they can also be daunting for policy-makers with limited budgets and resources seeking to identify which ones can produce the greatest return on investment. The approach used in this study can help address this challenge and go beyond the "laundry list" approach that is often a product of efforts to translate the large body of evidence on socioeconomic-based health inequalities into actual policy measures. The strength of the approach used in this study lies in its ability to identify the size of the contribution made by individual health determinants to IRHI. In this way, the method "unpacks" socioeconomic inequality in health into its constituent parts and informs policy-makers about those determinants that make the largest contribution to IRHI. This, in turn, helps establish priorities for policy formulation. This is not to deny that all the policy actions listed in Table 26 are important and can help reduce socioeconomic health inequality. However, the approach used in this study addresses the practical policy need to address the challenge in some order of priority and sequence.

In broad terms, it is possible to identify three different ways in which policy-makers can intervene to lower IRHI. As previously discussed, the contribution of a health determinant to IRHI is the product of 1) its association with health status, and 2) its concentration in one income group over another. This suggests the first two approaches to interventions that seek to reduce socioeconomic health inequality:

1. Policy makers can seek to alter the effect of a health determinant on the health status of individuals.

2. Policy-makers can seek to equalize the distribution of a health determinant across different socioeconomic groups. With respect to the measure of socioeconomic status used here, which is income, policy-makers can pursue a more equal distribution of a health determinant throughout the income distribution, or between high and low-income individuals.

Some health determinants are dichotomous in nature (*i.e.*, they are either present or not present). These dichotomous determinants are used to distinguish between the various categories of economic status, educational attainment, and marital status. For example, a person is listed as either employed, unemployed, retired, or a student, but will not be listed in more than one of these primary categories. If one of these dichotomous indicator variables (e.g. employment) makes a significant contribution to IRHI, which means that 1) it displays an association with health status and 2) its distribution favours one socioeconomic group over another, then a third basic approach presents itself to policy-makers for the reduction of IRHI:

3. Policy-makers can seek to increase (reduce) the prevalence of certain health determinants that have a positive (negative) effect on an individual's health status.

These three methods through which policy-makers can intervene to reduce IRHI create a basic framework for defining a set of feasible policy measures for a particular health determinant. For example, suppose that there exists a determinant, like "just getting by" financially, that makes a positive contribution to IRHI. If the determinant displays a negative effect on the health status of an individual, policy may not be able to alter it. The pathways through which the health determinant (in this case financial insecurity) acts on health may be unclear, poorly understood, subject to controversy, or the effects may be well beyond the control of the policy-maker to alter. Instead, there may exist the option to lessen the determinant's concentration among lower-income individuals, through income supports for low income individuals, for example, or improved employment insurance benefits for the unemployed, or other programs targeted to groups with a higher prevalence of low income. Another possible avenue for action that may present itself is the reduction of the health determinant's prevalence in the population altogether, like the presence of a disability.

This example demonstrates conceptually how the approach outlined in this study can help identify one possible course of action among several. The reduction of IRHI with respect to some health determinants may require measures designed to address the relationship between a determinant and health status, rather than to change its distribution between different socioeconomic groups. Still other health determinants may require policy measures that focus on their overall prevalence in order to change the degree of IRHI.

The framework used in this study also demonstrates the difference between pure inequality on the one hand, and health inequality related to socioeconomic status on the other. This distinction is important for policy purposes. Pure health inequality exists whenever two individuals differ in health status as a result of differences in educational attainment, economic status, income, age, and gender, among other determinants. By itself, this type of inequality does not translate into IRHI unless it is also accompanied by a concentration of these different socioeconomic determinants in one income group or another, like a university education or employment.

Measures that seek to alter the relationship between a health determinant and health status or to increase or reduce its overall prevalence will affect both pure health inequality and IRHI between individuals. In fact, any measure targeted towards the reduction of pure health inequality will also reduce IRHI, though the converse of this statement is not necessarily true. In theory, IRHI could be reduced without changing the differences in health status between individuals. This could occur when a policy seeks only to alter the distribution of a health determinant between different socioeconomic groups.

To take an example, suppose that the presence of a disability had a negative effect on individual health status and that the incidence of a disability occurs is concentrated in low income individuals. A policy could be designed to improve the incomes of the affected individuals. This would reduce their concentration in low income without addressing the effect that a disability has on health status. Thus, IRHI would be reduced (a flattening of the socioeconomic gradient) but inequality in health status would still remain. If policymakers could instead eliminate the effects of a disability on health status then the raw difference in health status would disappear. The inequality in health status between individuals with and without a disability would disappear. Without this inequality in health status between individuals resulting from the presence of a disability, it could no longer make a contribution to IRHI. A health determinant has to have an effect on individual health status in the first place in order for it to affect the slope of the socioeconomic gradient.

The health determinants model that is used to develop and decompose the health concentration indices in this study directs attention to "upstream" interventions. Upstream interventions seek to affect the root causes of poor health status. This is in contrast to "downstream" policy measures that focus on interventions that seek to change the behaviour of individuals (such as smoking or drinking), which are determined or influenced by the root causes. Although an ambitious and comprehensive approach that focuses on upstream interventions can be daunting for policy-makers, it is arguably more meaningful to address upstream determinants.

To emphasise, the health determinants model used in this study does not include behavioural or lifestyle risk factors like smoking, physical inactivity, unhealthy weights, or poor nutrition. Previous studies have shown these factors to be concentrated in lower-income groups and influenced to a considerable extent by the upstream determinants. Since these downstream factors are not included, the policy interventions considered below do not address lifestyle or behavioural interventions that comprise most health promotion efforts. There is also a practical reason for this omission. There is now sufficient evidence to indicate that the effectiveness of lifestyle interventions rises with education and income, two indicators of socioeconomic status. These interventions, therefore, have had the unintended consequence of helping to increase health inequality between socioeconomic groups (Lyons and Langille, 2000).

In fact, conventional downstream behavioural interventions aimed at healthier lifestyles have proved remarkably ineffective in alleviating the deeper influences of low socioeconomic status on health. Analysts have noted that “health promotion strategies focused purely at individual health behaviours yield limited success.” (Lyons and Langille, 2000, 7). Evidence indicates that those who are marginalized do not attend smoking cessation and nutrition classes, do aerobics, join gymnasiums, or shop for

healthy foods. More specifically, a comprehensive $1.5 million 5-year cardiovascular disease prevention and lifestyle intervention program in St. Henri, a Montreal neighbourhood where 45% of families live below the poverty line, attracted only 2% participation. The only significant result, compared to a control group, was that more people had their blood cholesterol levels measured (Raphael, 2001). Hence, unless upstream factors receive their proper due, efforts to reduce socioeconomic inequality in health will be limited in their effectiveness.

For these conceptual and practical reasons, the approach used in this study to analyze IRHI and identify the relevant policy implications focuses on upstream health determinants. Some of those determinants, like age and marital status, were found in the evidence to make little or no contribution to IRHI and so are omitted from the remaining discussion. The determinants that are examined further here from a policy perspective include income, education, economic status, and health conditions.

Income

Income emerged as one of the most important contributors to IRHI through time and in each location under study. Depending on the location and year, this single health determinant accounted for between one-third and over one-half of the IRHI observed. Income made its contribution to IRHI through both a positive association with individual health status and the inequality observed in its distribution. Any policy measures that focus on the relationship between income and health, on reducing income inequality, or a combination of both could lead to a significant reduction in IRHI.

In reality, there is probably little that policy can do to alter the direct effect of income on health. According to the materialist approach described by Kaplan and Lynch (2000), income affects health "because of what money can buy." Income determines the quantity and quality of goods and services that individuals can purchase and use to invest in their health. This consists of items like healthy food, warm clothing, and adequate shelter, which define the material conditions of health in which the individual lives. Income also provides the ability to participate in physical activities and recreational pursuits that may have a positive influence on health.

Further, as Kaplan and Lynch (2000) note, income has more than just a threshold effect on health, where once a certain amount of money is spent any extra income provides no further benefit. Rather, the evidence indicates that extra income above and beyond what is needed to provide the basic necessities of life appears to benefit one's health, albeit in a diminishing manner. Indeed, this is the relationship found in this study between income and health status in the health determinants model for each Atlantic Canadian location examined. The analysis of financial circumstances in this study, for example, found a clear gradient linking each level of improved financial security with an improved level of health. Thus, it was not only those who "cannot cope" financially that suffered poor health. Rather, those who classified their financial situation as "good" had better health, on average, than those who classified their situation as "satisfactory." Kaplan and Lynch (2000) refer to neomaterial conditions that involve fine gradations within each type of good and service that, in turn, affect health and vary directly with the income available to the individual.

The presence of this gradient in the relationship between health and income draws attention to taxation and transfer measures that seek to improve the incomes of those at the bottom of the income distribution and to redistribute income more equally among the population. To some extent, these measures are already in place. Progressive income tax schemes implemented at the provincial and national level lessen the degree of inequality in after-tax income.[20] In a progressive income tax system, the tax rate an individual pays on additional income earned in the labour market rises with income. Based on the principle of "ability to pay," a progressive income tax system ensures that high-income individuals pay a greater proportion of their income in tax than low-income individuals. Government transfers that target low-income individuals also help to lessen disparities in market income between households. These can include benefits to families with children, benefits for senior citizens, social assistance programs, benefits for the disabled and sick, and minimum wage laws set by governments at the provincial level (Ross, 2003).

How effective are these measures in reducing inequalities in income and health? The Gini coefficient is one way to summarize the degree of income inequality present in an income distribution. The Gini coefficient ranges in value between 0 and 1, where higher values correspond to greater inequality. For Canada as whole in 2001, the Gini coefficient for market income was 0.431 for families of two or more persons.[21] The Gini coefficient for total or gross income, which includes government transfers, was 0.359 and for after-tax income was 0.320 (Statistics Canada, 2003). Similar patterns are observed in Nova Scotia and Newfoundland. In 1999, the Gini coefficient for market income was 0.506 and 0.427 in Newfoundland and Nova Scotia, respectively. For gross income, which includes transfer payments, the respective Gini coefficients were 0.359 and 0.331, and for after-tax income they were 0.311 and 0.294. Thus, redistributive policies in Canada in the form of transfer payments and a relatively progressive taxation system do lessen income inequality (Statistics Canada, 2001).

International comparisons of income inequality, however, suggest more could be done to reduce inequalities in this country. In international terms, the degree of income inequality in Canada tends to fall somewhere between levels in the United States and those in Europe. Picot and Myles (2005) report Gini coefficients for after-tax family income at the end of the 1990s in The Netherlands, Germany, Belgium, Sweden, and Finland as 0.25. Canada's Gini coefficient was 0.29, while the Gini coefficients for Britain and the United States were 0.35 and 0.37 respectively. More recent Statistics Canada estimates for Canada show the Gini coefficient for 2003 at 0.32 – relatively stable since 1997, but up from 0.30 in 1995 (Statistics Canada, 2005).

Against this international backdrop, there is evidence that inequality in family incomes increased in Canada during the 1990s. This increase occurred as the incomes of families at the top of the distribution grew, while those of families at the bottom of the distribution remained stagnant or fell, depending on the source of data examined (Frenette, Green and Picot, 2004).[22] Evidence

[20] After-tax income is defined as income from all sources (or gross income) less taxes.

[21] Statistics Canada defines an economic family as consisting of two or more individuals who are related to each other by blood, marriage, common law, or adoption and live in the same dwelling. Market income consists of all earnings from the labour market and investment sources plus any other income before government transfers and taxes.

[22] In particular, survey data showed that the growth of incomes of individuals at the bottom of the distribution failed to keep pace with those of individuals at the upper end of the distribution during the 1990s. Tax data indicate that incomes earned at the lower end of the income distribution scale in Canada actually fell during the 1990s. Although the two sources lead to a disagreement on how much income inequality rose, both agree income inequality did rise.

from Newfoundland and Nova Scotia shows that these provinces were no exception to this trend. Between 1990 and 1999, the Gini coefficient for after-tax income of families rose from 0.286 to 0.311 in Newfoundland, while in Nova Scotia it increased from 0.278 to 0.294 (Statistics Canada, 2001).

The degree of inequality in the distribution of gross and after-tax income is a direct consequence of existing policies and is subject to further modification. However, for the contribution of income to IRHI to be reduced to zero via this method, complete equality of income would have to be achieved. Unfortunately, this is not a realistic goal since there are clearly practical limits to how much redistribution can occur in a market economy. Aside from the issue of what level of equalization should be the objective, tax evasion and work disincentive effects would thwart any attempts to achieve too much equality. However, the international data above indicate that the degree of income inequality in Europe is less than that in Canada, Nova Scotia and Newfoundland. This suggests that the rise in income inequality observed in this country over the past 10 to 15 years was not inevitable and could have been slowed or reversed through policy changes. As noted above, more redistribution could be achieved through a combination of increased transfers and more progressive marginal tax rates. At the very least, consideration should be given to the health consequences of changes in taxation or transfers that would widen inequality in after-tax income.

The relationship between income and health status draws attention not only to income distribution, but to the circumstances of those with low incomes. As the data on financial circumstances in the previous chapter indicated, there is a clear gradient linking health status to income, with those with the least financial security suffering the worst health outcomes. The situation of low-income groups is, therefore, of particular concern from a population health perspective.

The rate of low income in Canada, like the degree of income inequality, falls somewhere between that of the United States and that of Europe. One international comparison of low-income rates pegged Canada at 11.9 percent compared to the U.S. at 17 percent, The Netherlands at 8.9 percent, Sweden at 6.4 percent and Finland at 5.4 percent (Picot and Myles, 2005).[23] Using Statistics Canada's definition and threshold for low income,[24] the most recent Statistics Canada data show the rate of low income for all persons in Canada at 11.5 percent, compared to 10.7 percent in Nova Scotia and 11.9 percent in Newfoundland and Labrador (Statistics Canada, 2005). As with the inequality data above, it is clear from the European examples that both Canada and the provinces have low-income rates that are considerably higher than in many of their European counterparts. This suggests that there is further room to reduce the incidence of

[23] Following convention when making international comparisons, the state of low income occurs when a family's income is less than one-half the median income of the respective country.

[24] The low-Income cut-off line that Statistics Canada uses to determine the prevalence of low income varies with location and household composition. The line defines low income as a situation where a significantly larger share of income is devoted to the necessities of food, clothing and shelter than what is the case for an average family. In practical terms, this occurs when individuals or families spend slightly more than half their income on these necessities. In 2003, a family of four living in a city with a population of half a million or more would be counted as low income if the after-tax income of all family members fell below the cut-off of $31,277. For the same family living in a rural area, the cut-off was $20,460 (Statistics Canada 2005, 119).

low income in Canada – even to Scandinavian levels, which were achieved while maintaining successful market economies.

In Canada, the combined effects of taxes and transfers reduce the low-income rate for all persons by 50 percent, based on a comparison of income before and after transfers and taxes (Picot and Myles, 2005). This reduction is much greater than that observed in the U.S., where the low-income rate is reduced by only 28 percent as a result of transfers and taxes. But again, the reduction in Canada is considerably less than that observed in European countries. In Germany, taxes and transfers combine to reduce the rate of low income by from 64 to 71 percent, depending on the estimate used. In The Netherlands, the reduction is 59 percent, while in Sweden it is 78 percent. Based on the European examples, it is clear that more could be done in Canada to reduce the rate of low income more markedly than at present through tax and transfer policies. At the very least, policy changes that reduce entitlements and benefits – as occurred in Canada in the 1990s – should be avoided without first considering their potential to have adverse effects on health.

One example of the beneficial health effects that income support measures can have is noted by the effects of the TAGS program in Newfoundland. A primary goal of the program was to prevent a major disruption to the income of individuals and households affected by the closure of the groundfish fishery.[25] Results from the 1995 Adult Health Survey in Newfoundland indicated a reduction in IRHI in Newfoundland between 1990 and 1995, followed by a subsequent increase over the next five years. If the individuals who received TAGS are removed from the data and the analysis rerun, an increase in IRHI is observed, as the health concentration index rises from 0.015 to 0.016 between 1990 and 1995. In other words, it appears from these results that TAGS helped ameliorate the potentially negative health consequences of the decline in fisheries income and reduce IRHI. All too often, the value of transfer payments and income support programs is ignored in this respect, but it is likely that when health effects are included in the equation, many of these programs, like TAGS, are more cost-effective than is currently appreciated.

Permanent reductions in the rate of low income require more than just simple increases in the generosity of social programs. Changes in low-income rates in Canada tend to follow changes in the unemployment rates, and increases in the unemployment rate associated with a downturn in the economy tend primarily to affect low-skilled workers. To reduce the risks of unemployment as a potential precursor to increases in low-income rates requires at least two types of interventions. At the macro level, it requires an appropriate economic policy that consists of fiscal and monetary measures designed to maintain the level of aggregate demand and to reduce fluctuations in output. At the micro level, it requires the encouragement of higher levels of educational attainment on the part of individuals, which leads to better job opportunities and a lower risk of unemployment. The former strategy indicates that macroeconomic policy may have important consequences for the health of individuals – although it is not generally described in those terms. The latter strategy has added appeal because of the independent effect of educational attainment on health. In sum, the results here indicate that both direct strategies to

[25] The TAGS program involved a series of measures of which income support was only one. TAGS also involved training programs, work programs, relocation assistance, and early retirement and license buy-out packages. Income support was a significant, but not the only, component of the program.

improve income supports through transfers and taxation, and indirect strategies like enhancing employment and educational opportunities, which also affect income, can help reduce income-related health inequalities.

Finally, it is important to return to the early findings in this study, as summarized in Figure 5, which indicate that IRHI is greater in Newfoundland, Glace Bay, and Kings County than in Canada as a whole, and considerably greater than in all the European countries examined with the single exception of Portugal. If these results are representative of Atlantic Canada as a whole, then federal government initiatives that target this region may be particularly effective in reducing income-related health inequalities. At a minimum, both the provincial and federal governments should seek to reduce IRHI in Atlantic Canada at least to Canadian levels through effective income support and employment programs.

Education

Education presents an interesting policy conundrum. Most studies in this subject area have found a gradient in the association between educational attainment and health, with each higher level of education producing correspondingly better health outcomes. That conclusion is supported by the evidence in this study. However**,** the evidence in this study also indicates that only the attainment of a university education made a contribution towards the socioeconomic gradient in health reflected by IRHI because of its strong concentration among high-income individuals. The two remaining categories of educational attainment that were examined – the completion of a high school diploma and a non-university post-secondary program – were more evenly distributed throughout the income distribution. Therefore, while these two categories of educational attainment contributed to differences in health status between individuals, they did not contribute to IRHI.

This distinction is important in considering policy options in this field. To understand what policy measures could be implemented to address the effects of educational attainment on health in general and on IRHI in particular, it is first helpful to consider the pathways through which education affects health.

Education has been demonstrated to have a positive influence on the health status of individuals through multiple pathways. The most obvious one is its effect on income, since labour market earnings are closely correlated with educational attainment. In 2000, for example, the median hourly wage for a university graduate was $23 an hour. For someone with a post-secondary certificate, the median hourly wage was $16 an hour. The median hourly wage for a high school graduate was $12.80 an hour, while that for an individual who had not completed high school was $10.50 an hour (Marshall, 2003). Higher wages are not the only economic benefit associated with higher educational attainment. Jobs with high wages are also more likely to have greater non-wage benefits than are low-wage jobs. These non-wage benefits included medical, dental, and life insurance plans, pension plans, and, in some cases, profit sharing and stock option schemes. Almost two-thirds of individuals who had a university education had access to these various insurance plans of one type or another, while only one-third of those who had not completed high school had access to a similar level of benefits. About half of those who had

completed high school or a post-secondary certificate had access to various insurance plans and benefits (Marshall, 2003).

Aside from its income effects, higher educational attainment also influences the health-related behaviour of individuals through cognitive development and the acquisition of skills in two main ways. First, higher educational attainment generally encourages the development of lifestyle practices that are beneficial to health (Statistics Canada, 2000). For example, almost 40 percent of individuals who have not completed high school are current smokers, compared to only 14 percent of those with a university education. Smokers with less than a high school education also have a considerably higher rate of nicotine dependence, defined as having the first cigarette within 5 minutes of waking, than smokers with a university education. Individuals with a university education were more likely to be regular drinkers but less likely to engage in heavy drinking on a frequent basis than those without a high school education. With regard to dietary practices, those with a university education were more likely to demonstrate concern and action about their dietary practices than those without a high school education.

Secondly, educational attainment also affects people's utilization of health care. Education aids in the acquisition and comprehension of information which may influence an individual's decision to seek care and, once sought, this knowledge increases the efficacy of treatment due to closer adherence to medical advice and better knowledge about the nature and management of illness (Hammond, 2003). Individuals with higher educational attainment may also be able to communicate more effectively with health care professionals and to navigate the system once they enter do it (Roos and Mustard, 1997; Hammond, 2003).

Unfortunately, the health survey data utilized in this study do not permit the identification of which of these pathways have the greatest influence on health outcomes in Newfoundland, Kings County, and Glace Bay. The isolation of the particular pathways at work in the current context would certainly help formulate more precise and targeted policy measures. In the absence of that information, however, previous work in the area can still provide several suggestions that would likely help reduce IRHI.

Ultimately, policy interventions that focus on the association between education and health will seek to address the effect of low educational attainment on health, as in the example of the Dutch policy outlined in Table 26. This is because measures to reduce the high-income concentration of a university education are likely to be counterproductive. After all, the concentration of a university education among high-income individuals, which is responsible in large part for its contribution to IRHI, is a direct consequence of the type of jobs that university graduates hold. The high wage and non-wage benefits associated with such jobs are seen, at least in part, as ensuring that individuals are compensated for the investment in human capital that a university education represents.

In the short-run, educational attainment is largely pre-determined among the adult population. This suggests the pursuit of policy measures that target groups of individuals with low educational attainment rather than reducing the concentration of a university education among those with higher incomes to produce the greatest gains in reducing IRHI. Nova Scotia already has some policies in place designed to improve the educational attainment of certain groups. For

example, Operation Educate is a program presently operating in Kings County that provides free training in literacy, computer, and life skills; personal development; and job hunting skills to single parent families and persons with disabilities. The Youth Out of School initiative focuses on increasing the number of youth who complete their high school education (Nova Scotia Department of Health, 2003). The Nova Scotia Department of Education also sponsors the Community Learning Initiative that supports adult education through adult learning centers and the Cape Breton Literacy Network that provides free upgrading classes to adults 19 and older in the Cape Breton Regional Municipality who have been out of school for at least a year.

Nova Scotia's Office of Health Promotion, which was established in 2002, has awareness and education programs that target physical activity, healthy eating, tobacco control, and addiction prevention. As noted above, however, greater care is required by governments at all levels to tailor the content of such health promotion efforts to those of low socioeconomic status, as experience indicates that uptake on these subjects is usually greatest among those of higher status.

In the longer run, economic forces are themselves encouraging the development of policies that promote higher educational attainment, since technological change over the past two decades has led to the emergence of a knowledge-based economy with occupations that require increasingly higher skill levels. This increase in the skill content of work has led to a change in the composition of labour demand, where firms frequently substitute workers with a higher level of educational attainment for those with less education. The effects of the substitution process are at work in both Newfoundland and Nova Scotia, where the average years of schooling rose from 12.5 to 13.2 years between 1991 and 2001.[26]

Economic forces alone, however, cannot ensure that the benefits of this education-related job substitution are equally spread. Individuals from families of low or modest incomes are less likely to attend university than those from high-income families (Drolet, 2005). Family background is also an important determinant in the decision to participate in post-secondary education. Children who have parents with high levels of educational attainment are more likely to attend university than those from families where the educational attainment of the parents is low (Corak, Lipps and Zhao, 2003; Finnie, Laporte and Lascelles, 2004; Drolet, 2005). While the influence of family background on the decision to pursue post-secondary education is difficult to address from a policy perspective, since family background is pre-determined in the short-run, the effect of income on university education is more amenable to effective policy intervention.

The lower levels of university participation by students of low and modest incomes suggest the significance of financial barriers that may impede access to post-secondary education. Indeed, the Youth in Transition Survey conducted by Statistics Canada in 2000 found that 46 percent of those aged between 18 and 20 years of age faced barriers to the pursuit of post-secondary education. Almost two-thirds of this group reported facing a financial barrier. Other barriers came a distant second. Indeed, Coelli's (2004) study of post-secondary education participation rates during the 1990s found that tuition increases adversely affected university attendance by those from low-income families. Given that the average cost of university tuition alone almost

[26] These figures are from the author's own calculations using data from Statistics Canada's Labour Force Survey.

doubled in real terms over the 1990s, this finding is not surprising (Corak, Lipps and Zhao, 2003). Relevant policy measures, therefore, should focus on assisting students with the costs of post-secondary education, through either increased funding of post-secondary institutions that would reduce tuition fees or increased financial assistance to students with limited financial means, or a combination of both. Such measures probably hold the greatest promise of reducing IRHI through education-related interventions over the long run, by improving access to higher levels of educational attainment (and thereby to better health opportunities) for those currently excluded from post-secondary education for financial reasons.

Economic Status

The various categories of economic status differed in their contribution to IRHI in each area under study. Employment was the only category of economic status that made a consistent contribution to IRHI across the various surveys in all three regions studied. Its contribution came from the positive association between employment and individual health status combined with the concentration of employment among higher-income individuals. In Glace Bay, unemployment made a minor contribution to the reduction of IRHI through its positive association with individual health status (relative to those not in the labour force) and its concentration among lower-income individuals.[27] In Kings County and Newfoundland, unemployment and health status showed the same positive association (relative to those not in the labour force) and a concentration of unemployment among lower-income individuals, but did not make a significant contribution to IRHI. The remaining categories of economic status – students and retired individuals – made little contribution to IRHI.

In order to understand the implications for policy that follow from these results, the nature of the association between the different categories of economic status and individual health status must first be explained. The estimated association between employment and health status measures the effect of employment on health relative to the omitted category of economic status, which is comprised of individuals who are not active in the labour force. This category includes all individuals who are outside the labour force, like homemakers and those not actively looking for work, and who are neither students nor retired. The effect of employment, therefore, measures the health status of those with jobs relative to the health status of those who are inactive in the labour force. The positive association between health status and employment means that employed individuals are healthier, on average, than those who are not in the labour force.

A similar interpretation holds with respect to the observed effect of unemployment on health. The positive association between health and unemployment found here reflects the better health status of those who are unemployed relative to those who are not active in the labour force. This makes sense, as some of those not seeking work are likely to be excluded from the labour force for health reasons. A person is only classified as unemployed if he or she is actively seeking work, which assumes they have sufficient health to hold down a job. Also, those classified as unemployed are more likely to have been recently employed than those classified as not active in the labour force.

[27] As noted in the following paragraph, this positive association between unemployment and health is in relation to those not seeking work, not in relation to those with jobs.

The association of employment with health goes beyond its provision of income, the importance of which has already been discussed. Employment possesses other aspects that may also have a significant effect on health. Kasl and Jones (2000) provide a concise summary of Jahoda's (1992) description of the latent functions employment provides. Employment imposes structure on one's day, provides contact with others and a foundation for shared experiences, provides goals that transcend one's own, defines personal status and identity, and enforces activity (Kasl and Jones, 2000, 118). Unemployment, therefore, occasions the loss of not just income, but of these latent and very important functions. In turn, this loss can produce an adverse effect on health, but it should be noted that in some cases loss of a job may produce a beneficial effect if it removes the individual from a hazardous work environment. These hazards may include a direct threat to physical well-being from the nature of the work itself and/or the stress associated with a job where the reward to effort ratio is low, or where there is little control over one's work (Marmot *et al*., 1999).

Although these are plausible mechanisms through which employment and unemployment may have both positive and negative effects on health, the cross-sectional nature of the data used in this study makes it impossible to identify the direction of causality between the different categories of economic status on the one hand and health on the other. The observed effects of employment on health relative to those who are not in the labour force may represent a genuine causal relationship, in which case employment leads to better health status. It may also reflect reverse causality or selection, whereby the category of employed individuals is composed of only those who are healthy – or at least healthy enough to hold down a job. Studies report evidence supporting both possible directions of causality and this uncertainty about the nature of the relationships between economic status and health makes it difficult to identify the policy implications of the findings on that subject in this study. Instead, to identify appropriate policy interventions that have the potential to reduce IRHI, we must look to the fact that employment is concentrated among high-income individuals.

Just as employment is concentrated among higher-income individuals, so those who are not employed are concentrated in the lower-income groups. The evidence in this study indicates that improvements in the income levels of those who are not employed, relative to those who are employed, would generally aid in the reduction of IRHI. Health differences would still remain between those who are employed and those who are not, but the correlation of these differences with socioeconomic status would be diminished. Those who are not employed, however, comprise four distinct groups – the unemployed, students, retired individuals, and those who are not in the labour force. Low income is likely to be a transitory event for students. Retirement presents a mixed picture: in Glace Bay and Kings County, those who are retired and between the ages of 20 and 65 tend to be somewhat more concentrated among upper-income groups, while in Newfoundland they are somewhat more concentrated among lower-income groups. Excluding these two groups, it is evident that policies designed to improve the financial circumstances of the unemployed and those not in the labour force, both of whom are concentrated among low-income individuals, will reduce IRHI.

Table 27 shows the discrepancy in average equivalent household income between the categories of employed, unemployed and inactive (not in the labour force) for Glace Bay, Kings County, and Newfoundland in 2001. For those who are inactive in Glace Bay, average equivalent

household income is almost $13,000 less than for those who are employed. In Kings County, the difference is smaller, but still sizeable at approximately $9,000. Average equivalent household income in Newfoundland for those who are inactive is more than $12,000 less than for those who are employed. In Glace Bay and Kings County, the average incomes of the unemployed are about two-thirds of those of the employed; in Newfoundland they are only about one-half the incomes of the employed. Unfortunately, it is not possible from the data in any of the surveys to discern the contribution made by others in the household to family income or income received from other sources, so it is possible that several of those who are not in the labour force are living quite comfortably. Nonetheless, the discrepancy in average incomes between those who are employed and those who are not suggests that an increase in transfers to the unemployed and those not in the labour force will increase their incomes and, thus, reduce IRHI.

Table 27 Average Equivalent Household Income by Economic Status

Economic Status	Glace Bay	Kings County	Newfoundland 2001
Employed	$31,479	$35,984	$28,883
Unemployed	$21,589	$21,771	$14,565
Inactive	$18,517	$26,582	$16,183

Source: Glace Bay and Kings County GPI Community Surveys, 2001 Newfoundland Adult Health Survey, and author's calculations.

As Osberg (2000) and Picot, Morissette and Myles (2003) have detailed, this is precisely the opposite of what occurred during the 1990s. The federal government's Employment Insurance (EI) program is intended to protect against the disruptive consequences of job loss. Over the course of the 1990s, however, the replacement rate was lowered and eligibility requirements tightened over concerns about fiscal balance and the possible disincentive effects that higher replacement rates could have on the search for work. Consequently, the percentage of the unemployed eligible for EI dropped by half during the 1990s. Cuts to social assistance programs also occurred in many provinces in response to the same pressures. As a consequence of these cuts, the low-income gap, which is the difference between the average income of those below the low-income cut-off line and the cut-off line, did not resume its pre-recession levels of the 1980s even with the robust growth of the late 1990s (Picot and Myles, 2005). In fact, the gap increased considerably with the recession of the 1990s and has remained roughly constant since. The average income gap was $7,100 in 1995, rose to a peak of $7,600 in 1998, and fell back to $7,000 in 2003 (Statistics Canada, 2005). The increase in the low-income gap that occurred in the early 1990s has potentially adverse consequences for the health of those who are in a low-income situation compared to those who are employed. Measures to address and reduce this low-income gap would also help reduce IRHI.

These results have an important aspect to them. The evidence from Glace Bay, Kings County, and Newfoundland indicates that the state of unemployment *per se* may have considerably less influence on the determination of health status and IRHI compared to the loss of income it occasions. If that is the case, then improving income supports for the unemployed will help flatten the socioeconomic gradient in health. The drastic cuts to EI eligibility in the 1990s may have served to increase the gradient. From this perspective, improvements in EI eligibility and benefits may be one of the most practical steps that the federal government could take to mitigate the effects of economic status on IRHI.

In this way, the advantages of the methodology employed in this study are evident. The evidence enables us to go beyond the simple reporting of the correlations between socioeconomic status and health that characterize much of the prior research on the gradient. It allows policy-makers to prioritize which social and economic factors make the largest contribution to the gradient and, thereby, prescribe the actions most likely to reduce disparities and improve health. It also enables policy-makers to identify with greater accuracy than before the specific actions that can be taken to reduce socioeconomic inequality in health and improve population health.

Health Conditions

The presence of a long-term disability or one or more restrictions on daily activities helped raise IRHI in each of the areas under study. In the case of Glace Bay and Kings County, the presence of an activity restriction made the larger contribution to IRHI, while in Newfoundland disabilities contributed more to IRHI. The contribution of each health condition to IRHI was realized through the negative effect each one had on individual health status and their concentration among low-income individuals. In other words, people with disabilities and activity restrictions have lower health status and are more likely to experience low income than those without such disadvantages. The association between disabilities and activity restrictions on the one hand and poor health on the other is not surprising, but it is reasonable to question the inevitability of their association with low income. In addition, the evidence showed that the contribution made by these two health conditions to IRHI has persisted over time in Newfoundland. Therefore, efforts to reduce this effect would go a long way towards eliminating a persistent source of IRHI.

The concentration of individuals who reported either of these two health conditions among lower income groups is associated with the fact that a large proportion of them report their economic status as outside the labour force. The balance of evidence, therefore, appears to indicate that these disabilities and activity restrictions are impediments to employment. The 2001 Newfoundland AHS found that two-thirds of individuals who reported either condition were not in the labour force. The proportion was smaller for Kings County and Glace Bay owing to differences in the definitions of economic status and the two health conditions across the surveys. In Glace Bay, one-quarter of individuals who reported either condition were not in the labour force, while in Kings County one-fifth of those individuals were not in the labour force. The effect of these health conditions on income was particularly stark in Newfoundland, where average gross equivalent household income for those with either health condition was approximately $9,000 less than the average income of individuals without disabilities or activity restrictions. In Glace Bay and Kings County, the differential was much less marked, but still present.

In spite of the differences in definition and between the surveys, the source of the disabilities and activity restrictions was consistent across all the surveys and in each of the three locations. The presence of one or more chronic conditions was reported by virtually everyone who indicated they either had a long-term disability and/or one or more restrictions on daily activities. This indicates that a reduction in the prevalence of chronic diseases in the population would be one of the most effective means to reduce IRHI. Once an individual suffers from a chronic disease that

leads to either of these two health conditions, their effects on health status may prove difficult to alter. Once again, unfortunately, the cross-sectional nature of the datasets under study here prevent a definitive statement about whether low socioeconomic status is more likely to lead to the development of a chronic condition, or whether the direction of causality is the opposite – that those with chronic diseases are more likely to be poor because they have lost their earning power. Nonetheless, the results here still suffice to show that the prevalence of chronic conditions makes a significant contribution to the socioeconomic gradient in health and underline the importance of efforts to reduce their prevalence.

Regardless of the direction of causality, the contribution of disabilities and activity restrictions to IRHI can also be reduced by at least partially severing the nexus between these health conditions and low income. Thus, more adequate income supports for the disabled and those with activity restrictions would reduce the heavy concentration of those with these health conditions in low-income groups, and thus reduce IRHI. In sum, IRHI in these cases can be reduced either by reducing the prevalence of the chronic diseases that cause the disabilities and health conditions and/or by improving income supports for those with these conditions.

Summary of Policy Implications

This discussion about the policy implications of the research in this study has focused on the set of health determinants found to make the most significant contributions to IRHI in each area under study. These same determinants – income, education, economic status, and health conditions – were also found to persist over time in terms of their contribution to IRHI. The analytical framework presented here indicates three ways in which policy can intervene to reduce IRHI: 1) addressing the direct effect that a determinant has on health status; 2) seeking to alter the concentration of a variable's distribution across different socioeconomic groups; and/or 3) addressing the prevalence of a determinant within the population. The policy implications in relation to each health determinant involved particular combinations of these three approaches, since not every determinant could be addressed through each one of them.

Measures that would potentially reduce the degree of income inequality and the incidence of low income through adjustments to the taxation and transfer systems were identified as viable ways to reduce IRHI. It was shown that the effects of education on health and the particular contribution of education to IRHI could be addressed in the short-term by health education programs targeted towards individuals of low educational attainment. In the longer term, measures to encourage increased access to post-secondary education, particularly for those with lower incomes, were shown to be capable of reducing the contribution of educational inequalities to IRHI.

Measures to address the effects of economic status on IRHI were seen to overlap with measures designed to reduce the incidence of low income. In particular, it was noted that the contribution of employment to IRHI is due, in large part, to its concentration among higher income individuals. This indicates the need for policies that more effectively supplement the incomes of those who are unemployed or not in the labour force – contrary to the trends of the 1990s that saw considerable tightening in the eligibility criteria for EI and social assistance programs and cuts to benefit levels. A degree of caution must be exercised with respect to these implications

since direction of causality between economic status and health cannot be established with a sufficient degree of reliability. Even in the absence of such knowledge, efforts to raise their incomes will lessen IRHI since the incidence of unemployment is concentrated among low income individuals.

Unlike policy interventions to reduce the impact of income, education, and economic status on IRHI, the presence of long-term disabilities or activity restrictions calls for further efforts to reduce the prevalence of these conditions. In turn, this requires measures that can more effectively reduce the prevalence of the underlying chronic conditions that produce the disabilities and activity restrictions. And in common with the policy interventions described above, the evidence also points to the need to provide income supports for those with disabilities and activity restrictions to reduce their concentration among low-income groups.

This discussion of the policy implications of this limited set of health determinants may appear to produce something of a generalized laundry list of actions for policy-makers. But a common theme has in fact emerged. Not only have all four determinants been demonstrated to make a significant contribution to IRHI in the areas studied, but the analysis in each case has revealed the importance of income. Inequality in the distribution of income helps create socioeconomic inequality in health because income influences individual health status. Income allows the purchase of the requisites for better health and allows one to afford better material conditions. Higher educational attainment, which facilitates access to well-paid jobs, helps increase the gradient. Those who are unemployed lack the income levels of those who are employed and this also contributes to the existence of socioeconomic inequality in health. Lack of income also appears to present a barrier to higher educational attainment, which reduces the risk of low income and leads to better health. Appropriate interventions, therefore, designed to address situations of low income are likely to prove cost-effective since they will lead to improved health status on the part of individuals and reduce the demand for health care services. While the latter may not hold for those already experiencing a disability or one or more restrictions, better income supports will improve their socioeconomic situation and reduce IRHI.

In other words, the role of income emerges as a common theme with respect to each potential policy action. Reductions in income inequality and the incidence of low income may not be a panacea, but the evidence in this study indicates that such actions could provide significant reductions in IRHI and improve population health. The experience of several European countries has shown that the trends in these two areas over the past 15 years in Canada were not inevitable. Instead, they were the result of deliberate policy decisions and in the opposite direction of what was needed to reduce IRHI and improve health. At the very least, the results here indicate the negative health consequences of future increases in income inequality and the incidence of low income.

5. Dissemination Strategy

Conferences

Project collaborators shared the results of this research project in a series of three conferences in Nova Scotia, and in a session held in St. John's, Newfoundland and Labrador (Table 28).

Table 28 Research Project Dissemination Sessions

Location	Date and Time	Venue
Halifax, NS	June 2, 2005 9am – 3pm	Westin Hotel
Sydney, NS	June 7, 2005 8am – 12pm	Cape Breton University
Wolfville, NS	June 9, 2005 8am – 12pm	Acadia University
St. John's, NL	November 17, 2005 12pm – 2pm	Fairmont Newfoundland

The Halifax conference was attended by federal and provincial health policy analysts and planners from Atlantic Canada and Ottawa, as well as representatives of key non-government organizations (NGOs) and other agencies active in health promotion and the delivery of health and social services in Nova Scotia. About 80 attendees were present for the day's events. The organizations represented at the Halifax conference are provided in Table 29. A keynote address was given by Scott Logan, CEO and Assistant Deputy Minister, Office of Health Promotion, Government of Nova Scotia, and an expert panel consisting of Dr. George Kephart (Director, Population Health Research Unit, Dalhousie University), Dr. Ronald Labonte (Canada Research Chair, Institute of Population Health, University of Ottawa) and Dr. Shelley Phipps (Professor, Department of Economics, Dalhousie University) commented on the results and their significance for health policy research and policy formulation. The day's events (see Appendix C for agenda) included discussions on the results and methods, as well as the policy implications of the findings.

Table 29 Organisations Represented at the Halifax Conference

Annapolis Valley Health	East Hants Health Authority
Atlantic Canada Opportunities Agency	First Nations and Inuit Health Branch, Health Canada
Atlantic Centre of Excellence for Women's Health	Halifax District Health Authority, Capital Region
Atlantic Health Promotion Research Centre	Health Policy and Intergovernmental Affairs Directorate, Health Canada
Canadian Diabetes Association	Health Policy Branch, Health Canada
Canadian Institute for Health Information	Institute of Population Health, University of Ottawa
Cancer Care Nova Scotia	Literacy Nova Scotia
Centre for Clinical Research, Dalhousie University	Newfoundland and Labrador Statistics Agency

Table 29 Organisations Represented at the Halifax Conference

Doctors Nova Scotia	Nova Scotia Advisory Board on Colleges and Universities
Department of Applied Human Nutrition, Mount Saint Vincent University	Office of Policy and Promotion, Health Canada
Department of Community Health and Epidemiology, Dalhousie University	Public Health Agency of Canada, Atlantic Region
Department of Community Services, Province of Nova Scotia	Public Health Services, Capital Health
Department of Economics, Dalhousie University	Quality and Decision Support, Capital Health
Department of Family Studies and Gerontology, Mount Saint Vincent University	Research and Academic Affairs, Capital Health
Department of Health, Province of Nova Scotia	Rural Centre, Dalhousie University
Department of Health and Community Services, Province of Newfoundland and Labrador	School of Nursing, Dalhousie University
Department of Management and Marketing, University of Saskatchewan	Treasury and Policy Board, Province of Nova Scotia
Department of Psychology, Cape Breton University	Women's Health Bureau, Health Canada

Local conferences were also held in both Sydney and Wolfville, Nova Scotia. The focus of these conferences was on the dissemination of results to local-level stakeholders and decision-makers. Invitees represented health care, education, and social service providers. The organizations represented at the Sydney and Wolfville conferences are listed in Tables 30 and 31, respectively.

Table 30 Organisations Represented at the Sydney Conference

Cape Breton Economic Development Authority	Kanata Learning Opportunities Growth Centre
Cape Breton Regional Municipality	Membertou Wellness Centre
Cape Breton University	Mental Health Services, Cape Breton District Health Authority
Central Cape Breton Community Health Board	Public Health Nurses
Department of Community Services, Province of Nova Scotia	Public Health Services, Province of Nova Scotia
Eskasoni Community Health Centre	St. Francis Xavier Extension
Glace Bay GPI	Tompkins Institute, Cape Breton University
Guysborough Antigonish Straight/ Cape Breton District Health Authority	

Table 31 Organisations Represented at the Wolfville Conference

Annapolis Valley District Health Authority	Kings Canadian Mental Health Association
Annapolis Valley Work Activity Society/ Annapolis Valley Work Centre	Kings County GPI
L'Arche Homefires	Municipality of the County of Kings
The Beacon Program	Nova Scotia Community College, Kingstec Campus
Community of Inglewood	Red Cross Society
Department of Economics, Acadia University	School of Recreation Management and Kinesiology, Acadia University
The Flowercart	South Shore Health/ South West Health/ Annapolis Valley Health, Western Region
Hants Learning Network Association / Nova Scotia School for Adult Learning	Valley Disability Partnership
Human Resources and Skills Development Canada (HRSDC)	

Conference materials provided to participants in Halifax, Sydney and Wolfville included a project abstract, agenda for the working session, printed handouts of the presentations, and an exit survey. These materials are shown in Appendix C.

The exit survey was an important means to collect specific feedback on the format and content of the conferences, as well as an additional way to receive comments on the research results and recommendations. The vast majority of the participants reported that the conference format was appropriate and felt very satisfied with the value of the working session and feedback process. Most reported that the research and policy recommendations were relevant to their organizations and mandates, that they learned a great deal, and that they were provided with enough background information regarding the project to provide an informed opinion. Most participants also felt that they were given ample opportunity to contribute, although a number did comment that the conferences would have benefited from more time for open group discussions or breakout sessions. Table 32 summarizes the specific comments recorded on the exit surveys regarding the research results and recommendations.

Table 32 Summary of Conference Exit Survey Results

Conference	Summary of Comments on Research Results and Recommendations	
	Subject Area	**Comment**
Halifax, NS (19 surveys returned)	General	• Well done. • Important work. • Interesting presentation of complex research, and enjoyed the discussion of policy implications and future directions from a variety of perspectives. • Very interesting and worthwhile. • Fantastic if research can support initiatives that address income-related inequalities, poverty, education and unemployment.
	Methodology	• Use of community-specific data and comparative analysis between communities and countries useful. • Interactions between the independent variables in the models should be investigated. • Further exploration of the causal factors behind trends observed is required. • Interested in further examining trends over time. • Role of social capital (formal and informal) not adequately examined. • In terms of measuring health inequalities, how do we capture differences that are not income-related?
	Results	• Helpful to find further details and support regarding the relationships between income and health. • Interested in more emphasis on income inequality in policy discussion. • Excellent research and now need to find out how to translate the policy implications into practice.
	Policy Development and Communication	• Need to put the research results into the hands of community members. • Need to explore how to use the results to influence policy, including political decision-making and the mechanisms or processes that assist government in making policy. Need to combine this effort with enhanced citizen engagement. It's not just about the evidence, but the use of the evidence. • Credibility is enhanced by recognizing the realities and limitations of policy options. • In order to be successful, performance measures need to be relatively simple and easy to use. Question whether people will understand the complexity of the research, and have the ability to discuss and use the results.

Table 32 Summary of Conference Exit Survey Results

Conference	Summary of Comments on Research Results and Recommendations	
	Subject Area	**Comment**
Sydney, NS (16 surveys returned)	General	• The presentations provided valuable information. Further background information should have been provided. • Enjoyed presentation. Good discussion. • Good quantitative picture of this topic. • Some of the language used was difficult to understand. • Interesting information. Hope this work continues. • Very knowledgeable speaker. The input from the participants was very useful.
	Methodology	• Recommend more emphasis on the "social" aspects of the socioeconomic gradient. • There does not seem to be a simple answer – research addressed only one segment of the overall situation.
	Results	• Ignored the role of adult education in the discussion of results.
	Policy Development and Communication	• We need to increase awareness concerning these inequalities among policy-makers and communities. • To communicate to a broader audience (*e.g.,* politicians and members of the community), we need to develop a few simple and specific clear messages. • Need to include key community partners (*e.g.,* health care, physicians, community agencies) to mobilize the community in future dialogue. • Policy-makers need to be well informed on this topic, and public needs more awareness of the issue. • Policy recommendations are best broken down by government department responsibilities. • Needed more time in session for debate and feedback.
Wolfville, NS (15 surveys returned)	General	• Well done and presented. • Excellent presentation. • Research quite technical, but the presenter was great. • Excellent. • Discussion during the session was minimal due to time constraints. • Very glad I attended. • Useful information, presented in a fairly simple manner. • Thank you for the chance to learn more about this research. • Presentation was well done and prepared, and easy to follow. Good examples, good data, and good group of participants. • Work needs to be easier to read – use of plain language.
	Methodology	• More work needs to be done on environmental factors. • Interested in determining the effect of self employment/ entrepreneurship on health. • Research did not examine a large cross-section of determining factors.

Table 32 Summary of Conference Exit Survey Results

Conference	Summary of Comments on Research Results and Recommendations	
	Subject Area	**Comment**
	Results	• Findings will be valuable for our work. • Some good ideas for future research projects, especially dealing with mental health consumers. • Education was identified as an important contributor but see it as the basis for all other factors. • Less emphasis should have been placed on degree or length of education, and more emphasis on education through sharing information and people making informed choices. • The research findings are significant, and should be useful to many agencies and government departments.
	Policy Development and Communication	• Remember the importance of education in the trades and other vocations for those not academically inclined. Important not to underestimate the value of vocational schooling, as we will have a lack of skilled trades people in the future. University degrees are not the "end all" to bringing productive, healthy people to our communities. A working wage, full-time employment, and benefits programs for employees will make a great difference. • How can we move from policy research into influencing the political process and decision-making? • Need more information on how to influence policy change. Would like to hear examples of how the data and research actually helped to change policies. • Do you need more education or proper education? Elementary and secondary schools have the opportunity to plant the knowledge. Enable all individuals regardless of socioeconomic status to make proper choices. • Research will allow decisions to be made based on quantitative results. Need a business approach to reach politicians (manage it by measuring it; cost-benefit; provide solutions; *etc.*). • See a tremendous need for policy change. Would have been interested in more discussion about this. • The general policy recommendations provided were useful. Would the research suggest any particular age group and/or gender where the benefits of policy change would have the greatest impact? • It would have been useful to identify individuals to take ownership of required actions.

The focus of the dissemination session held in St. John's was on presentation and discussion of the results for Newfoundland. Participants included members of the academic community, provincial government decision-makers, and health care and social service providers. The organizations represented at the session are listed in Table 33.

Table 33 Organisations Represented at the St. John's Session

Association of Registered Nurses of Newfoundland and Labrador	Faculty of Medicine, Memorial University of Newfoundland
Centre of Excellence for Children and Adolescents with Special Needs, Memorial University of Newfoundland	Newfoundland and Labrador Centre for Applied Health Research
Centre for Nursing Studies	Newfoundland and Labrador Statistics Agency
Department of Economics, Memorial University of Newfoundland	School of Nursing, Memorial University of Newfoundland
Department of Health and Community Services, Government of Newfoundland and Labrador	School of Pharmacy, Memorial University of Newfoundland
Department of Sociology, Memorial University of Newfoundland	School of Social Work, Memorial University of Newfoundland
Eastern Health, Government of Newfoundland and Labrador	

The dissemination sessions proved valuable not only to report on the results of the research, but also to receive feedback and critical comment from representatives of government, academia, and community organizations. The sessions provided an opportunity to explore how the findings of the research might best be incorporated into the policies and initiatives of the various agencies and organizations represented. The ultimate goal of the gatherings was to improve and share understanding of how knowledge of the relationships between economic conditions and health outcomes can begin to provide practical assistance in the development of policies and programmes that are effective in improving the health of Canadians.

Publications

Initial results from the analysis of IRHI in Glace Bay were presented at the 33rd Annual Meeting of the Atlantic Canada Economics Association. These results will be combined with the analysis conducted for Kings County in an academic paper that will focus on the IRHI results at the community level in Nova Scotia. The journal presently targeted for publication of this paper is the *Canadian Journal of Public Health*.

Initial results from the analysis of the Newfoundland datasets were presented at a departmental seminar of Memorial University's Community Health and Epidemiology unit. The Newfoundland results will be developed into a separate article suitable for publication in *Health Economics* or *Social Science and Medicine*.

The overall results of the research were presented at the 34th Annual Meeting of the Atlantic Canada Economics Association. It is anticipated that a summary article on IRHI in the Atlantic region will also be prepared for publication in a journal oriented towards health science professionals.

Distribution of the Final Report

The following strategy will be implemented to distribute the Final Report:

- Posting of the Final Report on the GPI Atlantic internet site (www.gpiatlantic.org) as a free, viewable and downloadable PDF file, along with an advertisement on the release of the report on the site home page;
- Contacting all registered participants who attended the conferences in Halifax, Sydney, Wolfville and St. John's to notify them of the availability of the report;
- Informing relevant Canadian and provincial agencies and organizations that did not participate in the conferences, but for whom the research will likely be of interest, of the availability of the report; and
- Ongoing response by GPI Atlantic and by the author to inquiries regarding the project and the results.

The overall objective of the distribution strategy is to provide the Final Report to those agencies and organizations that might benefit from the research results and recommendations.

6. Literature Cited

Ågren, G. (2003). *Sweden's New Public Health Policy: National Public Health Objectives*.

Badley *et al.* 2000. *Determinants of Changes in Self-reported Health and Outcomes Associated with Those Changes*. Arthritis Community Research & Evaluation Unit. University of Toronto. Working Paper 00-05.

Bartley, J.F. and S.M. Montgomery. 1999. "Living in a high unemployment economy: understanding the health consequences" in *Social Determinants of Health.* Michael Marmot and Richard Wilkinson eds. Oxford University Press.

Berkman, L. and T. Glass. 2000. "Social integration, social networks and social support and health" in *Social Epidemiology*. Lisa Berkman and Ichiro Kawachi eds. Oxford University Press.

Bommier, A. and G. Steclov. 2003. "Defining health inequality: why Rawls succeeds where social welfare theory fails", *Journal of Health Economics.* 21, 497-513.

Borawski, E.A., J.M. Kinney and E. Kahana. 1996. "The meaning of older adults' health appraisals", congruence with health status and determinants of mortality", *Journal of Gerontology.* 51B(3), S 157-170.

Brunner, E. and M. Marmot. 1999. "Social organization and stress and health" in *Social Determinants of Health.* Michael Marmot and Richard Wilkinson eds. Oxford University Press.

Buckley, N. *et al*. 2004. "The transition from good to poor health: an econometric study of the older population", *Journal of Health Economics.* 23, 1013-1034.

Chipperfield, J.G. 1993. "Incongruence between health perceptions and health problems", *Journal of Aging and Health.* 5(4), 475-496.

Chotikapanich, D., J. Creedy and S. Hopkins. 2003. "Income and health concentration in Australia", *The Economic Record*. 79(246), 297-305.

Coelli, M. 2004. "Tuition increases an inequality in post-secondary education attendance." University of British Columbia. Mimeograph.

Corak, M., G. Lipps and J. Zhao. 2003. "Family income and participation in postsecondary education." Analytical Studies Research Paper No. 210. Statistics Canada.

Deaton, A. 2002. "Policy implications of the gradient of health and wealth", *Health Affairs.* 21(12), 13-30.

Decker, S. and D.K. Remler. 2004. "How much might universal health insurance reduce socioeconomic disparities in health? A comparison of the US and Canada." NBER Working Paper No. 10715.

Drolet, M. 2005. "Participation in post-secondary education in Canada: has the role of parental income and education changed over the 1990s?" Analytical Research Paper Series No. 219. Statistics Canada.

Ettner, S.L. 1996. "New evidence on the relationship between income and health", *Journal of Health Economics*. 15(1): 67-86.

Evans, R. 2002. *Interpreting and Addressing Inequalities in Health: From Black to Acheson to Blair to …?* in Seventh OHE Annual Lecture (updated and expanded edition). Office of Health Economics.

Finnie, R., C. Laporte and E. Lascelles. 2004. "Family background and access to post-secondary education: What happened over the 1990s?" Analytical Studies Research Paper Series No. 226. Statistics Canada.

Frenette, M., D. Green and G. Picot. 2004. "Rising income inequality in the 1990s: an exploration of three data sources." Analytical Research Paper Series No. 219. Statistics Canada.

Gambin, L.M. 2002. *The Determinants of Health: Existing Theory and Applications of Theory to Data from Newfoundland.* Master's Thesis, Memorial University, St. John's.

Glazier, R.H. *et al*. 2000. "The nature of increased hospital use in poor neighbourhoods: Findings from a Canadian inner city", *Canadian Journal of Public Health.* 91(4), 268-273.

Goetzel, R. 2001. "The financial impact of health promotion," *American Journal of Health Promotion*, 15 (5), May-June, 2001.

Grossman, M. 2004. "The demand for health 30 years later: a very personal retrospective and prospective reflection", *Journal of Health Economics.* 23, 629-636.

Hammond, C. 2003. "How education makes us healthy", *London Review of Education.* 1(1), 61-78.

Hay, D.I. 1988. "Socioeconomic status and health status: a study of males in the Canada Health Survey", *Social Science and Medicine.* 27(12), 1317-1325.

Health Canada. 1999. *Toward a Healthy Future: Second Report on the Health of Canadians,* September, 1999, Ottawa.

Humphries, K.H. and E. van Doorslaer. 2000. "Income-related health inequality in Canada", *Social Science and Medicine.* 50, 663-671.

Idler, E.L. and R.J. Angel. 1990. "Self-rated health and mortality in the NHANES-I Epidemiologic Follow-Up Study", *American Journal of Public Health.* 80(4), 446-452.

Idler, E.L. and S.V. Kasl. 1991. "Health perceptions and survival: Do global evaluations of health status really predict mortality?" *Journal of Gerontology.* 46(2), S55-S65.

Idler, E.L. and Y. Benyamini. 1997. "Self-rated health and mortality: a review of twenty-seven community studies", *Journal of Health and Social Behavior*. 38, 21-37.

Kakwani, N., A. Wagstaff and E. van Doorslaer. 1997. "Socioeconomic inequalities in health: Measurement, computation and statistical inference", *Journal of Econometrics*. 77, 87-103.

Kaplan, J. and G. Lynch. 2000. "Socioeconomic position" in *Social Epidemiology*. Lisa Berkman and Ichiro Kawachi eds. Oxford University Press.

Karch, B. 2000. "Social factors in health promotion," *American Journal of Health Promotion,* 3 (1).

Kasl, S.V. and B.A. Jones. 2000. "The impact of job loss and retirement on health" in *Social Epidemiology*. Lisa Berkman and Ichiro Kawachi eds. Oxford University Press.

Kawachi, I., S.V. Subramanian and N. Almeida-Filho. 2002. "A glossary for health inequalities", *Journal of Epidemiology and Community Health.* 56, 647-652.

Kephart, G., V.S. Thomas and D.R. MacLean. 1998. "Socioeconomic differences in the use of physician services in Nova Scotia", *American Journal of Public Health.* 88, 800-803.

Kong, M.-K. and H.K. Lee. 2001. "Income-related inequalities in health: some evidence from Korean panel data", *Applied Economics Letters.* 8, 239-242.

Larson, R. 1978. "Thirty years of research on the subjective well-being of older Americans", *Journal of Gerontology.* 33(1), 109-125.

Lauridsen J., T. Christiansen and U. Hakkinen. 2004. "Measuring inequality in self-reported health: discussion of a recently proposed approach using Finnish data", *Health Economics*. 28, 629-644.

Lynch, J.W. *et al*. 2000. "Income inequality and mortality: importance to health of individual income, psychosocial environment, or material conditions," *British Medical Journal.* 320, 1200-1204.

Lyons, R. and L. Langille. 2000. *Healthy Lifestyle: Strengthening the Effectiveness of Lifestyle Approaches to Improve Health,* Atlantic Health Promotion Research Centre, Dalhousie University, prepared for Health Canada, Health Promotion and Programs Branch, April, 2000

Mackenbach, J.P. and K. Stronks. 2002. "A strategy for tackling health inequalities in the Netherlands." *British Medical Journal*. 325: 1029-1032.

McLeod, C.B. *et al*. 2003. "Income inequality, household income and health status in Canada: a prospective cohort study", *American Journal of Public Health.* 93(8), 1287-1293.

Manga, P. 1993. "Socioeconomic inequalities" in *Canada's Health Promotion Survey 1990 Technical Report.* Thomas Stephens and Dawn Fowler eds. Minister of Supply and Services.

Marmot, M. *et al.* 1999. "Health and the psychosocial environment at work", in *Social Determinants of Health.* Michael Marmot and Richard Wilkinson eds. Oxford University Press.

Marmot, M. 2002. "The influence of income on health: views of an epidemiologist", *Health Affairs.* 21(2).

Marshall, K. 2003. "Benefits of the job", *Perspectives on Labour and Income*. 4(5), 5-12.

Mossey, J.M. and E. Shapiro. 1982. "Self-rated health: a predictor of mortality among the elderly", *American Journal of Public Health.* 72(8), 800-807.

Nova Scotia Department of Health. 2003. *Healthy People, Healthy Communities: Using the Population Health Approach in Nova Scotia*. Halifax.

Oliver, A., and D. Nutbeam. 2003. "Addressing health inequalities in the UK: a case study", *Journal of Public Health Medicine*. **25**(4), 281-287.

Osberg, L. 2000. "Poverty measurement in Canada and the United States: measurement, trends and implications", *Canadian Journal of Economics*. 33(4), 847-877.

Pampalon, R. *et al*. 1999. "Geographies of health perception in Quebec: a multi-level perspective", *Social Science and Medicine.* 48, 1483-1490.

Picot, G., R. Morissette and J. Myles. 2003. "Low-income intensity during the 1990s: the role of economic growth, employment earnings and social transfers." Analytical Studies Research Series No. 172. Statistics Canada.

Picot, G. and J. Myles. 2005. "Income inequality and low income in Canada: an international perspective." Analytical Studies Research Series No. 240. Statistics Canada.

Raphael, D. 2001. *Inequality is Bad for our Hearts,* York University.

Roberge, R., J.-M. Berthelot and M. Wolfson. 1995a. "Health and socio-economic inequalities", *Canadian Social Trends*. Statistics Canada. 15-19.

Roberge, R., J.-M. Berthelot and M. Wolfson. 1995b. "The Health Utility Index: measuring health differences in Ontario by socioeconomic status", *Health Reports.* (7)2, 25-32.

Roos, N.P. and C.A. Mustard. 1997. "Variation in health and health care use by socioeconomic status in Winnipeg, Canada: does the system work well? yes and no", *Milbank Quarterly.* 75(1), 89-111.

Roos, L.L. *et. al*. 2004. "Socioeconomic determinants of mortality in two Canadian provinces: multilevel modeling and neighbourhood context", *Social Science and Medicine.* 59, 1435-1477.

Ross, D.P. 2003. *Policy Approaches to Address the Impact of Poverty on Health.* Canadian Institute for Health Information.

Segovia, J., R.F. Bartlett and A.C. Edwards. 1992. *The St. John's Study of Health Practices and Medical Care Utilization, Final Report.* Memorial University of Newfoundland.

Segovia, J., R.F. Bartlett and A. Edwards. 1996. *Newfoundland Panel on Health and Medical Care; Adult Health Survey 1995 Methodology and Descriptive Results.* Memorial University of Newfoundland.

Segovia, J., A.C. Edwards and R.F. Bartlett. 1999. "Newfoundland Panel on Health and Medical Care—Adult Health Survey", *Canadian Journal of Public Health.* 90(6), 412-416.

Segovia, J. and A.C. Edwards. 2001. *Newfoundland Panel on Health and Medical Care; Medical Care Utilization 1992-1999, Final Report.* Health and Medical Care Research Group, Division of Community Health, Memorial University, St. John's.

Shields, M. 1999. "Long working hours and health". *Health Reports.* Vol. 11., No. 2. Statistics Canada, Ottawa.

Shields, M. 2002. "Shift work and health", *Health Reports.* Statistics Canada, Catalogue no. 82-003. Minister of Industry, Ottawa.

Statistics Canada. 2000. *Statistical Report on the Health of Canadians.*

Statistics Canada. 2001. *Income in Canada 1999.*

Statistics Canada. 2003. *Income in Canada 2001.*

Statistics Canada. 2005. *Income in Canada 2003.*

Stewart, J.M. 2001. "The impact of health status on the duration of unemployment spells and the implications for studies of the impact of unemployment on health status", *Journal of Health Economics.* 20, 781-796.

Tremblay, S., N. Ross and J.-M. Berthelot. 2002. "Regional socioeconomic context and health", *Health Reports*. 13, 1-12.

Van Doorslaer, E. and A.M. Jones. 2003. "Inequalities in self-reported health: validation of a new approach to measurement", *Journal of Health Economics.* 22, 61-87.

Van Doorslaer, E. and X. Koolman. 2004. "Explaining the differences in income-related health inequalities across European countries", *Health Economics*. 28, 609-628.

Veugelers, P.J., A. Yip and G. Kephart. 2001. "Proximate and contextual socioeconomic determinants of mortality: multilevel approaches in a setting with universal health care coverage", *American Journal of Epidemiology.* 154. 725-732.

Veugelers, P.J. and A.M. Yip. 2003. "Socioeconomic disparities in health care use: does universal coverage reduce inequalities in health?", *Journal of Epidemiology and Community Health.* 57, 424-428.

Wagstaff, A., P. Paci and E. van Doorslaer. 1991. "On the measurement of inequalities in health", *Social Science and Medicine.* 33(5), 545-557.

Wagstaff, A. and E. van Doorslaer. 1994. "Measuring inequalities in health in the presence of multiple-category morbidity indicators", *Health Economics*. 3, 281-291.

Wagstaff *et al*. 1997. "Income-related inequalities in health: some international comparisons", *Journal of Health Economics.* 16, 93-112.

Wagstaff, A., P. Paci and H. Joshi. 2001. "Inequalities in health: who you are? where you live? or who your parents were? Evidence from a cohort of British 33 year olds." Mimeograph.

Wagstaff, A., E. van Doorslaer and N. Watanabe. 2003. "On decomposing the causes of health sector inequalities with an application to malnutrition inequalities in Vietnam", *Journal of Econometrics*. 112, 207-223.

Wilkinson, R., and M. Marmot, eds. (1998). *Social Determinants of Health: The Solid Facts.* Centre for Urban Health, World Health Organization.

Wilson, K., M. Jerrett and J. Eyles. 2001. "Testing relationships among determinants of health, health policy and self-assessed health status in Québec", *International Journal of Health Services*. 31(1), 67-89.

Wolfson, M. *et al.* 1993. "Career earnings and death: a longitudinal analysis of older Canadian men", *Journal of Gerontology.* 48(4), S167-S179.

World Health Organisation. 2004. Constitution of the World Health Organization. Accessed at http://www.who.int/about/definition/en/.

APPENDIX A
THE CONCENTRATION INDEX AND THE DECOMPOSITION OF HEALTH INEQUALITY

The Concentration Index

There are a variety of means with which to estimate the concentration index for the distribution of a variable. One definition of the concentration index, C, is the following:

$$C = \frac{2}{\mu}\sum_{i=1}^{N} y_i R_i - 1$$

where μ is the mean of the health measure employed, y_i is the measure of health status, R_i is the relative fractional rank of individual i and N is the sample size.

The concentration index can also be estimated using the convenient regression method. The advantage to this method is that it provides an estimate of the standard error for the concentration index, which allows the construction of a confidence interval for the estimate of C. The equation for the regression method consists of the following:

$$2\sigma_R^2\left(\frac{y_i}{\mu}\right) = \alpha + \beta_1 R_i + e_i$$

where σ^2_R is the variance of the relative fractional rank, α is a constant term and e_i is an error term. The parameter β_1 estimates the concentration index while the coefficient's standard error is that for the index. The use of the fractional rank as the explanatory variable in the regression equation requires a correction for autocorrelation and so a Newy-West estimator of the variance-covariance matrix is used. This estimator is robust to autocorrelation and heteroscedasticity.

The estimate of the concentration index obtained via the convenient regression method is not standardized for age and sex. An indirect standardization can be performed if age and sex dummy variables are included in the above regression.

The Decomposition of Inequality

For a linear regression model of the following form,

$$h_i = \alpha + \sum_k \beta_k x_{ki} + \varepsilon_i$$

where h_i is a measure of health for individual i, β_k are the regression coefficients, x_k are the health determinants and ε_i is the error term, Wagstaff, van Doorslaer and Watanabe (2003) show that the concentration index, C, for the health measure can be decomposed as follows:

$$C = \sum_k \left(\frac{\beta_k \overline{x_k}}{\mu}\right) C_k + \frac{GC_\varepsilon}{\mu}$$

The term C_k is the concentration index for health determinant k, $\overline{x_k}$ is the mean of health determinant x_k, μ is the mean of the health measure and GC_ε is the generalized

concentration index for the error term. The concentration index is thus comprised of two parts. The first part is a deterministic one which is a weighted sum of the concentration indices for income-related health inequality in the k determinants of health. The weights are the elasticity of the health measure with respect to the k^{th} health determinant. The second part reflects the unexplained variation in health and health inequality across individuals.

In the case of an interval regression model, van Doorslaer and Koolman (2004) show that the concentration index, C, can be decomposed according to the formula,

$$C = \sum_{i=1}^{k} \left(\frac{\beta_i \bar{x}_i}{\mu} \right) C_k$$

where β_i is the coefficient from the interval regression and all variables are as previously defined. Unlike the linear regression model, there is no unexplained component.

Derivation of SAHS Score

Calculation of the scores for the latent health variable, h^*, follows the approach of Wagstaff and van Doorslaer (1994). The latent variable is assumed to follow a lognormal distribution since the distribution of health is likely to be skewed. The skewness of the distribution reflects the fact that in response to questions about SAHS, the proportion of individuals who report high levels of health is generally much larger than those who report poor health. In addition, if we assume that the distribution of the latent variable remains constant across populations over time and geography then we can compare surveys that use different numbers of categories for SAHS.

The categories of SAHS are assigned an integer value and ordered such that higher values correspond to increasingly worse health. With four categories of SAHS that correspond to poor, fair, good and excellent health, the relationship between the latent variable, h^*, and SAHS is the following:

$$\begin{aligned}
&\text{SAHS} = 1 \text{ if } -\infty < h^* \leq \alpha_1 \\
&\text{SAHS} = 2 \text{ if } \alpha_1 < h^* \leq \alpha_2 \\
&\text{SAHS} = 3 \text{ if } \alpha_2 < h^* \leq \alpha_3 \\
&\text{SAHS} = 4 \text{ if } \alpha_3 < h^* \leq +\infty
\end{aligned}$$

where α_i is the cut-point that separates the categories of SAHS from one another. When SAHS includes five categories (poor [SAHS =5], fair, good, very good and excellent [SAHS=1]), the relationship between h^* and SAHS is the following:

$$\begin{aligned}
&\text{SAHS} = 1 \text{ if } -\infty < h^* \leq \alpha_1 \\
&\text{SAHS} = 2 \text{ if } \alpha_1 < h^* \leq \alpha_2 \\
&\text{SAHS} = 3 \text{ if } \alpha_2 < h^* \leq \alpha_3 \\
&\text{SAHS} = 4 \text{ if } \alpha_3 < h^* \leq \alpha_4 \\
&\text{SAHS} = 5 \text{ if } \alpha_4 < h^* \leq +\infty
\end{aligned}$$

The cut-points for the categories are calculated using the following formula,

$$\alpha_j = \Phi^{-1}\left(\sum \frac{n_j}{N}\right)$$

where Φ^{-1} is the inverse of the standard normal density function, n_j is the total number of individuals that report category j of SAHS and N is the total number of individuals in the sample. These cut points divide the area underneath the standard normal density function into areas that correspond to the proportion of individuals in the sample that report each category of SAHS. The midpoint of each interval defined by these cut points represents the measure of the latent variable for use in the construction of a concentration curve. The score, z, for each category j of SAHS is calculated using the estimated cut points with the formula given as follows:

$$z_j = \left(\frac{N}{n_j}\right)\left[\phi(\alpha_{j-1}) - \phi(\alpha_j)\right]$$

where φ is the standard normal density function. Since the latent health variable, h^*, is assumed to follow a lognormal distribution, the value of h^* for each SAHS is is calculated as follows:

$$h^* = -e^{-z}$$

The values of h^* thus obtained can be used as the measure of health in the convenient regression method.

SAHS and HUI

Van Doorslaer and Jones (2003) improve upon this above method by tying the cutpoints that define the categories of SAHS to an objective measure of health status. This method requires the existence of a stable, monotonic relationship between the objective measure of health and the latent health variable that determines an individual's response to a question about SAHS. A stable relationship between these two variables implies that the individual's ranking of their health status with respect to SAHS will be the same as that obtained from the objective measure. With identical rankings between the two measures, cut-points that separate the various categories of SAHS from one another in terms of the objective health measure can be obtained from an inspection of its empirical distribution. That is, if a function F is the empirical distribution function of the objective health measure then

$$\mu_j = F^{-1}(G_j)$$

where μ_j are the thresholds and G_j is the cumulative frequency of observations for category j of SAHS. An interval regression with the cut-points thus defined yields predicted values in terms of the objective health measure.

Van Doorslaer and Jones (2003) chose the HUI as their objective measure of health and used the first wave of the National Population Health Survey, which contains information on both SAHS and the HUI, to calculate the cut-points. These cut-points, based on the cumulative proportion of the sample reporting the five categories of SAHS, are listed as follows: 0, 0.428, 0.756, 0.897, 0.947 and 1. The suitability of these cut-points for the surveys from 2001 were verified by an inspection of the empirical distribution of the HUI using the 2001 CCHS where there was little change noted.

In the case of the Newfoundland Adult Health Survey conducted prior to 2001, where there were only four categories available for SAHS, the same procedure can be used to derive cut-points in terms of the HUI. The cut-points for the four categories were the following: 0, 0.428, 0.84, 0.947 and 1. Again, use of the 2001 CCHS or the 1994/95 NPHS made little difference in terms of their definition.

APPENDIX B
DETAILED TABULATION OF RESULTS

Table B.1Regression Coefficients for Selected Health Determinants, Glace Bay and Kings County				
	20 and up		20 to 65	
	Glace Bay	Kings County	Glace Bay	Kings County
Male 25-34	-0.009	-0.019	-0.01	-0.012
	(0.54)	(-0.63)	(0.62)	(0.40)
Male 35-44	-0.031	-0.026	-0.033	-0.019
	(1.95)	(0.88)	(2.16)*	(0.65)
Male 45-54	-0.038	-0.072	-0.043	-0.063
	(2.41)*	(2.31)*	(2.70)**	(2.11)*
Male 55-64	-0.025	-0.058	-0.035	-0.052
	(1.23)	(1.84)	(1.77)	(1.70)
Male 65+	-0.045	-0.08		
	(2.01)*	(2.35)*		
Female 20-24	-0.001	-0.01	-0.001	-0.006
	(0.07)	(0.30)	(0.09)	(0.20)
Female 25-34	-0.014	-0.011	-0.014	-0.001
	(0.99)	(0.37)	(1.06)	(0.02)
Female 35-44	-0.023	-0.017	-0.026	-0.008
	(1.57)	(0.57)	(1.79)	(0.27)
Female 45-54	-0.045	-0.029	-0.048	-0.021
	(2.79)**	(0.97)	(3.05)**	(0.71)
Female 55-64	-0.036	-0.058	-0.046	-0.05
	(1.85)	(1.80)	(2.35)*	(1.61)
Female 65+	-0.039	-0.045		
	(1.80)	(1.35)		
Income	0.018	0.026	0.014	0.029
	(3.17)**	(4.61)**	(2.47)*	(4.77)**
High School	0.03	0.022	0.03	0.022
	(3.23)**	(2.30)*	(2.94)**	(2.19)*
Community College	0.022	0.035	0.015	0.025
	(2.38)*	(3.98)**	(1.49)	(2.72)**
University	0.042	0.053	0.042	0.041
	(4.39)**	(5.70)**	(3.99)**	(4.29)**
Married	-0.003	0.012	0.001	0.006
	(0.35)	(0.98)	(0.16)	(0.52)
Separated/Divorced	-0.011	0.006	-0.005	0.004
	(0.80)	(0.41)	(0.37)	(0.28)
Widowed	0.01	0.005	0.041	-0.007
	(0.64)	(0.24)	(2.36)*	(0.19)
Employed	0.044	0.041	0.055	0.046
	(3.47)**	(3.38)**	(4.15)**	(3.49)**
Unemployed	0.037	0.017	0.046	0.02
	(2.55)*	(0.95)	(3.04)**	(1.06)
Student	0.028	0.03	0.037	0.034
	(1.91)	(1.76)	(2.43)*	(1.93)
Retired	0.013	0.047	0.029	0.053
	(0.87)	(3.28)**	(1.68)	(3.08)**
Long-term Disability	-0.056	-0.05	-0.057	-0.039
	(5.40)**	(4.29)**	(5.33)**	(2.99)**
Activity Restriction	-0.116	-0.114	-0.108	-0.127
	(9.16)**	(8.20)**	(8.26)**	(7.60)**
Constant	0.692	0.576	0.717	0.549
	(12.96)**	(8.91)**	(12.96)**	(8.08)**
Number of Observations	1426	1492	1155	1227

(Robust z-statistic in parentheses)
** significant at 1%
* significant at 5%

Table B.2 Concentration Indices for Selected Health Determinants, Glace Bay and Kings County				
	20 and up		20 to 65	
	Glace Bay	Kings County	Glace Bay	Kings County
Predicted HUI	0.018	0.019	0.016	0.02
	(10.87)**	(12.60)**	(9.23)**	(12.93)**
Male 25-34	0.022	-0.122	0.007	-0.13
	(0.31)	(1.68)	(0.10)	(1.83)
Male 35-44	-0.044	0.026	-0.058	0.026
	(0.83)	(0.70)	(1.16)	(0.71)
Male 45-54	0.184	0.166	0.172	0.172
	(4.28)**	(4.02)**	(4.25)**	(4.10)**
Male 55-64	0.215	0.203		
	(4.06)**	(4.22)**		
Male 65+	0.016	0.078	0.196	0.206
	(0.34)	(1.58)	(3.77)**	(4.08)**
Female 20-24	-0.203	-0.189	-0.215	-0.189
	(2.70)**	(1.66)	(2.95)**	(1.62)
Female 25-34	-0.22	-0.283	-0.23	-0.287
	(3.30)**	(4.45)**	(3.56)**	(4.56)**
Female 35-44	-0.165	-0.121	-0.176	-0.128
	(4.33)**	(3.57)**	(4.72)**	(3.83)**
Female 45-54	0.155	0.031	0.143	0.031
	(3.72)**	(0.84)	(3.73)**	(0.84)
Female 55-64	-0.03	-0.013		
	(0.62)	(0.24)		
Female 65+	-0.101	-0.09	-0.044	-0.011
	(2.53)*	(1.58)	(0.99)	(0.21)
Income	0.038	0.032	0.039	0.031
	(57.64)**	(39.77)**	(52.96)**	(34.91)**
High School	-0.101	-0.001	-0.134	-0.021
	(3.62)**	(0.04)	(4.98)**	(0.77)
Community College	0.099	-0.023	0.089	-0.036
	(3.67)**	(1.02)	(3.53)**	(1.54)
University	0.474	0.269	0.471	0.25
	(11.24)**	(10.09)**	(10.67)**	(8.68)**
Married	0.121	0.059	0.115	0.038
	(10.25)**	(7.00)**	(9.49)**	(4.13)**
Separated/Divorced	-0.331	-0.165	-0.348	-0.127
	(7.37)**	(3.00)**	(7.18)**	(2.16)*
Widowed	-0.206	-0.357	-0.338	-0.25
	(4.52)**	(4.86)**	(3.20)**	(1.90)
Employed	0.198	0.073	0.181	0.072
	(9.83)**	(5.18)**	(10.02)**	(6.17)**
Unemployed	-0.188	-0.448	-0.202	-0.451
	(4.04)**	(6.51)**	(4.64)**	(7.06)**
Student	-0.026	0.052	-0.043	0.056
	(0.47)	(0.72)	(0.86)	(0.77)
Retired	0.01	0.054	0.079	0.145
	(0.43)	(1.81)	(2.21)*	(2.89)**
Long-term Disability	-0.077	-0.128	-0.077	-0.176
	(3.12)**	(4.01)**	(2.69)**	(4.51)**
Activity Restriction	-0.119	-0.147	-0.118	-0.212
	(4.28)**	(4.55)**	(3.76)**	(5.24)**
Number of Observations	1426	1492	1155	1227

(Robust z-statistic in parentheses)
** significant at 1%
* significant at 5%

Table B.3 Means for Selected Health Determinants, Glace Bay and Kings County				
	20 and up		20 to 65	
	Glace Bay	Kings County	Glace Bay	Kings County
Predicted HUI	0.835	0.847	0.844	0.858
Male 25-34	0.051	0.039	0.063	0.047
Male 35-44	0.078	0.125	0.096	0.152
Male 45-54	0.118	0.115	0.146	0.140
Male 55-64	0.082	0.084	0.101	0.103
Male 65+	0.073	0.092		
Female 20-24	0.033	0.015	0.041	0.019
Female 25-34	0.062	0.058	0.077	0.071
Female 35-44	0.134	0.150	0.166	0.183
Female 45-54	0.140	0.141	0.173	0.172
Female 55-64	0.084	0.086	0.104	0.105
Female 65+	0.118	0.086		
Income	9.981	10.292	9.986	10.291
High School	0.237	0.260	0.257	0.258
Community College	0.247	0.295	0.286	0.322
University	0.129	0.231	0.139	0.240
Married	0.622	0.788	0.662	0.805
Separated/Divorced	0.105	0.078	0.117	0.085
Widowed	0.102	0.050	0.029	0.016
Employed	0.344	0.558	0.423	0.672
Unemployed	0.110	0.051	0.134	0.061
Student	0.084	0.045	0.104	0.054
Retired	0.315	0.237	0.177	0.107
Long-term Disability	0.288	0.206	0.275	0.173
Activity Restriction	0.245	0.187	0.235	0.156
Number of Observations	1426	1492	1155	1227

Table B.4 Regression Coefficients for Selected Health Determinants, Newfoundland 2001					
	Newfoundland	**St. John's CHB**	**Eastern CHB**	**Central CHB**	**Western CHB**
Male 25-34	0.006	-0.005	0.012	0.019	0.011
	(0.69)	(0.32)	(0.72)	(1.12)	(0.55)
Male 35-44	0.007	0.008	0.008	0.017	0.009
	(0.86)	(0.57)	(0.52)	(0.98)	(0.43)
Male 45-54	-0.007	-0.003	-0.012	0.006	-0.008
	(0.81)	(0.17)	(0.74)	(0.33)	(0.36)
Male 55-64	0.003	-0.015	-0.013	0.032	0.017
	(0.32)	(0.92)	(0.64)	(1.63)	(0.75)
Male 65+	0.017	0.011	0.008	0.038	0.027
	(1.53)	(0.55)	(0.38)	(1.79)	(1.09)
Female 20-24	0.016	0.005	0.038	0.042	0.001
	(1.49)	(0.33)	(1.84)	(1.95)	(0.04)
Female 25-34	0.02	0.023	0.029	0.023	0.014
	(2.27)*	(1.60)	(1.77)	(1.31)	(0.66)
Female 35-44	0.015	0.017	0.017	0.022	0.013
	(1.68)	(1.17)	(1.12)	(1.29)	(0.63)
Female 45-54	-0.001	-0.006	-0.006	0.022	0.001
	(0.08)	(0.38)	(0.34)	(1.22)	(0.03)
Female 55-64	0.006	0.026	-0.001	0.009	0.008
	(0.57)	(1.37)	(0.06)	(0.41)	(0.33)
Female 65+	0.019	0.051	-0.003	0.036	0.011
	(1.63)	(2.57)*	(0.12)	(1.60)	(0.40)
Income	0.02	0.023	0.024	0.011	0.022
	(8.47)**	(5.40)**	(4.33)**	(2.12)*	(4.62)**
High School	0.001	0.001	0.003	0.002	-0.002
	(0.26)	(0.12)	(0.39)	(0.32)	(0.28)
Community College	0.000	-0.005	0.002	0.000	0.003
	(0.08)	(0.63)	(0.24)	(0.01)	(0.37)
University	0.011	0.016	0.000	0.01	0.012
	(2.72)**	(2.55)*	(0.03)	(1.12)	(1.42)
Married	-0.008	-0.011	-0.007	-0.022	0.000
	(1.67)	(1.58)	(0.77)	(2.18)*	(0.04)
Separated/Divorced	-0.006	-0.016	0.017	0.005	-0.021
	(0.74)	(1.10)	(1.11)	(0.29)	(1.18)
Widowed	0.015	0.003	0.02	0.002	0.03
	(1.77)	(0.25)	(1.08)	(0.08)	(1.58)
Employed	0.018	0.014	0.008	0.029	0.026
	(4.82)**	(1.68)	(1.18)	(3.69)**	(3.47)**
Unemployed	0.014	0.005	0.019	0.011	0.023
	(1.60)	(0.25)	(1.08)	(0.76)	(1.06)
Student	0.004	0.008	0.001	0.024	-0.007
	(0.54)	(0.60)	(0.03)	(1.49)	(0.43)
Retired	0.006	-0.003	0.011	0.013	0.002
	(1.05)	(0.24)	(0.79)	(1.17)	(0.17)
Long-term Disability	-0.133	-0.123	-0.134	-0.121	-0.151
	(17.18)**	(7.64)**	(9.01)**	(8.30)**	(9.59)**
Activity Restriction	-0.084	-0.1	-0.085	-0.092	-0.067
	(7.90)**	(4.55)**	(4.14)**	(4.26)**	(3.24)**
Constant	0.665	0.646	0.643	0.753	0.63
	(27.94)**	(15.42)**	(11.92)**	(15.30)**	(13.02)**
Number of Observations	6340	1540	1597	1604	1599

(Robust z-statistic in parentheses)
** significant at 1%
* significant at 5%

Table B.5 Concentration Indices for Selected Health Determinants, Newfoundland 2001					
	Newfoundland	**St. John's CHB**	**Eastern CHB**	**Central CHB**	**Western CHB**
Predicted HUI	0.019	0.018	0.019	0.015	0.022
	(37.56)**	(18.15)**	(18.24)**	(14.48)**	(21.59)**
Male 25-34	0.153	0.116	0.23	0.076	0.133
	(5.43)**	(2.40)*	(3.77)**	(1.26)	(2.46)*
Male 35-44	0.139	0.175	0.109	0.143	0.086
	(7.23)**	(5.08)**	(2.88)**	(3.65)**	(2.12)*
Male 45-54	0.183	0.146	0.176	0.202	0.246
	(9.27)**	(3.40)**	(4.87)**	(4.87)**	(6.29)**
Male 55-64	0.024	0.096	-0.005	0.052	0.042
	(1.04)	(1.65)	(0.10)	(1.21)	(1.01)
Male 65+	-0.19	-0.178	-0.215	-0.128	-0.221
	(7.58)**	(3.36)**	(4.26)**	(2.73)**	(4.56)**
Female 20-24	-0.17	-0.262	0.047	-0.401	-0.236
	(3.07)**	(3.15)**	(0.38)	(2.97)**	(1.77)
Female 25-34	-0.044	-0.067	0.005	-0.043	-0.077
	(1.72)	(1.35)	(0.10)	(0.86)	(1.33)
Female 35-44	-0.026	-0.039	-0.017	0.009	-0.054
	(1.42)	(1.08)	(0.49)	(0.22)	(1.55)
Female 45-54	0.09	0.06	0.075	0.128	0.099
	(4.58)**	(1.51)	(1.90)	(3.34)**	(2.44)*
Female 55-64	-0.198	-0.134	-0.21	-0.264	-0.119
	(8.08)**	(2.30)*	(4.51)**	(5.77)**	(2.75)**
Female 65+	-0.397	-0.444	-0.485	-0.324	-0.363
	(13.56)**	(6.45)**	(7.44)**	(6.55)**	(6.41)**
Income	0.042	0.041	0.041	0.041	0.044
	(232.27)**	(80.32)**	(119.64)**	(103.71)**	(136.98)**
High School	-0.048	-0.177	-0.039	0.046	-0.017
	(3.87)**	(6.44)**	(1.52)	(1.93)	(0.70)
Community College	0.183	0.068	0.21	0.208	0.233
	(12.66)**	(2.58)*	(7.45)**	(6.96)**	(7.87)**
University	0.495	0.358	0.481	0.575	0.55
	(28.98)**	(16.70)**	(11.79)**	(13.67)**	(13.48)**
Married	0.058	0.091	0.048	0.047	0.081
	(11.73)**	(7.80)**	(5.14)**	(5.20)**	(8.68)**
Separated/Divorced	-0.227	-0.252	-0.229	-0.109	-0.359
	(6.45)**	(4.10)**	(2.83)**	(1.31)	(5.39)**
Widowed	-0.399	-0.397	-0.461	-0.391	-0.391
	(12.68)**	(6.67)**	(7.01)**	(6.51)**	(6.29)**
Employed	0.24	0.173	0.271	0.254	0.238
	(40.79)**	(16.86)**	(22.68)**	(19.46)**	(19.68)**
Unemployed	-0.369	-0.491	-0.285	-0.243	-0.516
	(8.66)**	(3.87)**	(3.71)**	(3.87)**	(4.87)**
Student	-0.047	-0.139	0.195	-0.265	-0.091
	(1.09)	(2.10)*	(1.84)	(2.55)*	(1.19)
Retired	-0.156	-0.131	-0.252	-0.127	-0.118
	(7.41)**	(2.85)**	(5.74)**	(3.38)**	(2.75)**
Long-term Disability	-0.304	-0.329	-0.302	-0.283	-0.284
	(15.51)**	(6.95)**	(8.23)**	(7.21)**	(7.60)**
Activity Restriction	-0.307	-0.283	-0.279	-0.368	-0.287
	(10.44)**	(4.21)**	(5.38)**	(6.19)**	(5.07)**
Number of Observations	6340	1540	1597	1604	1599

(Robust z-statistic in parentheses)
** significant at 1%
* significant at 5%

Table B.6 Means for Selected Health Determinants, Newfoundland 2001					
	Newfoundland	**St. John's CHB**	**Eastern CHB**	**Central CHB**	**Western CHB**
Predicted HUI	0.858	0.869	0.855	0.858	0.848
Male 25-34	0.065	0.081	0.057	0.057	0.066
Male 35-44	0.122	0.137	0.120	0.118	0.114
Male 45-54	0.126	0.108	0.138	0.128	0.129
Male 55-64	0.091	0.072	0.089	0.104	0.099
Male 65+	0.068	0.058	0.070	0.073	0.072
Female 20-24	0.019	0.031	0.016	0.012	0.018
Female 25-34	0.080	0.085	0.082	0.081	0.074
Female 35-44	0.136	0.140	0.142	0.118	0.144
Female 45-54	0.123	0.127	0.124	0.120	0.119
Female 55-64	0.079	0.065	0.080	0.085	0.083
Female 65+	0.065	0.051	0.063	0.081	0.063
Income	9.803	10.029	9.736	9.745	9.712
High School	0.231	0.200	0.232	0.249	0.241
Community College	0.193	0.212	0.191	0.181	0.189
University	0.160	0.281	0.133	0.112	0.119
Married	0.757	0.674	0.783	0.804	0.764
Separated/Divorced	0.053	0.073	0.041	0.042	0.058
Widowed	0.069	0.066	0.075	0.072	0.063
Employed	0.522	0.629	0.486	0.471	0.505
Unemployed	0.031	0.020	0.036	0.044	0.025
Student	0.032	0.051	0.024	0.019	0.033
Retired	0.098	0.086	0.089	0.118	0.098
Long-term Disability	0.126	0.102	0.144	0.126	0.132
Activity Restriction	0.063	0.052	0.074	0.067	0.061
Number of Observations	6340	1540	1597	1604	1599

Table B.7 Regression Coefficients for Selected Health Determinants, Newfoundland 1995					
	Newfoundland	**St. John's CHB**	**Eastern CHB**	**Central CHB**	**Western CHB**
Male 35-44	-0.005	-0.004	-0.007	-0.009	-0.005
	(1.42)	(0.84)	(1.15)	(1.26)	(0.68)
Male 45-54	-0.016	-0.015	-0.02	-0.026	-0.004
	(4.20)**	(2.61)**	(2.61)**	(2.84)**	(0.54)
Male 55-64	-0.011	-0.003	-0.009	-0.013	-0.034
	(1.81)	(0.36)	(0.74)	(1.01)	(2.30)*
Male 65+	0.017	0.016	0.01	0.037	-0.001
	(1.97)*	(1.07)	(0.54)	(2.01)*	(0.07)
Female 25-34	0.005	0.002	-0.002	0.007	0.011
	(1.53)	(0.32)	(0.29)	(0.98)	(1.60)
Female 35-44	-0.001	0.006	-0.011	-0.01	0.007
	(0.23)	(1.14)	(1.60)	(1.29)	(0.96)
Female 45-54	-0.008	-0.004	-0.013	-0.02	-0.006
	(2.08)*	(0.67)	(1.67)	(2.31)*	(0.73)
Female 55-64	-0.004	-0.001	0.007	-0.022	-0.015
	(0.82)	(0.10)	(0.65)	(1.93)	(1.03)
Female 65+	0.006	0.003	-0.007	0.011	0.003
	(0.84)	(0.28)	(0.42)	(0.79)	(0.21)
Income	0.01	0.009	0.008	0.011	0.018
	(5.07)**	(2.64)**	(1.90)	(2.29)*	(3.95)**
High School	0.023	0.012	0.027	0.031	0.017
	(8.32)**	(2.21)*	(4.67)**	(5.64)**	(2.97)**
Community College	0.025	0.012	0.028	0.036	0.02
	(8.77)**	(2.20)*	(4.91)**	(6.12)**	(3.42)**
University	0.036	0.025	0.04	0.037	0.03
	(10.55)**	(4.30)**	(5.33)**	(4.93)**	(3.80)**
Married	-0.005	-0.002	0.006	-0.013	-0.012
	(1.45)	(0.48)	(0.72)	(1.70)	(1.56)
Separated/Divorced	-0.004	-0.001	-0.001	-0.01	-0.008
	(0.59)	(0.13)	(0.06)	(0.71)	(0.53)
Widowed	0.013	0.009	0.035	-0.002	0.016
	(1.82)	(0.83)	(2.17)*	(0.14)	(1.07)
Employed	0.015	0.018	0.018	0.005	0.012
	(4.53)**	(3.08)**	(2.62)**	(0.76)	(1.76)
Seasonally Employed	0.014	0.014	0.026	0.001	0.011
	(3.82)**	(1.91)	(3.54)**	(0.11)	(1.39)
Unemployed	0.013	0.011	0.01	0.004	0.027
	(3.10)**	(1.28)	(1.28)	(0.45)	(3.08)**
Retired	-0.015	-0.002	-0.02	-0.032	-0.011
	(2.38)*	(0.23)	(1.50)	(2.37)*	(0.81)
Fisheries Benefits	0.000	0.007	-0.001	-0.009	0.01
	(0.05)	(1.00)	(0.15)	(1.08)	(1.24)
Long-term Disability	-0.101	-0.101	-0.102	-0.097	-0.105
	(15.09)**	(8.45)**	(7.99)**	(6.74)**	(6.97)**
Activity Restriction	-0.131	-0.118	-0.151	-0.124	-0.126
	(11.52)**	(5.32)**	(7.31)**	(5.15)**	(4.96)**
Constant	0.77	0.789	0.783	0.78	0.706
	(38.50)**	(22.91)**	(19.37)**	(17.11)**	(16.09)**
Number of Observations	10253	3294	2799	2090	1872

(Robust z-statistic in parentheses)
** significant at 1%
* significant at 5%

Table B.8 Concentration Indices for Selected Health Determinants, Newfoundland 1995					
	Newfoundland	**St. John's CHB**	**Eastern CHB**	**Central CHB**	**Western CHB**
Predicted HUI	0.015	0.012	0.015	0.013	0.018
	(37.92)**	(18.80)**	(17.62)**	(15.04)**	(18.27)**
Male 35-44	0.054	0.003	0.082	0.083	0.081
	(3.79)**	(0.12)	(2.97)**	(2.56)*	(2.46)*
Male 45-54	0.177	0.155	0.168	0.156	0.28
	(10.10)**	(5.20)**	(4.98)**	(3.94)**	(6.57)**
Male 55-64	0.013	0.139	-0.015	0.004	-0.069
	(0.56)	(3.24)**	(0.32)	(0.08)	(1.37)
Male 65+	-0.272	-0.238	-0.287	-0.269	-0.211
	(12.71)**	(5.20)**	(7.49)**	(6.27)**	(5.18)**
Female 25-34	0.01	-0.001	-0.001	0.038	-0.071
	(0.64)	(0.02)	(0.03)	(1.10)	(2.06)*
Female 35-44	0.008	-0.029	0.042	0.008	0.027
	(0.55)	(1.24)	(1.62)	(0.25)	(0.81)
Female 45-54	0.133	0.118	0.153	0.12	0.19
	(8.16)**	(4.12)**	(4.95)**	(3.32)**	(4.81)**
Female 55-64	-0.102	-0.066	-0.163	-0.065	-0.185
	(4.53)**	(1.67)	(3.72)**	(1.36)	(3.59)**
Female 65+	-0.29	-0.279	-0.3	-0.294	-0.209
	(14.79)**	(6.89)**	(8.51)**	(7.71)**	(4.96)**
Income	0.037	0.036	0.037	0.034	0.038
	(172.96)**	(77.13)**	(93.54)**	(68.91)**	(82.01)**
High School	0.063	-0.011	0.078	0.087	0.093
	(6.73)**	(0.77)	(4.04)**	(3.74)**	(4.14)**
Community College	0.169	0.061	0.228	0.197	0.193
	(17.70)**	(3.99)**	(12.49)**	(8.55)**	(7.77)**
University	0.579	0.426	0.58	0.653	0.692
	(30.54)**	(20.55)**	(11.24)**	(11.43)**	(12.22)**
Married	0.042	0.049	0.051	0.044	0.051
	(12.21)**	(7.04)**	(8.80)**	(6.54)**	(6.62)**
Separated/Divorced	-0.241	-0.212	-0.405	-0.32	-0.202
	(7.35)**	(4.40)**	(6.14)**	(3.82)**	(2.54)*
Widowed	-0.262	-0.293	-0.254	-0.236	-0.227
	(11.39)**	(6.83)**	(6.07)**	(4.91)**	(4.21)**
Employed	0.322	0.216	0.348	0.34	0.376
	(57.76)**	(28.15)**	(27.18)**	(20.86)**	(24.57)**
Seasonally Employed	-0.098	-0.192	-0.044	-0.004	-0.027
	(7.22)**	(5.38)**	(1.80)	(0.17)	(0.95)
Unemployed	-0.307	-0.401	-0.228	-0.193	-0.343
	(19.13)**	(10.79)**	(8.01)**	(5.67)**	(9.94)**
Retired	-0.203	-0.205	-0.214	-0.181	-0.188
	(15.60)**	(8.15)**	(8.76)**	(6.67)**	(6.32)**
Fisheries Benefits	-0.19	-0.267	-0.115	-0.057	-0.228
	(10.69)**	(5.29)**	(4.10)**	(1.63)	(4.75)**
Long-term Disability	-0.256	-0.24	-0.237	-0.232	-0.279
	(16.27)**	(7.81)**	(8.75)**	(6.70)**	(7.95)**
Activity Restriction	-0.274	-0.252	-0.213	-0.268	-0.327
	(11.60)**	(5.34)**	(5.32)**	(5.34)**	(6.03)**
Number of Observations	10253	3294	2799	2090	1872

(Robust z-statistic in parentheses)
** significant at 1%
* significant at 5%

Table B.9 Means for Selected Health Determinants, Newfoundland 1995					
	Newfoundland	**St. John's CHB**	**Eastern CHB**	**Central CHB**	**Western CHB**
Predicted HUI	0.870	0.885	0.858	0.864	0.868
Male 35-44	0.130	0.128	0.128	0.129	0.135
Male 45-54	0.099	0.097	0.105	0.095	0.096
Male 55-64	0.060	0.056	0.054	0.069	0.064
Male 65+	0.063	0.047	0.068	0.071	0.073
Female 25-34	0.135	0.152	0.124	0.123	0.134
Female 35-44	0.147	0.148	0.154	0.142	0.144
Female 45-54	0.109	0.106	0.108	0.108	0.113
Female 55-64	0.060	0.064	0.056	0.063	0.058
Female 65+	0.084	0.071	0.094	0.095	0.081
Income	9.786	9.990	9.675	9.709	9.679
High School	0.261	0.308	0.248	0.226	0.248
Community College	0.248	0.285	0.244	0.230	0.215
University	0.104	0.184	0.059	0.061	0.080
Married	0.790	0.747	0.814	0.818	0.796
Separated/Divorced	0.043	0.063	0.034	0.031	0.040
Widowed	0.069	0.062	0.076	0.075	0.063
Employed Seasonally	0.408	0.554	0.343	0.322	0.349
Employed Seasonally	0.122	0.064	0.143	0.163	0.140
Unemployed	0.111	0.075	0.133	0.123	0.124
Retired	0.161	0.147	0.168	0.177	0.161
Fisheries Benefits	0.075	0.031	0.115	0.093	0.056
Long-term Disability	0.124	0.107	0.140	0.123	0.134
Activity Restriction	0.059	0.048	0.070	0.060	0.060
Number of Observations	10253	3294	2799	2090	1872

Table B.10 Regression Coefficients for Selected Health Determinants, St. John's 1985-2001				
	1985	**1990**	**1995**	**2001**
Male 25-34	0.001	0.008		-0.005
	(-0.1)	(-0.47)		(0.32)
Male 35-44	-0.005	0.003	-0.004	0.008
	(0.57)	(0.16)	(0.84)	(0.57)
Male 45-54	-0.012	-0.001	-0.015	-0.003
	(1.13)	(0.05)	(2.61)**	(0.17)
Male 55-64	0.007	-0.005	-0.003	-0.015
	(0.68)	(0.27)	(0.36)	(0.92)
Male 65+	0.003	-0.008	0.016	0.011
	(0.20)	(0.36)	(1.07)	(0.55)
Female 20-24	0.005	-0.001		0.005
	(0.77)	(0.05)		(0.33)
Female 25-34	0.007	0.016	0.002	0.023
	(0.98)	(0.93)	(0.32)	(1.60)
Female 35-44	0.012	0.022	0.006	0.017
	(1.58)	(1.21)	(1.14)	(1.17)
Female 45-54	0.008	0.006	-0.004	-0.006
	(0.83)	(0.31)	(0.67)	(0.38)
Female 55-64	-0.002	0.013	-0.001	0.026
	(0.17)	(0.69)	(0.10)	(1.37)
Female 65+	0.001	0.002	0.003	0.051
	(0.10)	(0.10)	(0.28)	(2.57)*
Income	0.007	0.014	0.009	0.023
	(1.90)	(3.12)**	(2.64)**	(5.40)**

Table B.10 Regression Coefficients for Selected Health Determinants, St. John's 1985-2001				
	1985	**1990**	**1995**	**2001**
High School	0.028	0.007	0.012	0.001
	(5.33)**	(0.94)	(2.21)*	(0.12)
Community College	0.03	0.011	0.012	-0.005
	(5.42)**	(1.74)	(2.20)*	(0.63)
University	0.042	0.015	0.025	0.016
	(7.08)**	(1.89)	(4.30)**	(2.55)*
Married	0.002	-0.01	-0.002	-0.011
	(0.46)	(2.04)*	(0.48)	(1.58)
Separated/Divorced	-0.004	-0.021	-0.001	-0.016
	(0.38)	(2.16)*	(0.13)	(1.10)
Widowed	0.012	0.006	0.009	0.003
	(1.11)	(0.50)	(0.83)	(0.25)
Employed	0.021	0.017	0.018	0.014
	(3.08)**	(2.29)*	(3.08)**	(1.68)
Seasonally Employed	0.014	0.023	0.014	
	(1.34)	(1.93)	(1.91)	
Unemployed			0.011	0.005
			(1.28)	(0.25)
Student	0.022	0.007		0.008
	(2.18)*	(0.67)		(0.60)
Retired	0.008	0.031	-0.002	-0.003
	(0.72)	(2.81)**	(0.23)	(0.24)
Fisheries Benefits	-0.104	-0.113	0.007	
	(7.37)**	(6.63)**	(1.00)	
Long-term Disability			-0.101	-0.123
			(8.45)**	(7.64)**
Activity Restriction		-0.154	-0.118	-0.1
		(3.80)**	(5.32)**	(4.55)**
Constant	0.784	0.741	0.789	0.646
	(22.98)**	(16.78)**	(22.91)**	(15.42)**
Number of Observations	3070	2447	3294	1540

(Robust z-statistic in parentheses)
** significant at 1%
* significant at 5%

Table B.11 Concentration Indices for Selected Health Determinants, St. John's 1985-2001				
	1985	**1990**	**1995**	**2001**
Predicted HUI	0.01	0.013	0.012	0.018
	(22.71)**	(17.56)**	(18.80)**	(18.15)**
Male 25-34	0.121	0.107		0.116
	(4.61)**	(3.70)**		(2.40)*
Male 35-44	0.129	0.124	0.003	0.175
	(4.65)**	(4.41)**	(0.12)	(5.08)**
Male 45-54	0.065	0.149	0.155	0.146
	(1.75)	(3.89)**	(5.20)**	(3.40)**
Male 55-64	0.111	0.029	0.139	0.096
	(2.03)*	(0.49)	(3.24)**	(1.65)
Male 65+	-0.255	-0.37	-0.238	-0.178
	(4.18)**	(6.34)**	(5.20)**	(3.36)**
Female 20-24	-0.172	-0.011		-0.262
	(4.70)**	(0.10)		(3.15)**

Table B.11 Concentration Indices for Selected Health Determinants, St. John's 1985-2001				
	1985	**1990**	**1995**	**2001**
Female 25-34	0.12	0.082	-0.001	-0.067
	(5.19)**	(2.89)**	(0.02)	(1.35)
Female 35-44	0.017	0.024	-0.029	-0.039
	(0.65)	(0.93)	(1.24)	(1.08)
Female 45-54	0.036	0.045	0.118	0.06
	(0.96)	(1.22)	(4.12)**	(1.51)
Female 55-64	-0.1	-0.152	-0.066	-0.134
	(1.99)*	(3.26)**	(1.67)	(2.30)*
Female 65+	-0.346	-0.47	-0.279	-0.444
	(7.22)**	(9.56)**	(6.89)**	(6.45)**
Income	0.031	0.034	0.036	0.041
	(85.30)**	(60.52)**	(77.13)**	(80.32)**
High School	0.03	0.099	-0.011	-0.177
	(1.83)	(5.23)**	(0.77)	(6.44)**
Community College	0.106	0.032	0.061	0.068
	(6.70)**	(2.04)*	(3.99)**	(2.58)*
University	0.394	0.46	0.426	0.358
	(16.55)**	(17.82)**	(20.55)**	(16.70)**
Married	0.067	0.032	0.049	0.091
	(8.29)**	(4.04)**	(7.04)**	(7.80)**
Separated/Divorced	-0.129	-0.144	-0.212	-0.252
	(2.02)*	(2.59)**	(4.40)**	(4.10)**
Widowed	-0.253	-0.36	-0.293	-0.397
	(4.61)**	(6.17)**	(6.83)**	(6.67)**
Employed	0.147	0.168	0.216	0.173
	(19.39)**	(21.77)**	(28.15)**	(16.86)**
Seasonally Employed			-0.192	
			(5.38)**	
Unemployed	-0.312	-0.316	-0.401	-0.491
	(7.29)**	(4.78)**	(10.79)**	(3.87)**
Student	-0.229	-0.136		-0.139
	(4.85)**	(1.51)		(2.10)*
Retired	-0.182	-0.288	-0.205	-0.131
	(3.91)**	(7.81)**	(8.15)**	(2.85)**
Fisheries Benefits			-0.267	
			(5.29)**	
Long-term Disability	-0.195	-0.372	-0.24	-0.329
	(4.54)**	(7.99)**	(7.81)**	(6.95)**
Restricted Activity		-0.385	-0.252	-0.283
		(4.34)**	(5.34)**	(4.21)**
Number of Observations	3070	2447	3294	1540

(Robust z-statistic in parentheses)
** significant at 1%
* significant at 5%

Table B.12 Means for Selected Health Determinants, St. John's 1985-2001				
	1985	**1990**	**1995**	**2001**
Predicted HUI	0.889	0.886	0.885	0.869
Male 25-34	0.141	0.130		0.081
Male 35-44	0.109	0.135	0.128	0.137
Male 45-54	0.063	0.088	0.097	0.108
Male 55-64	0.039	0.048	0.056	0.072
Male 65+	0.036	0.047	0.047	0.058
Female 20-24	0.076	0.007		0.031
Female 25-34	0.165	0.146	0.152	0.085
Female 35-44	0.111	0.159	0.148	0.140
Female 45-54	0.070	0.090	0.106	0.127
Female 55-64	0.051	0.064	0.064	0.065
Female 65+	0.064	0.081	0.071	0.051
Income	9.362	9.900	9.990	10.029
High School	0.275	0.257	0.308	0.200
Community College	0.278	0.350	0.285	0.212
University	0.154	0.175	0.184	0.281
Married	0.692	0.755	0.747	0.674
Separated/Divorced	0.036	0.056	0.063	0.073
Widowed	0.053	0.066	0.062	0.066
Employed	0.624	0.661	0.554	0.629
Seasonally Employed			0.064	
Unemployed	0.055	0.038	0.075	0.020
Student	0.054	0.015		0.051
Retired	0.063	0.110	0.147	0.086
Fisheries Benefits			0.031	
Long-term Disability	0.066	0.076	0.107	0.102
Activity Restriction		0.024	0.048	0.052
Number of Observations	3070	2447	3294	1540

Table B.13 Regression Coefficients for Social Support and other Selected Health Determinants							
	Glace Bay	**Kings County**	**Newfoundland**	**St.John's CHB**	**Eastern CHB**	**Central CHB**	**Western CHB**
Male 25-34	-0.011	-0.016	0.005	-0.002	0.015	0.019	0.001
	(-0.66)	(-0.54)	(0.54)	(0.16)	(0.86)	(1.05)	(0.06)
Male 35-44	-0.034	-0.024	0.006	0.007	0.012	0.017	0.000
	(2.12)*	(0.83)	(0.69)	(0.51)	(0.72)	(0.96)	(0.02)
Male 45-54	-0.041	-0.069	-0.009	-0.002	-0.01	0.008	-0.019
	(2.57)*	(2.26)*	(0.95)	(0.12)	(0.58)	(0.43)	(0.88)
Male 55-64	-0.027	-0.056	0.003	-0.011	-0.01	0.033	0.007
	(1.36)	(1.82)	(0.30)	(0.66)	(0.47)	(1.65)	(0.31)
Male 65+	-0.048	-0.077	0.015	0.013	0.007	0.037	0.019
	(2.11)*	(2.31)*	(1.34)	(0.65)	(0.33)	(1.70)	(0.74)
Female 20-24	-0.003	-0.009	0.017	0.01	0.04	0.042	-0.008
	(0.22)	(0.28)	(1.51)	(0.64)	(1.80)	(1.90)	(0.28)
Female 25-34	-0.014	-0.008	0.019	0.024	0.029	0.027	0.003
	(1.04)	(0.28)	(2.10)*	(1.63)	(1.70)	(1.45)	(0.16)
Female 35-44	-0.023	-0.014	0.014	0.018	0.021	0.022	0.006
	(1.55)	(0.49)	(1.61)	(1.23)	(1.30)	(1.26)	(0.26)
Female 45-54	-0.046	-0.027	-0.002	-0.004	-0.003	0.023	-0.012
	(2.87)**	(0.92)	(0.18)	(0.24)	(0.18)	(1.26)	(0.53)
Female 55-64	-0.038	-0.056	0.004	0.026	0.001	0.009	-0.005
	(1.96)*	(1.79)	(0.36)	(1.36)	(0.07)	(0.41)	(0.19)
Female 65+	-0.041	-0.042	0.016	0.05	-0.01	0.039	0.000
	(1.87)	(1.28)	(1.35)	(2.49)*	(0.39)	(1.70)	(0.01)
Income	0.018	0.026	0.021	0.022	0.025	0.011	0.023
	(3.28)**	(4.55)**	(8.52)**	(5.10)**	(4.55)**	(2.16)*	(4.54)**
High School	0.031	0.022	0.000	0.000	0.002	0.003	-0.003
	(3.33)**	(2.29)*	(0.09)	(0.03)	(0.26)	(0.36)	(0.39)
Community College	0.021	0.036	0.000	-0.006	0.002	0.000	0.002
	(2.26)*	(4.08)**	(0.08)	(0.70)	(0.26)	(0.05)	(0.32)
University	0.043	0.053	0.011	0.016	-0.001	0.01	0.011
	(4.57)**	(5.72)**	(2.72)**	(2.55)*	(0.14)	(1.08)	(1.34)
Married	-0.004	0.011	-0.009	-0.01	-0.012	-0.024	0.001
	(0.47)	(0.92)	(1.98)*	(1.52)	(1.26)	(2.34)*	(0.08)
Separated/Divorced	-0.011	0.005	-0.008	-0.016	0.013	0.002	-0.021
	(0.78)	(0.32)	(0.92)	(1.13)	(0.85)	(0.09)	(1.11)
Widowed	0.01	0.003	0.015	0.005	0.023	-0.001	0.028
	(0.64)	(0.14)	(1.70)	(0.39)	(1.26)	(0.05)	(1.37)

Table B.13 Regression Coefficients for Social Support and other Selected Health Determinants

	Glace Bay	Kings County	Newfoundland	St.John's CHB	Eastern CHB	Central CHB	Western CHB
Employed	0.047	0.043	0.017	0.012	0.008	0.028	0.025
	(3.68)**	(3.50)**	(4.48)**	(1.38)	(1.04)	(3.55)**	(3.23)**
Unemployed	0.039	0.018	0.014	0.000	0.021	0.012	0.023
	(2.70)**	(0.99)	(1.62)	(0.02)	(1.22)	(0.80)	(1.06)
Student	0.031	0.031	0.005	0.008	0.000	0.024	-0.007
	(2.10)*	(1.87)	(0.64)	(0.63)	(0.01)	(1.47)	(0.41)
Retired	0.014	0.046	0.007	-0.008	0.014	0.015	0.003
	(0.92)	(3.25)**	(1.05)	(0.72)	(0.99)	(1.28)	(0.21)
Long-term Disability	-0.056	-0.05	-0.131	-0.12	-0.131	-0.12	-0.152
	(5.43)**	(4.25)**	(16.88)**	(7.60)**	(8.71)**	(8.26)**	(9.41)**
Activity Restriction	-0.115	-0.115	-0.083	-0.099	-0.082	-0.092	-0.064
	(9.18)**	(8.27)**	(7.63)**	(4.54)**	(3.87)**	(4.22)**	(3.04)**
Social Support	0.02	0.014	0.018	0.017	0.017	0.017	0.021
	(2.62)**	(2.49)*	(4.43)**	(2.71)**	(1.71)	(1.92)	(2.49)*
Constant	0.672	0.569	0.647	0.647	0.612	0.734	0.618
	(12.60)**	(8.86)**	(25.93)**	(15.09)**	(10.73)**	(14.11)**	(12.32)**
Number of Observations	1423	1488	6129	1507	1539	1544	1539

(Robust z-statistic in parentheses)
** significant at 1%
* significant at 5%

Table B.14 Concentration Indices for Social Support and other Selected Health Determinants							
	Glace Bay	**Kings County**	**Newfoundland**	**St.John's CHB**	**Eastern CHB**	**Central CHB**	**Western CHB**
Predicted HUI	0.018	0.019	0.019	0.017	0.02	0.015	0.023
	(11.06)**	(12.64)**	(36.89)**	(16.74)**	(18.24)**	(14.06)**	(20.55)**
Male 25-34	0.014	-0.123	0.155	0.118	0.244	0.09	0.122
	(0.21)	(1.73)	(5.43)**	(2.47)*	(3.98)**	(1.49)	(2.05)*
Male 35-44	-0.042	0.026	0.132	0.172	0.097	0.128	0.08
	(0.79)	(0.72)	(6.63)**	(4.88)**	(2.50)*	(2.91)**	(1.91)
Male 45-54	0.185	0.168	0.181	0.136	0.172	0.217	0.235
	(4.23)**	(4.09)**	(8.88)**	(3.13)**	(4.52)**	(5.19)**	(5.97)**
Male 55-64	0.214	0.199	0.018	0.102	-0.012	0.033	0.038
	(3.94)**	(3.97)**	(0.78)	(1.68)	(0.23)	(0.78)	(0.92)
Male 65+	0.018	0.081	-0.187	-0.182	-0.191	-0.132	-0.224
	(0.37)	(1.58)	(7.26)**	(3.25)**	(3.70)**	(2.66)**	(4.54)**
Female 20-24	-0.199	-0.19	-0.155	-0.24	0.063	-0.378	-0.233
	(2.72)**	(1.65)	(2.68)**	(2.88)**	(0.51)	(2.79)**	(1.67)
Female 25-34	-0.221	-0.284	-0.043	-0.065	-0.009	-0.031	-0.075
	(3.21)**	(4.63)**	(1.68)	(1.24)	(0.19)	(0.63)	(1.31)
Female 35-44	-0.168	-0.121	-0.026	-0.043	-0.019	0.006	-0.047
	(4.34)**	(3.61)**	(1.44)	(1.20)	(0.55)	(0.15)	(1.34)
Female 45-54	0.157	0.03	0.088	0.056	0.081	0.129	0.091
	(3.96)**	(0.81)	(4.37)**	(1.40)	(2.00)*	(3.43)**	(2.19)*
Female 55-64	-0.036	-0.008	-0.193	-0.138	-0.218	-0.258	-0.106
	(0.75)	(0.15)	(7.83)**	(2.33)*	(4.70)**	(5.44)**	(2.34)*
Female 65+	-0.096	-0.096	-0.395	-0.439	-0.476	-0.326	-0.358
	(2.35)*	(1.69)	(13.23)**	(6.37)**	(7.24)**	(6.26)**	(6.05)**
Income	0.038	0.032	0.042	0.041	0.041	0.041	0.043
	(57.69)**	(39.74)**	(224.18)**	(78.03)**	(116.75)**	(101.33)**	(127.31)**
High School	-0.099	0.000	-0.053	-0.178	-0.046	0.046	-0.025
	(3.61)**	(0.00)	(4.16)**	(6.28)**	(1.80)	(1.94)	(1.02)
Community College	0.097	-0.023	0.18	0.064	0.208	0.209	0.227
	(3.71)**	(1.01)	(12.52)**	(2.33)*	(7.03)**	(6.95)**	(7.62)**
University	0.475	0.27	0.496	0.354	0.489	0.573	0.556
	(10.95)**	(10.32)**	(29.16)**	(16.70)**	(12.40)**	(13.65)**	(13.12)**
Married	0.121	0.058	0.057	0.089	0.049	0.046	0.081
	(10.03)**	(6.87)**	(11.31)**	(7.78)**	(4.96)**	(4.98)**	(8.52)**
Separated/Divorced	-0.33	-0.16	-0.231	-0.251	-0.224	-0.119	-0.371
	(6.99)**	(3.04)**	(6.38)**	(4.09)**	(2.70)**	(1.34)	(5.31)**

Table B.14 Concentration Indices for Social Support and other Selected Health Determinants

	Glace Bay	Kings County	Newfoundland	St.John's CHB	Eastern CHB	Central CHB	Western CHB
Widowed	-0.204	-0.358	-0.399	-0.393	-0.468	-0.39	-0.391
	(4.37)**	(5.00)**	(12.48)**	(6.25)**	(7.14)**	(5.96)**	(5.91)**
Employed	0.198	0.074	0.238	0.171	0.271	0.252	0.235
	(9.60)**	(5.36)**	(39.96)**	(16.40)**	(22.14)**	(18.91)**	(18.68)**
Unemployed	-0.188	-0.443	-0.378	-0.496	-0.274	-0.259	-0.542
	(3.88)**	(6.67)**	(8.68)**	(4.02)**	(3.57)**	(3.98)**	(4.83)**
Student	-0.026	0.05	-0.046	-0.134	0.212	-0.255	-0.123
	(0.49)	(0.71)	(1.06)	(2.00)*	(1.86)	(2.41)*	(1.54)
Retired	0.011	0.053	-0.163	-0.134	-0.252	-0.133	-0.127
	(0.46)	(1.72)	(7.49)**	(2.88)**	(5.43)**	(3.32)**	(2.98)**
Long-term Disability	-0.077	-0.129	-0.305	-0.327	-0.301	-0.278	-0.29
	(3.18)**	(4.04)**	(15.63)**	(7.04)**	(8.47)**	(7.18)**	(7.45)**
Activity Restriction	-0.118	-0.147	-0.316	-0.286	-0.299	-0.38	-0.284
	(4.39)**	(4.59)**	(10.39)**	(4.19)**	(5.50)**	(6.31)**	(4.64)**
Social Support	-0.009	0.008	-0.007	-0.008	0.011	-0.004	0.000
	(1.07)	(0.73)	(1.99)*	(0.86)	(1.76)	(0.74)	(0.01)
Number of Observations	1423	1488	6129	1507	1539	1544	1539

(Robust z-statistic in parentheses)
** significant at 1%
* significant at 5%

Table B.15 Means for Social Support and other Selected Health Determinants							
	Glace Bay	**Kings County**	**Newfoundland**	**St.John's CHB**	**Eastern CHB**	**Central CHB**	**Western CHB**
Predicted HUI	0.835	0.847	0.857	0.871	0.855	0.857	0.847
Male 25-34	0.050	0.039	0.065	0.082	0.057	0.058	0.065
Male 35-44	0.078	0.125	0.122	0.139	0.119	0.115	0.115
Male 45-54	0.118	0.115	0.126	0.108	0.141	0.126	0.131
Male 55-64	0.082	0.085	0.091	0.071	0.087	0.106	0.100
Male 65+	0.073	0.091	0.067	0.056	0.069	0.073	0.071
Female 20-24	0.033	0.015	0.019	0.030	0.016	0.012	0.018
Female 25-34	0.062	0.059	0.080	0.085	0.081	0.082	0.074
Female 35-44	0.134	0.150	0.138	0.140	0.145	0.121	0.146
Female 45-54	0.139	0.142	0.123	0.126	0.123	0.123	0.118
Female 55-64	0.084	0.085	0.078	0.066	0.081	0.085	0.081
Female 65+	0.118	0.086	0.064	0.050	0.063	0.080	0.061
Income	9.980	10.292	9.812	10.037	9.737	9.750	9.727
High School	0.237	0.259	0.231	0.197	0.235	0.250	0.241
Community College	0.247	0.296	0.195	0.211	0.191	0.184	0.193
University	0.129	0.231	0.161	0.284	0.131	0.113	0.120
Married	0.621	0.789	0.758	0.674	0.783	0.806	0.766
Separated/Divorced	0.105	0.077	0.054	0.074	0.042	0.041	0.060
Widowed	0.102	0.050	0.067	0.066	0.075	0.067	0.061
Employed	0.343	0.559	0.524	0.632	0.487	0.472	0.510
Unemployed	0.110	0.051	0.032	0.021	0.036	0.044	0.026
Student	0.084	0.045	0.031	0.051	0.022	0.019	0.032
Retired	0.316	0.236	0.097	0.086	0.090	0.115	0.098
Long-term Disability	0.289	0.206	0.128	0.102	0.146	0.130	0.133
Activity Restriction	0.246	0.188	0.063	0.052	0.072	0.068	0.061
Social Support	0.775	0.628	0.815	0.711	0.867	0.858	0.823
Number of Observations	1423	1488	6129	1507	1539	1544	1539

Table B.16 Regression Coefficients for Stress and other Select Health Determinants							
	Glace Bay	**Kings County**	**Newfoundland**	**Saint John's CHB**	**Eastern CHB**	**Central CHB**	**Western CHB**
Predicted HUI	-0.012	-0.004	0.013	0.001	0.018	0.031	0.018
	(-0.72)	(-0.13)	(1.51)	(0.08)	(1.03)	(1.78)	(0.85)
Male 25-34	-0.03	-0.012	0.012	0.012	0.009	0.026	0.013
	(1.86)	(0.45)	(1.33)	(0.82)	(0.55)	(1.47)	(0.62)
Male 35-44	-0.04	-0.057	-0.002	0.004	-0.009	0.016	-0.002
	(2.43)*	(1.99)*	(0.17)	(0.23)	(0.56)	(0.88)	(0.10)
Male 45-54	-0.036	-0.055	0.001	-0.017	-0.02	0.035	0.016
	(1.76)	(1.84)	(0.10)	(1.01)	(1.01)	(1.78)	(0.72)
Male 55-64	-0.059	-0.081	0.01	0.005	-0.006	0.037	0.022
	(2.55)*	(2.53)*	(0.93)	(0.26)	(0.29)	(1.74)	(0.92)
Male 65+	0.003	0.002	0.025	0.015	0.041	0.05	0.012
	(0.24)	(0.07)	(2.33)*	(0.90)	(2.04)*	(2.40)*	(0.41)
Female 20-24	-0.014	0.001	0.027	0.029	0.035	0.036	0.019
	(0.94)	(0.04)	(3.06)**	(1.95)	(2.07)*	(2.00)*	(0.93)
Female 25-34	-0.024	-0.002	0.023	0.023	0.023	0.036	0.023
	(1.59)	(0.06)	(2.60)**	(1.52)	(1.45)	(2.03)*	(1.08)
Female 35-44	-0.047	-0.016	0.005	0.000	-0.004	0.029	0.009
	(2.90)**	(0.56)	(0.51)	(0.01)	(0.25)	(1.61)	(0.39)
Female 45-54	-0.039	-0.05	0.006	0.025	-0.007	0.013	0.01
	(1.99)*	(1.66)	(0.54)	(1.35)	(0.36)	(0.63)	(0.43)
Female 55-64	-0.044	-0.041	0.016	0.048	-0.01	0.038	0.006
	(2.02)*	(1.29)	(1.38)	(2.48)*	(0.42)	(1.67)	(0.23)
Female 65+	0.013	0.024	0.019	0.021	0.023	0.01	0.02
	(2.37)*	(4.28)**	(7.94)**	(4.94)**	(4.20)**	(1.95)	(4.27)**
Income	0.03	0.026	0.000	-0.001	0.003	-0.001	-0.002
	(3.23)**	(2.74)**	(0.08)	(0.17)	(0.38)	(0.07)	(0.29)
High School	0.024	0.039	0.002	-0.004	0.003	0.004	0.005
	(2.63)**	(4.51)**	(0.49)	(0.54)	(0.36)	(0.47)	(0.61)
Community College	0.044	0.06	0.016	0.02	0.005	0.015	0.018
	(4.74)**	(6.45)**	(4.16)**	(3.14)**	(0.52)	(1.73)	(2.10)*
University	0.001	0.014	-0.005	-0.008	-0.001	-0.022	0.001
	(0.10)	(1.15)	(1.20)	(1.17)	(0.14)	(2.24)*	(0.09)
Married	-0.005	0.008	0.001	-0.012	0.028	0.013	-0.014
	(0.39)	(0.53)	(0.17)	(0.86)	(1.87)	(0.85)	(0.82)
Separated/Divorced	0.005	0.007	0.017	0.004	0.021	0.001	0.035
	(0.36)	(0.31)	(1.94)	(0.31)	(1.15)	(0.03)	(1.91)

Table B.16 Regression Coefficients for Stress and other Select Health Determinants							
	Glace Bay	**Kings County**	**Newfoundland**	**Saint John's CHB**	**Eastern CHB**	**Central CHB**	**Western CHB**
Widowed	0.05	0.049	0.022	0.02	0.009	0.035	0.028
	(3.96)**	(3.99)**	(5.84)**	(2.38)*	(1.26)	(4.50)**	(3.86)**
Employed	0.04	0.024	0.015	0.009	0.016	0.012	0.027
	(2.78)**	(1.33)	(1.77)	(0.51)	(0.94)	(0.85)	(1.24)
Unemployed	0.036	0.04	0.007	0.011	0.005	0.027	-0.005
	(2.40)*	(2.43)*	(0.89)	(0.80)	(0.27)	(1.68)	(0.30)
Student	0.011	0.043	0.002	-0.005	0.009	0.007	-0.005
	(0.75)	(3.01)**	(0.37)	(0.45)	(0.72)	(0.66)	(0.42)
Retired	-0.052	-0.05	-0.124	-0.116	-0.125	-0.11	-0.143
	(4.96)**	(4.23)**	(16.43)**	(7.35)**	(8.53)**	(7.78)**	(9.38)**
Long-term Disability	-0.11	-0.109	-0.079	-0.093	-0.077	-0.086	-0.063
	(8.69)**	(7.84)**	(7.59)**	(4.33)**	(3.92)**	(4.18)**	(3.16)**
Activity Restriction	-0.03	-0.029	-0.017	-0.013	-0.011	-0.014	-0.027
	(3.28)**	(3.09)**	(4.51)**	(1.70)	(1.35)	(1.97)*	(3.45)**
Not Very Stressful	-0.045	-0.051					
	(4.76)**	(5.14)**					
Somewhat Stressful	-0.095	-0.085					
	(4.94)**	(5.12)**					
Very Stressful	0.769	0.616					
	(14.58)**	(9.74)**					
Not Very Stressful			-0.038	-0.033	-0.036	-0.038	-0.044
			(10.00)**	(4.09)**	(4.75)**	(5.17)**	(5.78)**
A Bit Stressful			-0.064	-0.045	-0.059	-0.08	-0.074
			(11.30)**	(4.61)**	(4.91)**	(6.62)**	(6.41)**
Quite a Bit Stressful			-0.105	-0.089	-0.114	-0.108	-0.112
			(7.81)**	(4.10)**	(3.79)**	(3.94)**	(3.81)**
Extremely Stressful			0.703	0.684	0.673	0.785	0.679
			(30.02)**	(16.34)**	(12.70)**	(16.48)**	(14.13)**
Number of Observations	1413	1481	6331	1537	1595	1601	1598

(Robust z-statistic in parentheses)
** significant at 1%
* significant at 5%

Table B.17 Concentration Indices for Stress and other Select Health Determinants							
	Glace Bay	**Kings County**	**Newfoundland**	**Saint John's CHB**	**Eastern CHB**	**Central CHB**	**Western CHB**
Predicted HUI	0.018	0.019	0.019	0.018	0.019	0.015	0.022
	(10.56)**	(12.54)**	(35.50)**	(16.21)**	(16.81)**	(13.72)**	(19.70)**
Male 25-34	0.015	-0.124	0.154	0.114	0.229	0.076	0.144
	(0.22)	(1.75)	(5.54)**	(2.41)*	(3.82)**	(1.27)	(2.58)*
Male 35-44	-0.059	0.025	0.138	0.174	0.107	0.144	0.085
	(1.12)	(0.67)	(7.18)**	(4.92)**	(2.79)**	(3.50)**	(2.12)*
Male 45-54	0.191	0.174	0.187	0.145	0.182	0.205	0.245
	(4.39)**	(4.13)**	(9.47)**	(3.38)**	(4.83)**	(4.94)**	(6.39)**
Male 55-64	0.213	0.202	0.025	0.102	-0.006	0.045	0.046
	(4.05)**	(4.13)**	(1.05)	(1.77)	(0.13)	(1.04)	(1.13)
Male 65+	0.012	0.08	-0.19	-0.18	-0.214	-0.133	-0.224
	(0.25)	(1.56)	(7.71)**	(3.33)**	(4.25)**	(2.71)**	(4.60)**
Female 20-24	-0.199	-0.187	-0.175	-0.26	0.047	-0.401	-0.245
	(2.67)**	(1.62)	(3.12)**	(3.08)**	(0.39)	(2.96)**	(1.94)
Female 25-34	-0.223	-0.282	-0.047	-0.072	-0.003	-0.042	-0.076
	(3.19)**	(4.78)**	(1.83)	(1.40)	(0.06)	(0.84)	(1.37)
Female 35-44	-0.166	-0.122	-0.026	-0.04	-0.014	0.012	-0.059
	(4.34)**	(3.64)**	(1.45)	(1.10)	(0.39)	(0.32)	(1.70)
Female 45-54	0.159	0.03	0.09	0.061	0.077	0.132	0.099
	(3.94)**	(0.79)	(4.55)**	(1.53)	(1.96)*	(3.37)**	(2.45)*
Female 55-64	-0.021	-0.017	-0.197	-0.136	-0.217	-0.268	-0.119
	(0.45)	(0.33)	(8.07)**	(2.35)*	(4.82)**	(5.87)**	(2.73)**
Female 65+	-0.1	-0.089	-0.396	-0.439	-0.485	-0.323	-0.362
	(2.48)*	(1.50)	(13.39)**	(6.42)**	(7.67)**	(6.33)**	(6.27)**
Income	0.038	0.032	0.042	0.041	0.041	0.041	0.044
	(57.40)**	(39.68)**	(231.06)**	(79.81)**	(119.35)**	(103.13)**	(136.43)**
High School	-0.101	-0.001	-0.048	-0.177	-0.038	0.044	-0.017
	(3.78)**	(0.03)	(3.90)**	(6.44)**	(1.48)	(1.85)	(0.69)
Community College	0.097	-0.026	0.183	0.066	0.209	0.206	0.236
	(3.67)**	(1.11)	(12.69)**	(2.46)*	(7.15)**	(6.78)**	(8.10)**
University	0.473	0.27	0.495	0.357	0.481	0.576	0.551
	(11.06)**	(10.09)**	(29.14)**	(16.41)**	(11.57)**	(13.41)**	(13.26)**
Married	0.123	0.059	0.058	0.09	0.048	0.047	0.081
	(10.08)**	(6.97)**	(11.83)**	(7.93)**	(5.00)**	(5.26)**	(8.74)**
Separated/Divorced	-0.34	-0.161	-0.231	-0.252	-0.23	-0.117	-0.361
	(6.96)**	(3.00)**	(6.47)**	(3.98)**	(2.93)**	(1.39)	(5.54)**

Table B.17 Concentration Indices for Stress and other Select Health Determinants

	Glace Bay	Kings County	Newfoundland	Saint John's CHB	Eastern CHB	Central CHB	Western CHB
Widowed	-0.207	-0.364	-0.398	-0.394	-0.46	-0.389	-0.391
	(4.52)**	(4.77)**	(12.70)**	(6.44)**	(7.18)**	(6.39)**	(6.18)**
Employed	0.198	0.074	0.24	0.173	0.272	0.255	0.239
	(9.71)**	(5.17)**	(40.85)**	(16.77)**	(22.76)**	(19.83)**	(19.22)**
Unemployed	-0.191	-0.446	-0.372	-0.494	-0.285	-0.252	-0.522
	(4.02)**	(6.51)**	(8.50)**	(3.78)**	(3.67)**	(3.96)**	(4.78)**
Student	-0.027	0.054	-0.046	-0.14	0.196	-0.248	-0.092
	(0.51)	(0.74)	(1.07)	(2.09)*	(1.89)	(2.37)*	(1.18)
Retired	0.014	0.054	-0.158	-0.131	-0.251	-0.126	-0.118
	(0.61)	(1.74)	(7.45)**	(2.78)**	(5.72)**	(3.34)**	(2.80)**
Long-term Disability	-0.076	-0.128	-0.302	-0.328	-0.299	-0.277	-0.287
	(3.03)**	(3.93)**	(15.52)**	(7.09)**	(8.30)**	(6.89)**	(7.72)**
Activity Restriction	-0.117	-0.146	-0.307	-0.274	-0.282	-0.367	-0.285
	(4.13)**	(4.34)**	(10.23)**	(3.98)**	(5.17)**	(5.90)**	(4.71)**
Not Very Stressful	0.012	0.031					
	(0.56)	(1.55)					
Somewhat Stressful	-0.005	-0.013					
	(0.26)	(0.81)					
Very Stressful	-0.225	-0.087					
	(3.63)**	(1.47)					
Not Very Stressful			0.029	0.003	0.013	0.048	0.059
			(2.29)*	(0.11)	(0.50)	(1.98)*	(2.38)*
A Bit Stressful			0.01	0.027	0.015	-0.017	-0.01
			(0.62)	(1.70)	(0.95)	(1.00)	(0.63)
Quite a Bit Stressful			0.038	0.004	0.02	0.049	0.037
			(-1.88)	(0.11)	(0.45)	(1.20)	(0.93)
Extremely Stressful			-0.061	-0.031	-0.054	0.047	-0.259
			(1.27)	(0.34)	(0.58)	(0.47)	(2.48)*
Number of Observations	1413	1481	6331	1537	1595	1601	1598

(Robust z-statistic in parentheses)
** significant at 1%
* significant at 5%

Table B.18 Means for Stress and other Select Health Determinants							
	Glace Bay	**Kings County**	**Newfoundland**	**Saint John's CHB**	**Eastern CHB**	**Central CHB**	**Western CHB**
Predicted HUI	0.835	0.846	0.858	0.870	0.855	0.858	0.848
Male 25-34	0.051	0.039	0.065	0.081	0.057	0.057	0.065
Male 35-44	0.077	0.125	0.122	0.137	0.120	0.119	0.114
Male 45-54	0.118	0.114	0.126	0.108	0.138	0.127	0.129
Male 55-64	0.082	0.085	0.091	0.072	0.089	0.104	0.099
Male 65+	0.071	0.090	0.068	0.058	0.070	0.073	0.072
Female 20-24	0.032	0.015	0.019	0.031	0.016	0.012	0.018
Female 25-34	0.062	0.059	0.081	0.085	0.082	0.081	0.074
Female 35-44	0.135	0.151	0.136	0.140	0.141	0.117	0.144
Female 45-54	0.140	0.142	0.123	0.126	0.124	0.121	0.120
Female 55-64	0.084	0.086	0.079	0.065	0.080	0.086	0.083
Female 65+	0.118	0.086	0.065	0.051	0.063	0.081	0.063
Income	9.982	10.291	9.804	10.032	9.736	9.746	9.713
High School	0.237	0.262	0.231	0.200	0.233	0.249	0.241
Community College	0.247	0.296	0.193	0.212	0.191	0.181	0.189
University	0.130	0.231	0.160	0.281	0.133	0.112	0.120
Married	0.622	0.788	0.757	0.675	0.784	0.804	0.763
Separated/Divorced	0.104	0.078	0.053	0.073	0.041	0.042	0.058
Widowed	0.102	0.049	0.069	0.066	0.075	0.072	0.063
Employed	0.343	0.560	0.522	0.630	0.485	0.472	0.504
Unemployed	0.111	0.052	0.031	0.020	0.036	0.044	0.025
Student	0.085	0.045	0.031	0.051	0.024	0.019	0.033
Retired	0.314	0.236	0.098	0.087	0.089	0.118	0.098
Long-term Disability	0.288	0.207	0.126	0.101	0.144	0.126	0.132
Activity Restriction	0.245	0.187	0.063	0.051	0.074	0.066	0.061
Not Very Stressful	0.362	0.346					
Somewhat Stressful	0.400	0.469					
Very Stressful	0.070	0.068					
Not Very Stressful			0.236	0.223	0.234	0.247	0.241
A Bit Stressful			0.451	0.453	0.468	0.416	0.468
Quite a Bit Stressful			0.130	0.157	0.112	0.127	0.123
Extremely Stressful			0.027	0.033	0.028	0.025	0.025
Number of Observations	1413	1481	6331	1537	1595	1601	1598

Table B.19 Regression Coefficients for Income and Financial Circumstances					
	Newfoundland	**St. John's CHB**	**Eastern CHB**	**Central CHB**	**Western CHB**
Male 25-34	0.011	0.002	0.015	0.023	0.015
	(1.22)	(0.10)	(0.92)	(1.28)	(0.70)
Male 35-44	0.013	0.014	0.015	0.021	0.012
	(1.48)	(0.96)	(0.95)	(1.21)	(0.58)
Male 45-54	-0.002	0.005	-0.008	0.011	-0.003
	(0.18)	(0.34)	(0.47)	(0.59)	(0.15)
Male 55-64	0.005	-0.012	-0.013	0.034	0.02
	(0.55)	(0.69)	(0.66)	(1.70)	(0.90)
Male 65+	0.017	0.014	0.007	0.041	0.024
	(1.58)	(0.73)	(0.34)	(1.84)	(0.99)
Female 20-24	0.02	0.008	0.043	0.048	-0.002
	(1.81)	(0.51)	(2.13)*	(2.16)*	(0.06)
Female 25-34	0.023	0.03	0.033	0.024	0.014
	(2.59)**	(1.98)*	(1.99)*	(1.28)	(0.66)
Female 35-44	0.02	0.023	0.021	0.03	0.018
	(2.30)*	(1.52)	(1.35)	(1.67)	(0.86)
Female 45-54	0.006	0.005	-0.003	0.027	0.008
	(0.67)	(0.32)	(0.19)	(1.42)	(0.36)
Female 55-64	0.008	0.026	0.002	0.012	0.008
	(0.75)	(1.37)	(0.11)	(0.55)	(0.34)
Female 65+	0.017	0.046	-0.003	0.034	0.007
	(1.45)	(2.31)*	(0.12)	(1.52)	(0.27)
Income	0.01	0.012	0.012	0.000	0.014
	(3.65)**	(2.37)*	(1.99)*	(0.01)	(2.46)*
High School	0.001	-0.002	0.004	0.003	-0.002
	(0.24)	(0.20)	(0.51)	(0.47)	(0.28)
Community College	0.003	-0.004	0.007	0.004	0.004
	(0.73)	(0.51)	(0.99)	(0.49)	(0.51)
University	0.014	0.016	0.005	0.013	0.015
	(3.45)**	(2.52)*	(0.51)	(1.49)	(1.82)
Married	-0.007	-0.012	-0.006	-0.017	0.001
	(1.49)	(1.69)	(0.63)	(1.78)	(0.05)
Separated/Divorced	0.002	-0.009	0.025	0.013	-0.016
	(0.22)	(0.67)	(1.64)	(0.87)	(0.90)
Widowed	0.019	0.003	0.02	0.008	0.036
	(2.13)*	(0.27)	(1.10)	(0.44)	(1.86)
Employed	0.018	0.014	0.006	0.029	0.025
	(4.62)**	(1.65)	(0.85)	(3.67)**	(3.38)**
Unemployed	0.016	0.004	0.027	0.011	0.021
	(1.82)	(0.25)	(1.74)	(0.75)	(0.93)
Student	0.006	0.005	0.003	0.021	0.000
	(0.76)	(0.39)	(0.20)	(1.23)	(0.00)
Retired	0.004	-0.007	0.009	0.012	-0.001
	(0.69)	(0.59)	(0.69)	(1.05)	(0.05)
Long-term Disability	-0.129	-0.118	-0.13	-0.12	-0.144
	(16.86)**	(7.44)**	(8.82)**	(8.29)**	(9.25)**
Activity Restriction	-0.089	-0.099	-0.089	-0.1	-0.072
	(8.35)**	(4.61)**	(4.30)**	(4.64)**	(3.48)**
Good	-0.012	-0.016	-0.014	-0.014	0.000
	(3.18)**	(2.64)**	(1.90)	(1.86)	(0.02)

Table B.19 Regression Coefficients for Income and Financial Circumstances					
	Newfoundland	**St. John's CHB**	**Eastern CHB**	**Central CHB**	**Western CHB**
Satisfactory	-0.024	-0.028	-0.03	-0.027	-0.011
	(6.41)**	(4.14)**	(4.04)**	(3.58)**	(1.33)
Just Getting By	-0.037	-0.042	-0.042	-0.043	-0.019
	(7.57)**	(4.41)**	(4.18)**	(4.51)**	(1.96)
Can't Cope	-0.104	-0.109	-0.141	-0.071	-0.095
	(6.11)**	(2.97)**	(3.76)**	(2.73)**	(2.77)**
Constant	0.784	0.777	0.779	0.872	0.722
	(28.22)**	(15.41)**	(12.91)**	(15.82)**	(12.55)**
Number of Observations	6244	1507	1579	1584	1574

(Robust z-statistic in parentheses)
** significant at 1%
* significant at 5%

Table B.20 Concentration Indices for Income and Financial Circumstances					
	Newfoundland	**St. John's CHB**	**Eastern CHB**	**Central CHB**	**Western CHB**
Predicted HUI	0.019	0.019	0.02	0.015	0.022
	(35.82)**	(17.49)**	(17.16)**	(14.14)**	(20.16)**
Male 25-34	0.151	0.106	0.247	0.074	0.141
	(5.30)**	(2.16)*	(4.18)**	(1.20)	(2.53)*
Male 35-44	0.134	0.173	0.101	0.14	0.079
	(6.86)**	(4.94)**	(2.59)**	(3.32)**	(1.93)
Male 45-54	0.185	0.14	0.178	0.205	0.244
	(9.14)**	(3.18)**	(4.65)**	(5.07)**	(6.13)**
Male 55-64	0.023	0.096	-0.004	0.054	0.049
	(1.00)	(1.58)	(0.07)	(1.26)	(1.21)
Male 65+	-0.197	-0.202	-0.218	-0.137	-0.226
	(7.67)**	(3.59)**	(4.29)**	(2.77)**	(4.63)**
Female 20-24	-0.158	-0.251	0.116	-0.395	-0.236
	(2.68)**	(2.77)**	(0.95)	(2.95)**	(1.79)
Female 25-34	-0.043	-0.066	0.002	-0.045	-0.081
	(1.67)	(1.36)	(0.04)	(0.91)	(1.37)
Female 35-44	-0.028	-0.044	-0.022	0.009	-0.057
	(1.54)	(1.22)	(0.61)	(0.22)	(1.61)
Female 45-54	0.092	0.056	0.077	0.129	0.109
	(4.72)**	(1.40)	(1.87)	(3.43)**	(2.72)**
Female 55-64	-0.192	-0.117	-0.206	-0.262	-0.123
	(8.02)**	(1.95)	(4.47)**	(5.65)**	(2.82)**
Female 65+	-0.404	-0.448	-0.488	-0.33	-0.374
	(13.43)**	(6.48)**	(7.72)**	(6.44)**	(6.45)**
Income	0.042	0.041	0.041	0.041	0.044
	(229.45)**	(78.64)**	(119.01)**	(103.75)**	(134.63)**
High School	-0.05	-0.181	-0.034	0.041	-0.016
	(3.97)**	(6.62)**	(1.38)	(1.74)	(0.63)
Community College	0.181	0.063	0.208	0.203	0.233
	(12.34)**	(2.35)*	(7.15)**	(6.72)**	(7.63)**
University	0.493	0.354	0.481	0.575	0.548
	(28.76)**	(16.41)**	(11.99)**	(12.77)**	(12.91)**
Married	0.057	0.09	0.048	0.048	0.079
	(11.51)**	(7.72)**	(5.05)**	(5.41)**	(8.23)**

Table B.20 Concentration Indices for Income and Financial Circumstances					
	Newfoundland	**St. John's CHB**	**Eastern CHB**	**Central CHB**	**Western CHB**
Separated/Divorced	-0.226	-0.247	-0.233	-0.126	-0.345
	(6.28)**	(3.93)**	(2.88)**	(1.54)	(5.10)**
Widowed	-0.397	-0.393	-0.457	-0.391	-0.391
	(12.56)**	(6.55)**	(7.13)**	(6.48)**	(6.15)**
Employed	0.241	0.175	0.272	0.252	0.237
	(41.02)**	(16.68)**	(22.21)**	(18.83)**	(19.02)**
Unemployed	-0.369	-0.493	-0.285	-0.244	-0.514
	(8.62)**	(3.81)**	(3.72)**	(3.72)**	(4.81)**
Student	-0.031	-0.119	0.2	-0.266	-0.078
	(0.70)	(1.72)	(1.91)	(2.44)*	(0.98)
Retired	-0.157	-0.136	-0.25	-0.127	-0.116
	(7.40)**	(2.96)**	(5.93)**	(3.33)**	(2.70)**
Long-term Disability	-0.307	-0.34	-0.299	-0.285	-0.286
	(15.75)**	(7.38)**	(8.24)**	(7.01)**	(7.68)**
Activity Restriction	-0.306	-0.277	-0.288	-0.365	-0.285
	(10.13)**	(4.24)**	(5.16)**	(6.06)**	(4.78)**
Good	0.248	0.213	0.285	0.223	0.26
	(20.04)**	(9.18)**	(10.53)**	(8.83)**	(10.39)**
Satisfactory	0.021	-0.047	0.02	0.048	0.042
	(1.90)	(2.22)*	(0.97)	(2.30)*	(1.84)
Just Getting By	-0.392	-0.466	-0.363	-0.4	-0.35
	(36.77)**	(18.78)**	(17.60)**	(17.11)**	(18.81)**
Can't Cope	-0.661	-0.641	-0.655	-0.598	-0.697
	(9.50)**	(4.00)**	(4.62)**	(4.46)**	(5.76)**
Number of Observations	6244	1507	1579	1584	1574

(Robust z-statistic in parentheses)
** significant at 1%
* significant at 5%

Table B.21 Means for Income and Financial Circumstances					
	Newfoundland	**St. John's CHB**	**Eastern CHB**	**Central CHB**	**Western CHB**
Predicted HUI	0.857	0.869	0.855	0.858	0.848
Male 25-34	0.064	0.080	0.056	0.057	0.065
Male 35-44	0.123	0.139	0.119	0.119	0.116
Male 45-54	0.127	0.109	0.139	0.128	0.130
Male 55-64	0.092	0.073	0.090	0.105	0.100
Male 65+	0.068	0.058	0.070	0.071	0.072
Female 20-24	0.018	0.029	0.015	0.013	0.017
Female 25-34	0.080	0.086	0.081	0.080	0.071
Female 35-44	0.136	0.141	0.142	0.118	0.145
Female 45-54	0.123	0.128	0.124	0.121	0.119
Female 55-64	0.079	0.064	0.081	0.086	0.084
Female 65+	0.064	0.051	0.064	0.081	0.061
Income	9.805	10.037	9.736	9.744	9.715
High School	0.231	0.201	0.233	0.248	0.240
Community College	0.192	0.211	0.187	0.181	0.189
University	0.161	0.283	0.133	0.112	0.119
Married	0.759	0.676	0.784	0.807	0.766
Separated/Divorced	0.053	0.073	0.042	0.042	0.057
Widowed	0.069	0.066	0.075	0.072	0.063
Employed	0.521	0.628	0.484	0.472	0.504
Unemployed	0.031	0.021	0.035	0.043	0.025
Student	0.030	0.048	0.024	0.018	0.032
Retired	0.098	0.086	0.090	0.119	0.098
Long-term Disability	0.127	0.103	0.145	0.125	0.133
Activity Restriction	0.063	0.052	0.073	0.066	0.060
Good	0.236	0.267	0.217	0.233	0.226
Satisfactory	0.297	0.303	0.303	0.306	0.276
Just Getting By	0.266	0.228	0.281	0.246	0.307
Can't Cope	0.018	0.015	0.016	0.018	0.022
Number of Observations	6244	1507	1579	1584	1574

APPENDIX C
CONFERENCE MATERIALS

GPI Atlantic
535 Indian Point Rd, Glen Haven, NS B3Z 2T5
Phone: 902-823-1944•Fax: 902-820-2007
colman@gpiatlantic.org•www.gpiatlantic.org

Abstract: **The Socioeconomic Gradient in Health in Atlantic Canada: Evidence from Newfoundland and Nova Scotia 1985-2001**

Socioeconomic inequalities in health status between individuals have long been observed in many different countries and persist across time. These inequalities are often described in terms of a health gradient where poor health, measured by a variety of mortality or morbidity indicators, is concentrated in individuals of low socioeconomic status, often measured by income or educational attainment. The gradient has clear implications for the distribution of well-being in an economy and for governments in terms of healthcare costs and lost productivity. For health authorities, what makes the gradient all the more significant is that its very nature, which stems from differences in socioeconomic status, suggests that such inequalities are potentially avoidable.

If policymakers are to address the problems presented by the gradient, they need to have some knowledge of the extent of inequality in health status among individuals, the proportion that is accounted for by differences in socioeconomic status, and the socioeconomic variables that matter in its determination. Only then can appropriate policy measures be developed. The research findings to be presented use data from a series of health surveys conducted in Newfoundland between 1985 and 2001 and two community surveys conducted in Glace Bay and Kings County, Nova Scotia. Three questions about the socioeconomic inequalities in health in Atlantic Canada are investigated:

1. To what extent are socioeconomic inequalities in health present in Atlantic Canada? Is the degree of inequality low or high relative to that observed elsewhere? How has it changed over time?

2. What socioeconomic factors, like income, education and employment status, can explain the observed inequality? What is the contribution of each factor and its importance relative to other determinants of health?

3. What policy measures are suggested by the empirical results of the research? Are there specific policy gaps that exist between Atlantic Canada and elsewhere that explain the high degree of inequality?

The research shows that significant income-related health inequality exists in Atlantic Canada. In Newfoundland, it has risen over time. The effects of income, education and economic status on health, respectively, coupled with their unequal distribution among the population are the three most important socioeconomic contributors to differences in health status. Policy measures suggested by the findings of the research indicate that efforts to raise incomes and educational attainment, as well as those that focus on employment, would be the most effective at removing the gradient in health.

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AGENDA

The Socioeconomic Gradient in Health in Atlantic Canada: Evidence from Newfoundland and Nova Scotia 1985-2001

Date: Thursday, June 2nd, 2005
Time: 9am to 3pm
Place: Westin Hotel
Atlantic Ballroom
1181 Hollis Street
Halifax, NS
Phone: (902) 585-1123 (Ms. Liesel Carlsson)

8:30-9:00	Registration
9:00-9:15	Introduction and Review of Agenda ~ Dr. Ronald Colman, Executive Director, GPI Atlantic
9:15-10:30	Presentation of Research Results, followed by Q&A ~ Dr. Sean Rogers, Lead Researcher, Dalhousie University
10:30-10:45	***Break (coffee and tea provided)***
10:45-12:00	Panel Discussion – the importance of the results, and their place in the broader context of health policy research and policy formulation. Presented by: ~ Prof. George Kephart, Dept. of Community Health and Epidemiology, Dalhousie University ~ Prof. Ronald Labonte, Institute of Population Health, University of Ottawa ~ Prof. Shelley Phipps, Dept. of Economics, Dalhousie University
12:00-13:00	***Buffet Lunch (provided)***
13:00-13:45	Presentation of Policy Recommendations, followed by Q&A ~ Dr. Sean Rogers, Lead Project Researcher, Dalhousie University
13:45-14:15	Perspective on Policy Applications ~ Scott Logan, Assistant Deputy Minister, Nova Scotia Health Promotion
14:15-14:45	Open for Dialogue
14:45-15:00	Wrap-up and Conference Evaluations ~ please take a moment to fill out a comment form

GPI Atlantic
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AGENDA

The Socioeconomic Gradient in Health in Atlantic Canada: Evidence from Newfoundland and Nova Scotia 1985-2001

Date: Tuesday, June 7th, 2005
Time: 8:30 am to 12:30 pm
Place: Multipurpose Room (B)
Cape Breton University
Sydney, NS
Phone: (902) 585-1123 (Ms. Liesel Carlsson)

8:30-9:00	Registration
9:00-9:15	Opening Remarks and Review of Agenda ~ Dr. Peter MacIntyre, Behavioural and Life Sciences Department, Cape Breton University
9:15-10:00	The Socioeconomic Gradient in Health in Glace Bay ~ Dr. Sean Rogers, Lead Researcher, Dalhousie University
10:00-10:30	Open for Dialogue on Research Results
10:30-10:45	***Break ~help yourself to coffee/tea and a light snack***
10:45-11:15	Policy Recommendations ~ Dr. Sean Rogers, Lead Researcher, Dalhousie University
11:15-11:45	Open for Dialogue on Policy Recommendations
11:45-12:00	Closing Remarks and Evaluations *~Please take a moment to fill out a comment form*
12:00-12:30	Occasion for Further Dialogue

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AGENDA

The Socioeconomic Gradient in Health in Atlantic Canada: Evidence from Newfoundland and Nova Scotia 1985-2001

Date: Thursday, June 9th, 2005
Time: 8:30 am to 12:30 pm
Place: Beveridge Arts Centre (BAC) Room 132
Acadia University
Wolfville, NS
Phone: (902) 585-1123 (Ms. Liesel Carlsson)

8:30-9:00	Registration
9:00-9:15	Opening Remarks and Review of Agenda ~ Glyn Bissix, Acting Director of Recreation Management and Kinesiology, Acadia University
9:15-10:00	The Socioeconomic Gradient in Health in Kings County ~ Dr. Sean Rogers, Lead Researcher, Dalhousie University
10:00-10:30	Open for Dialogue on Research Results
10:30-10:45	***Break ~help yourself to coffee/tea and a light snack***
10:45-11:15	Policy Recommendations ~ Dr. Sean Rogers, Lead Researcher, Dalhousie University
11:15-11:45	Open for Dialogue on Policy Recommendations
11:45-12:00	Closing Remarks and Evaluations *~Please take a moment to fill out a comment form*
12:00-12:30	Occasion for Further Dialogue

Please note that the GPI Kings AGM directly follows, beginning at 1:00pm. Buffet lunch is provided for those remaining for the afternoon gathering. Contact gpikings@gpiatlantic.org for more information.

The Socioeconomic Gradient in Health in Atlantic Canada: Evidence from Newfoundland and Nova Scotia 1985-2001.

EXIT SURVEY

As an integral part of the conference, we ask you to complete the following comment form. Your feedback will help us to meet your expectations and improve the quality of our work.

Name: _____

Organisation (if any): _____

Mailing Address: _____

_____

Telephone: _____ **E-mail:** _____

Please answer the following questions on the <u>format</u> of the conference:

1. Do you feel that the conference format was appropriate?

❑ YES ❑ NO

2. Do you feel confident in the *value* of the working session and feedback process?

❑ Yes ❑ No

Please answer the following questions on the <u>content</u> of the conference:

3. Was the research presented relevant to you or your organization?

❑ YES ❑ NO

4. Were the policy recommendations presented relevant to you or your organization?

❑ YES ❑ NO

5. Do you feel that you were provided with enough background information regarding the project to provide an informed opinion?

❑ YES ❑ NO

6. Do you feel that during the working session you were given ample opportunity to contribute?

❑ YES ❑ NO

Comments on the Research Results and Recommendations:

Additional Comments:

Comment Forms may be left at the Registration Desk during the Working Session, or mail to:

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