
Poverty is making us sick:

A comprehensive survey of income and health in Canada

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December 2008



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Poverty is making us sick, reveals comprehensive new study

December 2, 2008

Poverty is making Canadians sick, robbing hundreds of thousands of their health and leading to widespread preventable illness and huge costs for the health care system, according to powerful new research released today by the Wellesley Institute and the Community Social Planning Council of Toronto. The study uses Canadian Community Health Survey and income files to paint the most comprehensive picture to date of our nation's health.

“High income does not guarantee good health, but low income almost inevitably ensures poor health and significant health inequity in Canada,” reports Dr. Ernie Lightman, lead researcher for the new study. Poverty is triggering a devastating health crisis among lower-income people, but the research shows that raising incomes leads to better health.

The researchers from the Social Assistance in the New Economy (SANE) program at the University of Toronto used the most recent and most complete health data. But with the global economic tsunami washing over Canada, growing poverty and income inequality are expected to make an already bad situation even worse.

Using sophisticated multivariate analysis, the researchers demonstrate that every \$1,000 increase in income leads to real increases in health. For instance, an increase of \$1,000 in income for the poorest twenty percent of Canadians will lead to nearly 10,000 fewer chronic conditions, and 6,600 fewer disability days (over a two week period).

Prof. Lightman and his research colleagues Andrew Mitchell and Beth Wilson, found that the poorest one-fifth of Canadians, when compared to the richest twenty percent, have:

- more than double the rate of diabetes and heart disease;
- a sixty percent greater rate of two or more chronic health conditions;
- more than three times the rate of bronchitis;
- nearly double the rate of arthritis or rheumatism.

The poorest fifth of our population face a staggering 358% higher rate of disability compared to the richest fifth. The poor experience major health inequality in many other areas, including 128% more mental and behavioural disorders; 95% more ulcers; 63% more chronic conditions; and 33% more circulatory conditions.

The Wellesley Institute has been a leader in pressing for practical and effective strategies to reduce the health gaps among Canadians. “Health inequity is, quite literally, killing us,” says Rick Blickstead, CEO of the Wellesley Institute. “This study shows pragmatic solutions that help to raise incomes can also lead to real health gains.”

The new research underlines the critical necessity for ensuring that there is a health equity lens in poverty reduction plans. The Ontario government is set to unveil its long-awaited Poverty Reduction Strategy in early December. Newfoundland and Labrador, Nova Scotia, Quebec and Manitoba have already launched their own poverty reduction plans. There is growing international and national pressure on the federal government to set out its own poverty reduction plan.

The Wellesley Institute advances health equity through **community-based research**, **community engagement**, **social innovation** and the informing of **public policy**.

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Introduction

This report, and a companion study to be released in early 2009, explore the most recent evidence on the relationship between income, a key social determinant of health, and important health outcomes in Canada. The two papers also examine access to and utilization of health services at different income levels.

We focus on the relationship between income and health outcomesⁱ using the most recent evidence available from the Canadian Community Health Survey (CCHS). Conducted in 2005, the CCHS is only large scale survey of the health of the Canadian population. The companion report will focus on the differences in health outcomes experienced among three distinct groups: the working poor, the non-working poor and the non-poor.

The focus in both studies is on health equity.

This research capitalizes on the availability of individual micro-data files data through Statistics Canada's Research Data Centres, which permits users to conduct research with confidential data from survey master files. This has a number of advantages: it permits analysis using key variables not usually available yet significant from a social determinants of health perspective. Secondly, it allows for comprehensiveness. Rather than focus on one or a few health indicators we have explored a comprehensive set of health and health care utilization indicators. Lastly, the large sample size of the CCHS (over 130,000) allows for precise and robust estimates, including multivariate regression analysis with observations at the level of the individual..

The time period that this research examines is also significant. The survey data represent the health of Canadian's population in 2005, close to the peak of the economic cycle. In 2005 the unemployment rate in Canada was 6.8 percent, among the lowest in recent history and close to the 6.0 percent rate achieved in 2007.ⁱⁱ

Context

This study grew out of the work of the Social Assistance in the New Economy Project (SANE) at the University of Toronto, a project that has received four major grants from the Social Sciences and Humanities Research Council of Canada (SSHRC) to explore the impacts of welfare reform and precarious employment in the context of an increasingly globalized economy.ⁱⁱⁱ

One of the key projects undertaken by the SANE project involved a longitudinal panel of social assistance recipients, drawn with the assistance of the City of Toronto Social Services department in the fall of 2002. One of the few, and perhaps the only investigation of its kind in Canada, the panel study followed a sample of social assistance recipients over several years, exploring their experiences with new service delivery models, their participation in employment programs, and (where possible) their post-welfare employment experiences. We found (supporting much of the existing literature on welfare reform) limited impact of the employment measures that have been a centrepiece of welfare reform in most western industrialized countries; the low paid and contingent nature of many of the jobs many recipients receive, and the welfare recidivism that has inevitably accompanied such unstable employment.

The first rounds of interviews led to the conclusion that the health impacts of welfare reform were in fact instrumental to understanding the dynamics of welfare reform. A large majority of the panel participants reported significant, and worsening, physical and mental health problems that created tremendous barriers to employment, even in the relatively strong growth economy of the period.^{iv} To be sure, poor health often precedes, and causes, entry to welfare. However it was clear that the health of the panel participants was made worse while on and off assistance, regardless of whether they remained on assistance continually or experienced periods of precarious employment in ‘flexible’ labour markets.

‘Flexible’ labour markets imply various forms of precarious employment and growing inequality: Despite the strong economic growth in Canada following the recession of the early 1990s, incomes in the lowest quintile remained stagnant while those in higher quintiles rose, leading to growing inequality (Statistics Canada, 2007; Green and Milligan, 2007). Such trends have become the hallmarks of the so-called ‘new economy’. It thus has become important to understand how these trends impact not just poverty and deprivation, but also health equity.

Around the world there is increased interest and attention paid to health equity and a concomitant focus on the ‘social determinants of health’.^v That is, there is growing recognition that elements of the social environment – the social and economic conditions in which people live – have profound effects on health.

Public Health Canada, an agency of Health Canada, has created a list of the determinants of health, reproduced below, along with brief comments on each entry.^{vi} Not all of these are *social* determinants of health, but a great many are amenable to public policy interventions.

- a. Income and social status. Income determines living conditions and access to important things such as safe housing and neighbourhoods, and sufficient nutritious food. Social status is also related to health, through its relationship to feelings of control over life circumstances and ability to manage stressful conditions.
- b. Social support networks. The availability of support from family and friends results in improved sense of well-being and is important in helping people to manage stress and the adverse impacts of challenging life events and circumstances.
- c. Education and literacy. Education is directly related to income and social status which influence health, but moreover, education and literacy skills may enable people to exercise greater coping and other life skills. This might for example, allow people with greater education to more easily navigate systems such as health care systems.
- d. Employment/working conditions. The conditions of employment and unemployment may also influence health, apart from the influence they exert on income and social status. Unsafe or stressful working conditions, and the stress and loss of income that is associated with unemployment will all play a major role in health.
- e. Social environments. The character of the larger community – the degree of supports available, the existence of networks, vibrant formal and informal community organisations permit people to build connections with others and relationships of trust and reciprocity.
- f. Physical environments. The influence of the physical environment includes exposure to pollutants which directly impact on health. Beyond this are other features of the physical

- environment such as the design of housing and neighbourhoods, and the availability of infrastructure such as transportation .
- g. Personal health practices and coping skills. Individual behaviours and lifestyle choices help individuals to prevent disease. Socio-economic circumstances also shape these choices.
 - h. Healthy child development. The circumstances of early childhood are recognized to influence development, readiness to learn and school and health later in life. Not surprisingly, healthy child development is in turn shaped by the socio-economic circumstances experienced in childhood.
 - i. Biology and genetic endowment.
 - j. Health services. Access to health services naturally contribute to health.
 - k. Gender. Gender differentials in social status, roles and outcomes can lead to differential health outcomes.
 - l. Culture. The exclusion and stigmatization of cultural groups distinct from dominant groups can be associated with greater risks and poorer health outcomes.

Current significance

This research is timely. While the data was collected in 2005 at a time of peak economic growth in Canada, today the global economy is entering a period of serious, and possibly prolonged, recession. A number of recent studies have focused on rising inequality and its implications, including the health consequences of poverty and inequality (OECD, 2008; Eikemo et al, 2008). It is hardly coincidental that many researchers have begun to explore these issues at roughly the same time. Rising inequality and stubbornly high levels of poverty, despite the period of economic growth that followed the last recession, falling unemployment and social assistance caseloads, have provoked profound questions about the limits of globalization and ‘flexible’ labour markets. No doubt the current recessionary period will sharpen debate over these issues considerably.

Moreover initiatives are currently underway in a number of provinces to seek ways of reducing poverty, particularly as it affects children. Quebec, Nova Scotia, Ontario, Newfoundland and Labrador and Manitoba are all engaged in systematic efforts to reduce poverty. A key benefit of meaningful poverty reduction will be the important health equity outcomes that would flow from successful efforts to eliminate poverty.

Methods

Our basic approach in this study involves a grouping of the adult population in Canada, aged 18 to 64, into five income quintiles, with the bottom or first quintile representing the twenty percent of the population with the lowest incomes. The top or fifth quintile represents the twenty percent of the population with the highest incomes^{vii}. The population under consideration throughout this report was restricted to adults aged 18-64.

We then examine various health outcomes using the most recent cycle of the Canadian Community Health Survey, conducted in 2005, and test for statistically significant differences among the quintiles: each quintile is compared (and tested for statistical difference) from the quintile directly above it^{viii}. We thus are able to assess whether the incidence of various chronic health outcomes and other health indicators differ significantly across income quintiles. In

simple language we ask whether the poor are significantly more likely than the rich to experience specific adverse health outcomes. We cannot directly assign causality between low income and poor health but the data are, in general, remarkably compatible with a hypothesis to that effect.

We subsequently use multivariate regression analysis to predict the impact on these health outcomes of increasing incomes by specific amounts (usually \$1,000). These data enable us to suggest that if incomes in the lowest quintile were increased by \$1,000 on average (regardless of reason), then multiple specific chronic health conditions would be reduced by particular amounts. This leads directly to policy commentary suggesting the importance of income equity in improving health equity across Canada.

There are graphs contained in the figures throughout this report. An appendix at the end of the report includes the detailed tables. This full report, and additional data, is available on-line at the Wellesley Institute web site at www.wellesleyinstitute.com.

Findings

The population

Basic descriptive statistics for the population considered in the study can be found in Appendix A, available on-line. Briefly, the average age of the respondents in the sample was 41 years, with the average age being slightly older in each succeeding higher income quintile (not shown). The sample was almost exactly divided between women and men.

Over 60 percent of the sample had completed some form of post-secondary education. Approximately one in eight (12 percent) had less than a secondary school education.

The largest group of respondents lived in couple families either with children (46 percent) or without (23 percent), while slightly over 16 percent were single persons alone and 7 percent lived in sole support parent families. The remaining 7 percent lived in other types of families. The average respondent lived in a household with three members.

Approximately 18 percent stated that they were either a visible minority or aboriginal.

Nearly 12 percent said they often experienced some form of activity limitation.

The mean 'adjusted household income'^{ix} of respondents rose from slightly over \$14,000 in the bottom quintile to nearly \$100,000 in the top quintile. Over 13 percent fell below the poverty line (Statistics Canada's Low Income Measure, or LIM).^x

Self-rated health

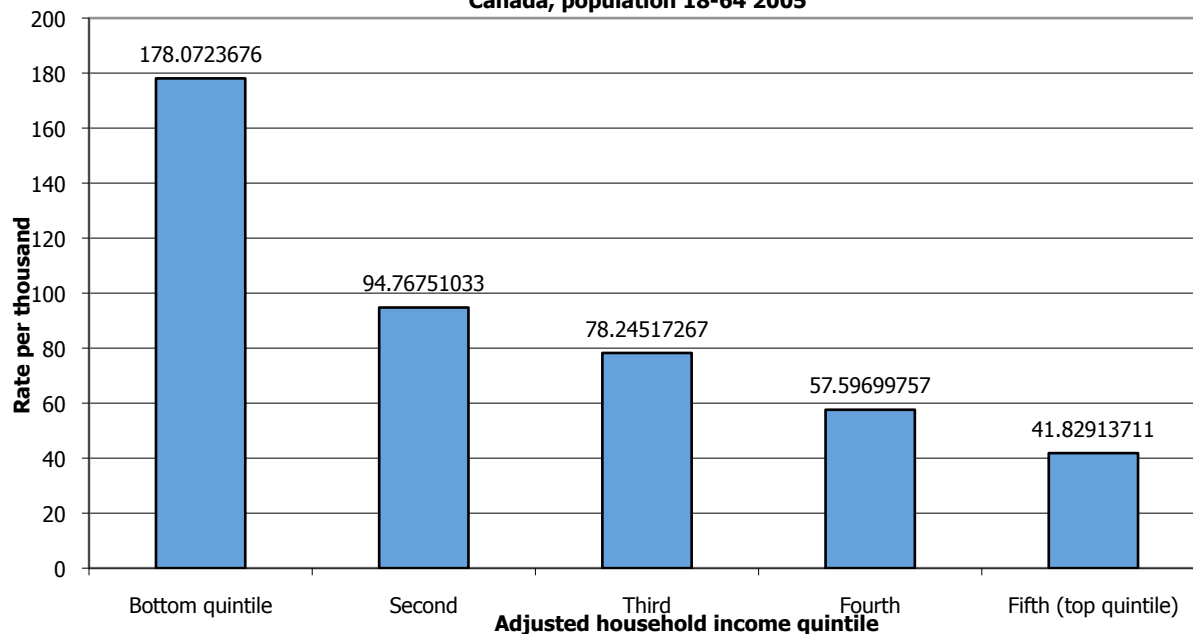
Canadian adults, on average, rate their health highly. While the majority of Canadian non-elderly adults rate their health as 'good', 'very good' or 'excellent', a significant minority – around 8 percent - rate their health only 'poor' or 'fair'.

There is a noticeable income gradient to self-rated health (See Table 1 at the end of this report and Figure 1 below). The number of people who rated their own health as 'poor' or 'fair' varied

with income from 178 per thousand population in the lowest income quintile (adjusted), to 42 in the top quintile. That is, roughly four times as many respondents in the bottom quintile reported their health as 'poor' or 'fair' as compared to the top quintile; the response rate for 'poor' or 'fair' health in the bottom quintile was roughly double that in the adjoining second quintile. All of the tests of significance with the adjacent categories were statistically significant.

Self-rated health has been shown to be a valid and reliable an indicator of health (Shields and Shooshtari, 2001; O'Brien, 1997; Lundberg and Manderbacka, 1996; and Brazier, Harper and Jones, 1992). Self-rated 'poor' or 'fair' health decreases dramatically as income quintile increases.

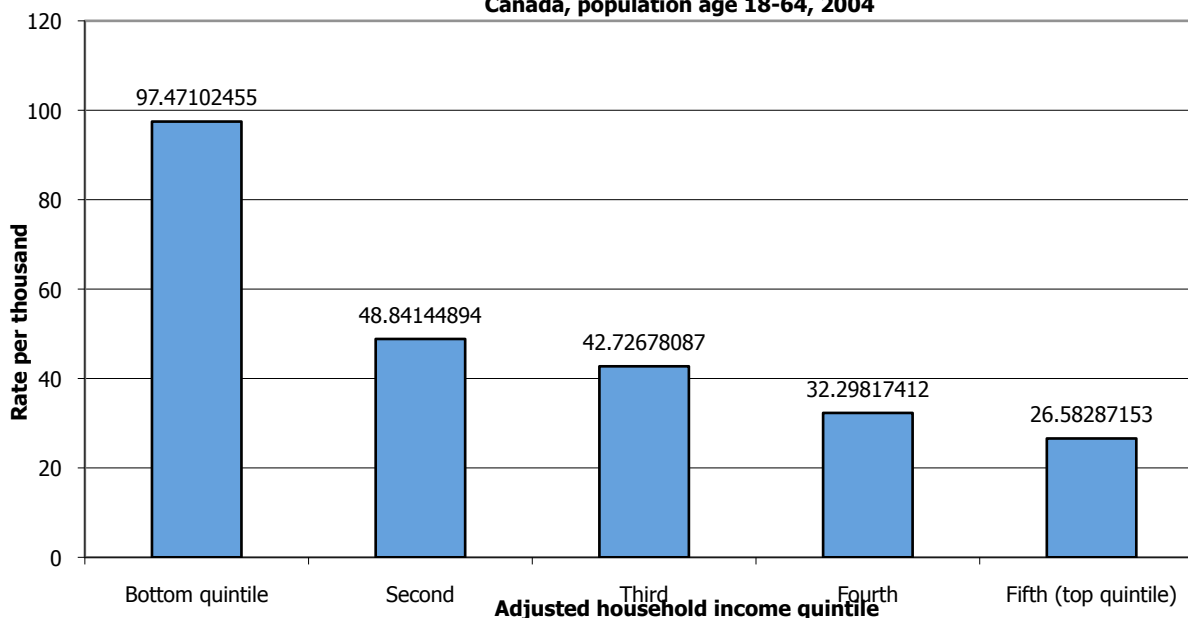
Figure 1: 'Poor' or 'fair' self-reported health, per thousand population
Age adjusted rates, by adjusted household income quintile
 Canada, population 18-64 2005



A second measure, referring to self-rated *mental* health showed similar differences between adjoining quintiles (Figure 2, next page). Self-rated 'poor' or 'fair' health in the bottom quintile, at 97 responses per thousand population, was roughly double that of the adjoining, second quintile, while each quintile was significantly different (at .01 level or better) from the quintile immediately above it.

Thus, similar to the overall indicator of self-assessed health, self-rated *mental* health improves substantially as income quintile rises.

Figure 2: Self-reported mental health 'poor' or 'fair'
Age adjusted rates per thousand, by adjusted household income quintile
Canada, population age 18-64, 2004



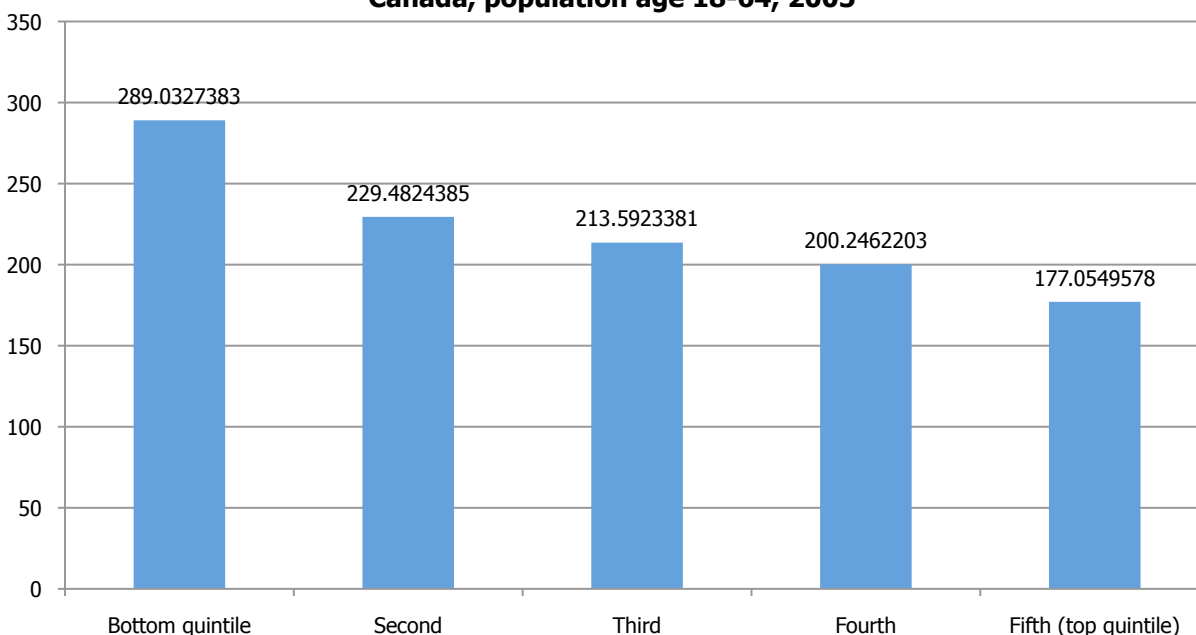
Chronic conditions

As we move from self-assessed health to chronic conditions that have been diagnosed by a physician, similar relationships are evident.^{xi} While it is common for Canadians at all income levels to report at least one chronic condition, there is a strongly significant difference observed between those in the first and second quintiles, from nearly 700 per thousand population reporting at least one chronic condition in the bottom quintile, to 672 per thousand in the second quintile.

While having at least one chronic condition is common amongst adults at all income levels, the incidence of *multiple* chronic conditions are much more highly related to income quintile. Nearly 30 percent (289 per thousand) of those in the lowest quintile reported having more than two chronic conditions, compared to only 23 percent in the second quintile, and less than 18 percent in the top income group (see Figure 3, next page). Similarly, the total number of chronic conditions reported dropped from nearly 2,000 (per thousand population), or slightly under 2 per person, in the bottom quintile, to approximately 1,400, or 1.4 per person in the top quintile. Again there is a clear gradient between adjoining quintiles.

The average number of chronic conditions, per thousand population, is 42 percent higher in the lowest quintile (1921), as compared to the highest (1356). While the incidence of multiple chronic conditions clearly rises as income drops, the incidence of such multiple conditions is particularly acute among the poorest twenty percent of the population.

Figure 3
More than two chronic conditions: Age adjusted rates (per thousand population)
Canada, population age 18-64, 2005



Disability

Those who said they often experienced limitations in participation in the activities of everyday living (hearing, seeing, communicating, walking, climbing stairs, bending, learning etc.), at home, in school, in the workplace or elsewhere, numbered approximately 87 per thousand in the bottom income quintile, a rate that declined to 36 in the second quintile and 30 in the middle quintile. In the top two quintiles the rate was approximately 20 per thousand, or less than one-quarter the rate in the bottom quintile. The differences are highly significant.

Those in the bottom quintile experienced ‘disability days’ – days when they were forced to reduce their activities or stay in bed due to illness or injury – at a rate far in excess of others in the population. In the bottom quintile there were an over 1,300 ‘disability days’ (over a two week period) per thousand population, compared with slightly over 800 in the second quintile. Thereafter the rate stayed relatively constant as income quintile rose.^{xii} The excess of approximately 500 disability days (per thousand population) faced by those in the lowest quintile, compared to those with higher incomes, has important ramifications for health equity, as well as for employment and educational policies and the costs of treating illness in Canada.

Stress and mental health

Self-reported stress, defined as finding most days ‘quite a bit or extremely’ stressful rises from 270 per thousand population in the bottom quintile to 295 in the top quintile. This is the first indicator we have seen where adverse health outcomes are higher in the top quintile than in the lowest. Not all quintiles – particularly those in the middle – differ statistically from one another,

though there is a significant drop between the first and second quintiles and a comparable increase when moving from the fourth to the top quintile.

When people reported on the number of weeks they felt depressed in the previous 12 months the reported numbers decline in a linear fashion as income quintile rises. The most important difference was between the first and second quintiles, where the number of weeks they felt depressed declined from over 1,700 (or about 1.7 weeks per person) in the bottom quintile to just over 970 in the second quintile (about 1.0 weeks per person). The differences among the second, third and fourth quintiles are smaller, but there is another noticeable drop upon reaching the fifth quintile, where the number of weeks dropped again to approximately 580, or about 0.6 weeks per person, a difference that was significantly different from other quintiles (not shown).

A formal measure of depression, a depression scale (0-8 scale in which higher scores reflect greater depression), confirms what the self-reported indicators suggest: an income gradient exists, most pronounced between the first and second quintiles, and then again upon reaching the fifth quintile. The average score declines from 0.67 in the bottom quintile to 0.45 in the second, remains level in the middle quintiles, then drops again to 0.34 in the top quintile.

Thus, while the highest income quintile respondents may have reported that most days were ‘quite a bit or extremely’ stressful with greater frequency than the other groups, they nevertheless recorded the fewest weeks in which they were depressed, along with the lowest scores on the depression scale. Apparently ‘stress’, as recorded, does not translate into depression among the upper quintile respondents.

Chronic conditions and income

We reported above on the relationship between income and the overall incidence of chronic conditions, and multiple chronic conditions. In this section we explore these relationships in more detail by examining broad *categories* of chronic conditions, and specific conditions within those categories that are particularly significant for population health.^{xiii} The categories include: endocrine and metabolic conditions, circulatory conditions, eye diseases, diseases of the nervous system and developmental disorders, respiratory diseases, musculoskeletal conditions, mental and behavioural disorders, and miscellaneous conditions.^{xiv}

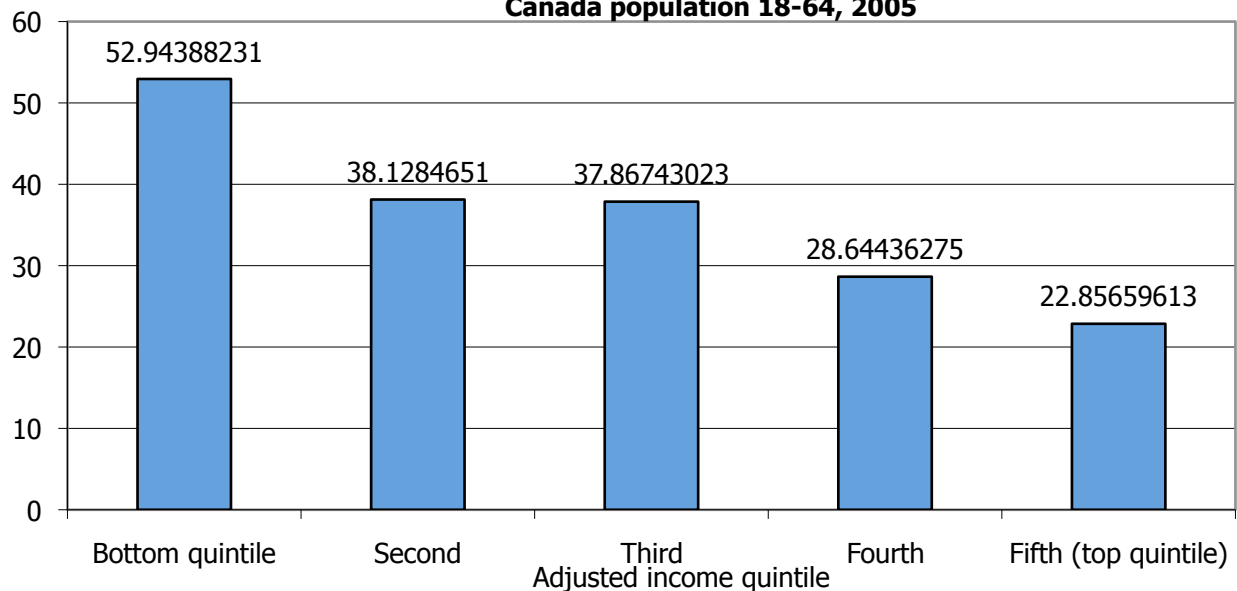
Endocrine and metabolic conditions

Endocrine and metabolic conditions encompass a variety of situations including thyroid conditions, diabetes, allergies and chemical sensitivities. Overall there is no clear relationship between the incidence of endocrine and metabolic conditions and income quintile (See Table 2 at the end of this report). The rate per thousand varies from a high of 377 per thousand (fourth quintile) to 364 (second quintile), with the only statistically significant difference (at the .05 level) being that between the fourth and top quintiles (377 versus 365 per thousand).

However, the aggregation involved in combining different chronic conditions masks significant differences among the component elements. The key condition of interest is diabetes, the entry in this group rated as having a moderate impact on the health utility index (Shultz and Kopec, 2003). Here a clear relationship with income does emerge with the rate in the lowest quintile (53 per thousand) being almost 40 percent higher than the rate in the next two quintiles (38 per

thousand) and more than double the rate of 23 in the top quintile (Figure 4, below). The difference in incidence between the bottom and the fourth quintiles, in particular, is highly statistically significant.

Figure 4
Diabetes: Age adjusted rates per thousand
by adjusted household income quintile
Canada population 18-64, 2005



There is also a highly significant difference between the incidence of multiple chemical sensitivities in the bottom quintile and all the other groups, reflecting perhaps higher levels of exposure in working or living environments for the poorest Canadians. From an environmental perspective, this finding may be of great policy importance in considering health equity.

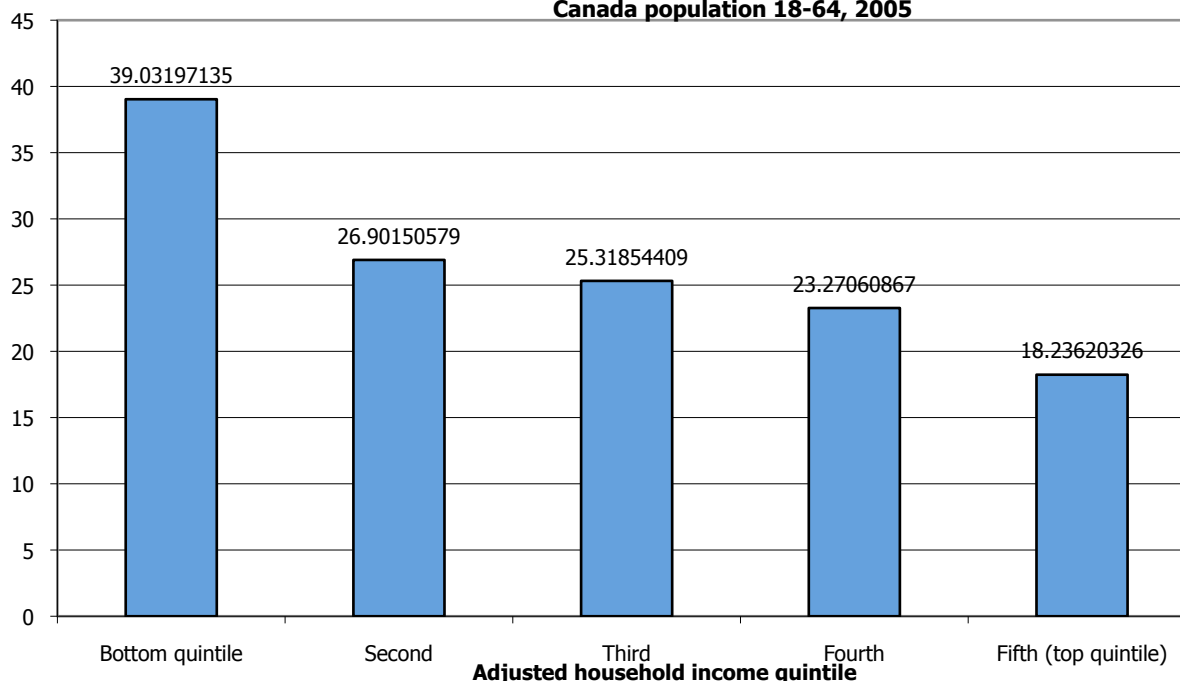
Circulatory conditions

Circulatory conditions reported here include: heart disease, high blood pressure and living with the effects of a stroke. Circulatory conditions as a group exhibit a strong and statistically significant inverse relationship with income, declining from an incidence of 152 per thousand in the lowest quintile to 142 in the second, and 114 per thousand in the top income group. The bottom income group experiences circulatory conditions at a rate 17 per cent higher than the middle quintile (which approximates the overall Canadian average).

Heart disease for example, is found at a rate of 39 cases per thousand in the lowest quintile, more than 40 percent higher than in the second quintile (27 cases per thousand). The incidence is more or less constant in the middle quintiles, but drops again to 18 per thousand in the uppermost income group, meaning that the incidence of heart disease in the lowest income group is more than double that of the highest quintile (Figure 5, below).

Figure 5
Heart disease

Age-adjusted rate per thousand, by adjusted household income quintile
Canada population 18-64, 2005



High blood pressure is significantly greater in the two lowest quintiles (poorest 40% of the population) as compared to the middle quintile. There is a significant drop in incidence again between the fourth and the top quintile. That is, high blood pressure is about 25 percent more common in the bottom quintile than in the top.

Overall, both heart disease and high blood pressure are found with much greater frequency in the lower quintiles as compared to the high income groups.

Eye diseases

The overall category of eye diseases exhibits a strong relationship with income. The incidence per thousand population is 27 in the lowest quintile and declines to 18 in the middle income groups, and then to 12 in the top quintile. The rate is highest in the bottom two quintiles, then drops significantly to the third and fourth quintile and then declines again to the fifth quintile, creating three levels or plateaus of incidence – the poorest 40% of the population followed by the next 40% and then the richest 20%.

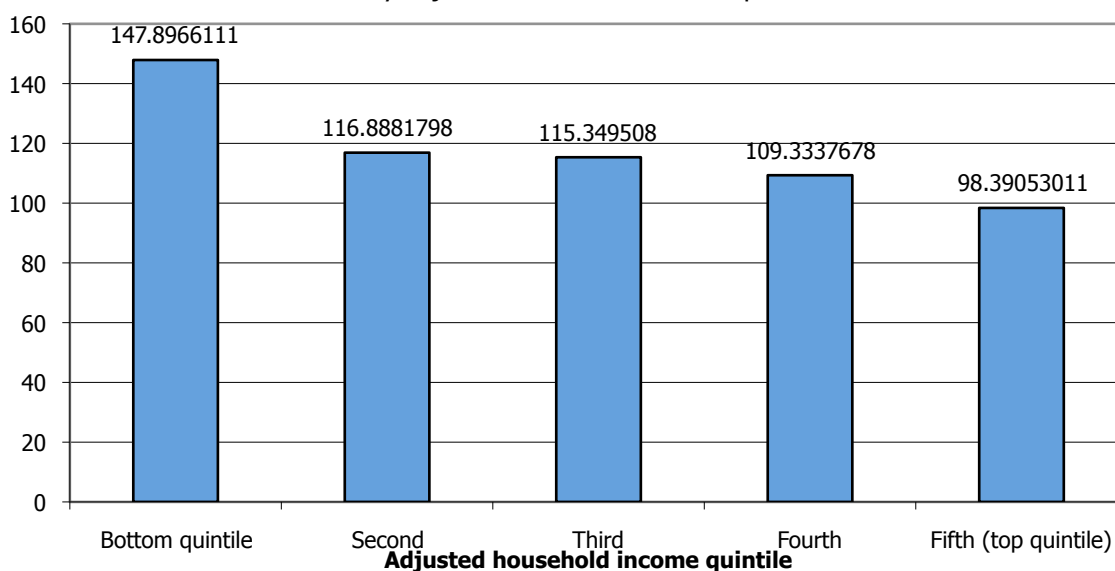
Diseases of the eyes include both cataracts and glaucoma. Because the incidence of these specific conditions is relatively low, sample size limitations prevent reliable calculation of incidence by quintile

Diseases of the nervous system and developmental disorders

This category includes learning disabilities, epilepsy and migraines. Incidence of these conditions as a group shows a strong inverse relationship to income, with the rates varying from 183 per thousand in the bottom quintile, to under 115 in the top quintile, a decline of about one-third overall.

Each of the three specific enumerated conditions shows a highly significant difference in incidence between the lowest and the adjoining quintile, suggesting that these conditions disproportionately affect the lowest income groups in Canada. Migraines are the most prevalent condition in this category, with an incidence of 148 per thousand in the bottom quintile to less than 100 in the top income quintile, a fifty percent disparity (Figure 6, below).

Figure 6: Migraines
Age-adjusted rates of migraines, per thousand population
 by adjusted household income quintile

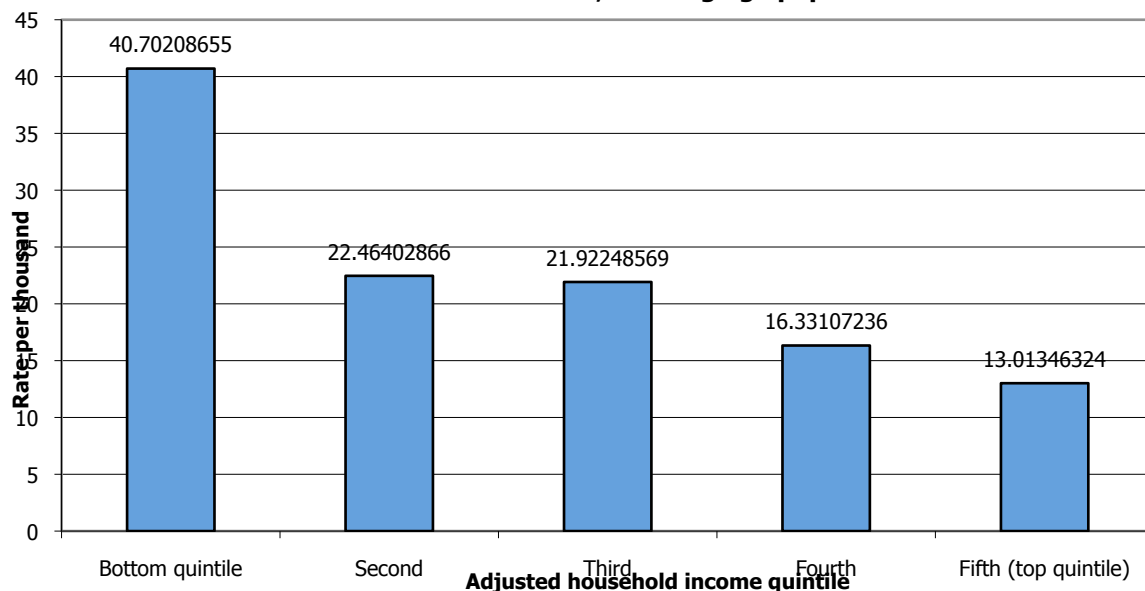


Respiratory diseases

This category includes both chronic bronchitis and asthma.^{xv} Both the overall category and the two individual conditions showed variation with income, the key significant differences being between the bottom and second quintiles. Above the first quintile the differences were not as large and often not statistically significant. Again this suggests that the incidence of respiratory diseases is strongly associated with the lowest incomes, with significantly higher rates found in the lowest quintile.

Chronic bronchitis had an incidence of 41 per thousand in the bottom quintile and dropped nearly in half to 22 per thousand in the second quintile (Figure 7, next page). The rates dropped again between third and fourth quintiles (from 22 to 16 per thousand), and again between the fourth and top quintiles (to a rate of 13 per thousand). Asthma declined from 98 cases per thousand population in the bottom quintile to 81 per thousand in the second quintile, a highly significant drop.

Figure 7: Bronchitis, age-adjusted rate per thousand by adjusted household income quintile Canada, working age population 2005

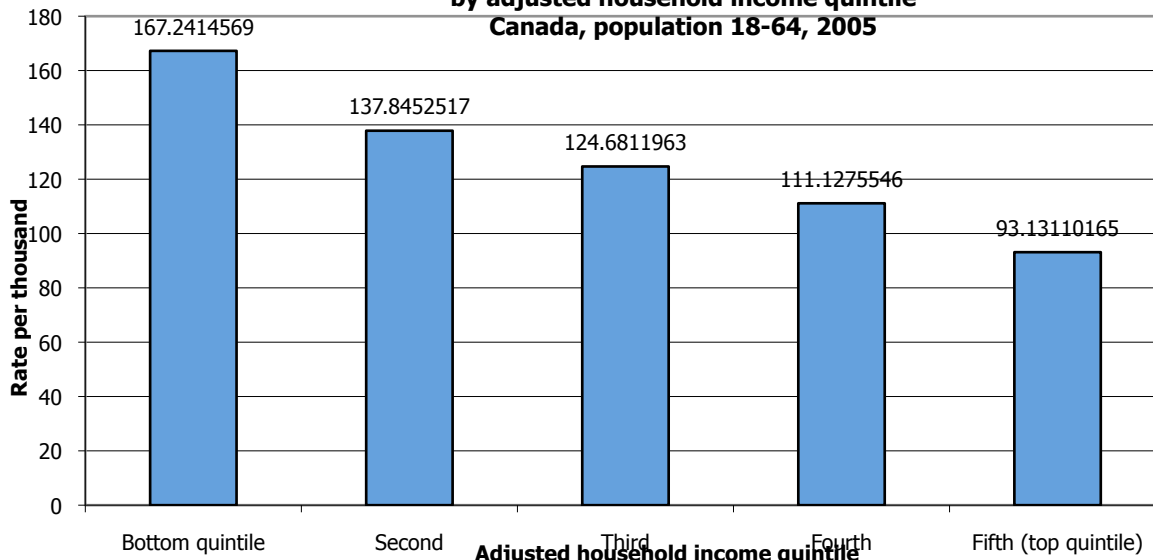


Musculoskeletal conditions

Musculoskeletal conditions include arthritis and rheumatism, back problems (not including arthritis or rheumatism), fibromyalgia and chronic fatigue syndrome. Incidence rates for the category as a whole and for each of the individual conditions show a significant inverse relationship with income. The overall rate in the bottom quintile is 329 per thousand population falling to 285 in the second quintile and 240 by the fifth quintile. The difference between each of the quintiles is strongly statistically significant.

While the incidence of all the conditions within the category decline with income, the key condition we focus on is arthritis or rheumatism (Figure 8, next page). After general back problems it is the condition which has the highest incidence rate, and it is the condition which has a severe impact on objective health functioning, as measured by its impact on the health utility index (Shultz and Kopec, 2003). In the bottom quintile there is an incidence of approximately 167 cases per thousand, compared with 138 in the second quintile, 125 in the middle quintile, 111 in the fourth and finally under 100 in the top quintile. That is, the incidence of arthritis or rheumatism is nearly 80 percent higher in the bottom as compared to the top quintile.

Figure 8:
Arthritis or rheumatism: Age-adjusted rate per thousand
by adjusted household income quintile



The incidence rate for each of the four identified conditions is significantly higher in the bottom or first quintile, compared to the adjoining quintile. Arthritis or rheumatism shows a strong, large and highly significant linear decline as we pass through each of the quintiles from poor to rich. Clearly this is a condition strongly associated with low income (and poverty) in Canada.

Mental and behavioural disorders

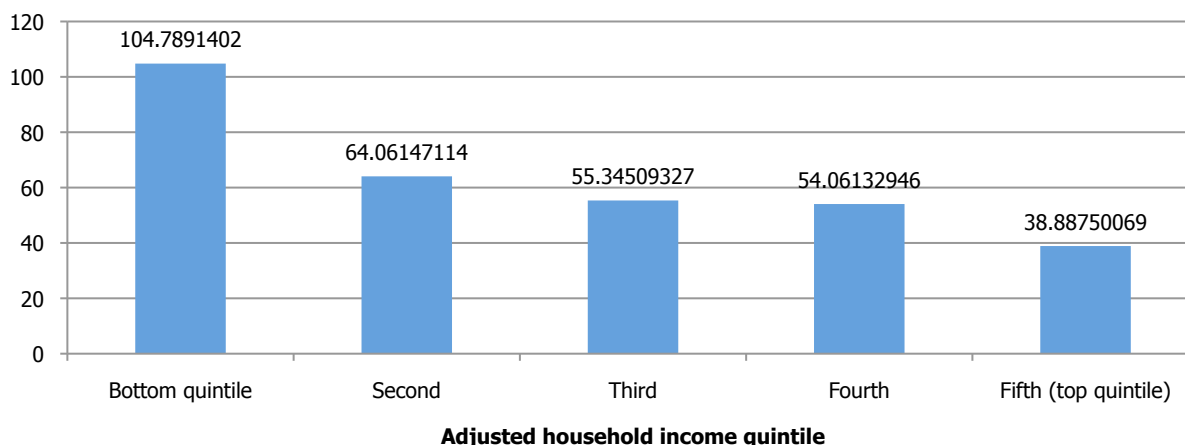
Mental and behavioural disorders include anxiety disorders, mood disorders, Alzheimer’s or dementia and schizophrenia. As group they relate closely to income, falling from a high of 146 per thousand in the bottom quintile to 64 in the highest, with most quintiles significantly different from the adjacent quintiles. There is a highly significant drop in incidence as we go from the bottom to the second quintile and from the fourth to the top quintile as well, reflecting greatest incidence among the poorest Canadians with the wealthiest quintile least affected

Anxiety and mood disorders, the two specific conditions for which incidence rates could be reliably calculated,^{xvi} showed clear relationships with income. In each case there is a significant drop in incidence with movement from the bottom to the second quintile.

In the case of anxiety the rate in the bottom quintile (81 per thousand) is significantly higher than the rate in the next quintile (44 per thousand population), and indeed, significantly higher than in all other quintiles.

Mood disorders are found at a rate of 105 per thousand in the lowest income quintile, a rate over 60 per cent higher than the 64 per thousand rate found in the second quintile. Similarly, the rate in the second quintile is significantly higher than the rate in the third and fourth quintiles, and the rate of 39 per thousand in the highest quintile is significantly lower than the rates of 54-55 found in the third and fourth quintiles.

**Figure 9:
Mood disorders: age-adjusted rate per thousand population
Canada population 18-64, 2005**



Miscellaneous conditions

Miscellaneous conditions include cancer, ulcers, urinary incontinence and bowel disorders.

In this category there is a significant difference between the first quintile and all other quintiles, with a rate of 110 per thousand in the bottom quintile and rates that range between 75 to nearly 90 in the other four. However, apart from the first quintile none of these other differences are statistically significant. Because this category includes a disparate group of conditions that may have little in common, the overall incidence rates may have limited practical meaning.

However, the rate of 25 cases per thousand of urinary incontinence in the first quintile is significantly higher than the rate of 21 in the second quintile which is, in turn, higher than the 13-16 cases per thousand found in the third, fourth and fifth quintiles.

The overall incidence of cancer does not vary significantly with income quintiles though the rates are low. It is possible certain specific types of cancer might vary by quintile but the limited sample sizes in the data do not permit us to explore this question.

Health care access and utilization

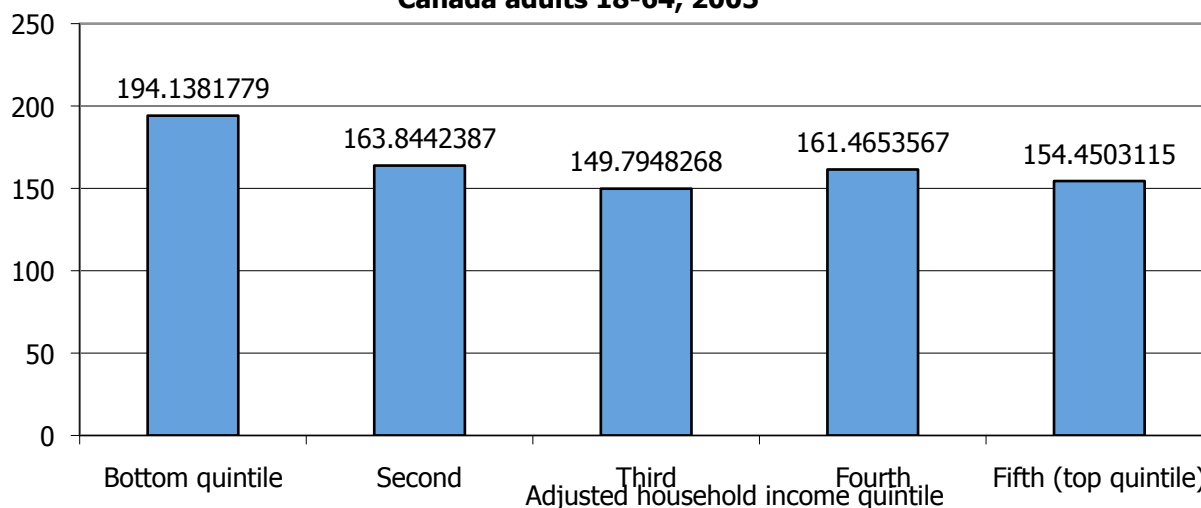
As might be expected, the differential health outcomes experienced across the income quintiles also translate into differences in health care access and utilization. This is the subject we explore in this section.

Access to and use of medical professionals

Access to a general practitioner varies with income. In the middle and upper income quintiles approximately 15 percent of the adult respondents to the CCHS said they did not have a regular family doctor, while in the poorest quintile the rate was nearly 20 percent, or about 194 people per thousand population (see Table 3, at end of report). Despite their greater health care needs as

documented above, those in the lowest income quintile are about 30% less likely to have a regular family doctor than the ‘average’ Canadian adult.^{xvii}

**Figure 10: Has no regular medical doctor:
Age adjusted rates
per thousand population
Canada adults 18-64, 2005**

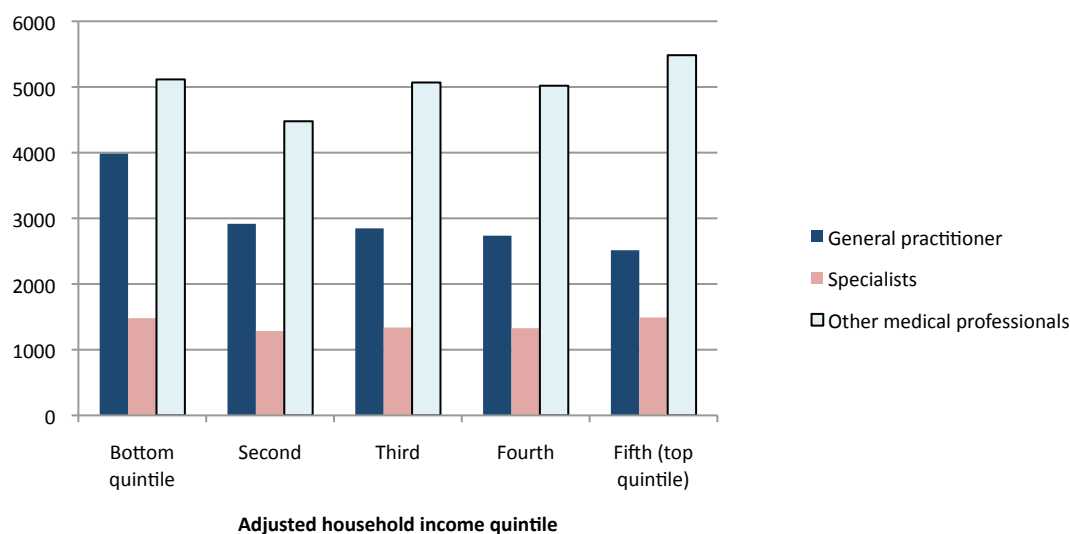


Visits to or consultations with medical professionals over a 12-month period also relate to income, but in highly differentiated ways. In Table 3 we see that the total number of all medical consultations appear to form a U-shaped relationship with income, declining by about 18 percent between the first and second quintiles, then rising through the third, fourth and fifth quintiles, although these latter differences are not statistically significant.^{xviii} Once again, the process of aggregating distinct specific situations masks important differences.

The source of these differences becomes more apparent when visits to specific types of health professionals are examined. The number of consultations with family doctors declines directly with income, with the largest drop occurring between the first and second quintiles, from nearly four per person to just less than three, and dropping further to approximately 2.5 per person at the fifth quintile.

On the other hand, consultations with specialists fall from 1,480 per thousand population in the bottom quintile to slightly below 1,300 in the second quintile and then rise again, reaching nearly 1,500 in the highest quintile. Similarly, consultations with medical professionals other than general practitioners and specialists display the same pattern, declining between the first and second quintiles, and then rising again to reach a peak in the top quintile.

Figure 11: Consultations with medical professionals
Age adjusted rates per thousand
by adjusted household income quintile, Canada 2005



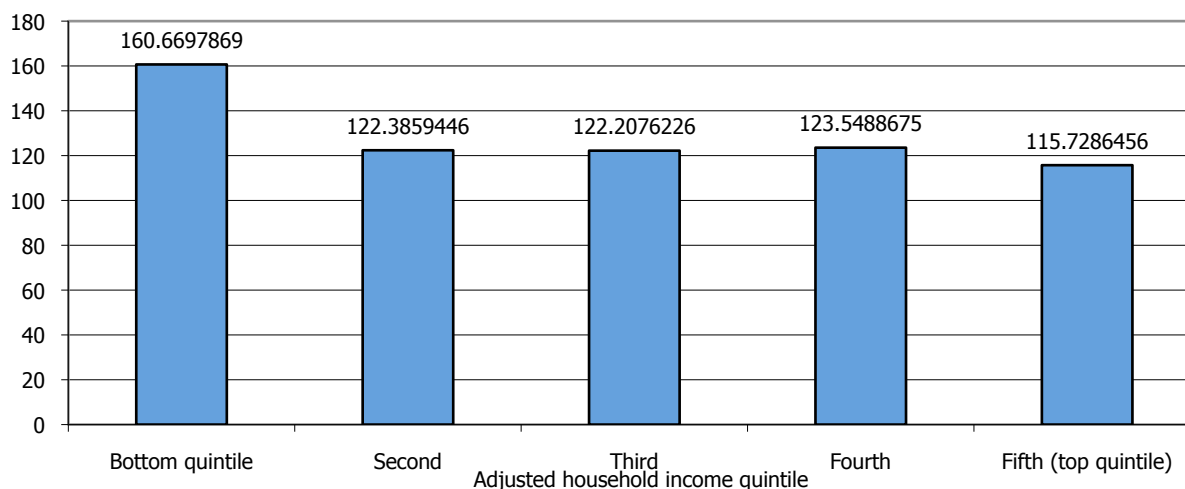
The significantly high use of all medical consultations in the lowest quintile undoubtedly reflects the poor health of this group, as reported throughout this report.

Another potentially valuable indicator of health care utilization is the amount of time people spend in hospitals over the course of a year. Those in the bottom quintile spend a disproportionately larger number of nights in institutions than the rest of the population: approximately 800 nights per thousand people, gradually falling to 282 in the uppermost quintile. The difference between the bottom quintile and all the other categories is large and highly significant, again reflecting the overall poor health of the poorest Canadians. The cost implications of 500+ more nights per year in hospital for the bottom quintile (per thousand population), compared to the top quintile, are major.

Unmet health care needs

Those with lower incomes are more likely to report health concerns, often at considerably greater rates than the rest of the population, but they are also significantly more likely to report that they have *unmet* health care needs – that is they did not receive care that they believed they required. Unmet health care needs were reported by approximately 161 out of a thousand people in the bottom quintile, compared approximately 120 per thousand in other quintiles. The difference between the poorest quintile and all other Canadians is highly significant.

Figure 12: Self-perceived unmet health care needs
Age adjusted rates per thousand
Canada: population 18-64, 2005



As important as the incidence of unmet health needs, are the reasons that people did not receive the care they believed they required.^{xix} While those in upper income quintiles were more likely to report that they didn't receive care for reasons of convenience ('not available at time required', or 'didn't get around to it') the reasons low income people did not seek care appear to be related to issues of cost, transportation problems, family responsibilities or a belief that the care available would not be adequate. For the upper income groups, the reasons related mainly to issues of personal choice while for the poor, the barriers were structural and financial. The differences in reason across the quintiles that are statistically significant can be seen in Table 3.

Access to health care insurance

Finally in this section we explore access to health insurance for costs not covered under medicare. The data refer only to Ontario.

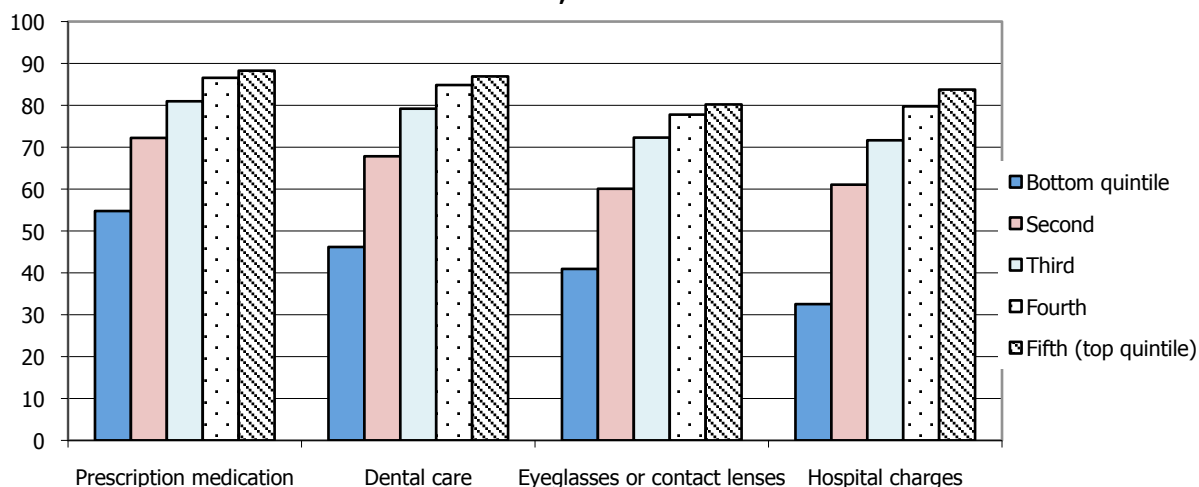
Once again there is a dramatic relationship with income (see Table 3 and Figure 13). For prescription medications only about half of those in the bottom quintile have such insurance, compared with approximately 80 percent of Ontario adults overall. Access to insurance for prescription medications peaks in the top quintile at 88 percent, but each quintile has significantly improved access over the quintile below.

A very similar relationship can be seen for dental care insurance, which rises from approximately 46 percent in the bottom quintile to 87 percent in the top; and eyeglasses, increasing from 41 percent in the bottom quintile to 80 percent in the top group. Lastly, insurance for additional hospital charges is accessible to one-third of those in the bottom quintile, but to 84 percent of those in the top quintile.

Once again, this is not a simple difference between the 'poor' and the 'non-poor'. At each level of income – each quintile - a difference in access compared to the adjoining group can be observed. These differences are numerically large, and statistically significant in all cases.

Clearly, access to private insurance for uninsured health costs is highly associated with income in Ontario.

**Figure 13: Access to health insurance by adjusted household income quintile
Canada, adults 18-64 2005**



The impacts of increasing incomes

The analysis presented so far provides compelling evidence of the powerful relationship between income and health outcomes, although it controls for only two factors closely related to health - income and age^{xx}. As the earlier overview of the social determinants of health makes clear, there is a range of other relevant factors, some also the result of or closely related to income, and others not.

This section of the study attempts to extend the analysis by asking a slightly different question: what is the impact of small increments of income (smaller than movements from one quintile to another) on changes in health status, access and utilization, once other factors known or suspected of being associated with health outcomes, are controlled for? Secondly, can such increments translate into measureable differences in health outcomes, particularly among those in the bottom quintile?

Although the Canadian Community Health Survey does not contain a complete set of ideal variables for a comprehensive measurement of the determinants of health, it does contain a range of useful control variables and acceptable proxies for many (see Table 4 at end of report).

In this section we use logistic regression and general linear modeling techniques to assess the impact on specific outcomes of a \$1,000 increase in incomes on those in the bottom quintile. The control variables which we hold constant are listed in Table 4 and the detailed regression results can be seen in appendices C and D. Overall, the regression results strongly indicate that income has a profound effect on health, even once these other specific factors are taken into account. In the section that follows we explore the approximate magnitude of this impact. For a variety of reasons we believe these estimates to be conservative.^{xxi}

Chronic conditions and disease

Self-rated health, mental health and stress

Once other factors are controlled for income exerts a powerful effect on most aspects of self-rated health. Our results suggest that within the bottom quintile a \$1,000 increment in income can be associated with over 3,000 more people rating their overall health as ‘good’, ‘very good’ or ‘excellent’ (see Table 5, at end of report). Similar, albeit smaller, effects are seen for self-rated mental health where the increment is associated with approximately 1,500 additional people rating their mental health as good or better.

Similarly, the number of weeks that people reported that they were depressed in the past year falls by nearly 56,000 among those in the bottom quintile in response to a \$1,000 increase in income. If weeks of depression mean weeks when people aren’t able to work or be otherwise productive then this represents more than 1,000 person years lost.

Conversely, the number of people reporting stress in the form of most days being ‘quite a bit’ or ‘extremely’ stressful rises somewhat with income, although this may be an artefact.

Endocrine and metabolic conditions

Within this category both the key condition of diabetes, and that of multiple chemical sensitivities are strongly associated with income. Every \$1,000 increment of income is associated with nearly 900 fewer cases of each of diabetes and chemical sensitivities (nearly 1800 cases in total), holding all else constant.

Circulatory conditions

Heart disease and the overall category of circulatory conditions miss the conventional threshold for statistical significance ($p < .05$), although they were very close to that mark.

Eye diseases

The overall category is positively related to income, with each income increment of \$1,000 being associated with approximately 330 fewer cases of eye disease. Within the category, nearly 200 fewer cases of cataracts can be associated with the increase in income, holding all else constant.

Nervous system and developmental disorders

Nearly 900 fewer cases of migraine are significantly associated with the \$1000 income increment.

Respiratory diseases

Chronic bronchitis was strongly associated with income, with over 600 fewer cases in the bottom quintile potentially associated with the \$1000 increment of income, all else constant.

Musculoskeletal diseases

Each individual condition and the category as a whole are strongly and negatively related to income. Overall, approximately 1,500 fewer musculoskeletal conditions are associated with an increment of \$1,000 in income. Similarly, significantly fewer numbers of each individual

condition - back problems (-785), arthritis or rheumatism (-1,281), fibromyalgia (-230) and chronic fatigue syndrome (-381) are associated with the \$1000 income increase.

Mental and behavioural disorders

Overall this category of chronic conditions was negatively associated with income. Within the category anxiety disorders were negatively associated with income, but missed the threshold only marginally. However the category of mood disorders was strongly and negatively associated with income, with approximately 1,000 fewer mood disorders in the bottom quintile associated with an income increment of \$1,000.

Miscellaneous

Under the ‘miscellaneous’ category only stomach or intestinal ulcers were associated with income, with up to 500 fewer occurring in the bottom quintile associated with a \$1,000 income increment.

Other indicators

As observed earlier, the presence of at least one chronic condition is common at all income levels. In the multivariate analysis we found no significant relationship found between income and the simple presence or absence of a chronic condition. However, having more than two chronic conditions was strongly related to income. The preceding results indicate powerful income effects for many individual conditions. Indeed the effect of income in the bottom quintile suggests that nearly 10,000 fewer chronic conditions, and 6,600 fewer disability days (over a two week period) might be associated with a \$1,000 change in income.

Explaining health care access and utilization

We saw earlier that those in the bottom quintile were approximately 30 percent more likely to have a need for health care that had gone unmet. Our multivariate analysis suggests that among those in the bottom quintile each \$1,000 in income may be associated with 600 fewer individuals having such unmet needs, once other factors are controlled for (see Table 6, at end of report).^{xxii}

Similarly, the likelihood of having a regular family doctor is significantly associated with income, such that nearly 1,000 additional people report having a regular doctor with each increment of \$1,000. In this case the relationship may be more subtle and less straightforward than simply income being equated with better health. Income here may represent such things as better jobs, a more stable residence, social status and ‘voice’; all things that may be associated with the likelihood of having a regular family doctor.

Consultations with medical professionals

There is a marked distinction among the different categories of medical consultations explored in the CCHS. The number of consultations with family physicians or general practitioners continues to be negatively related to income in the multivariate analysis, as it was in the analysis by income quintile. This logically follows from the observable differences in concrete health outcomes just explored. Just as there are measurable differences in health with each increment in income, the number of consultations with physicians also declines, in this case by nearly 25,000 among those in the bottom quintile.

On the other hand, consultations with specialists are *positively* related to income. The parameter estimates suggest that nearly 16,000 additional consultations with specialists are associated with an increase in income. Similarly, consultations with medical professionals other than general practitioners and specialists are positively associated with income.

We saw earlier that, apart from general practitioners, higher rates of consultations at low income levels were followed by rising rates as income rose from middle income levels, almost forming a U-shaped pattern.

These findings can perhaps be understood as the result of two different forces at work in different parts of the income distribution. First, and most obviously, the poorer health experienced by those with lower incomes translates into increased health care needs.

But secondly, the other force at play might involve greater *voice* - an ability on the part of those with greater resources (both financial and personal) to navigate and access the health care system. That is, as income and status rise, the ability to gain access to health services may rise in a way that is unrelated to objective health status.

Indeed the other multivariate results support this hypothesis, as education was also found to be positively related to the number of consultations with specialists and medical professionals other than general practitioners and specialists.^{xxiii}

Health insurance

The availability of health insurance for costs not covered by public health care is of tremendous importance to families. Indeed, researchers and policy makers hypothesize that the availability of supplemental health insurance to those on social assistance, as compared to an almost certain absence in the low wage labour market, is a factor in hindering people's efforts to leave social assistance.

Our multivariate results (for Ontario respondents only) again suggest a powerful relationship with income, with each of the four types of private insurance (prescription medications, dental insurance, eyeglasses and hospital insurance) being positively and strongly related to income. This is likely the result of higher income being associated with better quality jobs, and/or improved financial capacity to purchase such coverage privately.

Concluding comments

This research has sought to uncover the most comprehensive evidence on the relationship between income, health outcomes and key measures of health care access and utilization. Our focus has been on the concept of health equity and the role that income plays in pursuing or impeding attainment of this goal.

To do this we have used the most recent national data available from the Canadian Community Health Survey, the largest and most comprehensive data of its kind in Canada, to examine a range of health care outcomes according to the level of income of the individual household.

In general we found strong and highly significant relationships between low income status and the incidence of various chronic health conditions. The findings in this regard are more detailed than previously reported in other studies. We likewise found that overall utilization of the health care system (along with unmet needs in this system) were disproportionately weighted in favour of the poorest twenty percent of the population, undoubtedly reflecting their significantly poorer health overall.

Though it is not the intent of this paper to prescribe policy directions for the pursuit of health equity in Canada, this research clearly suggests – as others have also shown - that low income leads to poor health; and that poverty is incompatible with health equity. And to the extent that health equity is a desired social goal, this report provides quantitative estimates of the probable impacts of modest increases in income among the poorest Canadians.

High income, as this report shows, does not guarantee good health; but low income almost inevitably ensures poor health and significant health inequity in Canada.

Methodological notes:

Data. This analysis is based on data from the 2005 Canadian Community Health Survey (CCHS) Cycle 3.1. The 2005 CCHS was conducted by Statistics Canada, in partnership with Health Canada, the Canadian Institute for Health Information and provincial and territorial ministries of health. The survey includes information on the health status, health care use and health determinants of over 130,000 individuals aged 12 and over, residing in private dwellings covering all provinces and territories in Canada. Individuals living on Native reserves and on Crown lands, residents living in institutions, full-time members of the Canadian Forces and residents of certain remote regions are not included in the survey. The survey covers approximately 98% of the Canadian population aged 12 and over. Surveys were administered in person and by telephone utilizing a computer-assisted interviewing system.

The CCHS includes common content modules administered in all health regions, optional modules utilized by specific health regions, and sub-sample content asked of a subset of respondents to reduce respondent burden. Analyses presented in this report are based on data from common content and optional modules (analyses for Ontario only).

Sample. Adults between the ages of 18 and 64 with complete income data that would allow for their categorization into adjusted household income quintiles were included in the analysis. Household income was adjusted by dividing income by the square root of the number of household members. This is a standard adjustment recommended by the OECD and used by many researchers. Approximately 92,000 respondents were included in the national sample, with 28,000 respondents in the Ontario sample.

The following health outcomes and health care use measures are reported for Canada and Ontario based on common content modules of the CCHS:

Health outcomes include self-reported health, self-reported mental health, stress, number of disability days taken in a two-week period, and a range of chronic conditions.

Respondents were asked, “In general, would you say your health is: (excellent, very good, good, fair or poor)?” and “In general, would you say your mental health is: (excellent, very good, good, fair or poor)?” Responses were grouped into two categories: fair or poor vs. excellent, very good or good. Self-reported health is a valid and reliable measure of health, strongly associated with other measures of health including physicians’ ratings (Shields and Shoostari, 2001; O’Brien, 1997; Lundberg and Manderbacka, 1996; and Brazier, Harper and Jones, 1992)

Regarding stress, respondents were asked, “Thinking about the amount of stress in your life, would you say that most days are: (not at all stressful, not very stressful, a bit stressful, quite a bit stressful, or extremely stressful)?” Responses were grouped into two categories: quite a bit stressful or extremely stressful vs. not at all stressful, not very stressful, a bit stressful.

Regarding disability days, respondents were asked the number of days that they spent in bed for all or most of the day due to illness or injury in the 14 days preceding the interview.

Respondents were asked whether they were diagnosed by a health professional with a variety of chronic conditions that lasted or were expected to last six months or more. Chronic conditions were grouped into disease classifications using the World Health Organization’s International Classification of Diseases (ICD-10).^{xxiv} Disease classifications and chronic conditions include: Endocrine or metabolic condition (food allergies, allergies other than food, diabetes, thyroid condition, multiple chemical sensitivities), circulatory system condition (high blood pressure, heart disease, suffers from the effects of a stroke), eye disease (cataracts, glaucoma), diseases of nervous system or developmental disorder (migraine headaches, epilepsy, learning disability), diseases of the respiratory tract (asthma, chronic bronchitis), musculoskeletal diseases (fibromyalgia, arthritis or rheumatism, back problems excluding fibromyalgia, arthritis and rheumatism, chronic fatigue syndrome), mental and behavioural disorders (schizophrenia, Alzheimer’s Disease and other dementia, mood disorder, anxiety disorder), non-categorized conditions (cancer, stomach or intestinal ulcers, urinary incontinence, bowel disorder) and other chronic condition not listed. Due to

small group sizes, individual rates for cataracts, glaucoma, schizophrenia and Alzheimer's Disease and other dementia are not reported.

Health care use measures include items regarding self-perceived unmet health care needs, having and consulting with a family doctor, consultations with medical professionals, specialists and others, and staying overnight in a hospital, nursing home or convalescent home.

Multivariate Analysis.

Statistical analysis was undertaken with SAS statistical software version 9.1.

Simple tabular comparisons were done undertaken with chi-square statistics, utilizing bootstrap variance estimation techniques using the BOOTVAR program developed by Statistics Canada. Bootstrap variance estimation is one of a class of techniques developed to adjust for the fact that most surveys are not true random samples, as required by statistical theory, but typically have complex design features such as stratification. A failure to take these sample design issues into account leads to underestimates of standard errors of parameters and hence potential findings of significance where not warranted.

Complex comparisons of multiple categories were undertaken with general linear modeling techniques in SAS. As BOOTVAR does not support such models variance estimates are those resulting from the standard computations.

Regression estimates with dichotomous outcome variables (presence or absence of a chronic condition for example) were undertaken in SAS using logistic regression methods. Bootstrap variance estimates were obtained and used for significance testing.

Regression estimates for count data such as number of physician visits were conducted with general linear models in SAS PROC GENMOD using either Poisson or negative binomial distributions for the dependent variable, standard techniques for analysing data that takes the form of counts.

These results are deliberately cautious. There is, in the first place, the problem of endogeneity, or reverse causality. That is, low income may cause poor health, but poor health can also cause lower income. Simple associations, it is often argued, may therefore overstate the impact of income on health. However, other research has concluded that this is not a significant problem (Phipps, 2003).

Secondly, even though the gradients between health and income are frequently steepest at the lowest levels of income, the parameter estimates used are those that apply to the entire income distribution. If anything, this results in an understatement of the impacts. Equations tested with only those in the bottom quintile frequently resulted in much larger parameter estimates and hence suggest larger impacts. Unfortunately the estimates were not consistent or robust enough to allow estimates to be made on this basis due to sample size limitations.

Tables

Table 1: Overview of health indicators (age-adjusted, per thousand population)	First (bottom) quintile	Second	Third	Fourth	Fifth (top quintile)
Adults 18-64, Canada 2005					
By adjusted household income quintile	178****	95****	78****	58****	42
	97****	49**	43****	32***	27
Self-rated health:					
Self-rated health (poor or fair, versus good, very good or excellent)	696****	672	680	678**	665
Self-rated mental health (poor or fair, versus good, very good or excellent)	289****	229***	214**	200****	177
Chronic conditions:	1,921****	1,582**	1,513*	1,470****	1,356
Has a chronic condition					
> 2 chronic conditions	87****	36****	30**	21	19
Total number of chronic conditions	1,327****	824	819	768	718
Disability:					
Disability (Often has a participation or activity limitation)	270****	238**	252	262****	295
Disability days (over previous two weeks)	0.67****	0.45	0.42	0.41**	0.34
Stress and mental health:	1,739****	973	830	653	579
Stress: Most days quite a bit or extremely stressful versus not at all, not very or a bit stressful					
Depression scale					
Weeks depressed					
Notes: Asterisks indicate statistical significance from the next category above.					
* - Significant at the .05 level					
** - Significant at the .01 level					
*** - Significant at the .001 level					
**** - Significant at the < .0001 level					

Table 2: Chronic conditions: Age-adjusted rates, per thousand population
Canada, population 18-64, 2005

Condition	First (bottom) quintile	Second	Third	Fourth	Fifth (top quintile)
Endocrine and metabolic conditions:	372	364	369	377*	365
Thyroid conditions	54	58****	49	45*	39
Diabetes	53****	38	38****	29**	23
Food allergies	78*	70	75	75	78
Multiple chemical sensitivities	32****	24	22	20****	12
Other allergies	266	268	277****	296	293
Circulatory conditions:	152*	142**	130****	126***	114
Effects of a stroke	n/a	n/a	n/a	n/a	n/a
Heart disease	39****	27	25	23**	18
High blood pressure	126	126***	114	109**	101
Eye diseases:	27	24***	18	20****	12
Cataracts	n/a	n/a	n/a	n/a	n/a
Glaucoma	n/a	n/a	n/a	n/a	n/a
Nervous system and developmental disorders:	183****	138	136**	124*	115
Learning disabilities	40****	24	21***	16	18
Epilepsy	12****	5	5	4	3
Migraines	148****	117	115	109**	98
Respiratory diseases	119****	94	93	89	88
Chronic bronchitis	41****	22	22***	16*	13
Asthma	98****	81	78	79	79
Musculoskeletal:	329****	285****	277*	265****	240
Back problems (excluding arthritis or rheumatism)	229****	198	192	189****	173
Arthritis or rheumatism	167****	138***	125***	111****	93
Fibromyalgia	23****	16	14**	10*	8
Chronic fatigue syndrome	24****	13*	11***	7	6
Mental and behavioural disorders:	146****	90**	81	77****	64
Anxiety	81****	44	42	39	35
Mood disorders	105****	64**	55	54****	39
Alzheimer's or dementia	n/a	n/a	n/a	n/a	n/a
Schizophrenia	n/a	n/a	n/a	n/a	n/a
Miscellaneous:	110****	87	84	80	75
Cancer	9	9	9	7	8
Ulcers	47****	30	30**	25	24
Urinary incontinence	25**	21***	16	16	13
Bowel disorder	45*	38*	43	42*	37
Other chronic condition	148****	130*	120	126	128
Note: Asterisks indicate statistical significance from the next category above.					
* - Significant at the .05 level					
** - Significant at the .01 level					
*** - Significant at the .001 level					
**** - Significant at the < .0001 level					

Table 3: Access to, and utilization of health care services
Rates per thousand, by adjusted household income quintile

Adults 18 - 64, Canada 2005					
	Bottom quintile	Second	Third	Fourth	Fifth (top quintile)
Consultations with medical professionals:					
Has no regular medical doctor	194****	164**	150**	161	154
Number of medical consultations with all medical professionals	10,543****	8,664**	9,238	9,086	9,482
Number of consultations with general practitioner	3,985****	2,917	2,847	2,736***	2,514
Number of consultations with specialists	1,480****	1,284	1,338	1,327***	1,491
Number of consultations with medical practitioners other than general practitioners and specialists	5,115***	4,478***	5,068	5,019**	5,484
Nights as a patient	801****	459	389	312	282
Has self-perceived unmet health care needs	161****	122	122	124*	116
Reasons care not received:					
Care not available at time required (*)	10.2%	14.4%	13.3%	15.4%	15.6%
Felt care would be inadequate (*)	4.0%	5.4%	3.7%	3.2%	2.3%
Cost (****)	17.0%	9.3%	6.0%	4.2%	4.0%
Didn't get around to it (*)	5.8%	8.3%	8.5%	9.5%	7.8%
Personal or family responsibilities (**)	1.5%	1.2%	2.0%	0.5%	0.2%
Transportation problems (Quintiles 4 and 5 collapsed under 4) (****)	3.2%	0.8%	0.9%	0.5%	
Access to health insurance (Ontario only):					
Prescription medications	548****	722****	810****	866***	883
Dental care	462****	678****	792****	848***	869
Eyeglasses or contact lenses	409****	601****	723****	778***	802
Hospital charges	325****	611****	717****	797****	838
Note: Asterisks indicate statistical significance from the next quintile above.					
* - Significant at the .05 level					
** - Significant at the .01 level					
*** - Significant at the .001 level					
**** - Significant at the < .0001 level					

Table 4: variables used in multivariate analysis	Column1
Variable	Concept
Income in \$000 (adjusted for household size)	Economic well-being, access to goods and services
Age (measured in 10 year increments)	
Sex	Gender
Visible minority	Social status, culture
Aboriginal	Social status, culture
Education	Social status, literacy and access
Activity level	Health behaviour
Smoking (daily smoker versus no)	Health behaviour
Social assistance recipient (main source of income)	Social status
Activity limitations (Often or sometimes has activity limitations)	Disability, injury, biology/genetic endowment
Province	(Control variable for access and utilization equations only)

Table 5: Multivariate results for individual chronic conditions		
Canada, adults 18-64, 2005 ¹		
Condition	Impact associated with \$1,000 change in income	Statistical significance ²
Self-rated health and stress:		
Self-rated health (Good, very good or excellent)	3,185	****
Self-rated mental health (Good, very good or excellent)	1,545	****
Stress (Most days 'Quite a bit' or 'Extremely' stressful)	2,257	****
Depression (weeks depressed in past 12 months)	-55,838	****
Endocrine and metabolic conditions:		
	192	n.s.
Thyroid conditions	-194	n.s.
Diabetes	-889	****
Food allergies	427	n.s.
Multiple chemical sensitivities	-877	****
Other allergies	833	*
Circulatory conditions:		
	-522	n.s.
Heart disease	-272	n.s.
High blood pressure	-380	n.s.
Eye diseases:		
	-329	**
Glaucoma	-171	n.s.
Cataracts	-186	*
Nervous system and developmental disorders:		
	-109	**
Learning disabilities	-206	n.s.
Migraines	-861	**
Respiratory diseases:		
	-251	n.s.
Chronic bronchitis	-629	***
Asthma	-31	n.s.
Musculoskeletal:		
	-1,585	***
Back problems (excluding arthritis or rheumatism)	-785	*
Arthritis or rheumatism	-1,281	***
Fibromyalgia	-230	*
Chronic fatigue syndrome	-381	**
Mental and behavioural disorders:		
	-1,254	****
Anxiety disorder	-411	n.s.
Mood disorders	-995	***
Miscellaneous:		
	-425	n.s.
Cancer	-7	n.s.
Ulcers	-496	***
Urinary incontinence	-93	n.s.
Bowel disorder	33	n.s.
Other chronic conditions	418	n.s.
Other:		
Has a chronic condition	-271	n.s.
Number of chronic conditions	-9,521	****
Disability days in past two weeks	-6,577	***
¹ Controlling for the other variables in table 4. Complete results appear in Appendix C.		
² Statistical significance is indicated as follows:		

* p < .05		
** p < .01		
*** p < .001		
**** p < .0001		

Table 6: Multivariate results for health care access and utilization		
Canada, adults 18-64, 2005¹		
	Impact associated with \$1,000 change in income	Significance ²
Has self-perceived unmet health care need	(600.9)	*
Has a regular medical doctor	965.0	**
Consultations with medical professionals:		
All medical consultations	52,316.0	****
Consultations with family doctor	(24,684.4)	****
Consultations with medical specialists	15,923.1	****
Consultations with other medical professionals ³	46,555.9	***
Nights as a patient in a hospital, nursing home or convalescent home	(5,622.6)	n.s.
Access to health insurance (Ontario only):		
Prescription medications	13,819.0	****
Dental insurance	15,818.6	****
Eye glasses/contact lenses	13,436.6	****
Hospital charges	19,474.5	****
1 Controlling for the other variables in table 4. Complete results appear in Appendix D.		
2 Statistical significance is indicated as follows:		
* p < .05		
** p < .01		
*** p < .001		
**** p < .0001		
3 Includes nurses, dentists and/or orthodontists, chiropractor, physiotherapists, social worker or counsellor, psychologists, or speech, audiologists or occupational therapists.		

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Endnotes:

ⁱ The existence of a ‘health gradient’ – a clear relationship between income and health that exists at all income levels and cannot simply be reduced to the difference between the ‘poor’ and ‘non-poor’ - is recognized and accepted

ⁱⁱ Statistics Canada, *Labour Force Characteristics*, www40.statcan.ca/101/cst01/econ10.htm, accessed November 4, 2008.

ⁱⁱⁱ www.socialwork.utoronto.ca/research/projects/sane.htm

^{iv} The panel participants were not a random sample, and likely experienced worse health than other Ontario Works recipients who exit welfare for employment after only a short spell on assistance. However, other research has confirmed widespread and serious health problems among social assistance recipients generally.

^v For example, see: World Health Organisation (2008), *Closing the gap in a generation: Health equity through action on the social determinants of health*, Final report of the commission on Social determinants of health, Geneva: World Health Organization.

^{vi} Public Health Agency of Canada, What determines health? Accessed on-line at www.phac-aspc.gc.ca/ph-sp/determinants/index-eng.php#key_determinants, Ottawa: Health Canada.

^{vii} All figures reported by quintile have been age-adjusted to account for the fact that younger people are more likely to be found in lower income groups.

^{viii} Statistical significance refers to the chance that the outcome observed could have arisen by chance and does not reflect the true underlying relationship. For example, a significance of .001 means that there is a one-in-one thousand chance that the observed relationship is not the true relationship. A 95 percent significance level is a typical minimum standard. The statistical tests presented are in relation to the next adjacent category. In the case, the first quintile is statistically different from the second quintile, the second from the third and so on. Although not shown, this typically implies that all of the other paired combinations will also be statistically significant when the outcome changes monotonically – the first with the fifth, second with fourth etc. It will not necessarily be the case when the outcome does not change monotonically with income.

^{ix} ‘Adjusted household income’ refers to household income adjusted for family size, in this case adjusted by dividing by the square root of household size. This is a standard method for comparing household incomes among households with differing numbers of members. Logically, economies of scale suggest that households with the same level of income but different numbers of members will not enjoy the same standard of living. See: Organisation for Economic Cooperation and Development (undated), *What are Equivalence Scales?* OECD Social Policy Division, www.oecd.org/dataoecd/61/52/35411111.pdf, Paris: OECD.

^x The Low Income Measure was used in preference to the Low-Income Cut-Off (LICO), the other frequently-used poverty measure in Canada. The CCHS does not contain the geographic information necessary to assign respondents to the appropriate income cut-off for the LICO. More importantly, the last rebasing of the LICOs, the process by which the lines are adjusted for changes in overall standards of living and consumption patterns took place in 1992, rendering the indicator less useful over time (see Mitchell and Shillington, 2008). The LIM is more easily updated and is a measure consistent with those used in international comparative research.

^{xi} See appendix 1 for a listing of chronic conditions available in the Canadian Community Health Survey, classified according to categories created by the World Health Organization under the International Classification of Diseases.

^{xii} Even though the other adjacent quintiles were not different there were significant differences among other quintiles. For example the fifth quintile was not statistically different from the fourth, but was different from the first, second and third quintiles. Similarly the fourth is not different from the third, but was different from the first and second quintiles.

^{xiii} The categorization is drawn from the World Health Organization’s International Classification of Diseases. See Appendix B for details.

^{xiv} The CCHS requires that these be conditions diagnosed by a physician. Not all chronic conditions in the World Health Organization’s International Classification of Diseases are included in the CCHS.

^{xv} The CCHS also asks respondents about emphysema and chronic obstructive pulmonary disease. However, it only asked these of respondents age 30 and over making it difficult to include these in the category.

^{xvi} Numbers for dementia and schizophrenia were too small to permit independent analysis.

^{xvii} It should be noted that while the apparent increase between the third and fourth quintiles is statistically significant, the difference between the fourth and fifth quintiles is not.

^{xviii} ‘Medical consultations’ includes both telephone consultations and in-person visits with general practitioners, eye specialists such as ophthalmologists and optometrists, other medical doctors, nurses, dentists and orthodontists, chiropractors and physiologists, social workers and counsellors, psychologists, and speech, audiology or occupational therapists.

^{xix} The CCHS explored a range of reasons why care might not have been received including: care not available in area, care not available at time required, waiting time too long, respondent felt care would be inadequate, cost, too busy, respondent didn’t get around to it, respondent didn’t know where to go, personal or family responsibilities, transportation problems, respondent dislikes or is afraid of doctors, respondent decided not to seek care, and doctor didn’t think care was necessary. Although many of the reasons appear to be related to income, for the sake of brevity only those results that were statistically significant are presented. Additional information is available from the authors.

^{xx} The data are all age-adjusted, as noted earlier.

^{xxi} See the methodological appendix for a discussion of these results.

^{xxii} The control variables in this section are identical with the exception of the addition of control variables for provinces.

^{xxiii} The use of medical professionals other than general practitioners and specialists should also be related to the availability of health insurance. Unfortunately the data do not permit using these variables in our models as the survey only asked questions about health insurance of respondents in Ontario.

^{xxiv} For information on the ICD-10: www.who.int/classifications/icd/en/