

# Living with heart disease – the working-age population

Helen Johansen

## Abstract

### Objectives

This article compares the socioeconomic and health characteristics of the household population aged 35 to 64 with and without self-reported heart disease.

### Data sources

Information on the prevalence of heart disease is from the household component of Statistics Canada's 1996/97 National Population Health Survey.

### Analytical techniques

Weighted estimates of the health, health care utilization and socioeconomic characteristics of people aged 35 to 64 were calculated by sex and self-reported heart disease. Logistic regression was used to adjust for age and test for statistical significance.

### Main results

In 1996/97, about 3% of Canadians aged 35 to 64, or approximately 345,000 individuals, reported that they had been diagnosed with heart disease. Compared with their contemporaries without heart disease, they reported more pain, chronic conditions, and activity restrictions. They were much less likely than people without heart disease to be employed. A relatively large percentage of them lived in low-income households. The consequences of heart disease were particularly severe for women.

### Key words

cardiovascular disease, comorbidity, pain, disabled, income, employment, drugs, women

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Heart disease is the second leading cause of death in Canada and a major cause of hospitalization (see *Deaths and hospitalizations*). However, a diagnosis of heart disease does not necessarily result in death or institutionalization. In fact, many people with heart conditions continue to live in the community.

Information about people who die or are hospitalized because of heart disease is limited to what is contained in death certificates and hospital records. Even less is known about those who have been diagnosed with heart disease and are living in the community. The impact of this diagnosis on their lives is only infrequently assessed.<sup>1-4</sup>

Although heart disease is most prevalent among seniors, a substantial number of people aged 35 to 64 have been diagnosed with heart conditions. Because people in this age range may face the multiple responsibilities arising from work and family, the effects of such a diagnosis, not only on their health, but also on their employment, income and daily living, can be devastating.

This article uses data from the 1996/97 National Population Health Survey (NPHS) to examine the characteristics of the household population aged 35 to 64 who reported that a health professional had diagnosed them as having heart disease (see *Methods* and *Limitations*). Their health status, use of health care services and socioeconomic characteristics are compared with those of people in the same age group who were free of heart conditions. As well,

the circumstances of women with heart disease are contrasted with those of their male counterparts.

### **Majority are men**

In 1996/97, 3% of the household population aged 35 to 64—an estimated 345,000 individuals—reported that they had been diagnosed with heart disease (see *Definitions*). The prevalence of heart disease rose sharply with age. At ages 35 to 44, just

## **Methods**

### **Data sources**

This article is based on Statistics Canada's National Population Health Survey (NPHS). The NPHS, which began in 1994/95, collects information about the health of the Canadian population every two years. It covers household and institutional residents in all provinces and territories, except persons living on Indian reserves, on Canadian Forces bases, and in some remote areas. The NPHS has both a longitudinal and a cross-sectional component. Respondents who are part of the longitudinal component will be followed for up to 20 years. A more detailed description of the NPHS design, sample and interview procedures can be found in published reports.<sup>5</sup> See also *The National Population Health Survey – its longitudinal nature* in this issue.

This analysis of the circumstances of people with heart disease uses cross-sectional data from the second cycle of the NPHS, which was conducted in 1996/97. The data analyzed here pertain to the household population in the provinces.

The 1996/97 cross-sectional sample is made up of longitudinal respondents and respondents who were selected as part of supplemental samples, or buy-ins, in three provinces. The additional respondents for the buy-ins were chosen with the random digit dialing (RDD) technique and were included for cross-sectional purposes only.

Individual data are organized into two files: General and Health. Socio-demographic and some health information was obtained for all members of participating households. These data are found in the General file. Additional in-depth health information was collected for one randomly selected household member. The in-depth health information, as well as the information on the General file pertaining to that individual, is found in the Health file.

In households belonging to the cross-sectional buy-in component, one knowledgeable person provided the socio-demographic and health information about all household members for the General file. As well, one household member, not necessarily the same

person, was randomly selected to provide in-depth health information about himself or herself for the Health file.

Among individuals in the longitudinal component, the person providing in-depth health information about himself or herself for the Health file was the randomly selected person for that household in cycle 1 (1995/94) and was usually the person who provided information on all household members for the General file in cycle 2 (1996/97).

The 1996/97 cross-sectional response rates for the Health file were 93.1% for the longitudinal component and 75.8% for the RDD component, yielding an overall response rate of 79.0%. Information in the Health file is available for 81,804 randomly selected respondents. This analysis is based on 33,686 respondents aged 35 to 64, 1,182 of whom reported that they had been diagnosed by a health professional as having heart disease.

Mortality data, compiled from the vital statistics registries in each province, are from the Canadian Vital Statistics Data Base at Statistics Canada. Data on hospitalizations are from the the Hospital Morbidity File at Statistics Canada.

### **Analytical techniques**

All analyses are based on weighted data. Men and women aged 35 to 64 were analyzed separately. Estimates of health, health care utilization and socioeconomic characteristics by sex and self-reported heart disease were calculated. Because the population reporting heart disease has an older age distribution than the population not affected, weighted logistic regression was used to adjust for age. Coefficients of variation and standard errors were estimated using a weighted bootstrap procedure that fully accounts for the design effect of the NPHS.<sup>6,7</sup>

The percentages shown in the charts and Appendix tables were not age-adjusted. The odds ratios, however, were age-adjusted and were used to test statistically significant differences.

1% reported a diagnosis, but by ages 55 to 64, the proportion was 7% (Table 1).

At ages 35 to 54, the percentages of men and women who had been diagnosed were not significantly different, but at ages 55 to 64, the prevalence was higher among men. As a result, men accounted for more than half (58%) of all 35- to 64-year-olds with heart disease.

### Poor health

For a large share of 35- to 64-year-olds with heart disease, it was only one of several health problems. More than a third (36%) reported having at least two other major illnesses (asthma, arthritis, chronic obstructive lung disease, stroke, high blood pressure or diabetes), whereas this was true for just 6% of people without heart disease (Appendix Table A). To some degree, this discrepancy in disease prevalence might result from the older age distribution of the group with heart disease. But even when age was taken into account, the odds that people with heart disease would have at least two other serious chronic conditions were about six times those for people who were not afflicted (Table 2).

Table 1  
Prevalence of heart disease,<sup>†</sup> household population aged 35 to 64, by age group and sex, Canada excluding territories, 1996/97

|                    | Total        |                | Men          |                | Women        |                |
|--------------------|--------------|----------------|--------------|----------------|--------------|----------------|
|                    | '000         | %              | '000         | %              | '000         | %              |
| <b>Total 35-64</b> | <b>344.9</b> | <b>3</b>       | <b>200.4</b> | <b>3</b>       | <b>144.5</b> | <b>3</b>       |
| 35-44              | 56.4         | 1 <sup>‡</sup> | 26.9         | 1 <sup>‡</sup> | 29.6         | 1 <sup>‡</sup> |
| 45-54              | 112.9        | 3              | 69.8         | 4              | 43.1         | 2 <sup>‡</sup> |
| 55-64              | 175.6        | 7              | 103.7        | 8*             | 71.9         | 5              |

**Data source:** 1996/97 National Population Health Survey, cross-sectional sample, Health file

**Note:** Because of rounding, detail may not add to totals.

<sup>†</sup> Diagnosed by a health professional.

<sup>‡</sup> Coefficient of variation between 16.6% and 25.0%

\* Significantly higher for men than for women ( $p < 0.05$ )

Comorbid conditions were more common among women than men (Chart 1). Close to half (48%) of women with heart disease reported that they had at least two other chronic conditions, compared with 28% of the men.

As might be expected from the high prevalence of health problems, people with heart disease were much more likely than those without heart disease to report chronic pain, activity restriction and disability days. Even after allowing for their older

Table 2  
Age-adjusted odds ratios for selected health characteristics, household population aged 35 to 64, by heart disease<sup>†</sup> status and sex, Canada excluding territories, 1996/97

|  | Total      |                         | Men        |                         | Women      |                         |
|--|------------|-------------------------|------------|-------------------------|------------|-------------------------|
|  | Odds ratio | 95% confidence interval | Odds ratio | 95% confidence interval | Odds ratio | 95% confidence interval |
| <b>Health</b>                                |            |                         |            |                         |            |                         |
| Two or more comorbidities <sup>‡</sup>       | 5.6*       | 4.3, 7.4                | 4.8*       | 3.2, 7.0                | 8.1*       | 5.3, 12.4               |
| Chronic pain/discomfort                      | 2.8*       | 2.2, 3.7                | 2.3*       | 1.5, 3.4                | 4.1*       | 2.8, 5.9                |
| Activity restriction                         | 6.5*       | 4.9, 8.6                | 5.9*       | 4.0, 8.6                | 7.7*       | 5.2, 11.3               |
| One or more disability days in past 2 weeks  | 3.3*       | 2.5, 4.5                | 3.5*       | 2.3, 5.2                | 3.7*       | 2.4, 5.7                |
| Describes health as poor/fair                | 5.6*       | 4.3, 7.4                | 6.3*       | 4.4, 9.0                | 5.0*       | 3.3, 7.6                |
| Major depressive episode in past year        | 3.1*       | 1.9, 5.2                | 2.8*       | 1.2, 6.5                | 3.8*       | 1.8, 8.3                |
| <b>Health care utilization</b>               |            |                         |            |                         |            |                         |
| Took more than 3 medications in last 2 days  | 8.4*       | 6.3, 11.1               | 15.3*      | 10.6, 22.0              | 5.1*       | 3.4, 7.8                |
| Need help with housework or personal care    | 5.3*       | 4.0, 7.0                | 6.0*       | 4.0, 8.8                | 5.7*       | 3.8, 8.5                |
| Use home care <sup>§</sup>                   | 2.4*       | 1.3, 4.6                | 1.4        | 0.7, 2.8                | 3.7*       | 1.6, 8.7                |
| Overnight patient in past year <sup>††</sup> | 5.4*       | 3.9, 7.4                | 6.1*       | 4.0, 9.4                | 4.7*       | 2.8, 7.9                |

**Data source:** 1996/97 National Population Health Survey, cross-sectional sample, Health file

**Note:** Reference group is household population aged 35 to 64 not diagnosed with heart disease.

<sup>†</sup> Diagnosed by a health professional.

<sup>‡</sup> Asthma, arthritis, chronic obstructive lung disease, stroke, high blood pressure, diabetes

<sup>§</sup> Completely or partially government-funded; includes nursing, personal care and housework.

<sup>††</sup> In hospital, nursing home or convalescent home

\*  $p < 0.05$

## Definitions

Respondents to the National Population Health Survey were asked whether they had “long-term conditions that have lasted or are expected to last 6 months or more and that have been diagnosed by a health professional.” The interviewer read a list of conditions. Those relevant to this analysis are heart disease, asthma, arthritis, chronic obstructive lung disease, stroke, high blood pressure and diabetes. If respondents asked what was meant by “heart disease,” they were told that it includes angina, heart failure and rheumatic heart disease.

Respondents were asked, “Are you usually free of pain or discomfort?” Those who replied “no” were considered to have *chronic pain*.

A positive response to the question, “Because of a long-term physical or mental condition or a health problem, are you limited in the kind or amount of activity that you can do?” indicated an *activity restriction*.

*Disability days* were determined with two questions: “During that period (past 14 days), did you stay in bed at all for all or most of the day because of illness or injury, including any nights spent as a patient in a hospital?” and “During those 14 days, were there any days that you cut down on things you normally do because of illness or injury?” Respondents who answered “yes” to one or both of these questions were asked how many days they had had to spend in bed or had to cut down on their activities.

*General health* was assessed with the question: “In general, would you say your health is: excellent, very good, good, fair, poor?”

The use of *medications* (both prescription and over-the-counter) was assessed with the question, “In the past month, did you take any of the following medications: ...?” Among the options was “medicine for the heart.”

Those who responded “yes” to the question, “Have you received any home care services in the past 12 months?”, were considered to have been *home care* recipients. Home care services are health care or homemaker services received at home, with the cost being entirely or partially covered by government. Examples are nursing care, help with bathing or housework, respite care and meal delivery.

To determine whether respondents *needed help with housework or personal care*, they were asked if they required assistance in preparing meals, shopping for groceries or other necessities, doing normal everyday housework, doing heavy household chores such as washing walls, yard work, etc., or for personal care such as washing, dressing or eating.

A respondent who answered “yes” to the question, “In the past 12 months, have you been a patient over night in a hospital, nursing home or convalescent home?” was considered to have been an *overnight patient*.

Respondents who reported that they were currently working were considered to be *employed*. If they were not employed, they were asked the main reason they were not working. The reasons used in this analysis are: caring for family, recovering from illness/on disability, and retired.

Respondents who were employed were asked the number of hours they worked at each job in a week. These hours were totalled to classify employed respondents into those who *worked less than 30 hours a week* and those who *worked 30 or more hours a week*.

To determine respondents’ *main source of household income*, they were asked: “What was the main source of income?” For this analysis, several categories were combined: 1) wages, salaries, income from self-employment; 2) Employment Insurance, Worker’s Compensation, provincial or municipal social assistance or welfare; and 3) pensions (benefits from Canada or Quebec Pension Plans, retirement pensions, superannuation and annuities, Old Age Security and Guaranteed Income Supplement).

Income adequacy was calculated by taking into account both household income and the number of people in the household. *Low income* was defined as less than \$30,000 per year for 5 or more people, less than \$20,000 for 3 or 4 people, and less than \$15,000 for 1 or 2 people.

Respondents who answered “yes” to the question, “Thinking about the past 12 months, did your household ever run out of money to buy food?” were considered to be in *financial distress*.

Using the methodology of Kessler et al.,<sup>8</sup> the NPHS identifies a major depressive episode (MDE) with a subset of questions from the Composite International Diagnostic Interview. These questions cover a cluster of symptoms for depressive disorder, which are listed in the Diagnostic and Statistical Manual of Mental Disorders (DSM III-R).<sup>9</sup> Responses to these questions were scored on a scale and transformed into a probability estimate of a diagnosis of MDE. If this estimate was 0.9, that is, 90% certainty of a positive diagnosis, then the respondent was considered to have experienced *depression* in the previous 12 months.

*Low education* was defined as less than high school graduation.

age profile, the odds that 35- to 64-year-olds with heart disease would report these problems were significantly high, compared with people who were not afflicted. Chronic pain and disability days were more prevalent among women than men. For instance, 46% of women with heart disease reported chronic pain, compared with 29% of the men (Chart 2).

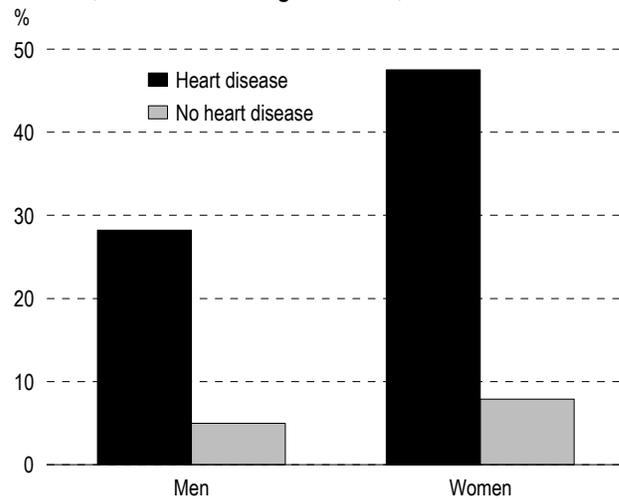
Given the prevalence of other health conditions, chronic pain and activity limitations, to say nothing of the diagnosis of heart disease itself, it is hardly surprising that a large percentage of 35- to 64-year-olds with heart disease assessed their health negatively. Overall, 41% of them described their health as fair or poor, while this was the case for only 9% of their contemporaries who did not have heart disease. After adjusting for age, the odds that people with heart disease would judge themselves to be in fair or poor health were about six times those of people who were not afflicted.

### Multiple-medication use

Perhaps in an attempt to cope with poor health and chronic pain, many people with heart disease used several medications. In 1996/97, more than half (52%) of 35- to 64-year-olds with heart disease reported to the NPHS that they had taken three or

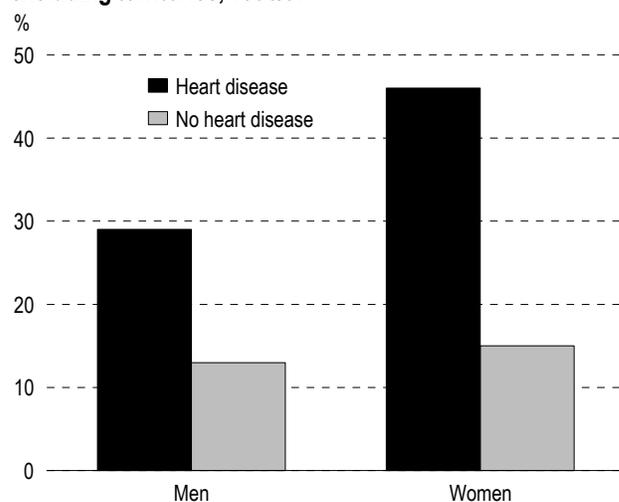
more medications (prescription and over-the-counter) in the last two days. For people in this age range who did not have heart disease, the corresponding figure was 9%. The age-adjusted

Chart 1  
Percentage of household population aged 35 to 64 with at least two other chronic conditions,<sup>†</sup> by heart disease<sup>‡</sup> status and sex, Canada excluding territories, 1996/97



Data source: 1996/97 National Population Health Survey, cross-sectional sample, Health file  
<sup>†</sup> Asthma, arthritis, chronic obstructive lung disease, stroke, high blood pressure, diabetes  
<sup>‡</sup> Diagnosed by a health professional.

Chart 2  
Percentage of household population aged 35 to 64 with chronic pain, by heart disease<sup>†</sup> status and sex, Canada excluding territories, 1996/97



Data source: 1996/97 National Population Health Survey, cross-sectional sample, Health file  
<sup>†</sup> Diagnosed by a health professional.

### Deaths and hospitalizations

Although the death rate for heart disease has declined steadily since 1960, the toll remains high.<sup>10</sup> In 1995, 6.6% of all deaths of men aged 35 to 39 were due to ischemic heart disease (IHD), which was the fourth most common cause of death of men in this age range.<sup>11</sup> By ages 60 to 64, IHD accounted for 24.1% of all male deaths, and ranked first among causes. For women, IHD was the fifth most common cause of death at ages 35 to 39, accounting for 3.9%. By ages 60 to 64, IHD was in first place and represented 14% of female deaths.

In 1996/97 IHD accounted for 57,420 hospital stays of men and 19,453 stays of women aged 35 to 64. This represented 12% and 4%, respectively, of all hospitalizations for this age group.

odds that men who had heart disease would be multiple-medication users were 15 times the odds for men who did not have heart problems. The odds of multiple-medication use among women with heart disease were 5 times higher than the odds for women who were not afflicted.

A range of medications is recommended for heart conditions. Possible long-term drug treatment includes aspirin, beta-blockers, lipid-lowering agents, angiotensin converting enzyme (ACE) inhibitors and perhaps anticoagulants.<sup>12</sup> Yet surprisingly, 34% of people with heart disease reported not taking a heart medication within the last month. This could reflect misclassification of disease or misclassification of medication, but it might also indicate missed opportunities for secondary health promotion.

### Home care

More than a third (36%) of people with heart disease reported needing help with one or more household tasks or personal care, compared with only 8% of those without heart disease. In fact, the odds that 35- to 64-year-olds with heart disease would need

help were five times those of their contemporaries without heart disease.

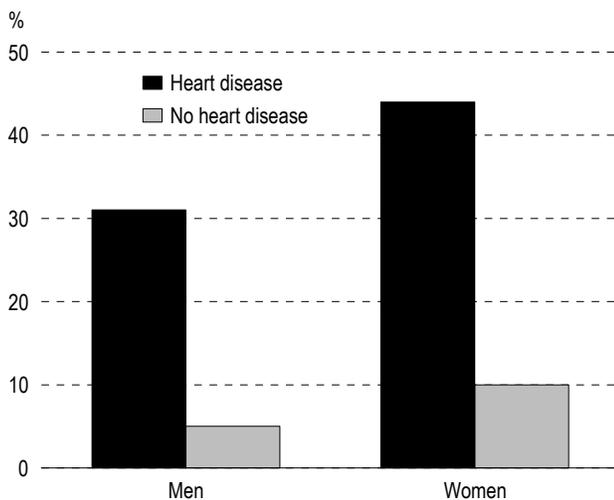
The number of people who actually received formal home care services (funded wholly or in part by the government) fell far short of the number who reported needing help. Thus, many who needed assistance did not get publicly funded help.<sup>13</sup> Their options would be to rely on family or friends, pay for assistance themselves, or do without.

Allowing for the older age distribution of those with heart disease, the odds were significantly higher that women who had been diagnosed with a heart condition would be home care recipients, compared with women who did not have heart disease. By contrast, men with heart disease did not have significantly higher odds of receiving home care than did men who were not afflicted.

The preponderance of women among home care recipients may be attributable to the fact that men are more likely to receive help from their spouse (Chart 3). It has been suggested that because male spouses may not be accustomed to care-giving roles, women with heart disease are disadvantaged compared with their male counterparts.<sup>1</sup> As well, a higher percentage of women (24%) than men (13%) with heart disease lived alone, and so they may have had less access to informal care (data not shown).

Chart 3

**Percentage of household population aged 35 to 64 who needed help with housework or personal care, by heart disease† status and sex, Canada excluding territories, 1996/97**



**Data source:** 1996/97 National Population Health Survey, cross-sectional sample, Health file

† Diagnosed by a health professional.

### Health care use

People with heart disease were heavy users of health care resources. However, the large percentage of them with other serious chronic conditions suggests that the care they received was not exclusively for heart disease.

Over a quarter (27%) of 35- to 64-year-olds with heart disease had been admitted over night to a hospital, nursing home or convalescent home in the previous year, compared with 6% of their contemporaries without heart disease (Appendix Table A, Chart 4). Even when the older age profile of people with heart disease is taken into account, they had five times the odds of admission as did those who were not afflicted.

Individuals aged 35 to 64 with heart disease accounted for more than 1 million hospital days in 1996/97, which was 16% of the total for this age

Chart 4  
**Percentage of household population aged 35 to 64 admitted to hospital† over night during last year, by heart disease‡ status and sex, Canada excluding territories, 1996/97**



**Data source:** 1996/97 National Population Health Survey, cross-sectional sample, Health file  
 † Includes nursing homes and convalescent homes.  
 ‡ Diagnosed by a health professional.

group. They also reported over 3 million physician consultations, or 7% of all consultations by 35- to 64-year-olds (data not shown).

### Lower employment rate

Causality cannot be inferred from cross-sectional data, but it seems likely that the employment and income situation of people with heart disease may be influenced by their poor health.

Although 35 to 64 is a prime age range for labour force participation, just 48% of men with heart disease reported that they were working for pay or profit when they were interviewed for the NPHS (Appendix Table B). The figure for men without heart disease was much higher at 83%. The corresponding rates among women were 36% and 64%. For both sexes, the age-adjusted odds that those with heart disease would be employed were less than half those for people without heart disease (Table 3).

Table 3  
**Age-adjusted odds ratios for selected employment and income characteristics, household population aged 35 to 64, by heart disease‡ status and sex, Canada excluding territories, 1996/97**

|   | Total      |                         | Men        |                         | Women      |                         |
|---|------------|-------------------------|------------|-------------------------|------------|-------------------------|
|   | Odds ratio | 95% confidence interval | Odds ratio | 95% confidence interval | Odds ratio | 95% confidence interval |
| <b>Employment status</b>                            |            |                         |            |                         |            |                         |
| Employed  | 0.4*       | 0.3, 0.5                | 0.3*       | 0.2, 0.4                | 0.4*       | 0.3, 0.7                |
| Not employed because:‡                              |            |                         |            |                         |            |                         |
| Caring for family                                   | 0.5        | 0.2, 1.5                | --         | --                      | 0.6        | 0.2, 1.9                |
| Illness/On disability                               | 5.5*       | 4.1, 7.3                | 5.4*       | 3.6, 8.3                | 5.9*       | 3.8, 9.2                |
| Retired   | 0.8        | 0.6, 1.1                | 1.3        | 0.9, 2.0                | 0.5*       | 0.3, 0.9                |
| Employed or caring for family                       | 0.3*       | 0.3, 0.5                | 0.3*       | 0.2, 0.4                | 0.3*       | 0.2, 0.6                |
| <b>Household income</b>                             |            |                         |            |                         |            |                         |
| Main source§  |            |                         |            |                         |            |                         |
| Wages/Salary  | 0.5*       | 0.3, 0.6                | 0.4*       | 0.3, 0.6                | 0.4*       | 0.2, 0.7                |
| Employment Insurance/ Workers' Compensation/Welfare | 3.1*       | 1.9, 4.9                | 3.1*       | 1.8, 5.3                | 3.1*       | 1.5, 6.5                |
| Pensions  | 1.4*       | 1.0, 2.0                | 1.4        | 0.9, 2.2                | 1.5        | 1.0, 2.3                |
| Low income  | 1.9*       | 1.4, 2.6                | 1.5*       | 1.1, 2.2                | 2.5*       | 1.5, 4.2                |
| Financial distress††                                | 3.2*       | 2.1, 4.9                | 3.1*       | 1.8, 5.3                | 3.3*       | 1.7, 6.4                |

**Data source:** 1996/97 National Population Health Survey, cross-sectional sample, Health file

**Note:** Reference group is household population aged 35 to 64 not diagnosed with heart disease. Because of rounding, a confidence interval with 1.0 as the lower limit may be significant.

‡ Diagnosed by a health professional.

§ Excludes other reasons.

¶ Excludes other sources.

†† Ran out of money for food in past year.

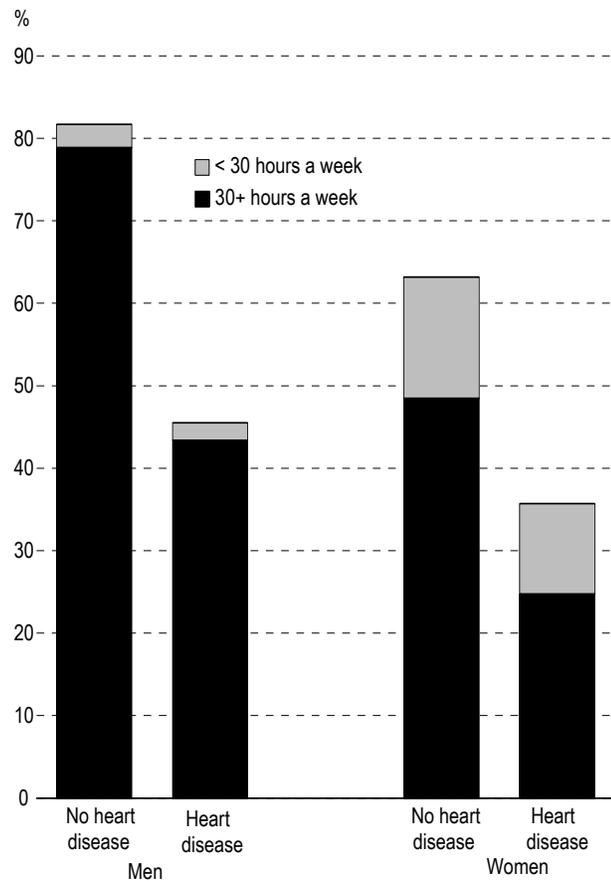
\*  $p < 0.05$

-- Amount too small to provide reliable estimate

In addition, 43% of the men with heart disease worked 30 or more hours a week, well below the figure for men who had not been diagnosed with a heart condition (79%) (Chart 5). Only 25% of women with heart disease worked at least 30 hours a week, compared with 48% of those who were not afflicted.

Regardless of whether they had heart disease, women were less likely than men to be employed. However, if family care and working for pay or profit are considered together, 43% of women with heart disease were “active,” compared with 48% of men, a difference that is not statistically significant. Other studies, too, have found that when homemaking

**Chart 5**  
Hours of work of employed household population aged 35 to 64, by heart disease† status and sex, Canada excluding territories, 1996/97



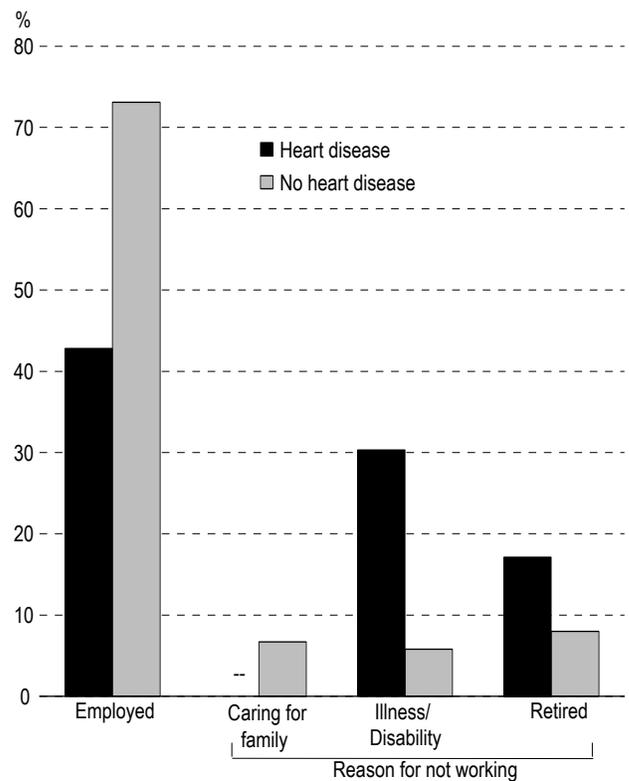
**Data source:** 1996/97 National Population Health Survey, cross-sectional sample, Health file  
† Diagnosed by a health professional.

tasks are counted, male and female activity rates are close.<sup>14</sup>

The main reason that 35- to 64-year-olds with heart disease gave for not working was that they were recovering from an illness or were on disability (30%). By contrast, only 6% of people who did not have heart disease cited illness or disability (Chart 6). Allowing for the age structure of the two groups, the odds that people with heart disease would not be working because of illness or disability were 5.5 times higher than those of people without heart disease.

As well, 17% of people aged 35 to 64 with heart disease reported that they had retired, more than double the figure (8%) for those without heart disease. But when adjusted for age, this difference was not statistically significant.

**Chart 6**  
Employment status of household population aged 35 to 64, by heart disease† status, Canada excluding territories, 1996/97



**Data source:** 1996/97 National Population Health Survey, cross-sectional sample, Health file  
† Diagnosed by a health professional.  
-- Amount too small to provide reliable estimate

### Less reliance on employment income

The income sources of people aged 35 to 64 with heart disease reflect their employment status. Employment was the main source of household income for just 62% of men and 52% of women with heart disease, compared with 87% of men and 80% of women without heart disease. The age-adjusted odds that people with heart disease would rely on employment income were half those of people without heart disease.

On the other hand, close to a quarter (24%) of 35- to 64-year-olds with heart disease cited pensions as their main source of household income, and another 13%, Employment Insurance/Workers' Compensation/welfare. Their odds of reporting these sources were three times higher than those for people without heart disease.

### Low income

The heavy reliance on pensions and government transfer payments means that a relatively large percentage of people with heart disease had low incomes. In 1996/97, 22% of 35- to 64-year-olds with heart disease were living in low income households versus 12% of those who did not have heart disease (Appendix Table B).

Low income was particularly common among women with heart disease. Close to a third (30%) of them lived in low-income households, double the proportion for women without a heart condition (14%). Adjusting for the age distribution of the two groups, the odds that women with heart disease would live in a low-income household were 2.5 times higher than those for women did not have heart disease (Table 3).

Just 16% of men with heart disease lived in low-income households, well below the figure for women. Nonetheless, compared with men who were not afflicted, those with heart disease still had significantly high odds of low income.

To some extent, the relationship between heart disease and income might be attributable to educational attainment. Low income tends to be associated with low education, which, in turn, is associated with risk factors for heart disease such as smoking, obesity and high blood pressure.<sup>15-17</sup>

However, even after adjusting for age, sex, living arrangements and education, the odds that 35- to 64-year-olds with heart disease would be in low-income households were almost two times higher than those for people without heart disease (OR=1.8; CI=1.3, 2.5) (data not shown). This

### Limitations

National Population Health Survey data on heart disease are subject to the problems inherent in self-reporting. Specifically, there was no independent source to verify whether people who reported having been diagnosed with heart disease actually did have it. The same is true of the other chronic conditions used in this article: asthma, arthritis, high blood pressure, stroke, diabetes and chronic obstructive lung disease.

The time elapsed since respondents were diagnosed with heart disease is not known. Respondents were not asked if more than one episode had occurred, nor was information about the severity of the problem collected.

Heart disease is a broad term, covered by ICD-9<sup>18</sup> codes 391 to 398, 402, 404, and 410 to 429. Respondents' heart problems could range from less serious ones such as acute pericarditis (420) to something much more serious such as acute myocardial infarction (410). In addition, some respondents may have been misclassified because they misunderstood what was asked, or because they did not remember receiving the diagnosis.

Hospital data show 76,873 hospital stays in 1996/97 attributable to ischemic heart disease (IHD) among men and women aged 35 to 64, which is 84% of the number of NPHS respondents with heart disease who reported having been admitted to hospital (about 91,800). This is consistent with the fact that IHD is a subcategory of the general term "heart disease," which was used in the NPHS.

The data in this article pertain only to the household population. This means that the analysis does not contain an estimate of the overall prevalence of heart disease among 35- to 64-year-olds. Although relatively few people in this age range live in institutions, their health characteristics may differ from those of household residents in ways that would affect the prevalence estimates if the former were included. And even among the household population, there may be a selection effect. That is, those who participated in the survey may have been healthier and more likely to engage in health-promoting behaviour than those who did not participate.

Finally, this is a descriptive study. The data are cross-sectional and cannot be used to determine causality. For instance, it is not possible to say whether an individual's employment status and income are the result of having heart disease.

suggests that the link between heart disease and low income is not entirely attributable to education.

The proportions of people with heart disease reporting financial distress (specifically, running out of money to buy food in the past year) were relatively high: 15% of women and 11% of men, more than double the figures for their contemporaries without heart disease. The odds that people with heart disease would report such difficulties were over three times those for people without a heart condition.

### High rate of depression

Possibly as a result of their poor health and comparatively unfavourable socioeconomic circumstances, people with heart disease reported a high prevalence of depression. Close to 16% of women aged 35 to 64 with heart disease had suffered a major depressive episode in the previous year, compared with 5% who did not have heart disease. The odds that women with heart disease would have experienced depression were about four times the odds for women without heart disease. Men with heart disease were also significantly more likely than their counterparts without heart disease to have suffered depression, although the difference was less pronounced. In other studies, too, researchers have observed a high incidence of depression among people with heart problems.<sup>19,20</sup>

### Women face more difficulties

In many respects, the consequences of heart disease appear to be particularly severe for women.

Compared with men who had been diagnosed, women with heart disease had about twice the odds of having at least two other chronic conditions, of suffering chronic pain, and of having had one or more disability days in the previous two weeks (Table 4). They also had much higher odds than men of living alone. To some extent, poorer health and living alone may have contributed to the high odds that women with heart disease would need help with housework or personal care and would use home care.

The odds that women with heart disease would be employed were only about half those of their male counterparts, and the odds of working fewer

than 30 hours a week were much greater for women. Women with heart disease also had significantly elevated odds of living in a low-income household.

These results support other studies that found poorer health and a lower quality of life among

Table 4  
Age-adjusted odds ratios for selected characteristics among women aged 35 to 64 with heart disease,<sup>†</sup> household population, Canada excluding territories, 1996/97

|  | Odds ratio | 95% confidence interval |
|--|------------|-------------------------|
| <b>Health</b>                                      |            |                         |
| Two or more comorbidities <sup>†</sup>             | 2.6*       | 1.4, 4.6                |
| Chronic pain/discomfort                            | 2.1*       | 1.2, 3.6                |
| Activity restriction                               | 1.6        | 1.0, 2.8                |
| One or more disability days in past 2 weeks        | 1.9*       | 1.1, 3.4                |
| Describes health as poor/fair                      | 1.0        | 0.6, 1.6                |
| Major depressive episode in past year              | 2.7        | 0.8, 8.6                |
| <b>Health care utilization</b>                     |            |                         |
| Took more than 3 medications in last 2 days        | 0.7        | 0.4, 1.1                |
| Need help with housework or personal care          | 2.0*       | 1.1, 3.4                |
| Use home care <sup>§</sup>                         | 4.0*       | 1.5, 10.8               |
| Overnight patient in past year <sup>††</sup>       | 1.0        | 0.5, 1.8                |
| <b>Employment status</b>                           |            |                         |
| Employed   | 0.5*       | 0.3, 0.9                |
| Work less than 30 hours per week                   | 3.1*       | 1.2, 8.5                |
| Not employed because: <sup>‡‡</sup>                |            |                         |
| Illness/On disability                              | 1.4        | 0.8, 2.4                |
| Retired  | 0.8        | 0.4, 1.5                |
| Employed or caring for family                      | 0.7        | 0.4, 1.3                |
| <b>Household income</b>                            |            |                         |
| Main source <sup>§§</sup>                          |            |                         |
| Wages/Salary                                       | 0.6*       | 0.3, 1.0                |
| Employment Insurance/Workers' Compensation/Welfare | 1.1        | 0.5, 2.2                |
| Pensions   | 2.3*       | 1.3, 4.1                |
| Low income   | 2.2*       | 1.2, 3.9                |
| Financial distress <sup>†††</sup>                  | 1.2        | 0.6, 2.7                |
| <b>Live alone</b>                                  | 2.4*       | 1.2, 4.6                |

**Data source:** 1996/97 National Population Health Survey, cross-sectional sample, Health file

**Note:** Reference group is men aged 35 to 64 diagnosed with heart disease. Because of rounding, some confidence intervals with 1.0 as the upper limit were significant.

<sup>†</sup> Diagnosed by a health professional.

<sup>‡</sup> Asthma, arthritis, chronic obstructive lung disease, stroke, high blood pressure, diabetes

<sup>§</sup> Completely or partially government-funded; includes nursing, personal care and housework.

<sup>††</sup> In hospital, nursing home or convalescent home

<sup>‡‡</sup> Excludes other reasons.

<sup>§§</sup> Excludes other sources.

<sup>†††</sup> Ran out of money for food in past year.

\*  $p < 0.05$

women than among men after a heart attack.<sup>1-3</sup> The literature suggests a number of reasons for this difference.

Diagnosis of heart disease is more complicated in women than in men.<sup>21</sup> Women's symptoms are different, and they have more heart failure. During the first year after a heart attack, women have been shown to have a greater risk of death, cardiac distress and re-infarction.<sup>22</sup> This analysis of NPHS data complements such results, in that women reported more pain and disability.

Women may undergo different treatment than men. In fact, lower rates of heart surgery among women<sup>23-26</sup> have raised questions about sex bias in selection for surgery.<sup>27,28</sup> An earlier study reported that during one year of observation, women were treated less aggressively for coronary artery disease and were less likely to use aspirin.<sup>29</sup> Other research showed that women were referred significantly less often to coronary care units than were men, even when the women had more angina pectoris and heart failure.<sup>3</sup>

Women appear to have relatively low participation rates in cardiac rehabilitation programs. Studies of rehabilitation outcomes report lower enrolment in such programs, poorer adherence and significantly higher dropout rates for women than men, even though women who completed cardiac rehabilitation experienced the same or even greater functional improvements.<sup>30</sup>

Like the NPHS, analyses in the Cardiac Arrhythmia Suppression Trials indicate that the socioeconomic circumstances of women with heart disease were less favourable than those of their male counterparts.<sup>4</sup> In general, women had lower incomes to begin with, and they returned to work less frequently, and after a longer absence.<sup>30</sup> This makes it harder for women to pay for the help they need. As well, the costs of transportation to a rehabilitation centre, of a healthier diet, and of medications could be a greater burden.

The double loads of work and family have emerged as documented risk factors for heart disease.<sup>31</sup> Women may continue to perform domestic chores even when they are sick, and return to such tasks before they have completely recovered.

As well, care-giving responsibilities may make it difficult to find time for rehabilitation programs. In fact, the NPHS data show that women with heart disease were just as likely to be caring for their family as were women without heart disease (data not shown).

### Concluding remarks

According to the 1996/97 National Population Health Survey, about 345,000 Canadians aged 35 to 64 have been diagnosed with heart disease. This condition is associated with compromised quality of life, in terms of physical and mental health and financial well-being. For many people, heart disease and its attendant health problems limit their ability to work and thereby earn enough to maintain a relatively comfortable standard of living. Women are particularly vulnerable.

Knowledge of the social, financial and health circumstances of people with heart disease helps direct secondary health promotion efforts most effectively. This knowledge aids in anticipating the indirect costs associated with heart disease, such as a lower employment rate, lower income, more pain and disability, and greater need for help with household tasks and personal care. ●

### Acknowledgements

The author thanks Claudio Pérez, Marie P. Beudet and Mike Gagnon for their technical assistance.

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## Appendix

Table A  
 Percentage of household population aged 35 to 64 with selected health characteristics, by heart disease<sup>†</sup> status and sex, Canada excluding territories, 1996/97

|  | Total           |    | Men             |                | Women            |    |
|--|-----------------|----|-----------------|----------------|------------------|----|
|  | Heart disease   |    | Heart disease   |                | Heart disease    |    |
|  | Yes             | No | Yes             | No             | Yes              | No |
|  | %               |    |                 |                |                  |    |
| <b>Health</b>                                |                 |    |                 |                |                  |    |
| Two or more comorbidities <sup>‡</sup>       | 36              | 6  | 28              | 5              | 48               | 8  |
| Chronic pain/discomfort                      | 36              | 14 | 29              | 13             | 46               | 15 |
| Activity restriction                         | 59              | 16 | 56              | 14             | 64               | 17 |
| One or more disability days in past 2 weeks  | 29              | 11 | 23              | 9              | 37               | 13 |
| Describes health as poor/fair                | 41              | 9  | 42              | 8              | 40               | 10 |
| Major depressive episode in past year        | 10 <sup>§</sup> | 4  | --              | 3              | 16 <sup>††</sup> | 5  |
| <b>Health care utilization</b>               |                 |    |                 |                |                  |    |
| Took more than 3 medications in last 2 days  | 52              | 9  | 57              | 6              | 45               | 11 |
| Need help with housework or personal care    | 36              | 8  | 31              | 5              | 44               | 10 |
| Use home care <sup>‡‡</sup>                  | 3 <sup>††</sup> | 1  | 2 <sup>††</sup> | 1 <sup>§</sup> | --               | 2  |
| Overnight patient in past year <sup>§§</sup> | 27              | 6  | 27              | 5              | 26 <sup>§</sup>  | 7  |

**Data source:** 1996/97 National Population Health Survey, cross-sectional sample, Health file

<sup>†</sup> Diagnosed by a health professional.

<sup>‡</sup> Asthma, arthritis, chronic obstructive lung disease, stroke, high blood pressure, diabetes

<sup>§</sup> Coefficient of variation between 16.6% and 25.0%

<sup>††</sup> Coefficient of variation between 25.1% and 33.3%

<sup>‡‡</sup> Completely or partially government-funded; includes nursing, personal care and housework.

<sup>§§</sup> In hospital, nursing home or convalescent home

-- Amount too small to provide reliable estimate

Table B  
 Percentage of household population aged 35 to 64 with selected employment and income characteristics, by heart disease<sup>†</sup> status and sex, Canada excluding territories, 1996/97

|  | Total           |    | Men             |    | Women            |    |
|--|-----------------|----|-----------------|----|------------------|----|
|  | Heart disease   |    | Heart disease   |    | Heart disease    |    |
|  | Yes             | No | Yes             | No | Yes              | No |
|  | %               |    |                 |    |                  |    |
| <b>Employment status</b>                                   |                 |    |                 |    |                  |    |
| Employed   | 43              | 73 | 48              | 83 | 36               | 64 |
| Not employed because: <sup>‡</sup>                         | --              | 7  | --              | -- | --               | 13 |
| Caring for family  | 30              | 6  | 28              | 5  | 34               | 7  |
| Illness/On disability                                      | 17              | 8  | 19              | 6  | 15 <sup>§</sup>  | 10 |
| Employed or caring for family                              | 46              | 80 | 48              | 83 | 43               | 77 |
| <b>Household income</b>                                    |                 |    |                 |    |                  |    |
| Main source <sup>††</sup>                                  |                 |    |                 |    |                  |    |
| Wages/Salary   | 58              | 84 | 62              | 87 | 52               | 80 |
| Employment Insurance/<br>Workers' Compensation/<br>Welfare | 13 <sup>§</sup> | 5  | 12 <sup>§</sup> | 4  | 14 <sup>††</sup> | 6  |
| Pensions   | 24              | 9  | 20              | 7  | 29               | 11 |
| Low income   | 22              | 12 | 16              | 11 | 30 <sup>§</sup>  | 14 |
| Financial distress <sup>§§</sup>                           | 12 <sup>§</sup> | 5  | 11              | 5  | 14 <sup>††</sup> | 6  |

**Data source:** 1996/97 National Population Health Survey, cross-sectional sample, Health file

<sup>†</sup> Diagnosed by a health professional.

<sup>‡</sup> Excludes other reasons.

<sup>§</sup> Coefficient of variation between 16.6% and 25.0%

<sup>††</sup> Excludes other sources.

<sup>‡‡</sup> Coefficient of variation between 25.1% and 33.3%

<sup>§§</sup> Ran out of money for food in past year.

-- Amount too small to provide reliable estimate