Catalogue no. 82-003-XPB

Health Reports

Spring 1997 Volume 8 No. 4

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Statistics Canada
Health Statistics Division

Health Reports

Spring 1997 Volume 8 No. 4

Published by authority of the Minister responsible for Statistics Canada

April 1997

All prices exclude sales tax
Price: Canada: $34.00 per issue, $112.00 annually
United States: US$41.00 per issue, US$135.00 annually
Other Countries: US$48.00 per issue, US$157.00 annually

Catalogue no. 82-003-XPB, Vol. 8, No. 4
Frequency: Quarterly
ISSN 0840-6529

Ottawa

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Acknowledgment

The clinical, methodological and subject matter specialists listed here have reviewed articles submitted for Volume 8 of *Health Reports*. The editors thank them for their valuable contribution of expertise and time.

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Depression: An undertreated disorder?

Brent Diverty and Marie P. Beaudet*

Abstract

In 1994, an estimated 6% of Canadians aged 18 and over—1.1 million adults—experienced a Major Depressive Episode (MDE). Although depression is amenable to treatment, fewer than half (43%) the people who met the criteria of having experienced an MDE in the past year (approximately 487,000) reported talking to a health professional about their emotional or mental health. Furthermore, only 26% of those who had an MDE reported four or more such consultations.

As expected, depression that was not chronic was more likely to be untreated. In addition, MDE sufferers whose physical health was good and those who had not recently experienced a negative life event were less likely to be treated. However, after controlling for these factors, a multivariate model suggests that lower educational attainment and inadequate income acted as barriers to treatment. Relatively few contacts with a general practitioner substantially reduced the odds of being treated. Also, men and married people who were depressed were less likely to receive treatment.

With data from Statistics Canada's 1994-95 National Population Health Survey (NPHS), this article examines the characteristics of people who met the criteria for having had an MDE, but who discontinued or did not receive treatment. The selection of explanatory variables was informed by an established theoretical framework of individual determinants of health service utilization, proposed by Andersen and Newman. Logistic regression was used to predict the probability of not being treated among people who experienced an MDE.

Key words: *depressive disorder, treatment, mental health services, help-seeking*

Depression touches the lives of many Canadians. According to Statistics Canada's 1994-95 National Population Health Survey (NPHS), approximately 6% of people aged 18 and over—1.1 million adults—had experienced a major depressive episode (MDE) in the 12 months before the survey (see *Major depressive episode*).

Although depression is one of the mental disorders most amenable to treatment,[1] just 43% of people identified by the NPHS as having experienced an MDE (about 487,000 adults) reported talking to a health professional about emotional or mental health in the same period. Furthermore, only 26% of people who experienced an MDE reported more than three consultations, a level of contact defined here as "receiving treatment" (see *Methods* and *Limitations*).

An MDE is characterized by a depressed mood and/or lack of interest in most activities lasting at least two weeks. The symptoms include appetite or sleep disturbance, decreased energy, difficulty concentrating, feelings of worthlessness, and/or suicidal thoughts.

Major depressive episode

Using the methodology of Kessler et al.,[2] the NPHS identifies a major depressive episode (MDE) with a subset of questions from the Composite International Diagnostic Interview (see *Appendix A*). These questions cover a cluster of symptoms for depressive disorder, which are listed in the Diagnostic and Statistical Manual of Mental Disorders.[3] 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 an MDE in the previous 12 months.

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Methods

Data source

The data are from the 1994-95 National Population Health Survey (NPHS), a longitudinal survey that measures the health status of the Canadian population. The NPHS will interview the same panel of respondents every two years for up to two decades. Data collection for the first wave began in June 1994 and finished in the summer of 1995.

The target population is household residents in all provinces and territories, except persons living on Indian reserves, on Canadian Forces bases, or in some remote areas. The final sample size was 27,263 households after including provincial buy-ins and households eligible to be rejected. The final response rate (the proportion of selected households agreeing to participate, including households later rejected for sampling reasons) was 89%. An institutional component of the NPHS covers long-term residents of hospitals and residential care facilities. Data from the institutional component are not included in this analysis. As well, data from the Northwest Territories and the Yukon were not available at the time of analysis.

The household survey collects most of the information from an adult household member knowledgeable about the health of all members of the household. In-depth health information is also collected from a randomly selected household member. For the core sample, these randomly selected individuals become members of the longitudinal panel and will be re-interviewed every two years. Among randomly selected respondents, the response rate was 96%. Further information about NPHS content and sample design are described elsewhere.[4,5]

NPHS respondents were asked, "In the past 12 months, have you seen or talked on the telephone to a health professional about your emotional or mental health?", followed by "How many times (in the past 12 months)?"

Analytical techniques

Treatment for depression can be sought through psychotherapy (counselling) or pharmacotherapy (medication). Pharmacotherapy in conjunction with psychotherapy has traditionally been used for moderate to severe depression, while psychotherapy has been used in less severe cases. A combination of both methods is becoming increasingly common, even for less severe episodes of depression.[6] Experts recognize three treatment phases: acute, continuation, and maintenance.[7,8] The acute treatment phase lasts six to 12 weeks, typically involving at least four visits: diagnosis, initiation of treatment, monitoring, and response assessment.[7,8] When anti-depressants are prescribed, regular monitoring is also advised.[6]

In accordance with these criteria, in this article, treatment for depression is defined as *at least four* consultations with a health professional about emotional or mental health in the previous year. Three-quarters of MDE sufferers were below this threshold. Depression sufferers with fewer than four contacts include people who "sought" as opposed to "received" treatment, those who discontinued treatment, and people who reported no contact. Together, they make up the untreated group.

To identify the characteristics of people who experienced an MDE but did not receive treatment, a number of demographic and socioeconomic variables, health care utilization indicators, health status indicators, and psychological factors were considered.[9,10] The selection of these explanatory variables was guided by an established theoretical framework of individual determinants of health service use, proposed by Andersen and Newman.[11] This framework assumes that choosing health care services is associated with a need for treatment, the ability to negotiate the health care system, and a predisposition to use the services (see *Appendix B*).

The first component of the framework, a need for treatment, what Andersen and Newman call "signalling characteristics," stems from the severity of an illness, the probability of its recurrence, and the ability to cope with its symptoms without treatment. A need for treatment may be recognized by the individual affected, those who know the individual, or by a health care provider. In the case of depression, some people may be able to cope without treatment. For those who are less able, unless the symptoms recur or are long-lasting, a need for treatment may not be easily discernible. Thus, the people who tend to not receive treatment are likely to be those whose circumstances, behaviour, and demeanour suggest that they have no need for it. The variables selected to measure the importance of need were chronic depression (yes, no), chronic strain (high, moderate, low), recent negative life events (yes, no), employment status (working, not working), self-rated health (poor or fair, good or very good, excellent), and level of recreational physical activity (inactive, moderate, active).

The second component of the framework, factors associated with the ability to secure health care services (Andersen and Newman's "enabling conditions"), measures access to, awareness of, and a willingness to seek treatment. Depression sufferers with few enabling factors may have more difficulty accessing the health care system, and consequently, may not receive treatment. The variables selected to measure the role of enabling conditions were educational attainment (high school diploma or less, more than high school education), household income (adequate, inadequate), social isolation (yes, no), and number of visits and/or telephone consultations with a general practitioner in the past year (0-2, 3-5, 6+).

The third component of the framework consists of inherent traits that existed before the onset of a specific illness. Andersen and Newman call these "predisposing characteristics" in that they may indicate a propensity toward, but are not directly responsible for, the use of health services. The predisposing characteristics selected for this analysis were age, sex, and marital status.

Analysis was performed using a logistic regression model predicting the probability of not receiving treatment for depression based on these variables measuring signalling characteristics, enabling conditions, and predisposing characteristics.

As a result of experimentation with different combinations of the explanatory variables, with different size categories for age and health care utilization, and with various interaction terms, several variables were dropped from the original model because of high levels of non-response, or because of their overlap with selected variables. These variables were urban/rural residence, living arrangements (alone or with others), overnight hospital stays, and use of alternative health care. To investigate possible inter-province differences in treatment, province of residence was considered as an independent variable; results were non-significant, and this was also dropped. Interaction terms between sex and age, sex and marital status, and income and education did not contribute significantly to the model.

A total of 972 respondents aged 18 and over had suffered an MDE in the 12 months before they were interviewed. The analysis was based on the 919 respondents about whom information on all the selected variables was available. Of this group, 234 (26%) had received treatment, and 685 (74%) had not.

Responses were weighted using the survey weights. Because of the complex multi-cluster sample design of the NPHS, the standard errors are underestimated. The jackknife approach to the estimation of the variance was used to calculate the confidence intervals for the odds ratios of the logistic regression.[12-15] The residual chi-square (a measure of how well the model fits the data), after backward elimination and using weights that were normalized, was 6.4 with 7 degrees of freedom (p=0.49).

A recent analysis of NPHS data revealed that women were twice as likely as men to have been depressed, and that young people were more likely than older people to have been depressed.[16] This study also found that being previously married, being exposed to considerable stress, and having few psychological resources increased the odds of experiencing an MDE. However, the characteristics associated with experiencing an MDE are not necessarily the same as those that are related to seeking professional help with emotional or mental disorders.

Typically, studies of the use of health care services for an emotional or mental disorder focus on patients who receive treatment. By relying mainly on hospital and other administrative data, these studies have been able to determine the characteristics of people who are treated. However, little information is available about those who are not treated. This is particularly true for depression, since many people who suffer from it do not receive treatment.[17]

Some MDE sufferers who do not receive treatment likely do not need it. They may have had non-recurring symptoms, a relatively short depressive episode, or are better able to cope. Others, however, would likely benefit from treatment.

This article uses data from the first wave of the NPHS to determine factors associated with not being treated for depression. It compares untreated MDE sufferers with those who received treatment.

The burden of suffering and the economic, social, and personal costs of depression are staggeringly high.[1] Depression tends to reduce immune status[18] and quality of life, and often interferes with work productivity and relationships. Identifying the characteristics of those who do not receive treatment provides information that may be helpful in reaching this group.

Non-chronic depression

People who suffered a major depressive episode, but whose depression was not chronic, had odds of being untreated nearly double those of people whose depression was chronic (odds ratio 1.9) (Table 1). For this analysis, chronic depression was defined as more than four weeks of symptoms in the past year, as opposed to the two weeks necessary to qualify as an MDE.

It is not surprising that people who had an MDE, but were not chronically depressed, were more likely to be untreated. As is the case with most health problems, those that persist or recur are most likely to be treated. Moreover, symptoms of depression are not always evident, particularly if they are relatively short-lived.

No recent negative life events

Depressed individuals in circumstances that increase their vulnerability—for instance, a major financial crisis, a demotion at work—are less likely to be untreated than are depression sufferers who do not report a recent negative life event. In fact, people who suffered an MDE but did not report a negative life event in the last year had higher odds of being untreated than did those reporting such an event (odds ratio 1.7).

The absence of such a signalling characteristic may be a deterrent to seeking and remaining in treatment. Negative life events are seen as legitimate reasons for being depressed, so the stigma often associated with receiving care for emotional problems may be reduced. The fact that these events are readily identifiable as a source of depression may also legitimize the seeking of care.

Otherwise healthy

People in poor health are at a relatively high risk of becoming depressed.[18,19] For someone whose health is failing, depression may arise out of helplessness or despair, especially if the condition is chronic or terminal. Thus, illness, like recent negative life events, can signal an increased risk of depression. General practitioners and other health care providers are aware of this, and since they are likely to be in frequent contact with people whose physical health has been compromised, they can identify and refer patients with MDE symptoms. By contrast, depressed people who are in

Limitations

This analysis has several important limitations. The item identifying respondents who had at least four contacts with a health professional about mental or emotional problems in the 12 months before the survey, does not necessarily refer to contacts triggered by a depressive episode. Therefore, it is possible that the treatment received was not in response to the identified MDE. Nonetheless, it is likely that the majority of people who experienced an MDE in that period, and who had four or more contacts with health care professionals about mental or emotional health, were receiving treatment for depression.

The broadness of the question used to measure contact with a health professional required a judgment about what constituted treatment. At this time, there are no published clinical practice guidelines in Canada for the treatment of depression, although experts recommend close monitoring of patients through regular contacts, whether medication is prescribed or not.[6-8] The selection of four visits to a health professional regarding emotional or mental health as the threshold for receiving treatment was to ensure that the group deemed to be receiving treatment was actually doing so. Respondents who had an MDE but fewer than four contacts during the year, were likely to be "untreated," and were, therefore, classified as such.

To determine whether three or fewer contacts with a health professional about emotional or mental health was a reasonable cut-off for non-treatment, the analysis was also performed using zero, one or no, two or fewer, and four or fewer contacts as the threshold. The profiles of depression sufferers who did not receive treatment were somewhat different if no contacts or one or fewer contacts during the year was used as the threshold for non-treatment, rather than two or fewer, three or fewer, or four or fewer. At the one or no contact cut-off, three variables—age, employment status, and social isolation—were significant, although this was not the case at higher contact thresholds (data available from the authors).

Another limitation is the difficulty of assessing the degree of bias introduced by inaccurate recall and self-reporting. Respondents may have over- or underestimated the significance of events or feelings from their past. They may have recalled inaccurately when contact with a health professional was made or the precise number of encounters. Investigations of reporting error in recalling such past events have been inconclusive.[20,21] In addition, some respondents may not have reported contacts with health care providers such as social workers and marriage counsellors, while others reported them.

The fact that the MDE could have occurred any time in the previous 12 months means that by the date of the NPHS interview, the behaviour, characteristics, and life circumstances of some people who had suffered a depressive episode several months earlier had changed. For instance, respondents who were no longer depressed and who described their health as good when they were interviewed might have had a less favourable self-assessment during or shortly after their MDE.

Survey and item non-response also constitute potential problems. Non-response in the NPHS was caused primarily by refusals or by interviewers' inability to contact selected respondents. This is of particular interest in the case of depression. It is possible that some non-respondents were depressed, but were unwilling to complete the survey because of the personal and probing nature of some questions. Consequently, non-response may not be random.

good physical health, and thus have the outward appearance of functioning well, are less likely to receive treatment.

Successively better health states were associated with declining odds of receiving treatment for depression. People who had experienced an MDE and who rated their health as good or very good had odds of being untreated double those of people in poor or fair health (odds ratio 2.2). This finding holds as self-rated health status improves. Only a small number of people with excellent physical health had experienced an MDE. Nonetheless, their odds of not receiving treatment were five times those of MDE sufferers in poor or fair health. People who rate their physical health highly may fail to recognize, or may be unwilling to acknowledge, that their emotional health is poor. On the other hand, they may also be better equipped to cope with a depressive episode.

Exercise

In this analysis, the relationship between recreational physical activity and receiving treatment for depression is not clear-cut. Other studies, among them a report from the U.S. Surgeon General, have found exercise to be associated with improvements in mental health.[22-24] Given this evidence, exercise might be expected to reduce and/or control depressive symptoms, and consequently, decrease the need for treatment. However, data from the NPHS indicate that people who experienced an MDE and who described themselves as active had odds of being untreated that were not significantly different from those who reported themselves as inactive. By contrast, MDE sufferers who were moderately physically active were untreated at a rate that was half that of inactive people (odds ratio 0.5). In other words, moderately physically active people who were depressed were more likely to have received treatment.

This somewhat unexpected result may be attributable to the measure of physical activity used here. It is not a comprehensive measure, in that it pertains only to recreational activity and excludes physical activities at work or in travelling to and from work.

Lower educational attainment and low household income

When other factors were controlled, relatively low educational attainment was associated with the likelihood of not receiving treatment for depression. MDE sufferers whose education had not extended beyond high school had odds of not receiving treatment twice those of people with higher attainment (odds ratio 2.0). People with less education may have limited information on depression, its symptoms, and the effectiveness of treatment. As well, social differences between themselves and "better-educated" health professionals may deter them from seeking treatment.[25]

Inadequate household income was also related to being untreated for depression. People from households with inadequate income had odds more than double those of people living in households with adequate income of not receiving treatment (odds ratio 2.1).

Income, like education, may be a barrier to treatment. The choices for people with inadequate incomes are restricted to services covered by provincial health care plans. In all provinces, individuals who seek care for mental or emotional problems will receive treatment if it is medically necessary.[26] But for those without additional insurance coverage, restrictions in the type of health care providers and the costs of prescriptions can be additional deterrents to initiating or continuing treatment.

Relatively few contacts with general practitioners

Not surprisingly, MDE sufferers who frequently consult general practitioners were more likely to receive treatment for depression.[a] Conversely, those with

[a] *The definition of receiving treatment for depression used in this analysis—four or more contacts with a health professional about emotional or mental health—could include general practitioners, since family doctors and internists are often called upon to diagnose and treat depression.[27] While the extent of overlap between contacts with a general practitioner and contacts with a health professional about emotional or mental health cannot be determined, the correlation suggests that it is not large (r = 0.23, calculated using continuous measures of these two variables). If the extent of overlap was large, the correlation coefficient would be 0.7 or greater, explaining at least half the variance.*

Table 1

Odds ratios for MDE sufferers being untreated for depression, Canada, 1994-95

Variable	% untreated	Odds ratio	95% confidence interval
Signalling characteristics			
Chronic depression			
Yes†	68.3	1.0	...
No	83.7	1.9*	(1.1, 3.4)
Chronic strain			
Low	76.6	1.1	(0.5, 2.5)
Moderate	77.5	1.2	(0.7, 2.1)
High†	71.3	1.0	...
Recent negative life event(s)			
Yes†	71.0	1.0	...
No	80.7	1.7*	(1.0, 3.2)
Employment status			
Not working	70.3	0.7	(0.4, 1.3)
Working†	77.0	1.0	...
Self-rated health			
Poor or fair†	61.3	1.0	...
Good or very good	77.2	2.2*	(1.2, 3.9)
Excellent	88.7	5.4*	(2.0, 15.1)
Recreational physical activity			
Inactive†	74.7	1.0	...
Moderate	67.9	0.5*	(0.3, 0.9)
Active	80.1	0.9	(0.5, 1.7)
Enabling conditions			
Educational attainment			
Some postsecondary or more†	70.1	1.0	...
High school diploma or less	80.3	2.0*	(1.3, 3.3)
Household income			
Adequate†	73.7	1.0	...
Inadequate	75.9	2.1*	(1.2, 3.6)
Social isolation			
No†	72.5	1.0	...
Yes	78.4	1.5	(0.9, 2.7)
Number of visits to general practitioner			
0-2	82.8	2.3*	(1.2, 4.3)
3-5	80.8	2.6*	(1.5, 4.3)
6+†	61.2	1.0	...
Predisposing characteristics			
Age			
18-29	79.3	1.0	(0.3, 3.5)
30-44	71.6	0.6	(0.2, 2.0)
45-59	69.7	0.7	(0.2, 2.1)
60+†	79.5	1.0	...
Sex			
Female†	70.2	1.0	...
Male	83.0	1.8*	(1.1, 3.1)
Marital status			
Married/With partner	76.0	2.1*	(1.2, 3.6)
Never married	78.4	1.4	(0.7, 2.8)
Previously married†	64.5	1.0	...

Source: *National Population Health Survey, 1994-95*

Note: *Sample size= 919. Analysis excludes 53 depressed respondents (5.4%) for whom information was missing on one or more of the variables included in the analysis.*

† *Identifies the reference category, for which the odds ratio is always 1.00.*

··· *Figures not appropriate or not applicable.*

* $p \leq 0.05$.

relatively few contacts were less likely to receive such treatment. After controlling for other factors, including health status, the odds that depressed persons with fewer than six visits to a general practitioner in the previous year would not receive treatment for depression were more than twice those of people reporting six or more visits.

The finding that less frequent users of the health care system are less likely to receive treatment appears obvious but hides a number of underlying factors. Some of these people may have been able to overcome their depressive episode without treatment. Others who rarely use the health care system may not see it as offering a solution to their emotional problems. They may not recognize that they are ill, or may not know that their illness is treatable. And for some, the system may be intimidating. Thus, less frequent use reduces the likelihood of being recognized, diagnosed, and treated or referred for treatment by the general practitioner. And in turn, relatively few contacts with health care providers may amplify a lack of familiarity, further reducing the likelihood of treatment for depression.

Men and married people less likely to be treated

Men were only about half as likely as women to have suffered an MDE.[1,16] And when they were depressed, men were less likely to be treated. When other factors were controlled, men had higher odds of not receiving treatment than did women (odds ratio 1.8) .

As well, married people who suffered an episode of depression were less likely to be treated than were previously married people (odds ratio 2.1). Perhaps the support of a partner is substituted for formal treatment by a health care professional. Alternatively, a partner may discourage entering and continuing treatment.

Non-significant factors

A number of variables that might reasonably have been expected to be associated with not receiving treatment for depression were not significant. These factors are age, employment status, chronic strains, and social isolation.

While the prevalence of depression varied substantially with age, the odds of being untreated did not.[16] Young adults who experienced an MDE were no more likely than people in middle life or the elderly to be untreated.

The association between treatment for depression and employment status might be anticipated to be similar to that for health status and negative life events. That is, depression sufferers who are employed might regard themselves, and be regarded by others, as functioning well, so their need for treatment would be less likely to be identified. Additionally, members of the paid workforce tend to have less time to devote to treatment, which can be lengthy. And for some people, prescribed medications may interfere with job performance. Yet despite these considerations, the odds that an employed person who suffered an MDE would not receive treatment were no greater than those for people who were not employed. It may be that the availability of private insurance and employee assistance programs to people who are employed offsets these potential deterrents to treatment. The finding of non-significance may also be due to the positive correlation between the two dichotomous variables, employment and income (r = .36).

Like recent negative life events, chronic strain increases vulnerability to depression, and may also be seen as a legitimate reason for treatment. Consequently, people who had an MDE but were found to have little chronic strain might be expected to have higher odds of being untreated than those confronting a high level of strain. But unexpectedly, the degree of chronic strain bore little relationship to the odds of not receiving treatment.

A weak support network of family and friends might also be thought of as a barrier to treatment for depression. Without family and friends to offer encouragement and support, a person suffering from depression might not seek or remain in treatment. By contrast, a weak support network may increase the need for treatment. These conflicting effects may cancel each other out, because when other factors were controlled, depression sufferers who were socially

isolated were no more or less likely to be untreated than were those with a stronger network of family and friends.

Implications

Some of the results of this analysis were anticipated. For instance, people who had an MDE but for whom depression was not chronic, or who did not experience a negative life event in the past year, were less likely to receive treatment than those whose depression was chronic or who had experienced a recent negative life event. Similarly, depression sufferers whose assessment of their own health ranged from good to excellent were more likely than those in poor health to be untreated. In other words, people who did not "signal" a need for treatment were more likely to remain untreated.

Other results of the analysis are important in the context of the Canadian health care system, whose mandate is to provide equal access to medically necessary treatment.[28] People who experienced an MDE and had relatively little formal education were more likely to be untreated. Inadequate income, too, may be a barrier to treatment in that the choice of providers may be restricted to those whose services are covered by provincial health care plans. As well, inadequate incomes may preclude the purchase of medications. MDE sufferers who had comparatively few contacts with general practitioners were more likely to be untreated, possibly because they are unaccustomed to seeking help from health professionals. Fewer contacts with general practitioners may also lessen the chances of being diagnosed with depression, and further limit access to mental health care providers.

Finally, some results of the analysis were surprising. For example, the amount of chronic strain an individual reported was not associated with receiving treatment. Nor was being employed, a potential source of private insurance or help via an employee assistance program. As noted earlier, this may have been the result of the association of income and employment status. As well, the age of people who were depressed had little to do with whether they would be treated.

The model used here should be viewed as a preliminary exploration of relationships. Future work should focus on identifying measures that will make the model more complete, such as the availability and use of employee assistance programs and private insurance for the treatment of mental disorders. A clearer and more comprehensive measure of treatment should also be developed. Finally, it is possible to assess the reliability and validity of self-reported contact measures used in the NPHS by linking them to administrative data including fee-for-service and reimbursed contacts with health care professionals.

Despite the limitations of the data, especially the broadness of the dependent variable, this study is the only current analysis based on a national Canadian sample of the characteristics of people who experienced an MDE but who did not receive treatment. While it serves to identify depression sufferers who did not receive treatment, it cannot identify those in need of treatment, although this analysis suggests that there may be many. It is appropriate, then, to say only that depression is undertreated in Canada, but not by how much.

Acknowledgments

The authors thank Gary Catlin, Cécile Dumas, and Doug Norris for their helpful suggestions.

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Appendix A

Questions used to identify a Major Depressive Episode (MDE)

The following National Population Health Survey (NPHS) questions are a subset from the Composite International Diagnostic Interview. These questions cover a cluster of symptoms for a depressive disorder, which are listed in the *Diagnostic and Statistical Manual of Mental Disorders* (DSMIII-R).[3] The question numbers refer to those used in the NPHS questionnaire. There are three possible paths through the questions:

(1) "yes" to Q2, then Q3 to Q13
(2) "no" to Q2, "yes" to Q16, then Q17 to Q26
(3) "no" to Q2 and "no" to Q16

Q2. During the past 12 months, was there ever a time when you felt sad, blue, or depressed for two weeks or more in a row? [Yes - go to Q3; No - go to Q16]

Q16. During the past 12 months, was there ever a time lasting two weeks or more when you lost interest in most things like hobbies, work, or activities that usually give you pleasure? [Yes - go to Q17; No - end]

Q3 or Q17. For the next few questions, please think of the two-week period during the past 12 months/ Q3) when these feelings were worst/ Q17) when you had the most complete loss of interest in things. During that time how long did these feelings usually last? [All day long; Most of the day; About half of the day; Less than half of the day]

Q4 or Q18. How often did you feel this way during those two weeks? [Every day; Almost every day; Less often]

Q5. During those two weeks did you lose interest in most things? [Yes; No]

Q6 or Q19. Did you feel tired out or low on energy all of the time? [Yes; No]

Q7 or Q20. Did you gain weight, lose weight or stay about the same? [Gained weight; Lost weight; Stayed about the same; Was on a diet]

Q8 or Q21. About how much did you (gain/lose)?

Q9 or Q22. Did you have more trouble falling asleep than you usually do? [Yes; No]

Q10 or Q23. How often did that happen? [Every night; Nearly every night; Less often]

Q11 or Q24. Did you have a lot more trouble concentrating than usual? [Yes; No]

Q12 or Q25. At these times, people sometimes feel down on themselves, no good, or worthless. Did you feel this way? [Yes; No]

Q13 or Q26. Did you think a lot about death - either your own, someone else's, or death in general? [Yes; No]

Appendix B

Independent variables[b]

Signalling characteristics

Chronic depression: an MDE in the past year that lasted more than four weeks.

Chronic strain was measured by asking respondents whether 11 statements were true or false.[29] A score of 1 was assigned to each "true" response. Low chronic strain was defined as a total score of 0 or 1 (44% of all randomly selected respondents); moderate chronic strain, 2 or 3 (34%); and high chronic strain, 4 to 11 (22%). The statements were:

1. You are trying to take on too many things at once.
2. There is too much pressure on you to be like other people.
3. Too much is expected of you by others.
4. You don't have enough money to buy the things you need.
5. Your work around the home is not appreciated.
6. Your friends are a bad influence.
7. You would like to move but you cannot.
8. Your neighbourhood or community is too noisy or too polluted.
9. You have a parent, a child or partner who is in very bad health and may die.
10. Someone in your family has an alcohol or drug problem.
11. People are too critical of you or what you do.

Recent negative life events were measured in the NPHS by asking respondents eight "yes/no" questions about events that happened to them or to someone close to them, such as a spouse or partner, child, relative or close friend.[30-32] Experiencing one or more such events meant that respondents would be considered to have endured this kind of stress.

1. In the past 12 months, were you or was anyone you know beaten up or physically attacked?
2. ..., did you or someone in your family have an unwanted pregnancy?
3. ..., did you or someone in your family have an abortion or miscarriage?
4. ..., did you or someone in your family have a major financial crisis?
5. ..., did you or someone in your family fail school or a training program?
6. ..., did you (or your partner) experience a change of job for a worse one?
7. ..., were you (or your partner) demoted at work or did either of you take a cut in pay?
8. Now, just you personally, in the past 12 months, did you go on welfare?

Employment status was divided into two categories: working, and not working. The not working category includes both the unemployed and those not in the labour force.

[b] *Self-evident categories are not listed here.*

Recreational physical activity was subdivided into three groups based on average daily energy expenditure (EE). Respondents with an estimated EE below 1.5 kcal/kg/day are considered physically inactive. A value between 1.5 and 2.9 kcal/kg/day, equivalent to taking a daily 45-minute walk, indicates moderate physical activity. Respondents with an estimated EE of 3.0 or more kcal/kg/day are considered physically active. Details of the calculations to obtain average daily EE can be found in the *National Population Health Survey Overview 1994-95*.[4]

Enabling conditions

Income adequacy is based on household income in relation to household size. Household income was classified as inadequate if any of the following three criteria were met:

Household income	and	household size
Less than $15,000	and	1 or 2 persons
Less than $20,000	and	3 or 4 persons
Less than $30,000	and	5 or more persons

Social isolation was measured by four "yes/no" questions. Those who answered "no" to one or more questions were classified in the socially isolated group.

1. Do you have someone you can confide in, or talk to about your private feelings or concerns?
2. Do you have someone you can really count on to help you out in a crisis situation?
3. Do you have someone you can really count on to give you advice when you are making important personal decisions?
4. Do you have someone who makes you feel loved and cared for?

Contact with a general practitioner was measured at the beginning of the interview by asking respondents how many times in the past 12 months they had seen or talked on the telephone with a general practitioner or family physician about their physical, emotional or mental health. A different question, asked in the mental health section of the interview, was used to determine contact with health professionals about only emotional or mental health.

Predisposing characteristics

Marital status was divided into three categories: single (never married), married (including living with partner and common-law union), and previously married (widowed, divorced, separated).

How far to the nearest physician?

*Edward Ng, Russell Wilkins, Jason Pole, Owen B. Adams**

Abstract

Meeting the need for physician care outside of urban centres has long been a health policy concern. The challenges of providing such services in these areas stem from relatively fewer physicians and greater travel distances. In 1993, nearly all (99%) residents of large urban centres (with one million or more people) were less than 5 km from the nearest doctor. But outside of urban centres, only 56% of residents were situated that close to a physician.

As well, proximity to physicians varied with income in less urbanized and rural areas, but not in more urbanized areas. And while Canadians in the southernmost parts of the country enjoyed very short distances to a physician, in northern latitudes, physicians tended to be much farther away. For instance, in 1993, at 65-69^0 north latitude, with 3,974 people for every physician, nearly two-thirds of the population (64%) was 100 km or more from the nearest doctor. By contrast, below 45^o north latitude, which includes Halifax, Toronto and all of southwestern Ontario, the population to physician ratio was 476, and 91% of the population was within 5 km of a physician.

Using the Canadian Medical Association's 1993 address registry of physicians, this article analyses the distance to the nearest physician (57,291 physicians) from a representative point within each of Canada's 45,995 census Enumeration Areas. Distance to the nearest physician by their specialty is also considered.

Key words: *health services accessibility, medically underserved area*

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When Canadians need to see a doctor, the cost of physician services is not a barrier. Each province and territory issues a health insurance card to all its residents that allows them to go to the doctor or clinic of their choice. Physicians providing insured services bill the provincial or territorial government, not their patients. These physicians are usually paid on a fee-for-service basis according to a schedule negotiated between every provincial and territorial government and the medical association in that jurisdiction.

However, travel distance may restrict some people's access to health services. Research on the pattern of physician service utilization has found "distance-decay" effects. The use of services tends to decline as the distance to a physician increases, especially in rural areas.[1,2]

Since the majority of Canadians live in urban areas, it is not surprising that in 1993 close to 87% of Canadians were less than 5 km from a physician. Nonetheless, another 12% were at least 5 km but less than 25 km away, and almost 2% had to travel 25 km or more.

This article examines the proximity of the population to physicians by calculating the aerial distance to the nearest physician from a representative point within each of Canada's 45,995 Enumeration Areas (EAs) (see *Methods*). These results are analyzed by community size, EA income, latitude north, and province or territory.

Geographic proximity to physicians is, of course, just part of the health care challenge facing residents outside of urban centres. Related issues, such as the quality and mix of facilities and the availability of emergency treatment, are not discussed here.

Methods

Data source

The population and income data analyzed in this article are from the 1991 Census. Population counts are from the 100% sample ("short-form" questionnaire); the income data are based on the 20% sample ("long-form" questionnaire).

It was not possible to calculate distance to the nearest physician for each individual. Instead, small geographic areas—census Enumeration Areas (EAs)—were considered. Each EA has a representative point that was used to represent the location of all the EA residents. The latitude and longitude of each representative point were obtained from the 1991 Geography Attributes File of the Geography Division of Statistics Canada.[3]

For this article, the postal codes from 57,291 physician mailing addresses were obtained from the Canadian Medical Association's Physician Master File for summer 1993. These addresses were assumed to refer to the location where physician services were provided. Using the Postal Code Conversion File (PCCF) and the Geocodes/ PCCF software, each physician was assigned the latitude and longitude of the representative point for the EA or block-face that corresponded to his or her mailing address postal code.[4-6] When the postal code referred to a post office box or rural post office, somewhat different methods were used.

For post office boxes in urban areas, all the postal codes within a given Forward Sortation Area (FSA) were considered. (The FSA is the postal service area represented by the first three characters of the postal code.) The average latitude and longitude of the representative points for all the EAs within the FSA were calculated. Given the limited area served by most urban FSAs, this approximate location was usually no more than 1 km from any possible point in the FSA.

For rural postal codes, the EA in which the post office was located was selected, along with the latitude and longitude of its representative point. It was assumed that a physician's practice was more likely to be located in the village centre, along with the post office, rather than in the outlying areas served by the same rural postal code.

Analytical techniques

The aerial distances from each EA representative point to the nearest physician were measured. If the calculated distance was 0.5 km or less, 0.5 km was arbitrarily assigned as the distance. One aim of this assignment was to eliminate distances of 0 km, which would occur when both physician and population were assigned the same representative point, as would happen outside of urban centres when the physician and population were coded to the same EA.

To calculate means and medians, these distances were weighted by the population of each EA. Because mean (average) distances are heavily influenced by outliers and are more suitable for non-skewed distributions, the analysis is based on medians, although mean distance is provided as a supplementary measure (Appendix, Tables A to C).

Distance to the nearest physician was tabulated at several geographic levels. EAs were grouped by province or territory, community size, and latitude. Latitude north was classified as follows: 40-44° (e.g., southwestern Ontario, Toronto, Halifax); 45-49° (e.g., St. John's, Saint John, Montreal, Ottawa, Winnipeg, Vancouver, Victoria); 50-54° (e.g., Regina, Saskatoon, Calgary, Edmonton); 55-59° (e.g., Churchill, Fort McMurray); 60-64° (e.g., Whitehorse, Yellowknife); 65-69° (northern parts of the Yukon and middle parts of the Northwest Territories); and 70°+ (northernmost part of the Northwest Territories).

To analyze distance to nearest physician by income, EAs were first classified as being in "more urbanized areas" (CMA/CA population of generally 50,000 or more) or "less urbanized and rural areas" (generally smaller CAs and non-CMA/CA areas). EA income was based on a derived variable from the 1991 Census—Income Per Person–Equivalent (IPPE)—which takes into consideration the economies of scale possible when two or more people share a household (see *Income Per Person-Equivalent*). EAs in both groups (more urbanized areas, and less urbanized and rural areas) were ranked by income and classified into "area-based" income quintiles.

Population to physician ratios were also calculated. Lower ratios generally indicate greater availability of physicians.

Limitations

Aerial distance to the nearest physician is a rather crude indicator of geographic accessibility to physician services and clearly underestimates the overland distance patients must travel on city streets and country roads. As well, considering distance alone ignores other elements of access to physicians. In addition, proximity and access are not necessarily synonymous, nor does access create equal health outcomes. Moreover, the nature of medical attention that individuals need will vary according to characteristics such as sex, age, and culture, as well as health status.

The physicians included in this article were those registered with the Canadian Medical Association as of summer 1993. The addresses in the directory may not fully reflect the geographical availability of physicians. Some may practice in more than one location, including occasional days in northern or isolated areas, while others may not work full time or may not see patients at all (if they are engaged in research or administration). A relatively small number of postal codes may refer to the physicians' home addresses, which could yield underestimates of population to physician ratios in more affluent areas. Because of incomplete, inaccurate or missing postal codes, 1.0% of physician records could not be coded to CMA/CA size, and 1.2% could not be coded to EA income quintile.

For this article, EA representative points were used for population locations. Distance to the nearest physician was not calculated for every person. Since residents may be located anywhere within an EA, some people will be somewhat closer to the nearest physician than others. Because many EAs included only institutional residents for whom no income data were collected on the census, and other EAs had so little population that data tabulated by income were suppressed, 0.8% of the total population could not be coded to EA income quintile.

In rural areas, it was assumed that physicians located their practices in village centres where the post office is situated. The net effect of this assumption combined with the technique of using EA representative points to represent a group of residents is unknown. Because rural postal codes cover relatively large areas compared with their urban counterparts, and because rural populations are more dispersed, the implications are far more consequential for estimates in rural areas.

Longer distances outside urban centres

Meeting the need for physician care outside of urban centres (non-CMA/CA areas) has long been a health policy concern (see *Definitions*).[7-13] The challenges of providing such services in these areas stem from relatively fewer physicians and greater travel distances. In 1993, non-CMA/CA areas had 23% of Canada's population, but only 9% of the country's physicians. Consequently, the ratio of people to physicians in these areas was higher than in urban centres. For example, large urban centres with one million or more residents had 390 people per physician. Outside urban centres, there were 1,175 people for every doctor (Chart 1; Appendix, Table A).

The smaller the community, the farther the distance to the nearest physician. Only 56% of residents outside of urban centres were less than 5 km from a physician in 1993. Nearly all (99%) residents of large urban centres with one million or more people were this close to a doctor (less than 5 km).

In addition, for specialized physician care, residents outside of urban centres have to travel much farther than do other Canadians. Most (86%) of the 5,300 physicians in non-CMA/CA areas were in general practice or family medicine. The remaining 730 were specialists, who accounted for just 3% of all specialists in Canada.

Big city—short distance

People living in large urban centres are generally not far from a doctor. At least 90% of the people in almost all of Canada's 25 CMAs were less than 5 km from the nearest physician. The proportions were slightly lower for Halifax (88%) and Saint John (82%) (Appendix, Table B).

Canada's three largest CMAs, Toronto, Montreal and Vancouver, had 32% of the population, but 39% of the country's doctors. Together, urban centres of 100,000 or more had 63% of the population, but 77% of physicians.

Definitions[14]

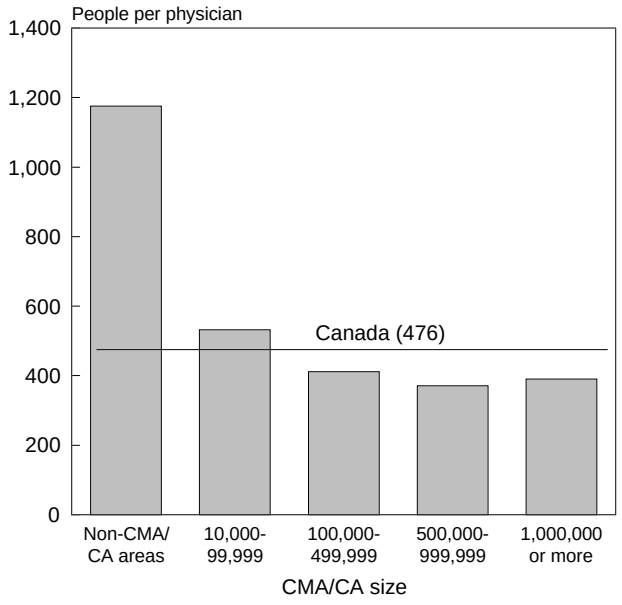
Enumeration Area (EA): The general approach adopted by the census to organize geographical data is to use a "building block" system, where smaller geographical units may be added together to form larger units, which in turn form even larger units, until they all add up to the total of Canada. The smallest unit in this system is the Enumeration Area—the geographic area canvassed, or enumerated, by one census representative. In rural areas, an EA can cover relatively wide reaches of land, but in urban areas, it is usually several city blocks. Each EA has a representative point that is used to provide a single longitude and latitude for the EA.

Census Metropolitan Area (CMA): A large urban centre consisting of an urbanized core, with 100,000 or more inhabitants in that core (based on a previous census), and adjacent urban and rural areas that have a high degree of economic and social integration with the urbanized core. Once an area is designated as a CMA, it maintains that status even if its core population falls below the 100,000 threshold. In 1991, there were 25 CMAs in Canada.

Census Agglomeration (CA): A small urban centre consisting of an urbanized core, with 10,000 or more inhabitants but less than 100,000 in that core (based on a previous census), and adjacent urban and rural areas that have a high degree of economic and social integration with the urbanized core. When the core of a CA attains a population of 100,000, the urban centre is re-designated as a CMA. In 1991, there were 115 CAs in Canada.

Chart 1

People per physician, by CMA/CA size, Canada, 1993

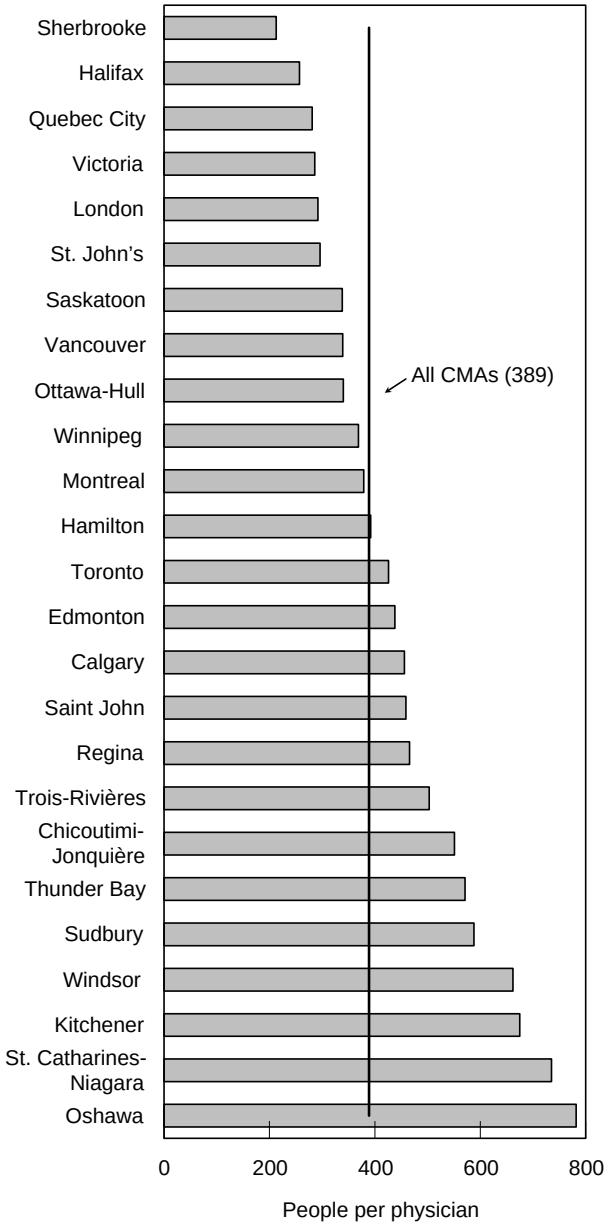


Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

The average population to physician ratio among CMAs was 389. The CMAs with the highest number of people per physician included Oshawa (782), St. Catharines-Niagara (735), Kitchener (675), and Windsor (662). On the other hand, Sherbrooke (213), Halifax (257), Quebec City (281), Victoria (286) and London (292) had ratios considerably below the CMA average (Chart 2).

Chart 2

People per physician, Census Metropolitan Areas, Canada, 1993



Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

A low ratio does not necessarily mean greater availability of physicians. For example, 14 of the 15 CMAs with the lowest population to physician ratios have a faculty of medicine in the area. Some of the physicians employed in these institutions are engaged in teaching, administration and/or research rather than treating patients.

Income a factor in less urbanized and rural areas

In the more urbanized areas of Canada, physicians are concentrated in the most affluent EAs (see *Income Per Person-Equivalent*). About 40% of all physicians in these more urbanized areas were located in "high-

Income Per Person-Equivalent

EA income was based on a variable derived from the 1991 Census—Income Per Person-Equivalent (IPPE)—which takes into consideration the economies of scale possible when two or more people share a household. It uses the distribution of household sizes in an EA to adjust for the bias introduced by more conventional measures such as average household income.

EA-level income information available from the census includes average household income (total EA income divided by the number of private households in that EA) and average personal income (total EA income divided by the population aged 15 and over in that EA). However, these two indicators do not account for the number of people per household. Two people sharing a residence do not require twice the income of a person living alone to maintain the same standard of living. Thus, an EA with relatively low average personal income, but many multi-person households, may have a standard of living similar to an EA with relatively high average personal income but many one-person households. The calculation of IPPE adjusts average household income for the bias introduced by the unequal distribution of household sizes across EAs.

These person-equivalents were originally intended for use on family data (for the calculation of low-income cut-offs), although in this article they were applied to household data. Since most households have only one family, this application was assumed to have had little effect. IPPE is calculated as follows:

IPPE = total household income in an EA / person-equivalents,

where person-equivalents =
1.00 (number of one-person households) +
1.36 (number of two-person households) +
1.72 (number of three-person households) +
1.98 (number of four-person households) +
2.30 (number of five- or more person households).

A more detailed description is available from the authors on request.

income EAs" (the highest quintile).[a] This disproportionate distribution resulted in a population to physician ratio of 193 in high-income EAs, which was less than half the ratio for the other quintiles (Chart 3). Despite this, income bore little relationship overall to the distance to the nearest physician in more urbanized areas. In 1993, 98% of residents of both high- and low-income EAs (highest and lowest quintiles) were within 5 km of the nearest physician.

In less urbanized and rural areas, physicians also tend to concentrate in high-income EAs, but to a much lesser degree. About 25% of all physicians in these areas were located in high-income EAs in 1993, where the population to physician ratio was 621, well below the average of 797 for all less urbanized and rural areas (Chart 3).

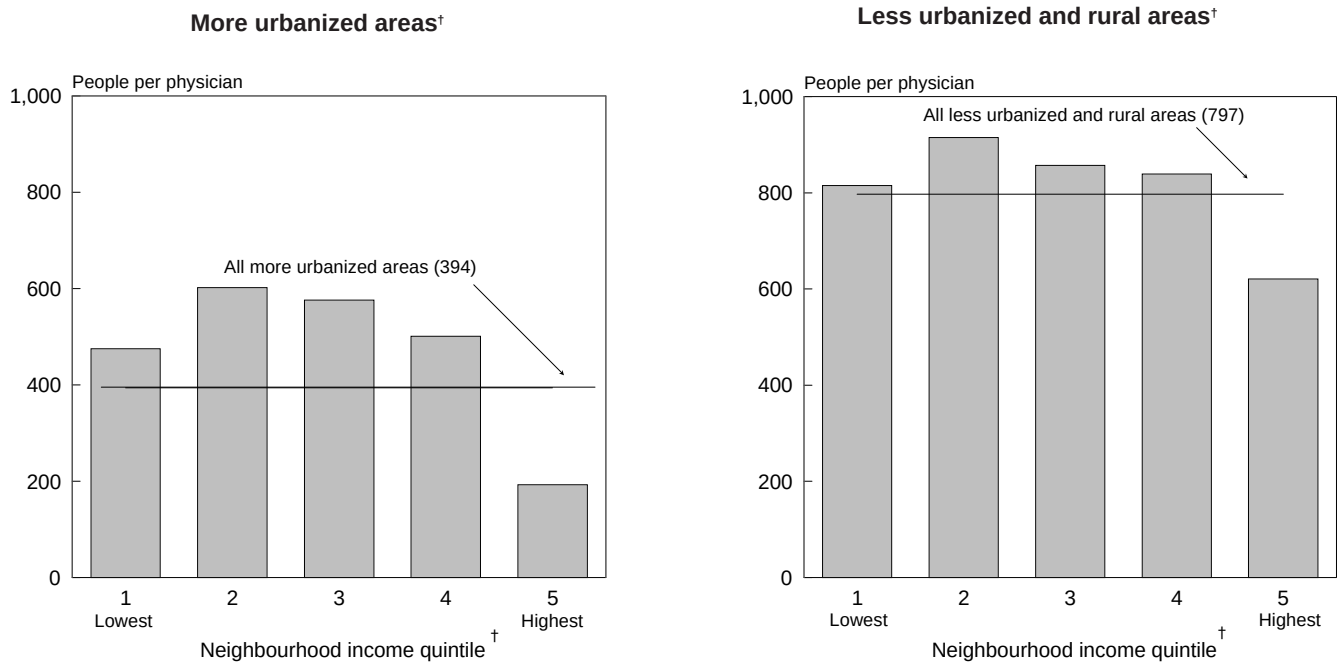
As well, residents of low-income EAs in less urbanized and rural areas tend to be farther away from the nearest physician. In 1993, 55% of residents of EAs in the lowest quintile were less than 5 km from a physician (Chart 4). By contrast, in high-income EAs, 76% of the population was less than 5 km from the nearest physician.

For people in low-income areas in less urbanized and rural Canada, the difficulties stemming from longer distances to doctors may be compounded by a lack of transportation. For instance, in rural areas, a 10-km trip to the doctor is relatively easy for a vehicle owner, but may be troublesome for others. According to the 1993 Household Income, Facilities and Equipment Survey, about 24% of households in rural areas with an income of less than $15,000 did not own a vehicle, compared with about 2% of those whose income was $30,000 or more.[15] In addition, the availability of public transit tends to be limited in rural locales.

[a] *The extent to which this reflected physicians' home address instead of their practice is unknown.*

Chart 3

People per physician, by degree of urbanization and EA income, Canada, 1993



Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

† *See Definitions and Methods.*

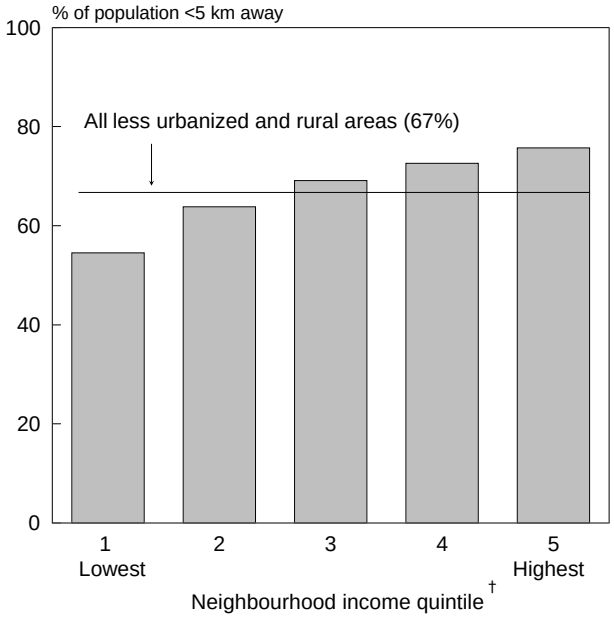
Latitude north

Since many residents of Canada's more northerly regions are located in widely dispersed communities and rural areas, it is not surprising that the population to physician ratio and distance to the nearest physician increase with latitude north (Map). For instance, in 1993, at 65-69° north latitude, with 3,974 people for every physician, nearly two-thirds of the population (64%) was 100 or more km from the nearest doctor (Charts 5 and 6).

No physicians were normally in residence above 70° north latitude to serve the 3,300 people living there. The entire population was 150 or more km away from the nearest physician, and the median distance was 839 km. However, physicians may still have been available in these remote areas through temporary assignments or rotation programs. As well, medical services may have been provided by clinics staffed by nurses.

Chart 4

Percentage of population less than 5 km from a physician, by EA income, less urbanized and rural areas,† Canada, 1993



Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

† *See Definitions and Methods.*

By contrast, in Canada's southernmost areas (below 45° north latitude), which include Halifax, Toronto and all of southwestern Ontario, the population to physician ratio was 476, and 91% of the population was within 5 km of a physician. The area from 45° to 49° north latitude, which includes Montreal, Vancouver, Ottawa, Calgary, Regina and Winnipeg, had a somewhat lower population to physician ratio (448) than did the area south of the 45th parallel, but a slightly smaller percentage of the population (87%) was within 5 km of a physician.

Northwest Territories and Yukon

The Northwest Territories (1,068) and the Yukon (695) had high population to physician ratios. But despite these high ratios, median distances to the nearest physician were relatively short: 1.2 km in the Northwest Territories and 2.1 km in the Yukon. In the Yukon, where the majority of the population (64%) lives in Whitehorse, 68% of residents were less than 5 km from a physician. In the Northwest Territories, where the population is more dispersed, 57% were less than 5 km from a physician, but 31% were 150 km or more away.

Both territories have high concentrations of Aboriginal people. About half (51%) the population of the Northwest Territories and 14% of the Yukon population reported single Aboriginal origins to the 1991 Census.[b] The Medical Services Branch (MSB) of Health Canada has made arrangements to serve Aboriginal people residing in more remote areas of the territories.[16] Many MSB facilities in remote Aboriginal communities are the only source of medical care within hundreds of kilometres.

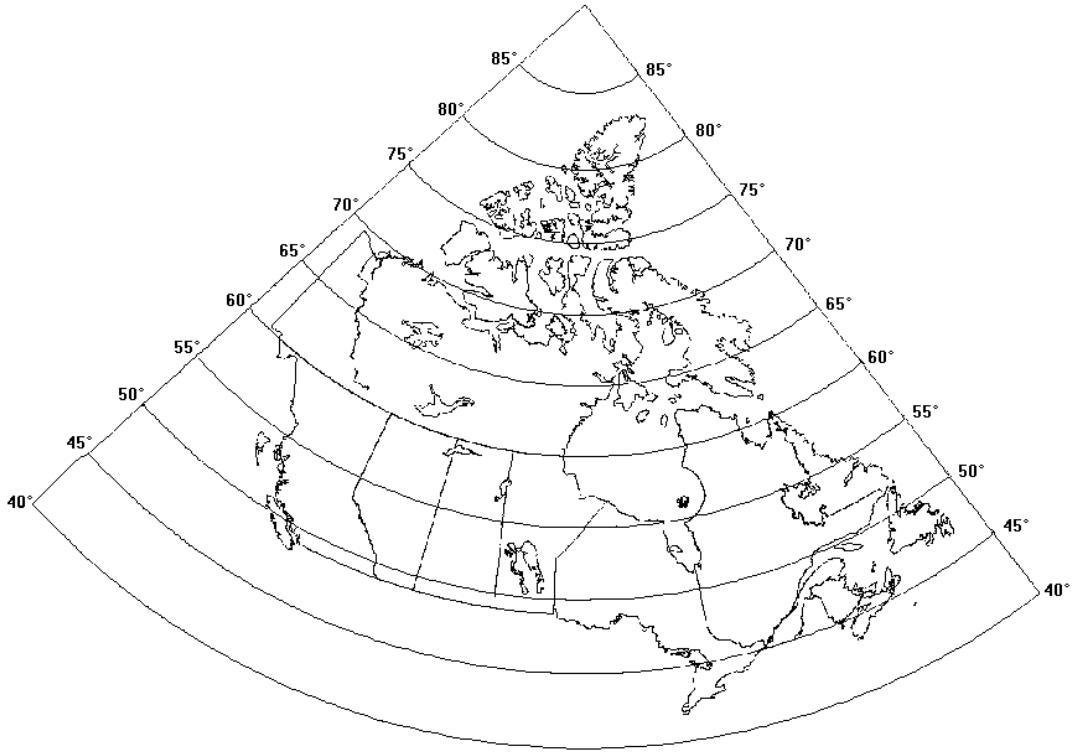
The provinces

As might be expected, population to physician ratios are high in provinces where many residents live in small communities or rural areas. For instance, in 1993, Prince Edward Island had the highest provincial ratio (721). Ratios were also high (over 600 people per physician) in New Brunswick and Saskatchewan (Chart 7). British Columbia enjoyed the lowest ratio (404),

[b] *Respondents to the Census may report more than one ethnic origin. Thus, it is possible for one person to have a combination of Aboriginal and non-Aboriginal origins, or more than one type of Aboriginal origin.*

Map

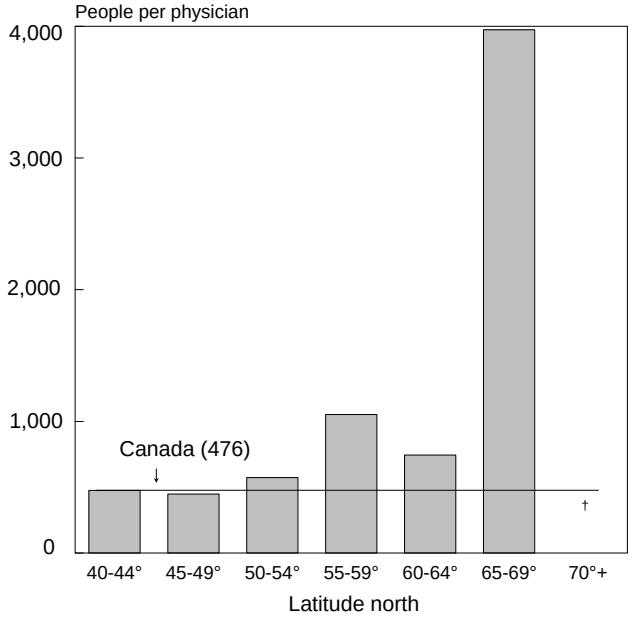
Canada with degrees of latitude



Source: *Geography Division, Statistics Canada*

Chart 5

People per physician, by latitude north, Canada, 1993

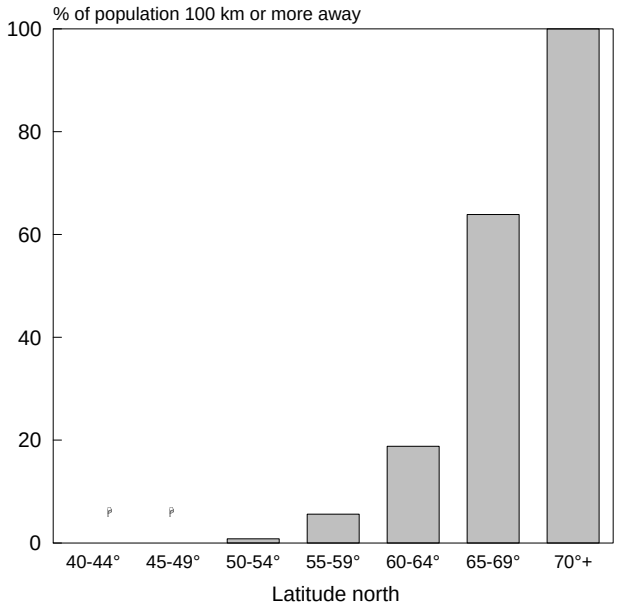


Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

† *No physicians normally reside at 70°+ north latitude.*

Chart 6

Percentage of population 100 km or more from a physician, by latitude north, Canada, 1993



Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

† *All population within 100 km of a physician.*

and only two other provinces, Quebec (447) and Nova Scotia (439), had ratios below the Canadian average.

Provincial differences in the proportion of residents less than 5 km from a physician were more striking and reflected the relative extent to which the population is concentrated in large urban centres in each province. In British Columbia, Quebec and Ontario, 91% of residents were less than 5 km from a physician. By contrast, in Nova Scotia, despite the low population to physician ratio, only 70% of residents were less than 5 km from the nearest physician. And in Saskatchewan, Prince Edward Island and New Brunswick, less than 70% were less than 5 km away (Chart 8).

Rurality was also evident in the percentages of provincial populations that were 25 km or more from the nearest physician. At 12%, the percentage was highest in Saskatchewan. The figure was 5% in Manitoba, and 4% in both Newfoundland and Alberta.

In Ontario, with 10 million people and 21,000 physicians, just 0.4% of the population was 25 or more km away from the nearest doctor. But although small in proportion, this meant that approximately 40,000 Ontario residents were 25 or more km away from a physician (compared with 24,000 in the Northwest Territories).

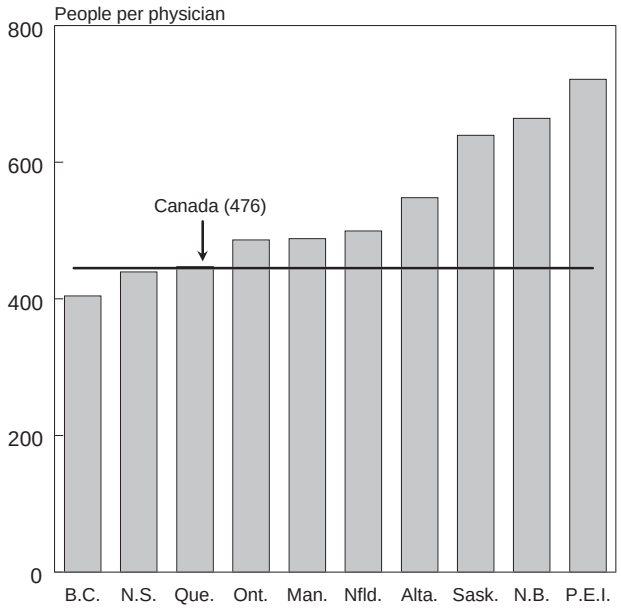
Medical specialties

Canada's health care system relies extensively on general practitioners to provide medical care and make referrals to specialists. They are the gatekeepers of the health care system; patients usually may not consult a specialist unless referred by a general practitioner. In 1993, just over half of Canada's physicians (55%) were in general practice or family medicine, and 86% of the population was within 5 km of a general practitioner. However, distances to specialists varied widely (Appendix, Table C).

Usually, the more physicians in a specialty, the shorter the distance. For example, the median distance to any of the 3,415 psychiatrists was 2 km, and just 16% of the population was 25 km or more away from one. On the other hand, the median distance to the 464 dermatologists was 5 km, and about 30% of the

Chart 7

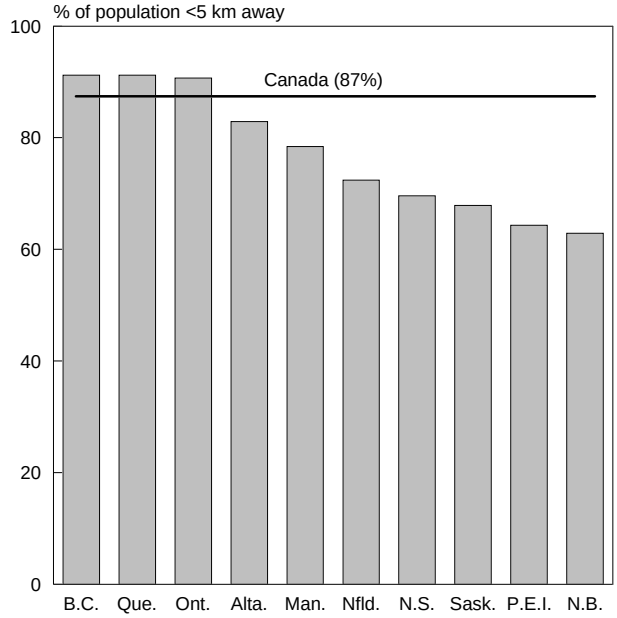
People per physician, by province, Canada, 1993



Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

Chart 8

Percentage of population less than 5 km from a physician, by province, Canada, 1993



Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

population had to travel 25 km or more. Of course, access to a specialist is more complex than to a general practitioner, involving not only distance, but also a referral, waiting time for an appointment, availability of technology, and other factors.

Implications

One objective of the publicly funded health care system has been to provide comparable access to health services for everyone.[17] The system was founded on the principle that "health services should be available to all Canadians wherever they are and whatever their financial means."[18] Potential barriers based on geographic location are relatively small in more urbanized areas. By contrast, in less urbanized and rural areas, distances are longer and differ somewhat by neighbourhood income. And distance to the nearest physician tends to increase with latitude north.

To some degree, persistent disparities in population to physician ratios by community size may stem from difficulties in attracting and maintaining physicians in less urbanized and rural areas. A national survey of physicians in rural practices and of those who had recently left rural areas identified morale problems related to long working hours, lack of personal opportunities, and insufficient professional support.[11] The burden is especially great for family physicians in rural areas who deal with problems that their counterparts in cities would readily refer to specialists.

Strategies to address this situation have included government and academic incentive programs, increased exposure of medical school students to rural practice, and organization of regional groupings of physicians to provide a critical mass of medical expertise.[7] The need for community involvement in attracting physicians to rural areas has also been recognized.

Financial incentives and the active recruitment of medical students have been used in an effort to adjust the geographic distribution of physicians.[7] However, the outcomes have been mixed. In Quebec, incentives such as bursaries, installation grants, higher rates of remuneration, and 20 days' paid leave each year for upgrading have not yielded the anticipated results.[12] Quebec physicians, particularly specialists, continue to concentrate in urban centres such as Montreal, Quebec City, and Sherbrooke.[12] Similarly, despite implementation of the Underserviced Area Program of Ontario, the number of physicians in these areas has not reached desired levels.[19]

Other strategies have been proposed to improve primary care in rural areas. For example, it has been suggested that the professional isolation of rural physicians might be reduced through continuing medical education and through telecommunications technology.[20] As well, the supply of rural primary care providers might be increased by lessening specialty and geographic differentials in physician income.

This article provides recent data on distance to the nearest physician and thereby quantifies what may be a problem for some Canadians. Unanswered here is whether travel distance to a physician is a deterrent to care. Patients who must travel a long way to a doctor may put off regular check-ups. Some may postpone visiting a physician for apparently minor ailments.

An analysis of health status and outcomes, by distance to the nearest physician, would help to answer these questions and build on the research presented here. To evaluate policies aimed at improving access to care, it would also be useful to examine changes over time in geographic proximity to physicians.[21] Data on distance to the nearest physician, combined with incidence data on diseases or health problems, could aid in the understanding of health care and public health issues.

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Appendix

Table A

People per physician and distance to nearest physician, by selected characteristics, Canada, 1993

Characteristics	Population		Physicians		Population per physician	Distance to nearest physician		% of population by distance (km) to nearest physician[†]					
						Mean	Median	<5	5-24	25-49	50-99	100-149	150+
		%		%		km					%		
Canada	**27,296,859**	**100.0**	**57,291**	**100.0**	**476**	**3.1**	**0.5**	**86.8**	**11.5**	**1.2**	**0.3**	**0.1**	**0.1**
Newfoundland	568,474	2.1	1,139	2.0	499	6.7	1.2	72.4	24.0	2.5	0.1	0.3	0.8
Prince Edward Island	129,765	0.5	180	0.3	721	4.4	3.0	64.3	35.7	-	-	-	-
Nova Scotia	899,942	3.3	2,048	3.6	439	4.0	0.5	69.6	29.3	1.1	-	-	-
New Brunswick	723,900	2.7	1,090	1.9	664	5.1	2.4	62.8	35.5	1.7	-	-	-
Quebec	6,895,963	25.3	15,435	26.9	447	2.0	0.5	91.2	8.2	0.3	0.1	0.1	-
Ontario	10,084,885	36.9	20,760	36.2	486	1.8	0.5	90.7	8.9	0.3	0.1	-	-
Manitoba	1,091,942	4.0	2,239	3.9	488	6.2	0.5	78.4	16.8	2.5	1.2	0.2	0.7
Saskatchewan	988,928	3.6	1,547	2.7	639	8.3	0.5	67.9	20.5	10.0	1.3	0.1	0.2
Alberta	2,545,553	9.3	4,641	8.1	548	3.9	0.5	82.9	13.5	2.9	0.5	0.1	-
British Columbia	3,282,061	12.0	8,118	14.2	404	2.3	0.5	91.2	7.2	1.1	0.3	0.1	-
Yukon	27,797	0.1	40	0.1	695	23.6	2.1	68.4	13.6	4.6	4.0	4.3	5.0
Northwest Territories	57,649	0.2	54	0.1	1,068	155.2	1.2	57.3	0.7	0.2	3.9	6.5	31.4
CMA/CA size[‡]													
1,000,000 or more	8,622,790	31.6	22,109	38.6	390	0.7	0.5	99.1	0.9	-	-	-	-
500,000-999,999	4,412,478	16.2	11,881	20.7	371	1.0	0.5	96.5	3.5	-	-	-	-
100,000-499,999	4,214,504	15.4	10,260	17.9	411	1.3	0.5	93.8	6.1	0.2	-	-	-
10,000-99,999	3,817,442	14.0	7,181	12.5	532	1.8	0.5	91.2	8.3	0.4	0.1	-	-
Non CMA/CA areas	6,229,645	22.8	5,302	9.3	1,175	10.2	3.8	55.6	37.4	4.7	1.1	0.4	0.8
CMA/CA size missing	…	…	558	1.0	…	…	…	…	…	…	…	…	…
More urbanized areas[‡]													
Income quintiles[§]													
All	17,918,831	100.0	45,524	100.0	394	0.9	0.5	97.1	2.9	-	-	-	-
1 (Lowest)	3,581,486	20.0	7,534	16.5	475	0.8	0.5	98.1	1.9	0.1	-	-	-
2	3,557,161	19.9	5,906	13.0	602	1.0	0.5	96.7	3.2	0.1	-	-	-
3	3,552,496	19.8	6,164	13.5	576	1.0	0.5	96.4	3.6	-	-	-	-
4	3,545,302	19.8	7,066	15.5	502	1.0	0.5	96.4	3.6	-	-	-	-
5 (Highest)	3,524,722	19.7	18,256	40.1	193	0.8	0.5	97.9	2.1	-	-	-	-
Income quintile missing	157,664	0.9	598	1.3	…	…	…	…	…	…	…	…	…
Less urbanized and rural areas[‡]													
Income quintiles[§]													
All	9,378,028	100.0	11,767	100.0	797	7.4	1.5	67.2	28.0	3.3	0.7	0.3	0.5
1 (Lowest)	1,912,480	20.4	2,350	20.0	814	14.2	3.4	54.5	33.9	6.5	2.5	0.8	1.8
2	1,860,652	19.8	2,033	17.3	915	8.1	1.8	63.8	31.8	3.3	0.5	0.1	0.5
3	1,873,236	20.0	2,187	18.6	857	5.9	1.5	69.1	27.5	2.7	0.3	0.3	0.1
4	1,860,220	19.8	2,217	18.8	839	4.4	1.3	72.6	25.2	1.9	0.2	-	-
5 (Highest)	1,802,032	19.2	2,902	24.7	621	4.3	1.1	75.7	21.9	2.1	0.2	0.1	-
Income quintile missing	69,408	0.7	78	0.6	…	…	…	…	…	…	…	…	…
Latitude north													
40-44°	8,754,188	32.1	18,372	32.1	476	1.4	0.5	91.3	8.7	-	-	-	-
45-49°	14,167,419	51.9	31,593	55.1	448	2.3	0.5	87.4	11.8	0.7	0.1	-	-
50-54°	3,989,181	14.6	6,946	12.1	574	6.2	0.5	77.2	16.7	4.5	0.8	0.3	0.5
55-59°	297,608	1.1	283	0.5	1,052	22.2	1.5	61.1	15.0	9.8	8.7	2.2	3.2
60-64°	69,304	0.3	93	0.2	745	47.0	1.3	69.6	6.0	2.0	3.7	4.7	14.0
65-69°	15,894	0.1	4	-	3,974	249.9	137.5	31.1	-	-	5.0	15.3	48.6
70+°	3,265	-	-	-	…	851.3	838.9	-	-	-	-	-	100.0

Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

† *In completed kilometres*

‡ *See Definitions.*

§ *See Methods.*

\- *Nil or zero*

… Figures not appropriate or not applicable

Table B

People per physician and distance to nearest physician, Census Metropolitan Areas, Canada, 1993

	Population	Physicians	Population per physician	Mean distance	% of population by distance to nearest physician	
					<5 km	≥5 km
				km	%	%
All CMAs	**16,665,360**	**42,867**	**389**	**0.9**	**97.4**	**2.6**
Toronto	3,893,046	9,130	426	0.7	98.8	1.3
Montreal	3,127,242	8,249	379	0.7	99.3	0.7
Vancouver	1,602,502	4,730	339	0.7	99.4	0.6
Ottawa-Hull	920,857	2,711	340	1.0	95.2	4.8
Edmonton	839,924	1,919	438	1.4	93.3	6.7
Calgary	754,033	1,655	456	1.0	97.4	2.7
Winnipeg	652,354	1,768	369	0.9	96.4	3.6
Quebec City	645,550	2,297	281	0.8	98.9	1.1
Hamilton	599,760	1,531	392	0.7	99.1	0.9
London	381,522	1,305	292	0.9	96.3	3.7
St. Catharines-Niagara	364,552	496	735	1.2	96.5	3.5
Kitchener	356,421	528	675	0.7	99.3	0.7
Halifax	320,501	1,249	257	1.8	87.5	12.5
Victoria	287,897	1,007	286	1.1	95.8	4.2
Windsor	262,075	396	662	1.0	96.2	3.8
Oshawa	240,104	307	782	0.9	96.5	3.5
Saskatoon	210,023	622	338	2.3	90.3	9.7
Regina	191,692	411	466	1.1	96.4	3.6
St. John's	171,859	581	296	1.4	95.2	4.8
Chicoutimi-Jonquière	160,928	292	551	1.6	92.2	7.8
Sudbury	157,613	268	588	1.6	92.0	8.0
Sherbrooke	139,194	654	213	0.9	97.0	3.0
Trois-Rivières	136,303	271	503	1.0	95.8	4.2
Saint John	124,981	272	459	2.7	82.4	17.6
Thunder Bay	124,427	218	571	1.7	92.7	7.3

Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*
Note: *In all CMAs, median distances to the nearest physician were 0.5 km. See Methods.*

Table C

Distance to nearest physician, by medical speciality, Canada, 1993

Specialty	Physicians		Distance to nearest physician		% of population by distance (km) to nearest physician†						
			Mean	Median	<5	5-24	25-49	50-99	100-199	200-299	300+
		%	km				%				
All physicians	**57,291**	**100.0**	**3.1**	**0.5**	**86.8**	**11.5**	**1.2**	**0.3**	**0.2**	**-**	**-**
General practice/Family medicine	31,311	54.7	3.2	0.5	86.3	12.0	1.2	0.3	0.2	-	0.1
Psychiatry	3,415	6.0	20.3	2.2	65.8	18.1	6.2	5.2	3.2	0.8	0.8
Internal medicine	2,290	4.0	19.0	2.5	64.0	20.6	6.1	5.4	2.7	0.3	0.8
Anesthesia	2,230	3.9	23.1	2.4	64.8	17.8	6.1	6.1	3.1	1.1	1.0
Pediatrics	1,918	3.3	20.6	2.5	64.0	17.8	7.2	6.6	3.1	0.8	0.7
General surgery	1,804	3.1	13.4	2.3	67.2	21.5	5.5	3.8	1.4	0.4	0.4
Diagnostic radiology	1,760	3.1	19.4	2.6	63.9	19.4	7.0	5.7	2.8	0.6	0.6
Obstetrics/Gynecology	1,599	2.8	19.9	2.8	62.4	19.7	7.4	6.4	2.7	0.6	0.7
Opthalmology	1,047	1.8	28.3	3.7	55.8	23.1	7.8	5.7	4.8	1.5	1.3
Orthopedic surgery	997	1.7	25.9	3.7	56.8	22.5	8.1	6.4	4.1	1.0	1.2
Cardiology	681	1.2	44.8	5.4	48.1	21.2	9.0	7.9	8.6	2.7	2.6
Otolaryngology	615	1.1	29.1	4.2	54.2	24.2	8.5	5.9	4.3	1.5	1.5
Anatomical pathology	572	1.0	31.0	4.9	50.2	25.1	10.2	7.3	4.6	1.4	1.4
Urology	559	1.0	28.4	4.5	52.7	25.3	9.0	6.1	4.6	1.1	1.2
Emergency medicine	482	0.8	52.5	6.8	43.0	26.7	8.7	7.2	6.3	3.9	4.3
Dermatology	464	0.8	44.9	5.3	48.6	22.5	8.6	8.0	6.1	2.9	3.2
Neurology	454	0.8	43.8	6.3	44.9	24.0	9.7	9.0	7.3	2.5	2.7
General pathology	439	0.8	35.5	5.0	49.9	23.2	8.9	7.5	7.2	1.9	1.4
Plastic surgery	392	0.7	41.7	5.8	45.8	23.9	9.9	9.7	5.4	3.0	2.3
Respiratory medicine	384	0.7	44.6	7.3	41.1	27.0	8.7	10.3	7.9	3.3	1.9
Gastroenterology	323	0.6	45.5	7.0	40.5	27.7	10.1	10.2	6.5	2.5	2.6
Community medicine	307	0.5	52.4	9.4	37.9	27.2	10.3	9.2	8.4	3.0	3.9
Radiation oncology	260	0.5	55.5	10.4	33.1	30.7	10.7	10.0	8.7	3.2	3.5
Haemotology	256	0.4	58.0	10.0	34.9	28.7	9.4	9.3	7.9	6.1	3.7
Endrocrinology/Metabolism	233	0.4	66.3	13.4	32.8	26.3	10.8	11.8	9.1	4.0	5.1
Rheumatology	224	0.4	68.9	9.6	34.8	28.2	9.5	8.8	7.8	4.3	6.5
Medical microbiology	221	0.4	77.4	13.3	31.6	27.4	8.7	11.9	8.9	3.8	7.8
Physical medicine	203	0.4	52.1	9.5	33.8	31.4	10.9	8.8	7.9	4.5	2.7
Neurosurgery	197	0.3	52.8	11.4	30.5	30.8	11.2	12.1	8.9	3.9	2.6
Cardiovascular/Thoracic surgery	191	0.3	63.2	13.3	28.8	30.3	12.3	11.7	8.0	4.7	4.2
Nephrology	189	0.3	66.8	12.5	29.8	31.3	8.2	10.6	9.7	5.7	4.8
Nuclear medicine	177	0.3	55.3	9.8	34.4	30.1	10.0	9.6	8.7	3.6	3.7
Vascular surgery	128	0.2	52.4	9.6	32.8	33.9	8.8	10.7	6.9	3.6	3.3
Medical oncology	105	0.2	74.5	15.6	26.7	30.5	9.8	13.9	9.6	3.8	5.6
Electroencephalography	103	0.2	298.2	51.3	14.5	22.2	13.0	9.3	6.7	4.2	30.1
Geriatric medicine	96	0.2	99.2	24.1	24.0	26.5	11.0	12.4	9.5	5.1	11.5
Clinical immunology	89	0.2	112.0	22.4	22.3	29.2	10.0	10.6	8.3	4.6	15.0
Infectious diseases	84	0.1	86.1	22.5	19.5	32.2	11.8	11.9	10.4	6.0	8.0
Medical biochemistry	83	0.1	104.3	25.9	20.3	29.2	10.3	12.2	12.0	4.6	11.4
Public health	75	0.1	160.8	29.1	18.3	29.2	10.8	11.5	9.0	4.4	16.8
Thoracic surgery	67	0.1	85.5	19.2	21.9	31.6	9.8	13.7	12.5	3.9	8.5
Physiatry	65	0.1	860.1	169.3	12.0	10.4	4.6	7.0	24.8	6.6	34.7
Haematological pathology	59	0.1	110.4	28.0	18.5	29.7	10.1	10.0	11.6	8.0	12.2
Pediatric general surgery	48	0.1	89.0	27.7	15.4	32.6	11.7	13.3	12.7	6.7	7.7
Occupational medicine	42	0.1	145.7	27.0	18.7	30.3	9.8	11.0	8.5	3.4	18.2
Neuropathology	26	--	111.5	41.2	11.6	31.6	10.2	14.2	11.7	9.3	11.2
Pediatric cardiology	12	--	195.0	65.7	8.4	26.7	9.0	14.1	13.0	8.1	20.7
Medical genetics	11	--	164.0	62.1	8.1	29.5	9.3	14.6	10.7	7.3	20.4
Cardiothoracic surgery	3	--	992.9	280.6	2.9	12.0	3.8	8.5	19.3	4.6	49.0
Pathology/Bacteriology	1	--	1,132.0	548.7	0.5	7.1	8.0	6.4	5.2	2.1	70.8

Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

† *In completed kilometres*

\- *Nil or zero*

-- *Amount too small to be expressed*

Downsizing Canada's hospitals, 1986/87 to 1994/95

Patricia Tully, Étienne Saint-Pierre*

Abstract

The period between fiscal years 1986/87and 1994/95 has seen a reduction in the number of hospitals in Canada and fundamental changes in the way they deliver their services. During this time, the number of public hospitals fell by 14%, and the number of approved beds in these hospitals declined by 11%. As a result, the number of staffed beds per 1,000 population dropped from 6.6 to 4.1.

Much of the decrease in approved beds in public hospitals can be attributed to the reduction in the hospital extended care sector. In fact, some hospitals with long-term care units have been re-designated residential care facilities. As well, a common trend emerged in all categories of public hospitals: the number of outpatient visits increased, while inpatient-days decreased.

Between 1986/87 and 1991/92, public hospitals' average annual increase in operating expenses (in current dollars) was 8%. However, from 1991/92 to 1994/95, public hospitals posted negative average annual growth in their expenditures (-2.4%), which reflects efforts made by various provinces to control hospital costs.

This article presents data from reports compiled by Statistics Canada: Annual Return of Health Care Facilities - Hospitals, 1986/87 to 1993/94 *and* Preliminary Annual Report of Hospitals, 1994/95.

Key words: *outpatient treatment, length of stay, hospital expenditures, staffed beds, approved beds*

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Since the mid-1980s, Canada's hospitals have experienced profound change. The number of hospitals, and consequently, the number of staffed beds have declined. Inpatient days have also decreased, and average length of stay has dropped. To a large extent, these changes can be traced to a sharp reduction in the hospital extended care sector and a rise in outpatient visits. Although some hospitals have closed, others have been converted to residential care facilities. These trends have allowed hospitals to reduce their operating expenditures, particularly since the early 1990s.

This article describes recent developments in various aspects of hospital care such as the number of staffed beds, length of stay, outpatient treatment, and expenditures. The data are from reports compiled by Statistics Canada: *Annual Return of Health Care Facilities - Hospitals, 1986/87 to 1993/94*[1] and *Preliminary Annual Report of Hospitals, 1994/95*[2] (see *Methods*).

Fewer hospitals

In fiscal year 1994/95, 978 hospitals were in operation in Canada, 901 of them public, 22 private, and 55 federal (see *Definitions*). Together, these hospitals had 156,547 beds approved by the provincial authorities (excluding bassinets for newborns). Public hospitals accounted for the vast majority—98%—of approved beds (Table 1).

Between 1986/87 and 1994/95, the number of public hospitals decreased by 14%, and the number of approved beds in these hospitals fell 11%. More than half the decline in the number of approved beds in public hospitals over the last eight years can be attributed to reductions in the hospital extended care sector.

While some hospitals have been closed, others have been converted to different uses within the health care sector. Some hospitals with long-term care units have become residential care facilities. Since these are no longer designated as hospitals, they are not included in this analysis. Still other hospitals have been re-assigned to provide outpatient treatment exclusively or have been merged with other facilities.

Methods

Data source

The data are from the *Annual Return of Health Care Facilities - Hospitals* and for fiscal year 1994/95, the *Preliminary Annual Report of Hospitals*. Under the Statistics Act, all facilities with a licence to operate a hospital (granted by provincial ministries of health and certain federal departments) are required to complete this report. The target statistical universe is all public, private and federal hospitals operating in the provinces and territories.

The results are based on data from the *Annual Returns* and the *Preliminary Annual Report*, for which the response rate always exceeds 80% of all hospitals, representing more than 90% of beds. The response rate for public hospitals is generally higher (about 90%). The estimates in this article are based on reported values only.

Analytical techniques

The number of outpatient visits is the sum of outpatient visits to emergency units, surgical day-care programs, general and special clinics, and day- and night-care programs.

The number of visits to day- and night-care programs is estimated from the number of outpatients registered in these programs. To compute this figure, the total number of visits to day- and night-care programs during the year is multiplied by the ratio of outpatients to the total number of patients using these programs.

For comparisons between provinces, the proportion of outpatients who are registered in day- and night-care programs is determined independently for each province. Because of the absence of data on this ratio for Quebec, the proportion calculated for Canada is used to estimate the number of outpatient visits to day- and night-care programs in that province. The same approximation was made for Ontario in 1993/94.

For comparisons between the different types of hospitals, the proportion used to estimate the number of outpatient visits to day- and night-care programs is calculated independently for each type of facility.

Limitations

Data on the number of outpatient visits are not collected for the *Preliminary Annual Report of Hospitals*. The statistics on outpatient visits and inpatient-days do not include private and federal hospitals or nursing stations and outpost hospitals.

A suitable (inflation) deflator is not yet available by province for 1994/95 hospital expenditures. Therefore, current dollars are used in this analysis. In addition, private and federal hospitals are not required to report financial information on this survey.

Staffed hospital beds

For hospitals overall, staffed beds (that is, beds actually available to patients) numbered 120,774 in 1994/95. This was down 30% from the peak of 172,425 staffed beds in 1986/87 (Table 2).

Extended care public hospitals experienced the most marked decline in staffed beds (by 46%). Reductions were also substantial in specialty public hospitals (34%) and general public hospitals with no long-term care units (32%).

Numerically, the decrease in staffed beds was greater in short-term care units (by 30,023) than in long-term care units (21,628). However, the percentage decrease in the number of staffed beds in long-term care units (36%) exceeded that in short-term care units (27%).

At the national level, the number of staffed beds per 1,000 population fell from 6.6 to 4.1 between 1986/87 and 1994/95. Although population growth contributed to the decline in the ratio, a shift to ambulatory care and the resulting bed closures largely explain this trend.

Throughout this period, Quebec had the highest ratio of staffed beds to population. Alberta's ratio had ranked second in 1986/87, but hospital reform in that province during the intervening years meant that by 1994/95, its ratio was lowest (Table 3). Manitoba had the smallest decrease in the number of staffed beds per 1,000 population, with its ratio falling from 5.8 to 4.9.

The number of staffed beds in short-term care units per 1,000 population fell in all provinces. And only in Newfoundland did the number of staffed beds in long-term care units per 1,000 population increase.

The decline in the number of staffed long-term care beds was particularly pronounced in Alberta and Quebec. Beginning in 1990/91 in Alberta and in 1993/94 in Quebec, some extended care hospitals and long-term care units of general hospitals were re-designated as residential care facilities. Alberta re-designated over 5,000 approved beds in 67 public hospitals, and Quebec re-designated over 9,000 approved beds in 71 hospitals (38 public, 33 private).

Table 1

Distribution of hospitals and approved beds,† by type of facility, Canada, selected years

	1986/87		1993/94		1994/95		Percent change 1986/87 to 1994/95	Percent change 1993/94 to 1994/95
		%		%		%	%	%
Hospitals								
Total	**1,224**	**100**	**1,157**	**100**	**978**	**100**	**-20**	**-15**
Public hospitals	1,053	86	998	86	901	92	-14	-10
General, without long-term care units	417	34	366	32	352	36	-16	-4
General, with long-term care units	365	30	353	31	363	37	-1	3
Teaching	61	5	58	5	56	6	-8	-3
Specialty	35	3	34	3	34	3	-3	-
Extended care	150	12	136	12	96	10	-36	-29
Nursing stations and outpost hospitals‡	25	2	51	4	-	-	-100	-100
Private hospitals	59	5	57	5	22	2	-63	-61
Federal hospitals	112	9	102	9	55	6	-51	-46
Approved beds†								
Total	**178,137**	**100**	**172,222**	**100**	**156,547**	**100**	**-12**	**-9**
Public hospitals	171,461	96	166,153	96	152,939	98	-11	-8
General, without long-term care units	25,440	14	23,326	14	21,021	13	-17	-10
General, with long-term care units	64,255	36	64,062	37	63,076	40	-2	-2
Teaching	39,787	22	38,384	22	37,263	24	-6	-3
Specialty	5,790	3	5,166	3	4,923	3	-15	-5
Extended care	36,084	20	35,070	20	26,656	17	-26	-24
Nursing stations and outpost hospitals‡	105	--	145	--	-	-	-100	-100
Private hospitals	3,682	2	3,587	2	1,226	1	-67	-66
Federal hospitals	2,994	2	2,482	1	2,382	2	-20	-4

Sources: *Annual Return of Health Care Facilities - Hospitals, 1986/87 to 1993/94; Preliminary Annual Report of Hospitals, 1994/95*
Note: *Percentages may not sum to 100 because of rounding.*
† *Includes beds for adults and cribs for children, but excludes bassinets for newborns.*
‡ *No public nursing stations or outpost hospitals were providing inpatient care in 1994/95; for this reason, none of these facilities was designated as a hospital.*
- *Nil or zero*
-- *Amount too small to be expressed*

Table 2

Staffed beds in hospitals, by type of care unit, Canada and provinces, 1986/87 and 1994/95

	All units			Short-term care units			Long-term care units		
	1986/87	1994/95	Percent change	1986/87	1994/95	Percent change	1986/87	1994/95	Percent change
			%			%			%
Canada†	**172,425**	**120,774**	**-30.0**	**111,696**	**81,673**	**-26.9**	**60,729**	**39,101**	**-35.6**
Newfoundland	3,401	2,753	-19.1	2,691	1,987	-26.2	710	766	7.9
Prince Edward Island	755	513	-32.1	662	477	-27.9	93	36	-61.3
Nova Scotia	5,705	3,722	-34.8	5,242	3,324	-36.6	463	398	-14.0
New Brunswick	5,151	3,397	-34.1	3,949	2,494	-36.8	1,202	903	-24.9
Quebec	54,741	38,849	-29.0	27,089	25,121	- 7.3	27,652	13,728	-50.4
Ontario	51,181	37,303	-27.1	37,334	24,354	-34.8	13,847	12,949	-6.5
Manitoba	6,369	5,527	-13.2	5,134	4,482	-12.7	1,235	1,045	-15.4
Saskatchewan	7,272	4,675	-35.7	6,448	4,097	-36.5	824	578	-29.9
Alberta	17,990	8,372	-53.5	11,755	7,598	-35.4	6,235	774	-87.6
British Columbia	19,466	15,527	-20.2	11,040	7,628	-30.9	8,426	7,899	- 6.3

Sources: *Annual Return of Health Care Facilities - Hospitals, 1986/87; Preliminary Annual Report of Hospitals, 1994/95*
† *Includes Northwest Territories and Yukon.*

Table 3

Staffed beds per 1,000 population, Canada and provinces, 1986/87 and 1994/95

	All units		Short-term care units		Long-term care units	
	1986/87	1994/95	1986/87	1994/95	1986/87	1994/95
Canada†	**6.6**	**4.1**	**4.2**	**2.8**	**2.3**	**1.3**
Newfoundland	5.9	4.7	4.7	3.4	1.2	1.3
Prince Edward Island	5.9	3.8	5.1	3.5	0.7	0.3
Nova Scotia	6.4	4.0	5.9	3.5	0.5	0.4
New Brunswick	7.1	4.5	5.4	3.3	1.7	1.2
Quebec	8.1	5.3	4.0	3.4	4.1	1.9
Ontario	5.4	3.4	3.9	2.2	1.5	1.2
Manitoba	5.8	4.9	4.7	4.0	1.1	0.9
Saskatchewan	7.0	4.6	6.2	4.0	0.8	0.6
Alberta	7.4	3.1	4.8	2.8	2.6	0.3
British Columbia	6.4	4.2	3.6	2.1	2.8	2.1

Source: *Annual Return of Health Care Facilities - Hospitals, 1986/87; Preliminary Annual Report of Hospitals, 1994/95*

† *Includes Northwest Territories and Yukon.*

Average length of stay

The average length of stay in hospital has also decreased. In 1994/95, patients in short-term care units of public hospitals had an average stay of 7 days, down from 9 days in 1986/87. Patients in Quebec remained in hospital the longest, averaging 9 days in 1994/95. Average hospital stays were shortest in Alberta and British Columbia (both 6.5 days). In all provinces, the average stay in short-term care units in 1994/95 was less than in 1986/87.

Stays in long-term care units were, of course, much longer, but this average also fell steadily from 236 to 153 days.

Definitions

Hospital: An institution where patients are accommodated on the basis of medical needs and are provided with continuing medical care and supporting diagnostic and therapeutic services, and which is licensed or approved as a hospital by a provincial government, or is operated by the Government of Canada.

Public hospital: A hospital recognized by the province as a "public hospital." Such hospitals are not-for-profit facilities owned by a municipality, an agency or a department of a provincial government, a religious organization, or a lay voluntary group.

Private hospital: A hospital owned by an individual or by a private organization and operated for profit. These hospitals provide various services, including both acute (short-term) and extended care.

Federal hospital: A hospital owned by a department or agency of the Government of Canada and operated on a non-profit basis to serve groups who fall under their mandate. For example, the Department of Veterans Affairs owns a hospital for veterans; Health Canada owns nursing stations and outpost hospitals for people in geographically isolated communities; and the Department of National Defence owns hospitals that treat members of the Canadian Armed Forces.

Long-term care unit: Inpatient unit provided for patients who, at the time of admission, require long-term medical care.

Short-term care unit: Inpatient unit provided for patients who, at the time of admission, require diagnostic and therapeutic services and/or skilled nursing care and medical attention.

General hospital without long-term care units: A hospital that provides primarily for the diagnosis and short-term treatment of patients for a wide range of diseases or injuries. The services of a general hospital are not restricted to patients of a specific age group or sex.

General hospital with long-term care units: A hospital with a group of beds or rooms or a separate wing or building for long-term care that is recognized as a distinct and separate treatment unit of the hospital.

Teaching hospital: A hospital that provides medical education programs, approved by the appropriate authorities, for major clinical instruction in at least the disciplines of internal medicine and general surgery to undergraduate medical students in their final two years.

Specialty hospital: A hospital that provides primarily for the diagnosis and short-term treatment of patients for a limited range of diseases or injuries, or a broad range of services to a specific age group (pediatric hospital, short-term care psychiatric hospital, neurological institute).

Extended care hospital: A hospital that provides primarily for the continuing treatment of patients with long-term illness. This type of hospital includes long-term psychiatric hospitals and rehabilitation hospitals.

Approved bed: A bed or crib approved for the hospital or for a unit of the hospital by the provincial authorities.

Staffed bed: A bed or crib that is actually available for patient accommodation, with staff available to provide the required level and type of care, whether or not it is actually occupied by a patient at that time.

Day- and night-care program: Programs specifically designed, staffed and equipped primarily for the care of outpatients who attend for a prescribed number of hours of the day or night. These may include diabetic or geriatric day care, renal dialysis, psychiatric, or substance abuse day- or night-care programs.

Surgical day-care program: A recognized, organized outpatient program. A surgical day-care patient is one who is not admitted as an inpatient to an inpatient bed, and on whom is performed an elective surgical or endoscopic procedure, under a local or general anesthetic, and who is released the same day.

General and special clinic: Clinic that is designed, staffed, and equipped to provide diagnostic and therapeutic services primarily to outpatients, for example, cancer treatment, allergy treatment, ophthalmology, dermatology.

Residential care facility: Facility that is approved, funded or licensed by provincial/territorial departments of health and/or social services. Some of these facilities are maintained for people chronically ill or disabled, who reside there more or less permanently. Other facilities provide shelter for shorter periods and often offer a program of service. Generally, the level of care in residential care facilities is below that in hospitals, although there is some overlap. Residential care facilities include institutions such as homes for the aged (including nursing homes); for persons with physical disabilities, developmental delays, psychiatric disabilities, or alcohol and drug problems; and for emotionally disturbed children, transients, delinquents and others.

Outpatient treatment and inpatient-days

A common trend has emerged in all types of public hospitals: the number of outpatient visits increased, while inpatient-days decreased. In 1993/94, 38 million outpatient visits were recorded for all public hospitals, up 15% from 1986/87. By contrast, inpatient-days declined 17% from 52 million to 43 million.

The rise in outpatient visits during this period is linked to the sharp increase in visits to day- and night-care programs (2.7 million visits in 1993/94, up 46%), to surgical day care (1.8 million, up 37%), and to general and special clinics (17.7 million, up 24%). On the other hand, the number of visits to emergency units in 1993/94 had barely changed since 1986/87 (15.9 million, up less than 1%).

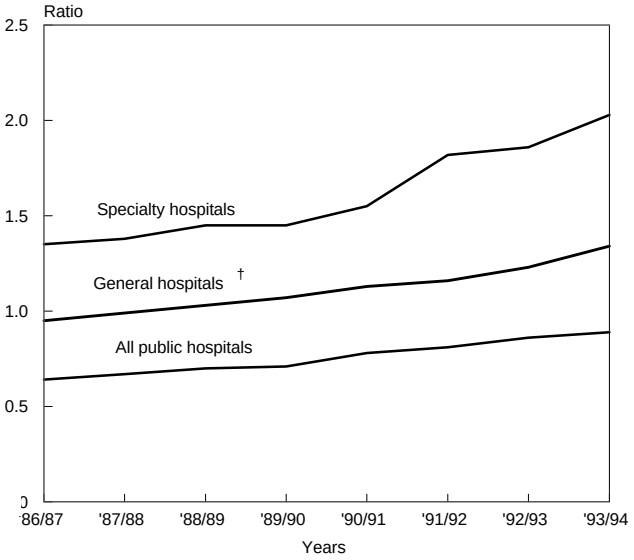
By 1993/94, for each inpatient-day in a public hospital, 0.88 outpatient visits were recorded, up from 0.64 in 1986/87. Specialty hospitals and general hospitals without long-term care units had the highest ratios of outpatient visits to inpatient-days—2.03 and 1.34, respectively—although since 1986/87, the ratio rose in all types of hospitals (Chart 1, Table 4). In seven years, the rise in the ratio of outpatient visits to inpatient-days ranged from 39% to 62% for different types of public hospitals. By 1993/94, the ratio exceeded 1.00 (more visits than inpatient-days) in most types of hospitals, and in specialty hospitals, the ratio was more than 2.00.

This upturn in outpatient visits relative to inpatient-days in public hospitals occurred in all provinces, but to varying degrees and for different reasons. For example, in Alberta, the ratio of outpatient visits to inpatient-days increased by 130% (Table 5). To some extent, this reflects the fact that since 1990/91, Alberta has not designated beds in extended care hospitals (auxiliary hospitals) and beds in long-term care units of general hospitals as hospital beds. On the other hand, Quebec and Manitoba had relatively small increases in the ratio: 17% and 19%, respectively. For Quebec, this is attributable to a comparatively small decrease in inpatient-days during the period. By contrast, in Manitoba, the decline in inpatient-days was close to that at the national level, but there was no increase in outpatient visits.

In 1993/94, the Northwest Territories had the highest ratio of outpatient visits to inpatient-days (1.83), followed by Alberta (1.25), Newfoundland (1.20), and Nova Scotia (1.16). In British Columbia, the ratio was 0.50.

Chart 1

Ratio of outpatient visits to inpatient-days, selected types of public hospitals, Canada, 1986/87 to 1993/94



Source: *Annual Return of Health Care Facilities - Hospitals, 1986/87 to 1993/94*

† *Without long-term care units*

Table 4

Ratio of outpatient visits to inpatient-days, public hospitals, Canada, 1986/87 and 1993/94

	1986/87	1993/94	Percent change
			%
All public hospitals	**0.64**	**0.88**	**38.9**
General, without long-term care units	0.95	1.34	41.8
General, with long-term care units	0.65	0.90	38.7
Teaching	0.90	1.29	43.0
Specialty	1.35	2.03	50.7
Extended care	0.07	0.11	61.6

Source: *Annual Return of Health Care Facilities - Hospitals, 1986/87 to 1993/94*

Note: *Ratios were rounded; percent change was calculated using unrounded data.*

Table 5

Ratio of outpatient visits to inpatient-days, public hospitals, Canada, provinces and territories, 1986/87 and 1993/94

	1986/87	1993/94	Percent change
			%
Canada	**0.64**	**0.88**	**38.7**
Newfoundland	0.85	1.20	41.3
Prince Edward Island	0.57	0.88	54.8
Nova Scotia	0.83	1.16	39.6
New Brunswick	0.71	1.03	45.0
Quebec	0.64	0.75	17.1
Ontario	0.75	1.08	43.2
Manitoba	0.62	0.74	18.8
Saskatchewan	0.62	0.89	42.5
Alberta†	0.54	1.25	130.3
British Columbia	0.34	0.50	46.2
Yukon	..	1.04	...
Northwest Territories	0.89	1.83	105.0

Source: *Annual Return of Health Care Facilities - Hospitals, 1986/87 to 1993/94*

Note: *Ratios were rounded; percent change was calculated using unrounded data.*

† *Since 1990/91, Alberta no longer designates beds in extended care hospitals (auxiliary hospitals) and beds in long-term care units of general hospitals as hospital beds.*

.. *Figures not available*

... *Figures not appropriate or not applicable*

Operating expenses

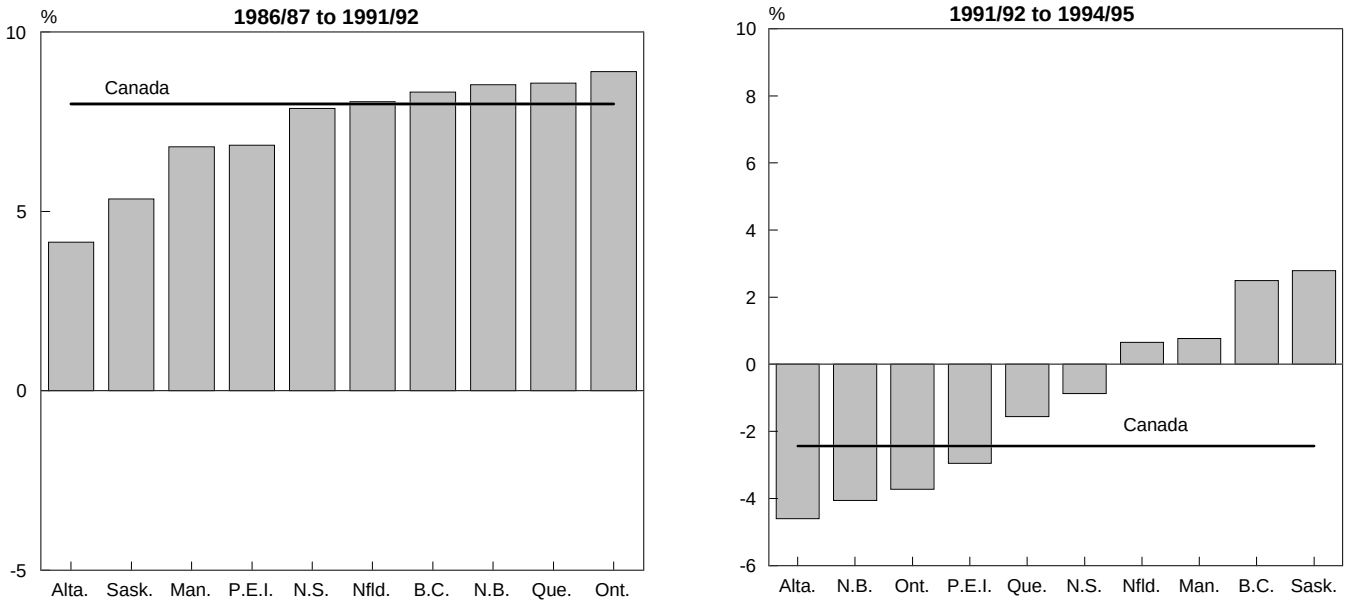
All provinces have been controlling hospital costs over the past few years. From 1991/92 to 1994/95, public hospitals posted negative annual average growth in operating expenses (-2.4%) (current dollars). This contrasts with an average annual increase of 8% between 1986/87 and 1991/92 (Chart 2).

Six provinces had a negative average annual growth rate between 1991/92 and 1994/95. The sharpest reductions in expenditures were made by Alberta, New Brunswick, and Ontario: down 4.6%, 4.1% and 3.7%, respectively.

Caution must be exercised in interpreting data on hospital spending. In some provinces, the rise in expenditures may be linked to population growth. For example, British Columbia had the highest average annual growth rate of expenses between 1986/87 and 1994/95. But part of this increase reflects population growth, which, at 22%, far surpassed that of any other province.

Chart 2

Average annual growth rate of operating expenses (in current dollars), public hospitals, Canada and provinces, 1986/87 to 1991/92 and 1991/92 to 1994/95



Source: *Annual Return of Health Care Facilities - Hospitals, 1986/87 to 1993/94; Preliminary Annual Report of Hospitals 1994/95*

By 1994/95, per capita hospital operating expenses for Canada overall stood at $759, down 9.2% from the previous year. Newfoundland had the highest provincial per capita hospital operating expenses ($927), and Prince Edward Island, the lowest ($553) (Table 6). In 1986/87, the highest per capita hospital operating expenses had been in Alberta, but by 1994/95, that province ranked eighth.

However, year-to-year variations in operating expenses may be significantly influenced by non-responding hospitals. For instance, there was a 55% increase in Saskatchewan's per capita operating expenses for 1994/95. This sharp upturn in operating expenses occurred because data for that were provided for some hospitals in 1994/95 had not been available for 1993/94.

Table 6

Per capita operating expenses (in current dollars), public hospitals, Canada, provinces and territories, selected years

	Per capita operating expenses			Percent change 1993/94 to 1994/95	Population† change 1993 to 1994
	1986/87	1993/94	1994/95		
	Current $			%	%
Canada	**623**	**836**	**759**	**-9.2**	**1.1**
Nfld.	623	938	927	-1.2	-0.6
P.E.I.	458	621	553	-11.0	1.3
N.S.	692	707	876	23.8	0.4
N.B.	618	921	778	-15.6	0.3
Que.	641	926	850	-8.2	0.6
Ont.	610	872	710	-18.5	1.3
Man.	633	862	870	1.0	0.4
Sask.	547	425	654	55.0	0.4
Alta.	724	803	676	-15.8	0.8
B.C.	564	700	739	5.6	2.6
Yukon	..	554	605	9.2	-1.5
N.W.T.	399	305	203	-33.6	1.4

Source: *Annual Return of Health Care Facilities - Hospitals, 1986/87 to 1993/94; Preliminary Annual Report of Hospitals 1994/95*

Note: *The year-to-year variation in operating expenses may be significantly influenced by non-respondent hospitals. If a large number of hospitals fail to provide data, the reported total operating expenses will be lower than the actual expenditures. Per capita operating expenses were rounded; percent change was calculated using unrounded data.*

† *Adjusted post-censal revised population estimates as of October 1; adjusted for net census undercoverage, including non-permanent residents.*

.. *Figures not available*

Implications

Public sector concern with controlling hospital expenditures is widespread. For this reason, trends in the administration of hospital care are similar in most provinces. The number of approved beds and staffed beds is declining, and hospital stays are becoming shorter. Increasingly, outpatient treatment is favoured, and patients are hospitalized less and less. In addition, operating expenses have levelled off.

The costs of health care do not necessarily disappear when they are not incurred by hospitals. "The process of shifting the costs and the care from hospitals can serve to increase long-term costs for the system."[3] Comparable amounts may have to be incurred by other sectors such as residential care facilities and home care, and by individual patients and their families. The costs of nursing care, drugs, medical supplies, specimen collection by laboratories, food, laundry, utilities and cleaning that are provided by hospitals have to be covered by these other institutions or by patients themselves, either out-of-pocket or by private insurance, once they go home after early discharge, day surgery or other outpatient care.[3]

Therefore, it is important to regard hospital statistics as only part of the total Canadian health care picture. The changes in hospitals point to the need to examine their impact on related areas of health care practices and spending.

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Cancer incidence and mortality, 1997

Steering Committee for Canadian Cancer Statistics: John R. McLaughlin, Anthony L.A. Fields, Jane F. Gentleman, Isra Levy, Barbara Whylie, Heather Whittaker, Rod Riley, and Judy Lee; and B. Ann Coombs and Leslie A. Gaudette*

Abstract

In 1997, there will be an estimated 130,800 new cases of cancer and 60,700 deaths from the disease, an increase of one third and one quarter, respectively, over 1987. These increases are due mainly to the growth and aging of the population. (All figures exclude non-melanoma skin cancer.)

In 1997, three types of cancer will account for at least half of all new cases in men and women: prostate, lung and colorectal cancer for men; breast, lung and colorectal cancer for women. Lung cancer will be the leading cause of cancer death in 1997, resulting in one-third of cancer deaths for men and almost one-quarter of cancer deaths for women.

Among women, overall trends in age-standardized rates of cancer incidence and mortality have remained relatively stable since 1985, as large increases in the rate of lung cancer have been offset by declining or stable rates for most other forms. Among men, the overall incidence rate is rising slightly as a result of the sharp increase in the incidence of prostate cancer. The mortality rate for men peaked in 1988 and has since declined, because of decreases in the rates for lung, colorectal and some other cancers.

This article presents information on trends since the mid-1980s in cancer incidence and mortality, adapted from Canadian Cancer Statistics 1997.

Key words: *neoplasms, incidence, mortality, registries*

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Cancer is the leading cause of death for Canadian women, and after heart disease (excluding stroke), the second leading cause of death for Canadian men.

Among women, the age-standardized incidence rate of cancer has been relatively stable since 1987, whereas among men, it has been rising slightly, largely because of an increase in prostate cancer rates. During that period, the number of new cases and the number of deaths from cancer have increased substantially for both sexes, mainly because of the growing and aging Canadian population. Cancer tends to affect older Canadians, with 72% of new cases and 81% of deaths occurring among those aged 60 and over.

The most common cancer sites continue to be breast cancer for women and prostate cancer for men. However, among women, the incidence rate of lung cancer has been rising rapidly and is now estimated to be a third higher than a decade ago. Among men, lung cancer rates levelled off in the mid-1980s and have since consistently declined.

Lung cancer will be the leading cause of cancer death among women in 1997, followed by breast cancer. But while lung cancer mortality rates among women are rising, breast cancer mortality rates have declined slightly over the past decade. For men, although the incidence of prostate cancer continues to rise, at least partly reflecting the use of earlier detection techniques, lung cancer will remain the leading cause of cancer death in 1997, far surpassing deaths from prostate cancer, which ranks second.

Methods

Data source

This article has been adapted from *Canadian Cancer Statistics 1997*.[1] *Canadian Cancer Statistics* is published annually by the National Cancer Institute of Canada. Limited copies of the 1997 edition are available from the Canadian Cancer Society (Suite 200, 10 Alcorn Avenue, Toronto, Ontario M4V 3B1; telephone 416-961-7223), the Health Statistics Division of Statistics Canada (613-951-1746), local offices of the Canadian Cancer Society, and Statistics Canada's Regional Reference Centres. The publication is also available on the following websites: National Cancer Institute of Canada (www.cancer.ca/stats), Statistics Canada (www.statcan.ca, then click on the following series of choices: English; Products and Services; and Downloadable Publications; Index of Downloadable Publications), and Health Canada (www.hwc.ca/hpb/lcdc/bc/stats.html).

Information on cancer cases and deaths comes from the provincial and territorial cancer registries and offices of vital statistics, respectively, which send their data to Statistics Canada for compilation at the national level. The process of collecting complete information about cancer cases in each province and then compiling it results in a considerable delay before reliable national data for a particular year are available. Therefore, Statistics Canada provides estimates of current incidence and mortality, using up to 10 years of the most recent actual data.

Analytical techniques

This article contains actual rates and frequencies up to the most recent year for which complete data are available (1992 for incidence, 1994 for mortality) and estimated values for subsequent years up to 1997. It is important to emphasize that the figures provided for 1997 are estimates rather than actual data.

Estimates are developed as follows: time trends in the known rates are examined; these trends are projected to the present time to obtain current rate estimates; and these rate estimates for the current year are applied to current population estimates.

The average annual percent change (AAPC) values were calculated for each cancer site by fitting a model that assumed a constant rate of change over time in the age-standardized incidence rates (ASIRs) or age-standardized mortality rates (ASMRs). That is, a linear model was applied to the ASIRs and ASMRs after logarithmic transformation. The AAPC is equal to $100(e^{b} - 1)$, where b is the slope of that model. Data from 1985 to 1992 were used for incidence and mortality. These series were long enough to create estimates of AAPCs that were both reliable and current.

Probabilities of developing/dying from cancer were calculated based on the age- and sex-specific cancer incidence and mortality rates for Canada in 1992, and on life tables based on 1991-1993 all-cause mortality rates. The methodology used was that of Zdeb[2] and Seidman et al.[3] The life table procedures assumed that the rate of cancer incidence for various age groups in a given period will prevail throughout the future lifetimes of persons as they age. Since these may not be the rates that will prevail at the time a given age is attained, the probabilities should be regarded only as approximations.

The probability of dying from cancer represents the proportion of persons dying from cancer in a cohort subjected to the mortality conditions prevailing in the population at large in 1994. The indicator was calculated by determining the proportion of deaths attributed to specific types of cancer for each sex and age group, multiplying this proportion by the corresponding number of deaths in the life table, summing the life table deaths over all sex and age groups, and dividing by the number of survivors at birth to obtain the probability of dying from each cause.

Potential years of life lost (PYLL) was calculated by obtaining deaths for ages <1, 1-4, 5-9, ..., 90+ for Canada in 1994, and life expectancy at the midpoints of the age groups. The PYLL is the total number of years of life lost obtained by summing over all age groups the number of deaths multiplied by the life expectancy of survivors.[4]

All results in this article exclude non-melanoma skin cancer, an estimated 61,000 cases of which will occur in 1997.

Definitions

Incidence: The number of new cases of a given type of cancer diagnosed during the year.

Mortality: The number of deaths during the year that are attributed to a particular type of cancer, based on the underlying cause of death.

Crude rate: The number of new cases of cancer or cancer deaths during the year, expressed as a rate per 100,000 persons in the population.

Age-specific rate: The number of new cases of cancer or cancer deaths during the year, expressed as a rate per 100,000 persons in a given age group.

Age-standardized rate: The number of new cases or cancer deaths per 100,000 that would have occurred in the standard population (1991 Canadian population) if the actual age-specific rates observed in a given population had prevailed in the standard population.

Deaths to new cases ratio: The number of deaths divided by the number of new cases during the same year.

This article presents information on trends since the mid-1980s in cancer incidence and mortality (see *Methods*). It has been adapted from *Canadian Cancer Statistics 1997*, an annual publication developed by a steering committee reporting to the Advisory Committee on Cancer Control of the National Cancer Institute of Cancer.[1] The committee includes representatives of the National Cancer Institute of Canada, the Canadian Cancer Society, Statistics Canada, Health Canada, the Canadian Council of Cancer Registries, and university-based cancer researchers.

Planning for the future

In 1997, there will be an estimated 130,800 new cases of cancer and 60,700 deaths from the disease, a rise of one third and one quarter, respectively, over 1987. During this period, incidence will have increased 39% for men and 32% for women, and the number of deaths, 22% and 29%, respectively. Although in 1997 men outnumber women in the estimated number of both deaths and new cases, the deaths to new cases ratio is the same for each sex (0.46) (Table 1).

Cancer incidence and mortality are increasing mainly because of the growth and aging of the population. The numbers of new cases and deaths are an important measure of the cancer burden on the Canadian population and health care system, and can be used to plan patient services and health care facilities needed to meet the growing demand.

Table 1

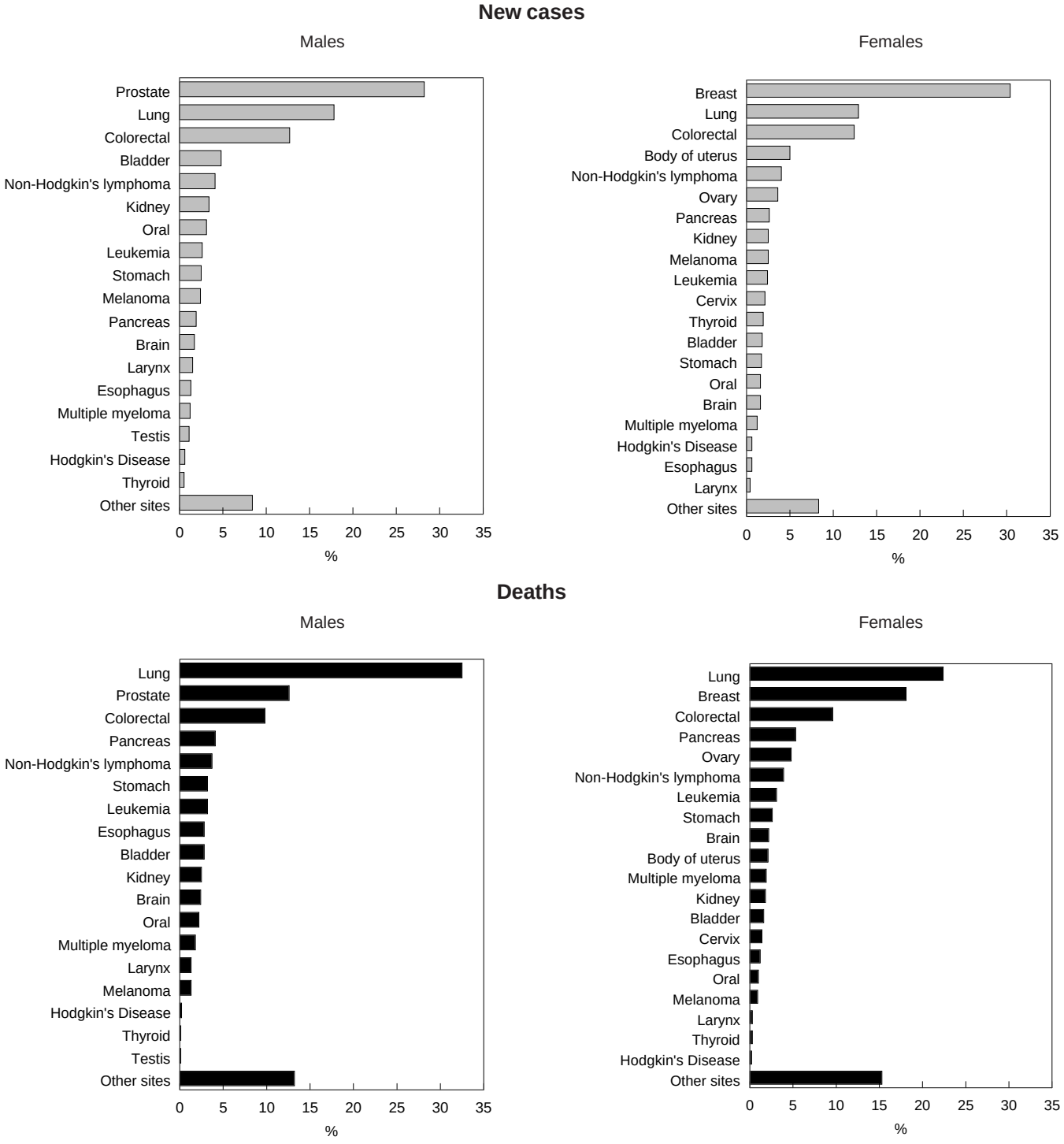
Estimated new cases and deaths, selected cancer sites, by sex, Canada, 1997

	New Cases			Deaths			Deaths/Cases ratio		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
All cancers	**130,800**	**70,200**	**60,600**	**60,700**	**32,600**	**28,100**	**0.46**	**0.46**	**0.46**
Lung	20,300	12,500	7,800	16,900	10,600	6,300	0.83	0.85	0.81
Prostate	19,800	19,800	...	4,100	4,100	...	0.21	0.21	...
Female breast	18,400	...	18,400	5,100	...	5,100	0.28	...	0.28
Colorectal	16,400	8,900	7,500	5,900	3,200	2,700	0.36	0.36	0.36
Non-Hodgkin's lymphoma	5,300	2,900	2,400	2,300	1,200	1,100	0.43	0.41	0.46
Bladder	4,500	3,400	1,100	1,350	910	440	0.30	0.27	0.40
Kidney	3,900	2,400	1,500	1,310	810	500	0.34	0.34	0.33
Leukemia	3,300	1,850	1,450	1,910	1,050	860	0.58	0.57	0.59
Melanoma	3,200	1,700	1,500	660	410	250	0.21	0.24	0.17
Oral	3,170	2,200	970	1,000	710	290	0.32	0.32	0.30
Body of uterus	3,000	...	3,000	580	...	580	0.19	...	0.19
Pancreas	2,900	1,350	1,550	2,850	1,350	1,500	0.98	1.00	0.97
Stomach	2,800	1,750	1,050	1,770	1,050	720	0.63	0.60	0.69
Ovary	2,200	...	2,200	1,350	...	1,350	0.61	...	0.61
Brain	2,170	1,200	970	1,380	770	610	0.64	0.64	0.63
Multiple myeloma	1,550	830	720	1,100	580	520	0.71	0.70	0.72
Thyroid	1,520	370	1,150	135	45	90	0.09	0.12	0.08
Cervix	1,300	...	1,300	390	...	390	0.30	...	0.30
Larynx	1,290	1,050	240	530	440	90	0.41	0.42	0.38
Esophagus	1,250	880	370	1,260	910	350	1.01†	1.03†	0.95
Hodgkin's Disease	820	430	390	120	70	50	0.15	0.16	0.13
Testis	760	760	...	30	30	...	0.04	0.04	...
Other sites	10,970	5,930	5,040	8,675	4,365	4,310	0.79	0.73	0.86

Source: *National Cancer Institute of Canada: Canadian Cancer Statistics 1997*
Note: *Incidence figures exclude the estimated 61,000 new cases of non-melanoma skin cancer (ICD-9 173).*
† *The high ratio (in excess of 1.0) may result from incomplete registration of this cancer before death, or may be due to incorrect reporting of this cancer on death certificates.*
··· *Figures not appropriate or not applicable*

Chart 1

Percentage distribution of estimated new cases and deaths, selected cancer sites, by sex, Canada, 1997



Source: *National Cancer Institute of Canada: Canadian Cancer Statistics 1997*
Note: *Incidence figures exclude the estimated 61,000 new cases of non-melanoma skin cancer (ICD-9 173).*

Leading types of cancer and their prognoses

In 1997, three types of cancer will account for at least half of all new cases in men and women: prostate, lung and colorectal cancer for men; breast, lung and colorectal cancer for women. Prostate cancer is, by far, the most common among men, as is breast cancer among women (Chart 1).

Lung cancer will be the leading cause of cancer death in 1997, resulting in an estimated 10,600 deaths for men and 6,300 for women. Prostate cancer, with an estimated 4,100 deaths, and breast cancer, with 5,100 deaths, are the next leading causes of cancer death among men and women, respectively. For each sex, colorectal cancer will be the third leading cause of cancer death (3,200 deaths among men and 2,700 deaths among women).

Cancer sites can be classified into three groups on the basis of the deaths to new cases ratio: those with a very good prognosis (ratio of 0.3 or less—breast, prostate, bladder, melanoma, body of the uterus, cervix, Hodgkin's disease, testis, and male bladder); those with a fairly good prognosis (ratio greater than 0.3 but less than or equal to 0.5—colorectal, non-Hodgkin's lymphoma, kidney, oral, larynx, and female bladder); and those with a poor prognosis (ratio greater than 0.5—lung, stomach, adult leukemia, pancreas, ovary, brain, and multiple myeloma).

Prostate cancer in men and lung cancer in women: unwelcome trends

Among women, overall trends in age-standardized rates of cancer incidence and mortality have remained relatively stable since 1985, as large increases in the rate of lung cancer have been offset by declining or stable rates for most other forms. Among men, however, the overall incidence rate is rising slightly as a result of the sharp increase in the incidence of prostate cancer. The mortality rate for men peaked in 1988 and has since declined, because of decreasing rates for lung, colorectal and a number of other cancers (Charts 2 and 3).

While, age-standardized incidence rates and mortality rates for many cancer sites have stabilized or fallen during the past decade, there are some notable exceptions, including lung cancer incidence and mortality for women, breast cancer incidence for women, and prostate cancer incidence for men.

Among women, from 1985 to 1992, the age-standardized incidence rate of lung cancer increased by an average of 3.4% per year, and from 1985 to 1994, the age-standardized mortality rate rose at an annual average of 3.5%. By contrast, among men, lung cancer rates levelled off in the mid-1980s and have since consistently declined, reflecting the drop in men's tobacco consumption since the mid-1960s. Women's smoking rates have fallen only slightly in the past three decades. As a result, while men's lung cancer incidence and mortality rates are still twice those of women, the gap has narrowed.

The age-standardized incidence rate of breast cancer rose steadily over the past decade, possibly reflecting increased detection through mammographic examinations. Breast cancer mortality rates, however, have declined slightly since the mid-1980s, and particularly since 1990. Similar reductions in mortality rates are occurring in the United States, the United Kingdom, and Australia.[5] It is not clear whether the changes are a result of early detection, improved treatment, or changes in risk or protective factors.

Since 1985, the age-standardized incidence rate of prostate cancer has increased at an annual average of 5.3%. After years of steady increases, the rate has risen particularly sharply since 1989. The increases before 1990 were at least partly due to greater detection of cancers through the use of trans-urethal resection of the prostate for suspected benign prostatic hypertrophy.[6] The sharp rise in recent years is mainly the result of increased PSA (prostate specific antigen) testing.[7] No risk factors or protective factors have yet been implicated in the incidence changes. Mortality rates for prostate cancer have risen, though relatively slowly, since 1985; the increases appear to have stabilized in the early 1990s.

Two other types of cancer whose incidence rates increased between 1985 and 1992 are cancer of the kidney in men (average annual percent change of 2.1%), and non-Hodgkin's lymphoma in both sexes (average annual percent change of 1.7% among men and 1.5% among women). (The increase in the latter is at least partly related to HIV infection.)

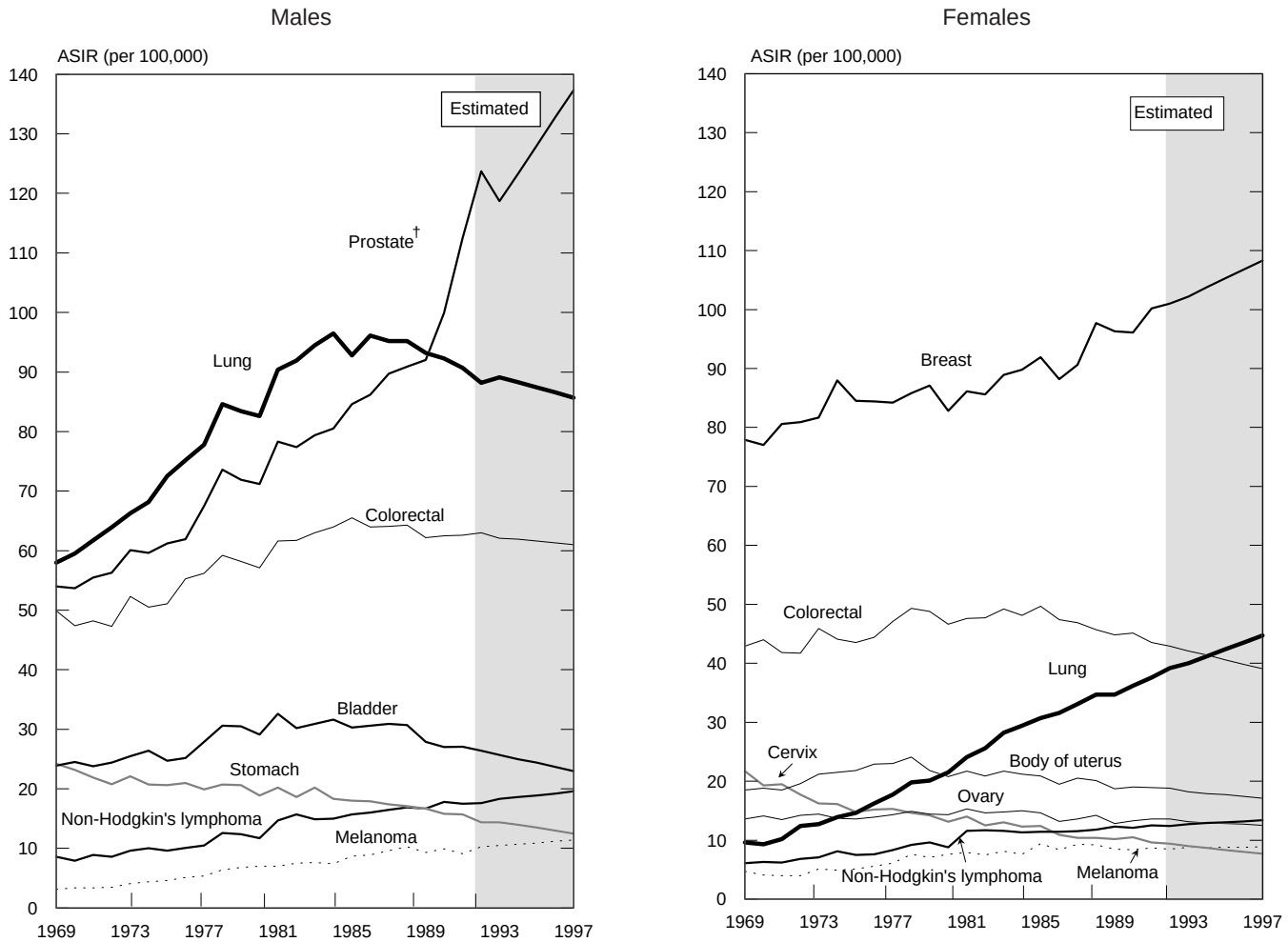
For most cancers, incidence rates and death rates have declined

Rates for many other cancer sites have generally declined. For example, incidence and mortality rates for colorectal cancer continue to decrease, particularly among women. Research in the United States suggests that more widespread use of early detection methods may have made more effective treatment possible at earlier stages, notably among elderly patients. Lifestyle changes, such as a healthier diet, may also have contributed to the decline.[8,9]

Between 1985 and 1992, bladder cancer incidence rates decreased, on average, by 2.4% per year for men and 2.7% per year for women. Between 1985 and 1994, bladder cancer mortality rates for men fell by 1.4% per year, while rates among women were stable. The reason for the downturn in incidence rates is partly a change in reporting procedures for at least one

Chart 2

Age-standardized incidence rates (ASIR), selected cancer sites, by sex, Canada, 1969-1997



Source: *National Cancer Institute of Canada: Canadian Cancer Statistics 1997*
Note: *Rates standardized to age distribution of 1991 Canadian population.*
† *Current rates for prostate cancer are possibly underestimated because they do not fully account for the impact of PSA testing in the 1990s.*

registry,[10] but the declining mortality rate may suggest improved survival among men, or possibly, a true decline in incidence.

Mortality rates have dropped dramatically for testicular cancer and Hodgkin's disease as a result of improved treatment methods. Continuing large reductions in stomach cancer incidence and mortality rates may be at least partly due to improved diets. Lower rates of invasive cervical cancer reflect, to some extent, the impact of early detection through Pap smear screening programs.

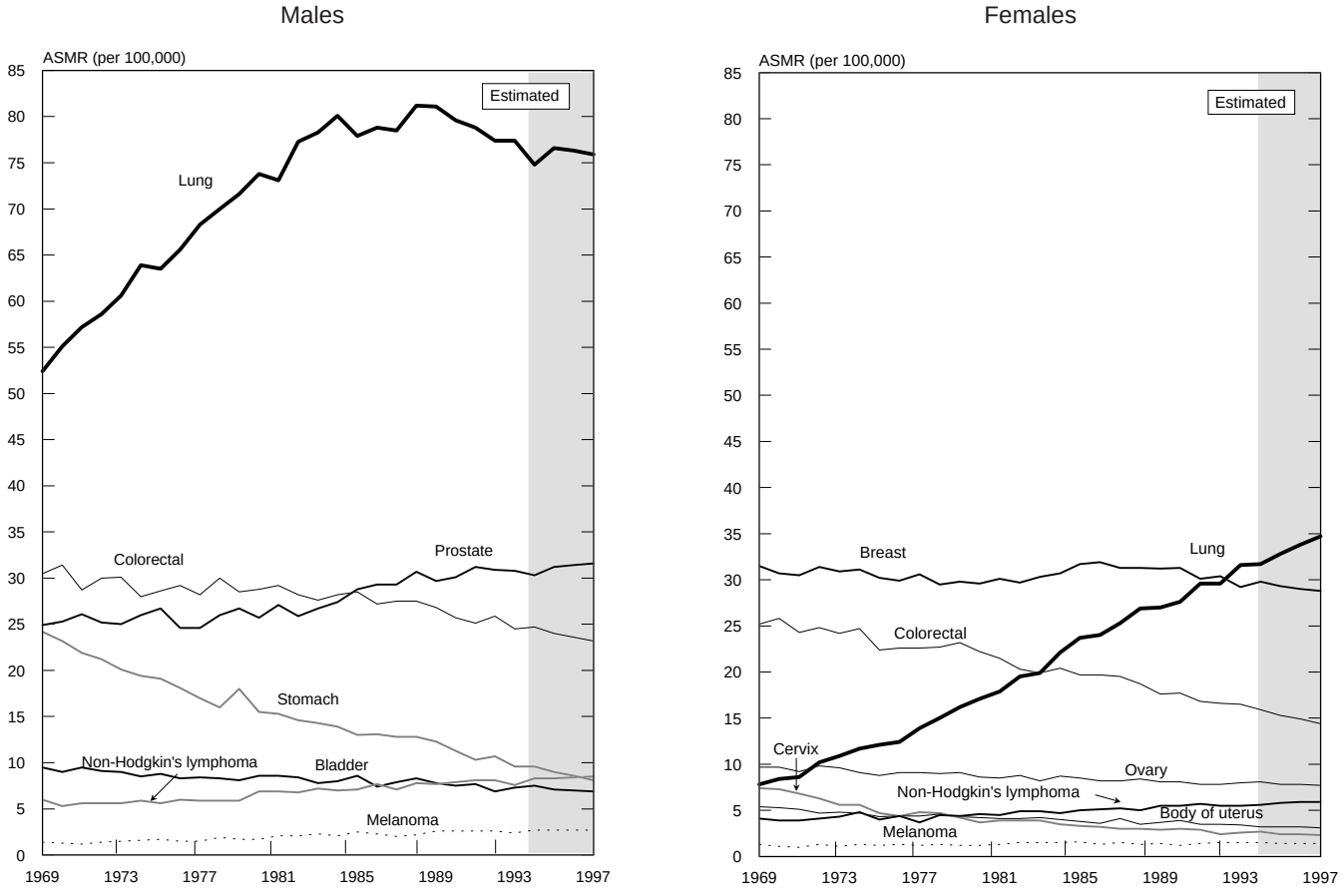
Cancer affects older people most

Cancer tends to be a disease of the elderly (Table 2). For 1997, a total of 59,600 new cases (46%) and 34,500 cancer deaths (57%) are estimated to occur in Canadians aged 70 and over, and another 34,300 new cases (26%) and 14,700 deaths (24%) in those aged 60-69. By contrast, only 1% of new cases and 0.3% of deaths will occur among people younger than age 20.

Close to 50% or more of all newly diagnosed cancers of the lung, prostate, colon and rectum occur among people aged 70 and over (Table 3). Prostate cancer, in particular, is linked with age: 62% of new cases and 83% of deaths occur in men aged 70 and over.

Chart 3

Age-standardized mortality rates (ASMR), selected cancer sites, by sex, Canada, 1969-1997



Source: *National Cancer Institute of Canada: Canadian Cancer Statistics 1997*
Note: *Rates standardized to age distribution of 1991 Canadian population.*

Table 2

Estimated new cases of cancer and cancer deaths, by age group and sex, Canada, 1997

	New cases			Deaths		
	Total	Male	Female	Total	Male	Female
All ages	**130,800**	**70,200**	**60,600**	**60,700**	**32,600**	**28,100**
0-19	1,390	730	660	210	120	90
20-29	1,690	820	870	250	130	120
30-39	4,750	1,850	2,900	960	380	580
40-49	10,700	3,800	6,900	3,150	1,350	1,800
50-59	18,500	9,000	9,500	6,900	3,600	3,300
60-69	34,300	20,300	14,000	14,700	8,600	6,100
70-79	38,700	22,800	15,900	19,400	10,900	8,500
80+	20,900	10,900	10,000	15,100	7,500	7,600

Source: *National Cancer Institute of Canada: Canadian Cancer Statistics 1997*

Note: *Incidence figures exclude the estimated 61,000 new cases of non-melanoma skin cancer (ICD-9 173). Totals may not add due to rounding.*

Table 3

Estimated new cases and deaths, selected cancer sites, by age group and sex, Canada, 1997

	Lung			Colorectal			Prostate	Breast
	Total	Male	Female	Total	Male	Female	Male	Female
New cases								
All ages	**20,300**	**12,500**	**7,800**	**16,400**	**8,900**	**7,500**	**19,800**	**18,400**
0-19	10	5	5	5	--	5	..	..
20-29	25	15	10	45	20	25	..	70
30-39	180	70	110	210	100	110	5	900
40-49	1,050	480	570	900	500	400	90	3,200
50-59	3,100	1,800	1,300	2,300	1,400	900	1,300	3,600
60-69	6,600	4,200	2,400	4,400	2,700	1,700	6,000	4,400
70-79	6,700	4,200	2,500	5,200	2,800	2,400	8,400	4,300
80+	2,630	1,650	980	3,400	1,450	2,000	3,900	2,100
Deaths								
All ages	**16,900**	**10,600**	**6,300**	**5,900**	**3,200**	**2,700**	**4,100**	**5,100**
0-19	10	5	5	..	..	..	..	..
20-29	5	5	..	5	..	5	..	10
30-39	115	40	75	55	30	20	..	180
40-49	720	370	350	230	120	100	10	570
50-59	2,100	1,200	900	630	400	240	95	810
60-69	5,200	3,400	1,800	1,340	840	540	650	1,050
70-79	5,900	3,800	2,100	1,840	1,050	860	1,550	1,300
80+	2,850	1,800	1,050	1,790	740	1,100	1,850	1,200

Source: *National Cancer Institute of Canada: Canadian Cancer Statistics 1997*

Notes: *Incidence figures exclude the estimated 61,000 new cases of non-melanoma skin cancer (ICD-9 173). Totals may not add due to rounding.*

Incidence rates for breast cancer are highest in older women, peaking at ages 70-79. However, because breast cancer also occurs frequently in younger women, and because there is a large number of such women in the population, women under age 60 account for a relatively large proportion of cases.

Actual and estimated age-specific incidence and mortality rates from 1969 to 1997 indicate that at ages 20-59, incidence rates for all cancers combined are somewhat higher among women than men, largely because of the high incidence of cancers of the breast and genital organs among women of reproductive age. At age 60 and over, the incidence of most types of cancer is higher among men than women.

Since 1984, increases in cancer incidence have occurred primarily among people aged 60-79, whereas mortality rates have remained relatively stable in this age group. For those aged 80 and over, both incidence and mortality rates have been stable since 1984. Among Canadians in all age groups under 60, mortality rates have declined steadily since 1969.

What are the chances?

Many people who develop cancer will survive it. For males, 41 in 100 will develop cancer at some point in their lives (excluding non-melanoma skin cancer) (Table 4). However, only 27 of the 41 males affected will die from cancer. Females' lifetime probability of developing cancer is 36 out of 100, and 23 of them will die from it.

The relative extent to which the lifetime probability of developing a cancer exceeds the lifetime probability of dying from it reflects the prognosis for that cancer (Chart 4). For both men and women, lung cancer has a poor prognosis: the probabilities of developing and dying from the disease are close. By contrast, for prostate cancer and breast cancer, and for colorectal cancer in both sexes, the probability of developing the cancer far exceeds the probability of dying from it, indicating a better prognosis.

Among men, the chance of developing prostate cancer by age 60 is small (0.7%), but by age 70, it has increased to about 4%, and by age 90, to 12%. Over a lifetime, 1 in 8 men will develop prostate cancer, but only 1 in 27 will die from it. By contrast, 1 in 11 men will develop lung cancer, and 1 in 12 will die from the disease.

During their lifetime, approximately 1 in 9 women is expected to develop breast cancer, but just 1 in 25 will die from it. Fewer women—1 in 21—will develop lung cancer, but almost as many—1 in 24—will die from it.

Leading cause of years of life lost

Cancer is the leading cause of potential years of life lost (PYLL), a measure of premature death, for both males and females. In 1994, 891,000 potential years of life were lost to cancer, representing 29% of the PYLL resulting from all causes of death (Table 5). Heart disease ranked second, causing 636,000 PYLL. Although more males than females die of cancer each year, the PYLL figure for females slightly exceeds that for males. This is because females generally live longer than males, and because the cancer death rate at ages 30-49 is higher among women than among men.

Table 4

Probability of developing cancer by specific age and lifetime probability of developing and dying from cancer, by sex, Canada

	Probability (as a %) of developing cancer by age:							Lifetime probability of: Developing†		Dying†	
	30	40	50	60	70	80	90	%	One in:	%	One in:
Male											
All cancers	**0.7**	**1.3**	**2.9**	**8.2**	**20.1**	**34.0**	**40.2**	**41.2**	**2.4**	**27.0**	**3.7**
Prostate	--	--	--	0.7	4.2	9.5	12.0	12.4	8.1	3.8	26.5
Lung	--	0.1	0.3	1.5	4.3	7.6	9.0	9.1	10.9	8.3	12.0
Colorectal	--	0.1	0.3	1.1	2.8	5.0	6.2	6.4	15.7	2.8	35.2
Bladder	--	--	0.1	0.4	1.1	2.1	2.6	2.7	36.5	0.9	109.9
Lymphoma	0.2	0.3	0.5	0.9	1.4	2.1	2.5	2.5	39.7	1.5	69.0
Oral	--	0.1	0.2	0.5	1.0	1.4	1.6	1.6	61.7	0.6	175.4
Stomach	--	--	0.1	0.2	0.6	1.1	1.5	1.5	66.7	1.1	90.1
Kidney	--	--	0.1	0.4	0.8	1.3	1.5	1.5	67.1	0.6	163.9
Leukemia	0.1	0.2	0.2	0.3	0.6	1.0	1.3	1.3	75.8	0.9	109.9
Pancreas	--	--	0.1	0.2	0.5	0.9	1.1	1.1‡	90.1	1.2‡	81.3
Melanoma	--	0.1	0.2	0.4	0.6	0.8	0.9	0.9	107.5	0.3	370.4
Female											
All cancers	**0.7**	**1.8**	**4.8**	**10.4**	**18.9**	**28.5**	**34.2**	**35.5**	**2.8**	**22.5**	**4.5**
Breast	--	0.4	1.7	3.8	6.5	9.3	10.7	11.0	9.1	4.1	24.6
Colorectal	--	0.1	0.3	0.8	2.1	3.9	5.4	5.7	17.5	2.7	37.3
Lung	--	0.1	0.3	1.1	2.5	4.0	4.6	4.8	21.0	4.2	23.8
Lymphoma	0.1	0.2	0.3	0.6	1.1	1.7	2.2	2.3	44.4	1.3	78.1
Body of uterus	--	--	0.2	0.6	1.3	1.9	2.2	2.2	45.0	0.5	204.1
Ovary	--	0.1	0.3	0.5	0.9	1.3	1.5	1.5	65.4	1.1	92.6
Pancreas	--	--	--	0.1	0.4	0.8	1.1	1.1‡	88.5	1.3‡	76.3
Leukemia	0.1	0.1	0.2	0.3	0.4	0.7	1.0	1.0	97.1	0.7	140.8
Kidney	--	--	0.1	0.3	0.5	0.7	0.9	0.9	106.4	0.4	250.0
Stomach	--	--	0.1	0.1	0.3	0.6	0.8	0.9	109.9	0.8	133.3
Bladder	--	--	--	0.1	0.3	0.6	0.8	0.9	113.6	0.4	227.3
Cervix	0.1	0.2	0.3	0.5	0.6	0.8	0.8	0.8	120.5	0.3	322.6
Melanoma	0.1	0.1	0.3	0.4	0.6	0.7	0.8	0.8	122.0	0.2	555.6

Source: *National Cancer Institute of Canada: Canadian Cancer Statistics 1997*

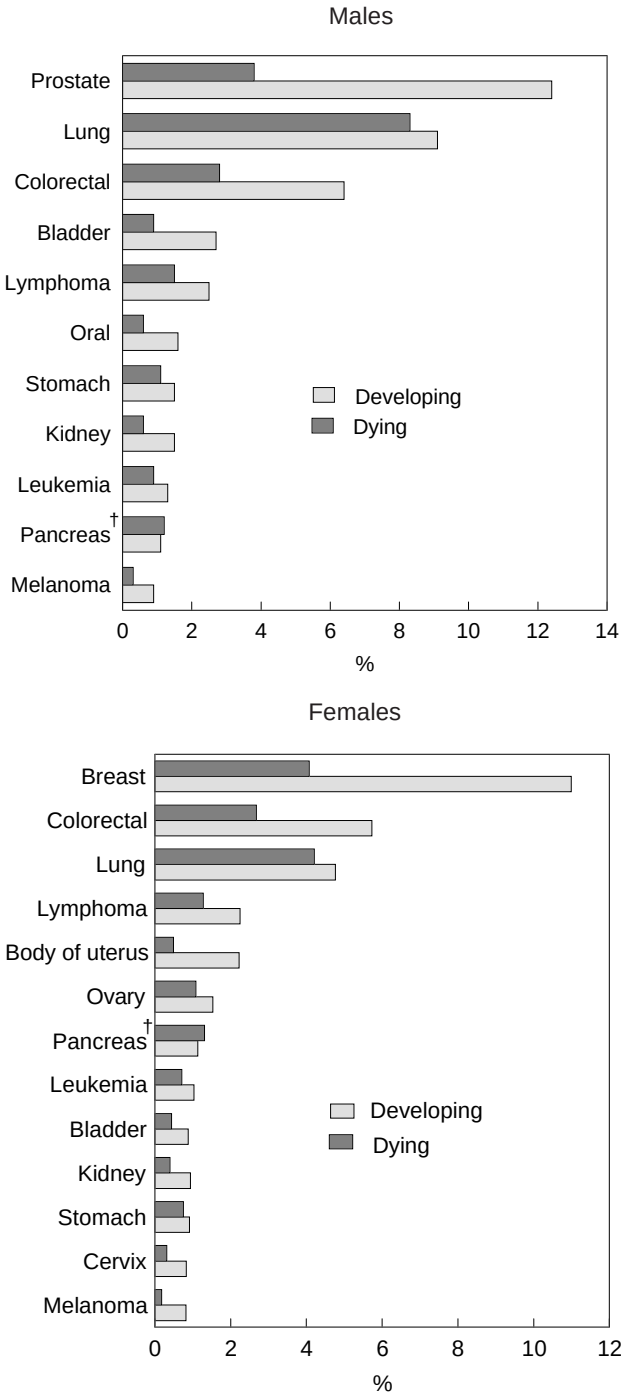
† *The probability of developing cancer is based on 1991-1993 data and calculated by selected age groups; the probability of dying from cancer is based on 1994 data. The probability for all ages is calculated from birth to the end of life. Non-melanoma skin cancer is excluded from the calculations.*

‡ *These probabilities are approximations and are based on cross-sectional data, which may explain the greater apparent likelihood of dying from cancer of the pancreas than of developing it.*

-- *Amount too small to be expressed*

Chart 4

Lifetime probability of developing (1991-1993) and dying (1994) from cancer, selected sites, by sex, Canada



Source: *National Cancer Institute of Canada: Canadian Cancer Statistics 1997*

Note: *Life probabilities are calculated from birth to the end of life, based on cancer incidence rates for 1991-1993.*

† *These probabilities are approximations and are based on cross-sectional data, which may explain the greater apparent likelihood of dying from cancer of the pancreas than of developing it.*

Lung, colorectal and prostate cancer, the three leading cancers in men, accounted for 49% of male PYLL due to cancer. Breast, lung and colorectal cancer in women accounted for 51% of female PYLL due to cancer. These rankings have been consistent in recent years. For women, however, the PYLL due to lung cancer, which almost equals that of breast cancer, reflects the increasing rates of lung cancer mortality in women aged 50-79.

The more common the cancer and the more quickly it leads to death, the higher the premature mortality that results. The potential years of life lost because of breast cancer, at 99,000 years, far exceed those lost because of prostate cancer, at 33,000 years, an effect of the relatively young age at which some women die from breast cancer. By contrast, for Hodgkin's Disease, a cancer that is less common and relatively curable, the PYLL is 3,000.

Table 5

Potential years of life lost because of cancer, Canada, 1994

	Potential years of life lost (PYLL)					
	Total		Males		Females	
	'000	%	'000	%	'000	%
All cancers	**891**	**100.0**	**431**	**100.0**	**460**	**100.0**
Lung	234	26.2	138	32.0	96	20.8
Breast	99	11.2	...	...	99	21.6
Colorectal	83	9.3	42	9.8	41	8.9
Pancreas	41	4.6	19	4.5	22	4.7
Non-Hodgkin's lymphoma	35	4.0	19	4.3	17	3.6
Leukemia	33	3.8	18	4.2	15	3.3
Prostate	33	3.8	33	7.8	...	...
Brain	32	3.6	17	4.0	15	3.3
Stomach	28	3.2	16	3.8	12	2.6
Ovary	26	2.9	...	...	26	5.6
Kidney	18	2.1	11	2.6	7	1.6
Oral	16	1.8	12	2.7	5	1.0
Bladder	15	1.7	10	2.3	5	1.1
Multiple myeloma	15	1.6	7	1.7	7	1.5
Melanoma	13	1.5	7	1.7	6	1.2
Cervix	11	1.3	...	...	11	2.4
Body of uterus	9	1.0	...	...	9	1.9
Larynx	8	0.9	6	1.4	2	0.3
Hodgkin's Disease	3	0.4	2	0.5	1	0.2
Testis	2	0.2	2	0.4	...	...

Source: *National Cancer Institute of Canada: Canadian Cancer Statistics 1997*

Note: *Figures are ranked in order of total PYLL for both sexes combined and are calculated based on life expectancy. Count and percentage totals may not add because of rounding and the exclusion of other sites. All figures exclude non-melanoma skin cancer (ICD-9 173).*

··· *Figures not appropriate or not applicable*

Acknowledgments

Many people helped to produce *Canadian Cancer Statistics 1997* and this article. In particular, we thank the staff at the provincial and territorial cancer registries; Michel Beaupré of the Fichier des tumeurs du Québec; Marek Wysocki and Carole Morin of Statistics Canada; Chris Waters, Robert Semenciw, and Don Wigle of Health Canada; and Mary McBride of the British Columbia Cancer Agency. The text for this article was adapted from *Canadian Cancer Statistics 1997* by Marion Pogson of StepSoft Inc.

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Preliminary postcensal population estimates, by sex and age group, Canada, provinces and territories, July 1, 1996

	Canada	Nfld	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta	B.C.	Yukon	N.W.T.
						'000							
Both sexes	**29,963.6**	**570.7**	**137.3**	**942.8**	**762.5**	**7,389.1**	**11,252.4**	**1,143.5**	**1,022.5**	**2,789.5**	**3,855.1**	**31.5**	**66.6**
<1	377.9	6.1	1.7	10.7	8.7	86.1	145.6	16.2	13.8	38.8	48.2	0.5	1.5
1-4	1,582.9	25.8	7.3	45.7	36.7	374.5	602.1	66.3	58.2	162.1	196.2	2.1	5.8
5-9	2,015.8	36.7	10.0	63.1	49.3	462.3	761.9	83.1	79.7	211.6	247.6	2.4	8.1
10-14	2,019.6	43.0	10.1	63.7	52.2	465.9	746.8	81.1	82.0	213.1	253.2	2.5	6.1
15-19	2,002.9	44.7	10.1	63.5	53.3	502.6	721.7	78.5	76.5	196.6	247.8	2.2	5.3
20-24	2,036.3	46.6	9.8	66.5	56.9	478.8	757.6	81.0	70.0	197.1	264.4	2.2	5.5
25-29	2,223.5	45.3	9.8	68.7	57.0	519.7	858.2	81.5	64.3	216.0	294.3	2.4	6.3
30-34	2,631.2	47.1	11.0	80.6	64.6	643.2	1,023.4	93.8	77.7	249.1	330.7	3.3	6.7
35-39	2,666.4	48.0	11.0	82.0	64.6	675.4	996.7	94.4	82.9	263.6	338.8	3.2	5.7
40-44	2,387.5	46.9	9.9	73.8	61.1	610.0	874.6	85.2	75.6	230.9	311.8	3.0	4.6
45-49	2,159.5	42.6	9.8	69.3	56.9	553.5	804.4	75.9	62.9	190.4	287.6	2.7	3.7
50-54	1,672.2	32.4	7.4	53.6	42.2	455.1	616.5	58.8	48.0	139.2	214.9	1.8	2.3
55-59	1,332.6	24.4	6.0	42.7	33.3	349.9	503.3	47.7	41.9	109.5	171.2	0.9	1.7
60-64	1,213.1	20.9	5.6	38.5	30.1	315.4	462.4	44.6	40.6	97.4	155.6	0.8	1.3
65-69	1,129.3	18.6	5.0	34.5	27.7	290.8	433.9	42.7	39.9	87.1	147.4	0.7	1.0
70-74	979.9	15.9	4.5	30.7	25.6	243.5	378.3	40.3	36.9	72.0	131.3	0.4	0.5
75-79	704.3	12.4	3.7	25.2	19.2	168.9	261.6	31.4	30.8	52.8	98.0	0.2	0.3
80-84	467.6	8.0	2.6	16.9	13.1	109.1	170.9	22.7	22.5	34.8	66.8	0.1	0.2
85-89	240.6	3.8	1.4	8.7	6.9	56.7	87.9	11.8	11.9	17.9	33.4	0.0	0.1
90+	120.5	1.6	0.8	4.5	3.2	27.6	44.6	6.4	6.5	9.3	15.9	0.0	0.1
Males	**14,845.0**	**285.2**	**67.7**	**464.3**	**377.3**	**3,642.6**	**5,560.5**	**567.4**	**507.8**	**1,404.6**	**1,916.8**	**16.1**	**34.6**
<1	194.0	3.1	0.9	5.5	4.4	44.2	74.7	8.4	7.1	20.0	24.8	0.2	0.8
1-4	811.9	13.2	3.8	23.7	18.6	191.9	308.5	33.9	29.9	83.5	100.9	1.0	3.0
5-9	1,031.3	18.8	5.1	32.4	25.3	236.5	390.0	42.8	40.6	108.3	126.0	1.3	4.1
10-14	1,031.9	21.8	5.2	32.4	26.6	237.7	382.0	41.8	41.7	109.1	129.3	1.2	3.2
15-19	1,026.3	22.5	5.0	32.1	27.3	257.3	370.8	39.7	39.7	100.7	127.4	1.1	2.6
20-24	1,033.5	23.8	5.0	33.9	28.9	243.8	383.7	41.7	35.6	100.8	132.5	1.1	2.7
25-29	1,121.5	23.1	4.9	35.1	28.9	265.0	429.0	41.5	32.0	109.5	148.0	1.2	3.2
30-34	1,334.0	23.5	5.3	40.6	32.6	328.4	518.2	47.9	38.5	127.1	166.7	1.7	3.5
35-39	1,343.9	24.0	5.4	40.5	32.3	340.8	502.1	48.2	42.0	134.8	169.2	1.6	2.9
40-44	1,191.8	23.5	5.0	36.1	30.3	305.4	432.8	42.7	38.8	117.8	155.4	1.5	2.4
45-49	1,084.8	21.5	5.0	34.8	28.8	277.0	401.0	38.4	32.3	97.1	145.6	1.3	2.1
50-54	838.2	16.5	3.8	27.1	21.4	225.8	307.6	29.5	24.1	71.0	109.1	1.0	1.3
55-59	661.9	12.5	3.0	21.3	16.7	171.8	249.0	23.7	20.7	55.8	86.0	0.6	0.9
60-64	596.2	10.5	2.7	19.0	14.7	151.6	226.3	22.0	20.2	48.8	79.3	0.4	0.7
65-69	536.2	9.1	2.5	16.0	12.9	133.5	206.9	20.1	19.3	42.5	72.4	0.4	0.5
70-74	432.8	7.4	2.1	13.4	11.4	104.4	166.4	17.8	17.0	32.8	59.6	0.2	0.2
75-79	289.2	5.4	1.5	10.3	8.0	65.6	108.0	13.0	13.1	22.4	41.6	0.1	0.1
80-84	174.9	3.2	0.9	6.2	4.9	38.0	64.1	8.7	8.9	13.4	26.5	0.0	0.1
85-89	78.3	1.4	0.5	2.9	2.2	16.9	28.1	4.1	4.2	6.2	11.7	0.0	0.1
90+	32.5	0.5	0.2	1.1	0.9	6.9	11.5	1.6	2.1	2.9	4.7	0.0	0.0
Females	**15,118.6**	**285.5**	**69.6**	**478.5**	**385.2**	**3,746.6**	**5,691.9**	**576.1**	**514.7**	**1,385.0**	**1,938.3**	**15.3**	**31.9**
<1	184.0	3.0	0.8	5.2	4.3	41.9	70.9	7.9	6.7	18.9	23.4	0.2	0.7
1-4	771.0	12.6	3.5	22.0	18.0	182.6	293.7	32.4	28.4	78.6	95.2	1.1	2.8
5-9	984.5	17.9	4.9	30.7	24.0	225.8	372.0	40.2	39.1	103.4	121.6	1.1	3.9
10-14	987.7	21.1	4.9	31.3	25.6	228.2	364.8	39.3	40.3	104.0	123.9	1.2	2.9
15-19	976.5	22.2	5.1	31.4	26.0	245.3	350.9	38.8	36.8	95.9	120.4	1.1	2.7
20-24	1,002.9	22.8	4.8	32.6	28.0	234.9	373.9	39.3	34.4	96.3	132.0	1.1	2.7
25-29	1,102.1	22.2	4.9	33.6	28.1	254.7	429.2	40.0	32.3	106.5	146.3	1.2	3.0
30-34	1,297.2	23.6	5.6	40.0	32.0	314.8	505.2	46.0	39.1	122.1	164.0	1.6	3.2
35-39	1,322.5	24.1	5.6	41.5	32.3	334.6	494.6	46.2	40.8	128.9	169.6	1.7	2.7
40-44	1,195.7	23.5	4.9	37.6	30.8	304.5	441.9	42.6	36.8	113.1	156.4	1.5	2.1
45-49	1,074.7	21.1	4.8	34.5	28.1	276.5	403.5	37.5	30.6	93.3	142.0	1.3	1.6
50-54	834.0	15.9	3.6	26.5	20.8	229.4	308.9	29.2	23.9	68.2	105.8	0.8	1.0
55-59	670.7	11.9	3.0	21.5	16.6	178.1	254.3	24.0	21.2	53.8	85.2	0.4	0.7
60-64	616.9	10.3	2.9	19.5	15.4	163.8	236.1	22.6	20.4	48.6	76.3	0.4	0.7
65-69	593.1	9.5	2.5	18.5	14.8	157.3	227.0	22.6	20.6	44.6	74.9	0.3	0.5
70-74	547.1	8.5	2.4	17.3	14.2	139.1	211.8	22.5	19.9	39.2	71.7	0.2	0.2
75-79	415.1	7.0	2.2	14.9	11.2	103.2	153.6	18.4	17.7	30.4	56.4	0.1	0.1
80-84	292.7	4.9	1.7	10.7	8.1	71.1	106.8	14.1	13.6	21.4	40.3	0.1	0.1
85-89	162.3	2.4	1.0	5.8	4.6	39.8	59.8	7.7	7.7	11.7	21.7	0.0	0.0
90+	88.0	1.1	0.6	3.4	2.3	20.7	33.1	4.7	4.4	6.3	11.2	0.0	0.0

Source: *Demography Division, Population Estimates Section*
Note: *The population estimates are adjusted for net census undercoverage and include non-permanent residents.*

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The Decline of Marriage in Canada, 1981 to 1991	84-536	Paper	$36	$44	$51
Mental Health					
Mental Health Statistics	83-245	Paper	$15	$18	$21
National Population Health Survey					
National Population Health Survey Overview 1994-95	82-567	Paper	$10	$12	$14
Nursing					
Nursing in Canada 1995: Registered Nurses	83-243	Paper	$30	$36	$42
		Microfiche	$25	$30	$35
Residential Facilities					
List of Residential Care Facilities	83-240	Paper	$20	$24	$28
Residential Care Facilities	83-237	Paper	$35	$42	$49
		Microfiche	$25	$30	$35
Therapeutic Abortion					
Selected Therapeutic Abortion Statistics	82-550	Paper	$40	$48	$56
Therapeutic Abortions	82-219	Paper	$30	$36	$42
		Microfiche	$25	$30	$35
Tuberculosis					
Tuberculosis Statistics	82-220	Paper	$32	$39	$45
		Microfiche	$25	$30	$35

National Population Health Survey, 1994-95 public use microdata files

Requests for National Population Health Survey data products should be directed to:

Client Custom Services Unit
Health Statistics Division
Statistics Canada
Ottawa, Ontario
K1A 0T6

Telephone: (613) 951-1746
Fax: (613) 951-0792

		Product number	Format	Price		
				Canada	US ($ US)	Other countries ($ US)
Public-use household member microdata files	• ASCII	82F0001XDB95001	Diskette	$1,300	$1,300	$1,300
	• ASCII and IVISION	82F0001XCB95001	CD-ROM	$1,600	$1,600	$1,600
Residential Care	• ASCII	82M0010XDB	Diskette	$ 500	$ 500	$ 500

Special Tabulations

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