

# Trends in Breast Cancer Incidence and Mortality

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## Abstract

Breast cancer is the leading form of cancer diagnosed in Canadian women (excluding non-melanoma skin cancer), accounting for about 30% of all new cases. After age 30, incidence rates begin to rise, and the highest rates are among women aged 60 and over. Canadian incidence rates have increased slowly and steadily since 1969, rising most rapidly among women aged 50 and over. Canada's rates are among the highest of any country in the world, ranking second only to those in the United States.

After decades of little change, breast cancer mortality rates for all ages combined have declined slightly since 1990. While not dramatic, this decline is statistically significant and is consistent with similar decreases in the United Kingdom, the United States, and Australia.

Breast cancer survival rates are relatively more favourable than those of other forms of cancer. Survival rates are better for younger women and for women whose cancer was detected at an early stage.

This article presents breast cancer data from the Canadian Cancer Registry, the National Cancer Incidence Reporting System, and vital statistics mortality data, all of which are maintained by the Health Statistics Division of Statistics Canada. These data are provided to Statistics Canada by the provincial and territorial cancer and vital statistics registrars.

**Keywords:** breast neoplasms, risk factors, survival rate, international comparisons

Breast cancer is one of the most serious health concerns of Canadian women. Approximately one woman in nine can expect to develop it during her lifetime.<sup>1,a</sup> Although incidence rates are highest for older women, breast cancer can strike women in their prime of life and at the peak of their work and family responsibilities. In 1993, breast cancer was the leading cause of death in women aged 35 to 49.<sup>2</sup>

About one woman in 25 will die of breast cancer. For women of all ages, breast cancer ranked as the fourth leading cause of death (5% of all deaths) after ischaemic heart disease (21%), stroke (9%) and lung cancer (5.4%).<sup>2</sup>

Men can get breast cancer, too, but it occurs far more frequently in women. In 1991, for about every 140 cases that occurred in women, one case of breast cancer was diagnosed in a man.<sup>3</sup>

Controlling the impact of breast cancer has proven difficult. Few risk factors that have been identified lend themselves to preventive action, and current advances in treatment so far appear to have had little effect on overall mortality.<sup>4</sup>

Trends in breast cancer incidence and mortality described in this article are based on data from the Canadian Cancer Registry, the National Cancer Incidence Reporting System, and vital statistics mortality data, all of which are maintained by the Health Statistics Division of Statistics Canada (see **Methods**).

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<sup>a</sup> This analysis excludes non-melanoma skin cancer, which is more commonly diagnosed than breast cancer. These skin cancers are incompletely reported and are seldom fatal.

## Leading form of cancer in women

Breast cancer is by far the leading form of cancer diagnosed in Canadian women, accounting for about 30% of all newly reported cancers (Table 1). The number of new cases diagnosed more than doubled from 6,900 to an estimated 18,600 between 1969 and 1996 (Chart 1). However, much of this increase was attributable to population aging, as age-standardized breast cancer incidence rates rose less rapidly during this period from 78 to an estimated 107 per 100,000 (Chart 2).

Advancing age is the most important risk factor for breast cancer (see **Risk factors**). Incidence rates increase rapidly from age 30 to age 70, level off, and drop after age 84 (Chart 3).

## Incidence rates stable for younger women

With increasing public awareness that breast cancer can develop in relatively young women, concern has been raised that the disease is increasing among women in their forties. And in fact, among women aged 40 to 49, breast cancer is the leading cancer,

**Table 1**

**Estimated new cases and deaths, by cancer site, females, Canada, 1996**

Site	New cases	Deaths
<b>All cancers</b>	<b>60,600</b>	<b>28,200</b>
Breast	18,600	5,300
Lung	7,600	6,000
Colorectal	7,500	2,900
Body of uterus	3,000	620
Non-Hodgkin's lymphoma	2,400	1,100
Ovary	2,100	1,350
Pancreas	1,550	1,500
Kidney	1,550	520
Leukemia	1,450	910
Melanoma	1,450	250
All other sites	13,400	7,750

**Source:** National Cancer Institute of Canada, *Canadian Cancer Statistics 1996*.

**Note:** Excludes non-melanoma skin cancer.

## Methods

### Data sources

This analysis is based on information from the Canadian Cancer Registry (CCR) (1992), the National Cancer Incidence Reporting System (NCIRS) (1969 to 1991), and vital statistics mortality data (1969 to 1994), all of which are maintained by the Health Statistics Division of Statistics Canada.<sup>2,3,5</sup> As of the 1992 data collection year, the most recent year for which cancer incidence data were available, the CCR replaced the NCIRS. Both registries are population-based systems that cover the entire Canadian population. They collect information on every case of cancer by compiling information provided by provincial and territorial cancer registries.<sup>3</sup>

Data provided by the Saskatchewan Cancer Registry and the Northern Alberta Breast Cancer Registry were used to calculate survival rates by age at diagnosis and stage of cancer.

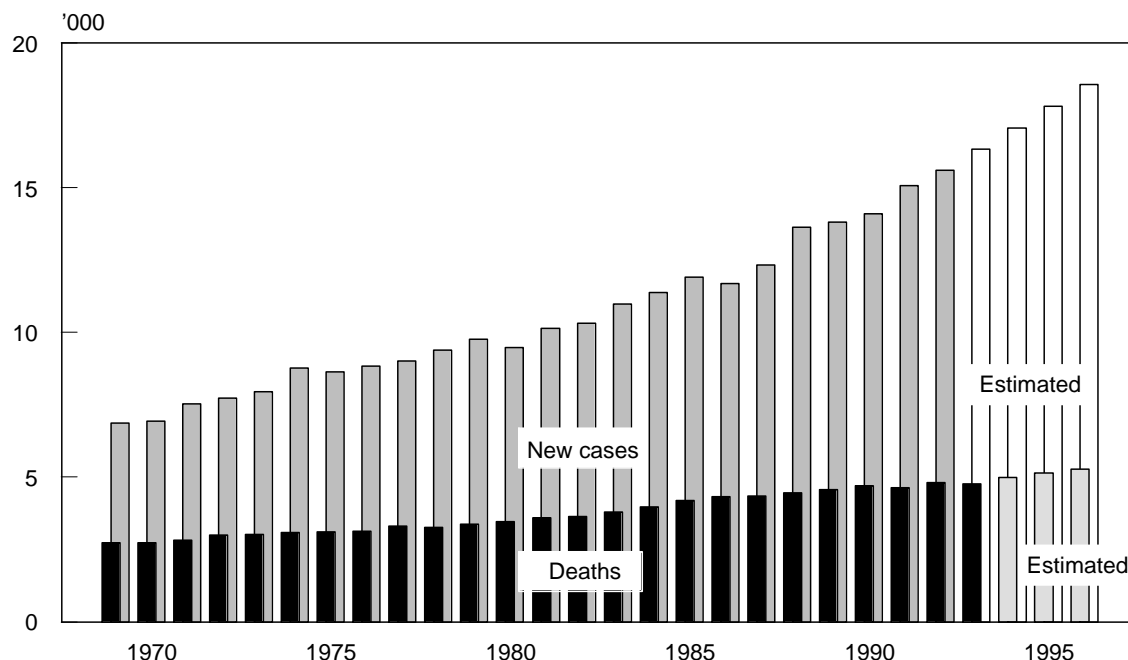
### Analytical techniques

Because of delays in compiling and processing cancer data, estimates for recent years are produced by modelling incidence and mortality data by province for selected cancer sites. Data from 1984 to 1991 or 1992 were used to compute incidence estimates from 1993 to 1996; data from 1984 to 1993 were used to compute 1994 to 1996 mortality estimates. For more information, refer to *Canadian Cancer Statistics 1996*.<sup>1</sup>

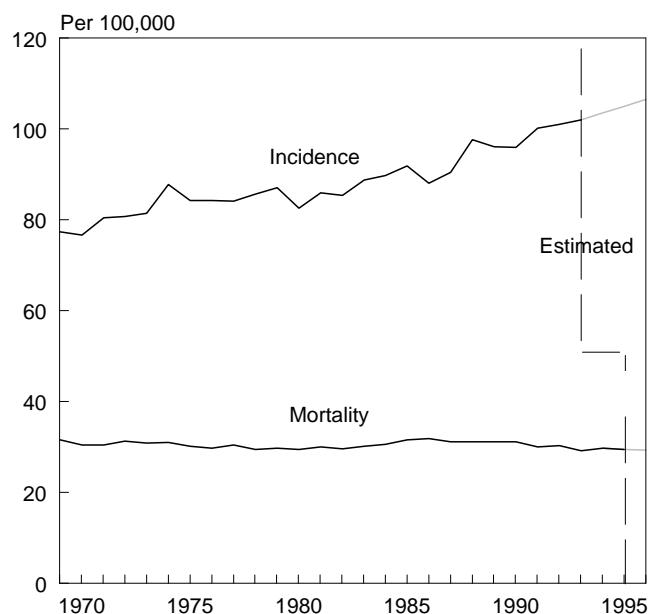
Changes in the annual age-standardized breast cancer incidence and mortality rates were examined by calculating the average annual percent change (AAPC) over a time period. The AAPC is  $(e^{\beta} - 1)100$ , where  $\beta$  is the slope from a regression of log rates on year.

Rates in this article were age-standardized to the 1991 Canadian population to account for changes in the age structure of the population over time. Population estimates were adjusted for net census undercoverage.

Observed survival was calculated using a Kaplan-Meier survival curve. Data provided by the Northern Alberta Breast Cancer Registry and the Saskatchewan Cancer Registry were pooled. Data points calculated for each of the two registries were comparable based on visual comparison and results from the Wilcoxon univariate chi-square test ( $p = 0.2361$ ). The follow-up period used to calculate survival rates was from January 1, 1980 to December 31, 1990.

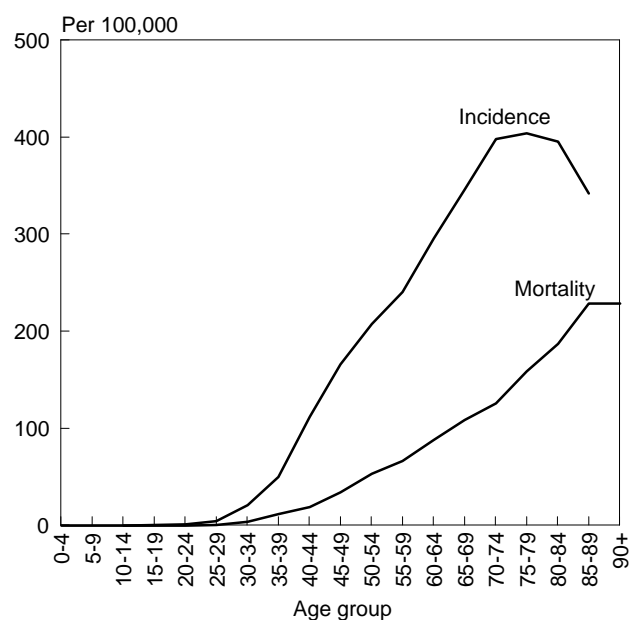
**Chart 1****New cases and deaths from breast cancer, females, Canada, 1969-1996**

Source: Canadian Cancer Registry, National Cancer Incidence Reporting System, and Health Statistics Division

**Chart 2****Age-standardized breast cancer incidence and mortality rates, females, Canada, 1969-1996**

Source: Canadian Cancer Registry, National Cancer Incidence Reporting System, and Health Statistics Division

Note: Rates are age-standardized to the 1991 Canadian population adjusted for net census undercoverage.

**Chart 3****Breast cancer incidence and mortality rates, by age group, females, Canada 1992**

Source: Canadian Cancer Registry and Health Statistics Division

# Risk factors

Over the past 50 years, many studies have attempted to determine risk factors for breast cancer. Yet only 55% of new cases can be explained by known risk factors.<sup>6</sup> Moreover, most of the risk factors identified do not lend themselves to preventive action.<sup>6</sup>

The well-established risk factors associated with a moderate to high relative risk for breast cancer include age, country of birth, family history of breast cancer, and biopsy-confirmed benign proliferative breast disease.<sup>7</sup> Well-established risk factors associated with minor relative risk include a number of factors related to hormonal status and lifestyle factors including socioeconomic status, obesity and religion.<sup>7</sup> Of the hormonally-related factors, age at first full-term pregnancy shows some of the strongest relative risks.

Increased risk is associated with a fourth group of factors in many studies, but the level of association

is still uncertain.<sup>7</sup> Many of these involve or affect exposure to hormones, including oral contraceptives, estrogen replacement therapy and the number of children. Prolonged breast feeding, which has been shown in a number of populations to reduce risk, is thought to explain at least some of the reduced risk in Inuit women. Diet has been long thought to be important, although a strong association between breast cancer and specific dietary components has yet to be confirmed.<sup>6,7</sup>

It has also recently been proposed that most of the risk factors can be explained in terms of either the number of potentially susceptible breast cells, or the susceptibility of these cells to develop breast cancer at different phases of a woman's life.<sup>8</sup>

Overall, few risk factors have any potential to be modified to aid primary prevention of the disease. Secondary prevention through breast screening appears to offer the best hope to control breast cancer.<sup>7</sup>

# Risk factors for breast cancer in women

Factor	High-risk group	Low-risk group
<b>High relative risk (&gt; 4.0)</b>		
Age	Old	Young
Country of birth	North America, Northern Europe	Asia, Africa
Family history (mother and sister with breast cancer)	Yes	No
<b>Moderate relative risk (2.1-4.0)</b>		
History of cancer in one breast	Yes	No
Family history (mother or sister with breast cancer)	Yes	No
Biopsy - confirmed benign proliferative disease	Yes	No
Chest X-ray (moderate to high doses)	Yes	No
<b>Minor relative risk (1.1-2.0)</b>		
Socioeconomic status	High	Low
Marital status	Never-married	Ever-married
Place of residence	Urban	Rural
Religion	Jewish	Seventh-Day Adventist, Mormon
Age at first full-term pregnancy	≥ 30 years	<20 years
Age at menarche (first menstruation)	≤ 11 years	≥15 years
Age at menopause	≥ 55 years	<45 years
Obesity		
Breast cancer ≥ 50 years of age	Obese	Thin
Breast cancer < 50 years of age	Thin	Obese

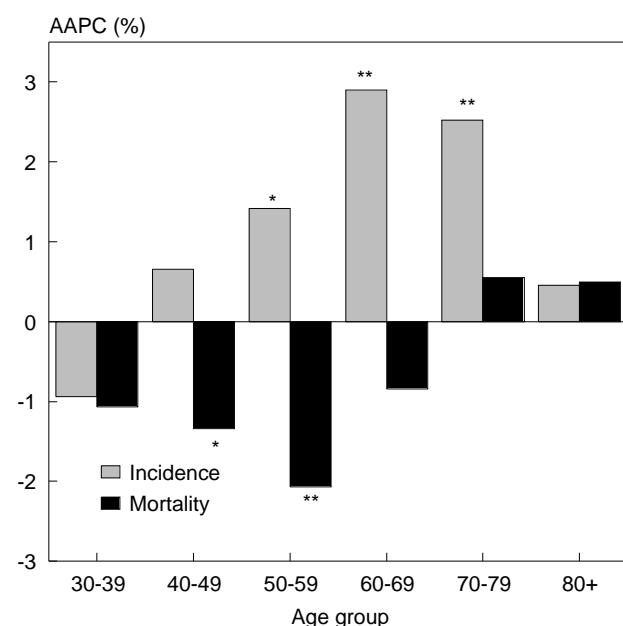
**Source:** Adapted from Kelsey JL. Breast cancer epidemiology: Summary and future directions. *Epidemiologic Reviews* 1993; 15(1): 256-63.

accounting for 2,684 new cases in 1992—one-third of all cancers diagnosed in this age group. Although the number of newly diagnosed cases in women aged 40 to 49 increased by 65% between 1982 and 1992, incidence rates were fairly stable. The increased number of breast cancers diagnosed in this age group is thus entirely explained by the movement of baby-boomers into the over-40 age group, a trend also observed in the United States.<sup>9,10</sup>

By contrast, notable increases in incidence rates by 2.5% to 3% per year have occurred among women aged 60 to 79 (Chart 4). Because of the rapid rise in breast cancer incidence among women aged 70 to 79, their rate now exceeds that of women aged 80 and over (Chart 5). The upturn among women aged 70 to 79 may reflect increases in mammographic screening or changing reproductive experiences among cohorts.

**Chart 4**

**Average annual percent change (AAPC) in breast cancer incidence (1984-1991) and mortality rates (1984-1993), by age group, women aged 30 and over, Canada**



Source: Health Statistics Division

\* Significantly different from zero ( $p < 0.05$ )

\*\* Significantly different from zero ( $p < 0.01$ )

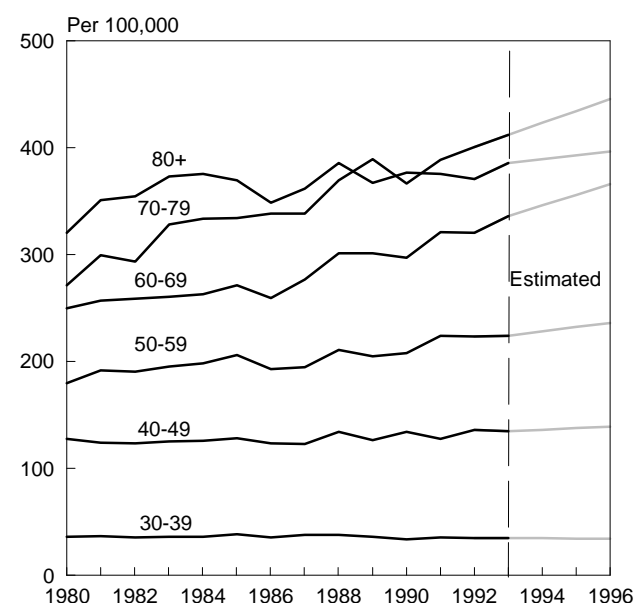
(Women over age 80 in the 1990s would have started childbearing before the 1930s, that is, before the decline in the birth rate during the Depression. From 1930 to 1945, the average age at the birth of first child increased: a well-established risk factor for breast cancer.)

### Mortality rate down slightly

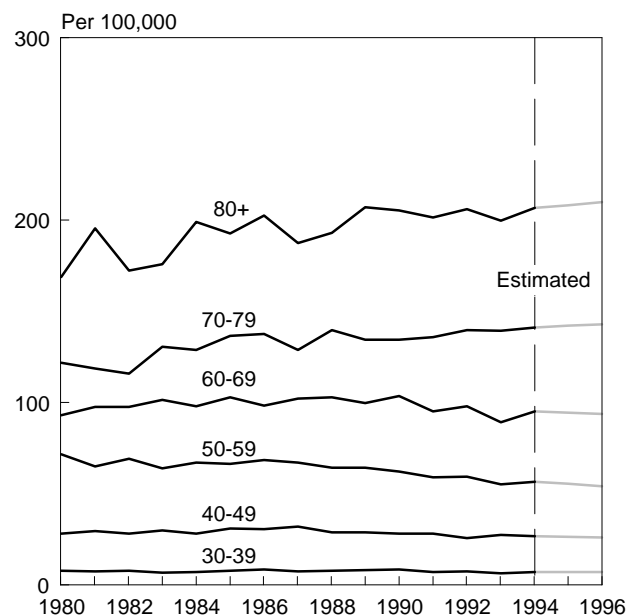
The number of deaths due to breast cancer rose between 1969 and 1996 from 2,750 to an estimated 5,300 (Chart 1). Mortality rates, however, remained relatively stable at around 30 to 32 per 100,000 women between 1969 and 1990 (Chart 2). Between 1990 and 1993, the rate declined from 31 to 29 per 100,000, the lowest since 1950. This decline, while not dramatic, is statistically significant ( $p < 0.05$ ) and is generally comparable to declines in the United States, the United Kingdom, and Australia.<sup>11-15</sup>

**Chart 5**

**Breast cancer incidence rates, by age group, women aged 30 and over, Canada 1980-1996**



Source: Canadian Cancer Registry and National Cancer Incidence Reporting System

**Chart 6****Breast cancer mortality rates, by age group, women aged 30 and over, Canada, 1980-1996**

Source: Health Statistics Division

Since 1984, breast cancer mortality rates have declined by about 1% to 2% per year among women aged 30 to 59. However in 1990, among women aged 60 to 69, trends in breast cancer mortality changed abruptly (Chart 6). After years of steady increases, rates dropped by almost 15% between 1990 and 1993. On the other hand, mortality rates for women aged 70 and over have been fairly stable since 1984.

Much of the decrease in cancer mortality among women overall largely is due to the changing trend among women aged 60 to 69. This decrease in mortality since 1990 among these women is consistent with what would be expected based on the reproductive experiences of this birth cohort.<sup>15</sup> Specifically, this group of women tended to become mothers at younger ages than had been the case for earlier cohorts. And younger age at first full-term pregnancy entails a lower relative risk of breast cancer. However, declines in mortality for this and other age groups may also be due to other factors, such as earlier detection through mammography or treatment effects.<sup>12,13,15</sup>

**Table 2****Age-standardized annual breast cancer incidence rates (1989-1991) and mortality rates (1991-1993), females, Canada, provinces and territories**

	Age-standardized incidence rate	95% confidence interval	Age-standardized mortality rate	95% confidence interval
	Per 100,000			
<b>Canada</b>	<b>97.6</b>	<b>96.7 - 98.5</b>	<b>29.9</b>	<b>29.4 - 30.4</b>
Nfld.	80.0**	73.7 - 86.3	29.1	25.4 - 32.9
P.E.I.	102.2	88.4 - 116.0	25.4	18.7 - 32.0
N.S.	102.3*	97.1 - 107.4	32.9*	30.1 - 35.7
N.B.	95.1	89.5 - 100.7	29.0	26.0 - 32.0
Que.	91.2**	89.4 - 92.9	31.6**	30.6 - 32.6
Ont.	98.1	96.6 - 99.6	30.6*	29.7 - 31.4
Man.	104.7**	99.9 - 109.4	27.5*	25.2 - 29.9
Sask.	102.7*	97.7 - 107.7	27.0*	24.5 - 29.4
Alta.	97.7	94.4 - 101.1	29.9	28.1 - 31.7
B.C.	106.8**	104.0 - 109.5	26.0**	24.7 - 27.3
Yukon	68.8	35.1 - 102.5	18.8	0.6 - 37.0
N.W.T.	67.1*	38.3 - 96.0	37.1	13.0 - 61.3

Source: Health Statistics Division

Note: Rates are age-standardized to the 1991 Canadian population adjusted for net census undercoverage.

\* Significantly different from national rate ( $p < 0.05$ )

\*\* Significantly different from national rate ( $p < 0.01$ )

**Across Canada**

Provincial breast cancer incidence rates have generally converged. But while the traditional pronounced gradient of decreasing rates from west to east has largely disappeared,<sup>16</sup> rates are still relatively high in British Columbia, Manitoba, Saskatchewan and Nova Scotia, and low in Quebec, Newfoundland, the Yukon and the Northwest Territories (Table 2). By contrast, mortality rates show a slight east to west gradient, with lower-than-average rates in British Columbia, Saskatchewan and Manitoba.

The higher incidence rates now found in provinces east of Ontario may, in part, reflect improved cancer registration procedures.<sup>3</sup> And because some women will develop more than one primary breast cancer, some inter-provincial differences could be due to registries using different rules to count these multiple primaries.

Changing patterns of age at birth of first child, as well as differing rates of implementation of screening mammography may contribute to provincial variations in breast cancer incidence rates. Socioeconomic factors are also thought to explain at least part of the low incidence rates for Newfoundland. Socioeconomic factors may be related to other risk factors, such as diet, age at menarche (first menstruation), and age at birth of first child (see **International comparisons**)

### Low rate among Inuit

Low breast cancer incidence rates in the Northwest Territories primarily reflect the very low rates among

the Inuit. From 1969 to 1988, Inuit women in the Northwest Territories had a breast cancer rate just one-tenth the Canadian average.<sup>17</sup> However, anecdotal reports suggest that this trend is changing, with more breast cancers reported for Inuit women in the Northwest Territories since 1988 than were reported in the previous 20 years. Breast cancer rates among Inuit women in northern Quebec and Labrador are about half the Canadian rate, but it is difficult to draw conclusions based on the small numbers involved.<sup>18</sup> Rates for the entire Canadian Inuit population, at one-fifth the Canadian average, are generally lower than those among Alaskan or Greenlandic Inuit, suggesting that the introduction of risk factors for breast cancer occurred later among Canadian Inuit.<sup>17,19</sup>

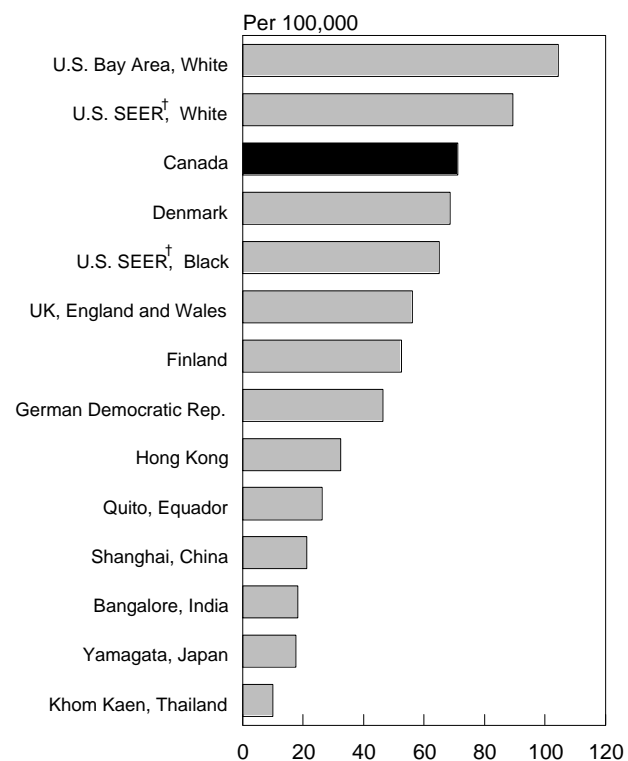
### International comparisons

According to the most recently available data, Canada's breast cancer incidence rates are among the highest in the world, exceeded primarily by those in the United States.<sup>20</sup> Breast cancer is very much a Western disease, with Canada's rates just ahead of those in western Europe. Very low rates are reported for most Asian and African populations, although rates in Asian countries have increased considerably in recent years.<sup>21</sup> However, when women from these areas migrate to the United States, higher breast cancer rates are found in their daughters and granddaughters, especially those born in the United States or who migrated at a young age. This suggests that social and environmental risk factors for breast cancer are not only more important than genetic risk factors, but also that they can change relatively rapidly, with equally rapid increases in breast cancer risk.<sup>7</sup>

Until the mid-1980s, Canada's breast cancer incidence and mortality rates closely paralleled those of the United States.<sup>22</sup> In Canada, age-standardized incidence rates generally increased until 1988, plateaued in 1989 and 1990, then rose to even higher levels in 1991 and 1992. By contrast, the American rate peaked in 1987, declined in the next two years, and then rose slowly in line with the trend before 1986.<sup>9</sup> The dramatic increase in American rates up to 1987 mainly reflected smaller tumours diagnosed at an early stage. This transitory increase has been attributed to early detection from screening mammography.<sup>10</sup> Further research is needed to determine whether screening explains changes in Canadian trends.

Since 1990, Canada's breast cancer mortality rates have declined slightly. While not dramatic, this is consistent with somewhat stronger declines in the United States, the United Kingdom, and Australia. And in these countries, rates have decreased mainly in women under age 60, except Australia, where the trend has not yet been confirmed. The declines in Britain are thought unlikely to be due to screening, but may reflect improvements in case management and treatment, possibly as a result of the widespread use of tamoxifen in the late 1980s.<sup>12,14</sup>

### Annual female breast cancer incidence rate, Canada and selected countries and registry populations 1983-1987



Source: Parkin DM, Muir CS, Whelan SL, et. al. **Cancer Incidence in Five Continents, Volume VI.**

Note: Rates are age-standardized to the World Standard Population.

† The Surveillance, Epidemiology and End Results program (SEER) covers about 10% of the U.S. population.

# A favourable survival rate

Breast cancer survival rates are more favourable than those of most other forms of cancer.<sup>22,23</sup> According to data from the Alberta and Saskatchewan cancer registries, almost 70% of women diagnosed with breast cancer can expect to live at least five more years, and about 50% can expect to live for at least 10 years. Survival rates vary considerably by age, with younger women far more likely than older women to survive 10 years after diagnosis (Table 3). This occurs, in part, because these statistics are observed survival rates, and older women are more likely to die from other causes.

Less encouraging is the observation that, whereas survival rates for most types of cancer level off after five years, those for breast cancer continue to fall.<sup>22</sup> Thus, for many years after diagnosis, constant vigilance is needed for effective control of breast cancer.

Survival is also highly dependent on the stage at which the cancer is diagnosed. Women diagnosed when the cancer is confined to the breast and is less than 2 cm in size (Stage I) survive far longer on average

than those who are diagnosed with tumours that have metastasized to distant organs (Stage IV) (Chart 7).

Because of the high incidence and relatively long survival rate, over 80,000 Canadian women who are alive today have been diagnosed with breast cancer.<sup>23</sup> Since these women tend to be younger than survivors of most other types of cancer, it is perhaps not surprising that breast cancer survivors are demanding a higher priority be placed on controlling this disease.

# Acknowledgments

The authors thank Marek Wysocki for calculating the average annual percent changes and significance levels for inter-provincial differences in incidence and mortality rates, Karla Nobrega for the survival calculations, and Jane Gentleman and Judy Lee for helpful comments. The co-operation of provincial and territorial cancer registries and vital statistics registrars who supply incidence and mortality data to Statistics Canada is gratefully acknowledged. In particular, we

**Table 3**

**Ten-year survival after breast cancer diagnosis, by age group, Saskatchewan and northern Alberta, 1980-1990**

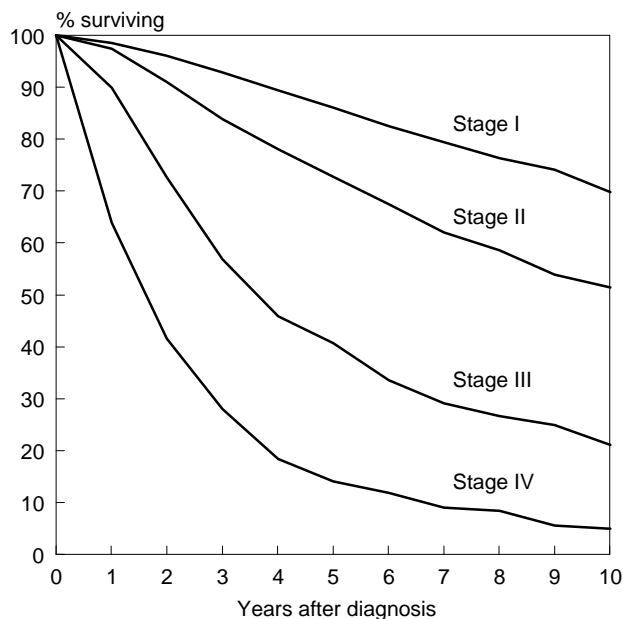
Years after diagnosis	Age group				
	All ages	40-49	50-59	60-69	70+
% surviving					
1	94	98	97	94	90
2	87	92	90	87	81
3	80	86	83	81	71
4	74	81	78	75	64
5	69	77	74	71	58
6	64	74	70	66	51
7	60	72	68	61	44
8	57	69	65	59	39
9	54	67	62	55	35
10	51	66	59	50	32

**Source:** Northern Alberta Breast Registry, Saskatchewan Cancer Registry

**Notes:** Rates calculated are for observed survival. Survival rates are not presented for women under age 40 because of the small number of cases.

**Chart 7**

**Ten-year survival after breast cancer diagnosis, by stage of cancer, female, Saskatchewan and northern Alberta, 1980-1990**



**Source:** Northern Alberta Breast Registry, Saskatchewan Cancer Registry

**Note:** Rates calculated are for observed survival.



thank Diane Robson of the Saskatchewan Cancer Registry and Heather Bryant of the Alberta Cancer Registry for providing data to calculate the survival rates.

## References

1. National Cancer Institute of Canada. **Canadian Cancer Statistics 1996** Toronto: National Cancer Institute of Canada, 1996.
2. Statistics Canada. **Leading Causes of Death at Different Ages, 1993** (uncatalogued). Ottawa: Statistics Canada, 1996.
3. Statistics Canada. **Cancer in Canada 1991** (Catalogue 82-218) Ottawa: Statistics Canada, 1995.
4. Miller AB. Mammography: Reviewing the evidence. **Canadian Family Physician** 1993; 39: 85-90.
5. Statistics Canada. **Mortality - Summary List of Causes, 1994 Vital Statistics** (Catalogue 82-209-XPB) Ottawa: Statistics Canada, 1996.
6. Brinton LA. Ways that women may possibly reduce their risk of breast cancer. **Journal of the National Cancer Institute** 1994; 86(18): 1371-2.
7. Kelsey JL. Breast cancer epidemiology: Summary and future directions. **Epidemiologic Reviews** 1993; 15(1): 256-63.
8. MacMahon B. A biological framework for the risk factors for breast cancer. **Advances in Oncology** 1994; 10(4): 3-9.
9. Miller BA, Gloeckler Ries LA, Hankey BF, et al (editors). **SEER Cancer Statistics Review: 1973-1990** Bethesda, Maryland: National Cancer Institute, 1993.
10. Miller BA, Feuer EJ, Hankey BF. Recent incidence trends for breast cancer in women and the relevance of early detection: An update. **CA-A Cancer Journal for Clinicians** 1993; 43(1): 27-41.
11. Jelfs P, Coates M, Giles G, et al. **Cancer in Australia 1989-1990 (with Projections to 1995)** Canberra: Australian Institute of Health and Welfare, 1996.
12. Beral V, Hermon C, Reeves G, et al. Sudden fall in breast cancer death rates in England and Wales [letter]. **Lancet** 1995; 345: 1642-3.
13. Quinn M, Allen E. Changes in incidence of and mortality from breast cancer in England and Wales since introduction of screening. **British Medical Journal** 1995; 311: 1391-5.
14. Tarone RE, Chu KC. Implications of birth cohort patterns in interpreting trends in breast cancer rates. **Journal of the National Cancer Institute** 1992; 84: 1402-10.
15. Tarone RE, Chu KC, Gaudette LA. Birth cohort and calendar period trends in breast cancer mortality in the United States and Canada. **Journal of the National Cancer Institute** in press.
16. Band PR, Gaudette LA, Hill GB, et al. **The Making of the Canadian Cancer Registry: Cancer Incidence in Canada and Its Regions, 1969 to 1988**. Ottawa: Canadian Council of Cancer Registries, Health and Welfare Canada, Statistics Canada, 1993.
17. Gaudette LA, Gao RN, Freitag S, et al. Cancer incidence by ethnic group in the Northwest Territories (NWT) 1969 - 1988. **Health Reports** (Statistics Canada, Catalogue 82-003) 1993; 5(1): 23-32.
18. Gaudette LA, Miller AB, Freitag S, et al. **Cancer Patterns in the Inuit of Canada 1970-1984** NHRDP Final Report. Ottawa: National Health Research Program. Health and Welfare Canada: 1989 Nov. Grant #6611-1006-55.
19. Miller AB, Gaudette LA. Breast cancer in circumpolar Inuit. **Acta Oncologica Scandinavica** 1996; 35(5): 577-80.
20. Parkin DM, Muir CS, Whelan SL, et al. **Cancer Incidence in Five Continents, Volume VI** (IARC Publication No. 120). Lyon, France: International Agency for Research on Cancer, 1992.
21. Coleman MP, Estève J, Damiecki P, et al. **Trends in Cancer Incidence and Mortality** (IARC Publication No. 121). Lyon, France: International Agency for Research on Cancer, 1993.
22. National Cancer Institute of Canada. **Canadian Cancer Statistics 1993** Toronto: National Cancer Institute of Canada, 1993.
23. National Cancer Institute of Canada. **Canadian Cancer Statistics 1995** Toronto: National Cancer Institute of Canada, 1995.