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# Canadian Cancer Statistics 1999

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Canadian Cancer Society  
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Additional copies may be requested from Divisions of the Canadian Cancer Society,  
Statistics Canada, or the Cancer Bureau, Health Canada (see pages 71 to 73).

Version française de cette publication disponible sur demande.



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The production and distribution of the monograph is the result of collaboration among all these groups.

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## TABLE OF CONTENTS

	Page
Introduction	7
Highlights	9
Current Incidence and Mortality	11
Geographic Patterns of Cancer Occurrence	17
Trends in Incidence and Mortality	23
Age and Sex Distribution of Cancer	39
Probability of Developing/Dying from Cancer	45
Potential Years of Life Lost Due to Cancer	47
Cancer in Children Aged 0-14 Years	51
Special Topics:	
• Factors Contributing to the Population Burden of Cancer Incidence and Mortality	53
• A New National Cancer Surveillance System for Canada	57
Glossary	59
Appendix I: Methods	61
Appendix II: Actual Data for New Cases and Deaths	67
References	69
For Further Information	71
Order and Evaluation Form	75

## Tables

1. Estimated New Cases and Deaths for Selected Cancer Sites by Sex, Canada, 1999	13
2. Estimated Population, New Cases and Deaths for All Cancers by Sex, Canada and Provinces/Territories, 1999	18
3. Estimated New Cases for Major Cancer Sites by Sex, Canada and Provinces, 1999	19
4. Estimated Age-Standardized Incidence Rates for Major Cancer Sites by Sex, Canada and Provinces, 1999	20
5. Estimated Deaths for Major Cancer Sites by Sex, Canada and Provinces, 1999	21
6. Estimated Age-Standardized Mortality Rates for Major Cancer Sites by Sex, Canada and Provinces, 1999	22

## TABLE OF CONTENTS

7.1 Age-Standardized Incidence Rates for Selected Cancer Sites, Males, Canada, 1970-1999	32
7.2 Age-Standardized Mortality Rates for Selected Cancer Sites, Males, Canada, 1970-1999	33
8.1 Age-Standardized Incidence Rates for Selected Cancer Sites, Females, Canada, 1970-1999	34
8.2 Age-Standardized Mortality Rates for Selected Cancer Sites, Females, Canada 1970-1999	35
9. Average Annual Percent Change (AAPC) in Age-Standardized Incidence (1987-1994) and Mortality (1987-1996) Rates for Selected Cancer Sites, Canada	36
10. Distribution of Cancer by Age Group and Sex, Canada, 1999	40
11. Distribution of Cancer for Selected Cancer Sites by Age Group and Sex, Canada, 1999	41
12. Probability of Developing Cancer by Age, and Lifetime Probability of Developing and Dying from Cancer, Canada	46
13. Potential Years of Life Lost Due to Cancer, Canada, 1996	48
14. New Cases and Age-Standardized Incidence Rates (1990-1994) and Deaths and Age-Standardized Mortality Rates (1992-1996) by Histologic Cell Type of Cancer for Children Aged 0-14 Years, Canada	52

## Figures

1.1 Percentage Distribution of Estimated New Cases and Deaths for Selected Cancer Sites, Males, Canada, 1999	14
1.2 Percentage Distribution of Estimated New Cases and Deaths for Selected Cancer Sites, Females, Canada, 1999	15
2.1 New Cases and Age-Standardized Incidence Rates (ASIR) for All Cancers, Canada, 1970-1999	26
2.2 Deaths and Age-Standardized Mortality Rates (ASMR) for All Cancers, Canada, 1970-1999	27
3.1 Age-Standardized Incidence Rates (ASIR) for Selected Cancer Sites, Males, Canada, 1970-1999	28
3.2 Age-Standardized Mortality Rates (ASMR) for Selected Cancer Sites, Males, Canada, 1970-1999	29
4.1 Age-Standardized Incidence Rates (ASIR) for Selected Cancer Sites, Females, Canada, 1970-1999	30
4.2 Age-Standardized Mortality Rates (ASMR) for Selected Cancer Sites, Females, Canada, 1970-1999	31



## TABLE OF CONTENTS

5. Average Annual Percent Change (AAPC) in Age-Standardized Incidence (1987-1994) and Mortality (1987-1996) Rates for Selected Cancer Sites, Canada	37
6. Index of Age-Standardized Mortality Rates Including and Excluding Lung Cancer, Canada, 1971-1996	38
7. Age-Specific Incidence and Mortality Rates, All Cancers, 1970-1999	42
8. Age-Specific Incidence (1994) and Mortality (1996) Rates for All Cancers by Sex, Canada.	43
9. Leading Causes of Potential Years of Life Lost (PYLL), Canada, 1996	49
10. The Total Number of New Cases or Deaths, Showing the Contribution of Change in Cancer Risk, Population Growth, and Change in Population Age-Structure (1971 reference), All Cancers, All Ages, Males, Canada, 1971-1999	54
11. The Total Number of New Cases or Deaths, Showing the Contribution of Change in Cancer Risk, Population Growth, and Change in Population Age-Structure (1971 reference), All Cancers, All Ages, Females, Canada, 1971-1999	55
12. A New National Cancer Surveillance System for Canada	58

## Tables in Appendix II

Table 1: New Cases of Cancer by Site and Sex, Canada, 1994	67
Table 2: Cancer Deaths by Site and Sex, Canada, 1996	68

## INTRODUCTION

**T**his monograph is published by the National Cancer Institute of Canada in collaboration with Health Canada, Statistics Canada, provincial/territorial cancer registries and university-based researchers. It is part of an annual series that began publication in 1987.

The main purpose of the publication is to provide health professionals, researchers and policy-makers with detailed information regarding the incidence and mortality of the most common types of cancer by age, sex, time period and province. It is hoped that these data will stimulate new research and assist decision-making and priority-setting processes at the individual, community, provincial and national levels. The monograph is also used by educators, the media and by members of the public with an interest in cancer.

Special Topics are included each year. This year the Special Topics are (1) an analysis of the relative impact of population growth and aging on cancer incidence in Canada, and (2) a review of current directions in cancer surveillance in Canada. In past years, other Special Topics included:

- ◆ international comparisons (1998);
- ◆ a comparison of cancer in Canada from 1987 to 1997 (1997);
- ◆ an evaluation of the accuracy of previously reported estimates (1996);
- ◆ detailed reviews of prostate cancer (1996), colorectal cancer (1995) and breast cancer (1993);
- ◆ survival rates (1991-1993, 1995);
- ◆ prevalence estimates (1995);
- ◆ smoking prevalence and lung cancer (1991);
- ◆ cancer in aboriginal populations (1991);
- ◆ age-specific trends among women (1990);
- ◆ cancer rates by income level (1990) and
- ◆ the economic burden of cancer (1990, 1996).

Information on cancer incidence and mortality comes from the provincial and territorial cancer registries and offices of vital statistics, 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 this information at the national level results in a considerable delay before reliable information for a particular year is available for all of Canada. This report contains actual rates and frequencies up to the most recent year for which complete data are available (1994 for incidence; 1996 for mortality), and, in addition, estimated values for years up to 1999. The estimates are made in the following way: first, time trends in the known rates are examined; second, these trends are projected to the present time to obtain current rate estimates; and third, these rate estimates for the current year are applied to current population estimates.

The statistical methodology used for this edition is the same as that used from 1995 to 1998, but differs from that used up to 1994, primarily because the standardization of incidence and mortality rates is now based on the 1991 Canadian population rather than the World Standard Population. Age-standardized rates are higher with this methodology because the Canadian population has a higher proportion of older people, among whom cancer is more common. Standardization using the Canadian population is used so that results are more relevant and useful to those concerned with cancer in Canada. **Nevertheless, it should be noted that it is not appropriate to compare age-standardized rates presented herein to those from publications that employ a different standard population.**

## INTRODUCTION

Details of the statistical methods used to produce the projections are described in *Appendix I: Methods*. **It is important to emphasize that the figures provided for 1999 are estimates, rather than actual data.**

The statistics contained herein refer to all types of cancer, defined according to the standardized classification that is used worldwide. As is customary in reports from cancer registries, the statistics exclude skin cancers other than melanoma. Benign tumours and carcinoma in-situ are also excluded. Details of how cancer sites were classified and definitions of technical terms are provided in the *Glossary*.

Individuals who require additional information can refer to the section entitled *For Further Information*, which indicates how to contact the various agencies involved, including Health Canada, Statistics Canada, the Canadian Cancer Society, the National Cancer Institute of Canada, and provincial and territorial cancer agencies. Related information can also be found in other publications, including: reports from provincial and territorial cancer registries; *Cancer Incidence in Canada, 1969-1993* and *Health Reports*, published by Statistics Canada; *Chronic Diseases in Canada*, and *Canadian Cancer Incidence Atlas* published by Health Canada; a collaborative monograph entitled *The Making of the Canadian Cancer Registry*; *Cancer Incidence in North America*, published by the North American Association of Central Cancer Registries; and *Cancer Incidence in Five Continents*, published by the International Agency for Research on Cancer.

The development of this publication over the years has benefited considerably from the comments and suggestions of readers. The Steering Committee appreciates and welcomes such comments, including ideas on how the report can be improved (an *Order and Evaluation Form* is included on the final page of this report). Finally, **readers can be included on the mailing list for next year's publication by completing the *Order and Evaluation Form*.**



## Current Incidence and Mortality

An estimated 129,300 new cases of cancer and 63,400 deaths from cancer will occur in Canada in 1999.

In 1999, the most frequently diagnosed cancers will continue to be breast cancer for women and prostate cancer for men.

Lung cancer remains as the leading cause of cancer death for both sexes. Almost one-third of the cancer deaths in men, and almost one-quarter in women are due to lung cancer alone.

## Trends in Incidence and Mortality

Among men the cancer mortality rate for all cancers combined has been declining slowly since 1988, due to decreases in mortality rates for lung, colorectal, and certain other cancers.

Among Canadian men, prostate cancer will continue to be the most frequently occurring cancer in 1999. Beginning in 1994, incidence rates for prostate cancer began to decline after increasing rapidly for several years. With mortality rates remaining stable during this period, these trends were likely due to the rapid increase in the use of early detection techniques (such as by measuring levels of Prostate Specific Antigen).

Among women, cancer incidence and mortality rates have remained relatively stable. However, when lung cancer rates are excluded, the mortality rate for women has dropped by 15% since 1971.

Lung cancer incidence and mortality rates among women continue to increase rapidly and are now almost five times as high as rates in 1969. However, they remain only half as high as rates for men.

Breast cancer incidence among women rose steadily over the past three decades, although the rate of increase is declining somewhat, whereas mortality rates for breast cancer declined slightly since 1986 and particularly since 1990. This pattern of divergent trends is consistent with benefits being achieved through screening programs and improved treatments.

For colorectal cancer, the third most common cancer for both men and women, both incidence and mortality rates have declined steadily over the past decade and a half, with the rate of decline being more pronounced among women.

Thyroid cancer is a relatively rare disease that in the past decade has had the most rapidly increasing incidence rate among women. The rate of increase is less pronounced in men, and mortality rates for both men and women remained quite stable. The reasons for these patterns are not clear.

## Age and Sex Distribution of Cancer

Cancer is primarily a disease of older Canadians, with 70% of new cancer cases and 80% of deaths due to cancer occurring among those who are at least 60-years-old.

After age 70, the rate at which men die from cancer is higher than the rate at which women develop cancer.

### Probability of Developing/Dying from Cancer

During their lifetimes, 1 in 9 women are expected to develop breast cancer, 1 in 18 will develop colorectal cancer, and 1 in 21 will develop lung cancer. Among men, 1 in 8 will develop prostate cancer during their lifetime, mostly after age 70, 1 in 11 will develop lung cancer and 1 in 16 will develop colorectal cancer.

The probability of developing cancer is lower for younger people, such that the probability of developing breast cancer over the next ten years is 1 in 250 for 30-year-old women, but 1 in 31 for 70-year-old women. The probability of developing prostate cancer during the next decade for 70-year-old men is 1 in 13, which is the highest level of 10 year risk for all cancers and both sexes.

### Potential Years of Life Lost Due to Cancer

Cancer is the leading cause of premature death in Canada, being responsible for almost one-third of all potential years of life lost.

Lung cancer is by far the leading cause of premature death due to cancer.

Smoking is responsible for about one-third of potential years of life lost (PYLL) due to cancer, for about one-quarter of PYLL due to diseases of the heart and for about one-half of PYLL due to respiratory disease.

### Cancer in Children Aged 0-14 Years

Among Canadian children in recent years, an average of 879 were diagnosed with cancer and 176 died from cancer each year. The most common childhood cancer is leukemia, which accounts for over 30% of new cases and deaths.

### Factors Contributing to the Population Burden of Cancer Incidence and Mortality

Changes in the age structure and growth of the population have been the most significant determinants of the steadily increasing total number of new cases and cancer deaths in Canada since 1971.

As the Canadian population continues to age and grow in size, there will be a concordant increase in the number of new cases. This suggests the need for a strategic approach, on a national basis, for planning for cancer control and delivery of cancer care.

## CURRENT INCIDENCE AND MORTALITY

The importance of different forms of cancer in Canada in 1999 can be expressed by three measures shown in Table 1. **Incidence** is expressed as the number of new cases of a given type of cancer diagnosed per year. **Mortality** is expressed as the number of deaths attributed to a particular type of cancer during the year. **The deaths to cases ratio** (the number of deaths divided by the number of new cases) is a crude indicator of disease severity. The closer a value is to 1.0, the poorer the prognosis for that cancer. Frequencies listed in Tables 1 to 6 are **estimates** based on modelling trends in cancer and population data since 1986 for both cancer incidence and mortality (incidence estimates for prostate cancer were modelled using data from 1980-1989). These estimates are rounded to the nearest 5, 10, 50 or 100. Readers requiring actual data or information on less common sites of cancer may refer to Tables 1 and 2 in *Appendix II* or to source publications.<sup>2,12,18</sup>

Some problems that may be inherent in using the above statistics are considered below.

### Sources of Data

Incidence figures collected by provincial and territorial cancer registries are reported to the Canadian Cancer Registry (CCR) maintained by Statistics Canada, beginning with cases diagnosed as of 1992. The patient-oriented CCR has evolved from the event-oriented National Cancer Incidence Reporting System that collected data from 1969-1991. The new CCR is regularly updated, is internally linked to track patients diagnosed with tumours in more than one province, and its records are linked to death certificates. Data from these series are published annually by Statistics Canada,<sup>18</sup> and by the North American Association of Central Cancer Registries,<sup>6</sup> every five years by the International Agency for Research on Cancer,<sup>12</sup> and in occasional reports.<sup>2,7,19</sup>

Every effort is made to count all newly diagnosed cases of cancer among people who reside in a given province at the time of diagnosis, and to accurately and consistently record for each case the site and histological type of cancer from pathology and other records, according to definitions in the CCR Data Dictionary. Cancer sites included in this report are defined according to the groupings listed in the *Glossary*. Although the provincial cancer registries strive, through the Canadian Council of Cancer Registries and its Standing Committee on Data Quality, to achieve uniformity in defining and classifying new cases, reporting procedures may still vary across the country. This is particularly true for skin cancer (other than melanoma), which occurs frequently but is difficult to register completely because it is usually treated successfully without requiring hospitalization or the review of a pathologic specimen. **For this reason, all tables in this monograph exclude the estimated 66,000 cases of non-melanoma skin cancer for Canada in 1999.\*** Registration levels for cancer have become more comparable across the country, particularly in the period between 1981 and the mid-1980s, as registries standardized their procedures for case-finding, including linkage to provincial mortality data files.

Cancer mortality statistics are derived from death records maintained by the provincial and territorial registrars of vital statistics for persons resident in that province or territory at the time of death. Cancer deaths are those attributed to some form of cancer as the underlying cause of death by the certifying physician.

\* The number of new cases of non-melanoma skin cancer is estimated using incidence rates from the cancer registry in British Columbia, which is considered to have the most complete data. Please refer to Appendix I: Methods for further details.



Although these procedures have been standardized both nationally and internationally, some lack of uniformity is inevitable. The description of the type of cancer provided on the death certificate is usually less precise than that obtained by the cancer registries from hospital and pathology records. Also, cancer deaths occurring in a given year will usually be the result of cancers diagnosed in previous years.

### Estimates for Cancer Incidence and Mortality, Canada, 1999

An estimated 129,300 new cases of cancer and 63,400 deaths from cancer will occur in Canada in 1999. Men outnumber women for both new cases and deaths, as shown by sex ratios (male:female) of 1.1 for both incidence and mortality (Table 1).

Three types of cancer account for at least 50% of the new cases in each sex: prostate, lung, and colorectal cancers in males, and breast, lung, and colorectal cancers in females. Almost one-third of the cancer deaths in men, and almost one-quarter in women are due to lung cancer alone (Figures 1.1 and 1.2).

Lung cancer will continue as the leading cause of cancer death among Canadian women in 1999, accounting for an estimated 6,800 deaths compared to the 5,400 deaths expected for breast cancer. This results from the rapid increase in lung cancer mortality rates among women over the past decade, while breast cancer mortality has declined slightly. Lung cancer incidence among women also continues to rise. With an estimated 8,500 new cases, lung cancer is the second leading form of cancer incidence, just ahead of the 7,800 new cases expected for colorectal cancer, which ranks third. Lung cancer incidence is still slightly less than one-half of breast cancer which remains the leading cancer in terms of incidence among Canadian women.

Among Canadian men in 1999, prostate cancer will continue as the leading form of cancer in terms of incidence, with an estimated 16,600 newly diagnosed cases compared to 12,000 lung cancers. The past rapid increase in the numbers of prostate cancers detected in all provinces across Canada was a result of the widespread rise in the use of earlier detection techniques. The downturn in new cases recently seen in some provinces indicates that the recent increases in prostate cancer incidence will not continue. To reflect this, the number of new prostate cancer cases was derived from an earlier period (see *Appendix I: Methods*) and can be viewed as a conservative estimate of the number expected in 1999.

Lung cancer will remain the leading cause of cancer death among Canadian men in 1999; the estimated 10,600 lung cancer deaths far exceed the 4,100 deaths due to prostate cancer, the second leading cause of male cancer death.

### Deaths to Cases Ratio

The ratio of deaths to new cases, at 49% overall, is slightly higher in males than in females. Based on these ratios, the cancer sites listed in Table 1 can be classified into three groups: those with a very good prognosis (a ratio of 30% or less — breast, prostate, female oral, body of the uterus, testis, melanoma, cervix, Hodgkin's disease, thyroid and male bladder); those with a fairly good prognosis (a ratio greater than 30% but less than 50% — colorectal, non-Hodgkin's lymphoma, female bladder, kidney, male oral and larynx); and those with a poor prognosis (ratio greater than 50% — lung, adult leukemia, pancreas, stomach, ovary, brain, multiple myeloma and esophagus).

## CURRENT INCIDENCE AND MORTALITY

**Table 1**

**Estimated New Cases and Deaths for Selected Cancer Sites by Sex, Canada, 1999**

	New Cases 1999 Estimates			Deaths 1999 Estimates			Deaths/Cases ratio 1999 Estimates		
	Total	M	F	Total	M	F	Total	M	F
<b>All Cancers</b>	<b>129,300</b>	<b>66,500</b>	<b>62,800</b>	<b>63,400</b>	<b>33,600</b>	<b>29,800</b>	<b>0.49</b>	<b>0.51</b>	<b>0.47</b>
Lung	20,500	12,000	8,500	17,400	10,600	6,800	0.85	0.88	0.80
Breast	18,700	-	18,700	5,400	-	5,400	0.29	-	0.29
Prostate <sup>1</sup>	16,600	16,600	-	4,100	4,100	-	0.25	0.25	-
Colorectal	16,600	8,800	7,800	6,300	3,400	3,000	0.38	0.38	0.38
Non-Hodgkin's Lymphoma	5,800	3,200	2,600	2,500	1,300	1,200	0.43	0.42	0.46
Bladder	4,800	3,600	1,250	1,400	980	440	0.29	0.27	0.35
Kidney	3,800	2,400	1,450	1,400	830	550	0.37	0.35	0.38
Melanoma	3,500	1,850	1,650	770	460	310	0.22	0.25	0.19
Body of Uterus	3,400	-	3,400	650	-	650	0.19	-	0.19
Leukemia	3,300	1,900	1,450	2,100	1,200	910	0.63	0.63	0.63
Oral	3,200	2,200	990	1,050	730	300	0.32	0.33	0.30
Pancreas	3,000	1,450	1,550	3,100	1,500	1,600	1.03 <sup>2</sup>	1.03 <sup>2</sup>	1.03 <sup>2</sup>
Stomach	2,800	1,750	1,050	2,000	1,200	800	0.72	0.69	0.77
Ovary	2,600	-	2,600	1,500	-	1,500	0.58	-	0.58
Brain	2,300	1,250	1,000	1,500	860	650	0.66	0.67	0.64
Thyroid	2,000	460	1,550	160	55	100	0.08	0.12	0.07
Multiple Myeloma	1,700	920	760	1,200	630	570	0.71	0.69	0.75
Cervix	1,500	-	1,500	420	-	420	0.29	-	0.29
Esophagus <sup>2</sup>	1,300	910	410	1,350	990	380	1.03 <sup>2</sup>	1.09 <sup>2</sup>	0.91
Larynx	1,250	1,050	240	530	430	95	0.41	0.42	0.40
Hodgkin's Disease	840	460	380	130	70	60	0.16	0.16	0.16
Testis	800	800	-	40	40	-	0.05	0.05	-
All Other Sites	9,000	4,900	4,100	8,400	4,300	4,100	0.93	0.88	0.99

- Not applicable

<sup>1</sup> The number of new prostate cases was estimated based on data years 1980-1989. Please refer to Appendix I: Methods for further details.

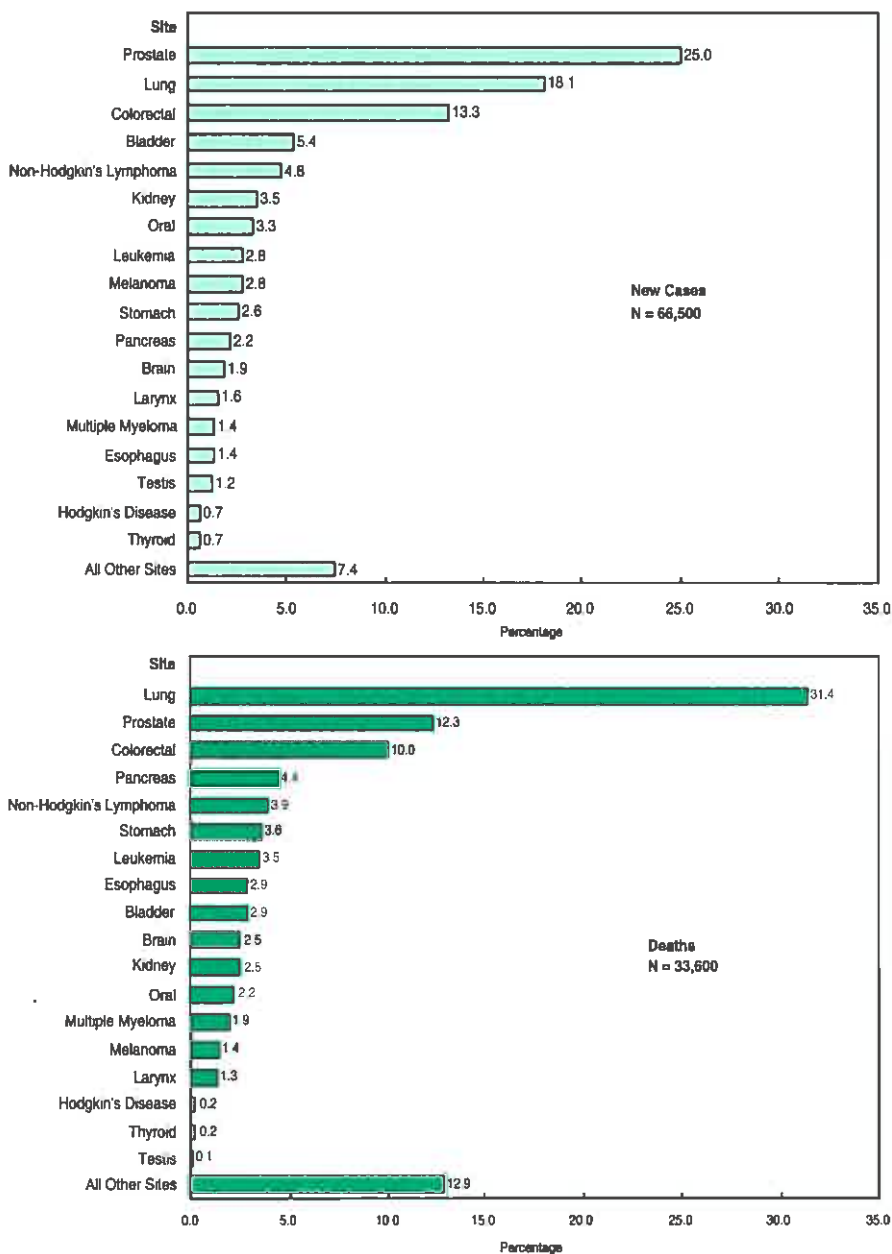
<sup>2</sup> The high ratio (in excess of 1.0) for cancers of esophagus and pancreas may result from incomplete registration of this cancer before death, or may be due to incorrect reporting of this cancer on death certificates.

**Note:** Incidence figures exclude an estimated 66,000 new cases of non-melanoma skin cancer (ICD-9 173).

**Source:** Cancer Bureau, LCDC, Health Canada

**Figure 1.1**

**Percentage Distribution of Estimated New Cases and Deaths for Selected Cancer Sites, Males, Canada, 1999**



**Note:** Incidence figures exclude an estimated 66,000 new cases of non-melanoma skin cancer (ICD-9 173).

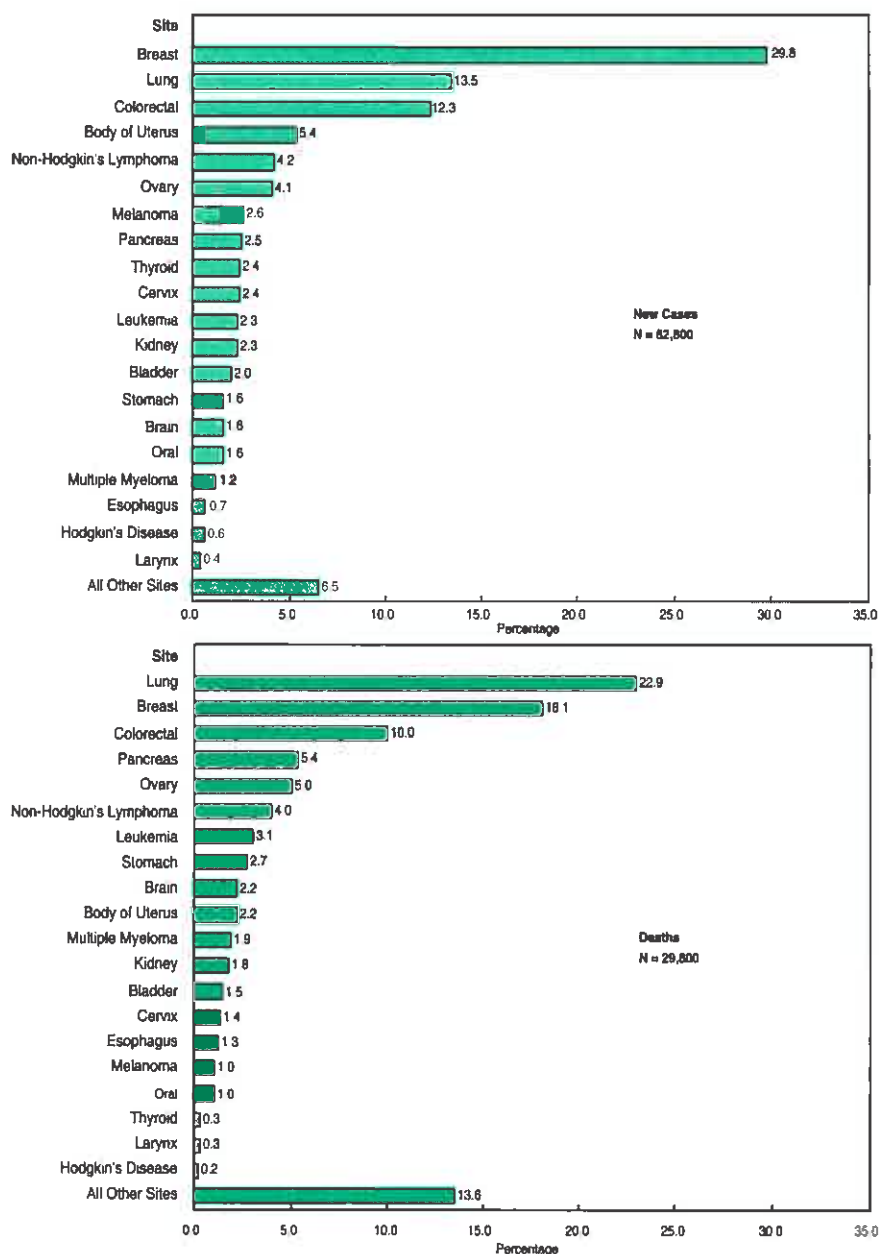
**Source:** Cancer Bureau, LCDC, Health Canada



## CURRENT INCIDENCE AND MORTALITY

**Figure 1.2**

**Percentage Distribution of Estimated New Cases and Deaths for Selected Cancer Sites, Females, Canada, 1999**



**Note:** Incidence figures exclude an estimated 66,000 new cases of non-melanoma skin cancer (ICD-9 173).

**Source:** Cancer Bureau, LCDC, Health Canada

## GEOGRAPHIC PATTERNS OF CANCER OCCURRENCE

Table 2 presents population projections and estimates of new cases and deaths for all cancer sites combined, by sex and by province or territory for 1999. Tables 3 and 4 present estimates of the number of new cases and the age-standardized incidence rates for each of the major cancer sites, by sex and by province for 1999. The age-standardized estimates take into consideration the differences in provincial age distributions, thus facilitating inter-provincial comparisons. Similarly, Tables 5 and 6 present estimates of the number of deaths and the age-standardized mortality rates for each of the major cancer sites, by sex and by province for 1999. The calculation of standardized rates using the 1991 Canadian population as the standard is described in the *Glossary*.

Data on provincial numbers and rates of incident cancer cases and cancer deaths provide valuable information for research, knowledge synthesis, planning and decision making at the provincial level. These data are therefore of interest to researchers, health care workers, planners and policy-makers. Inevitably, these data will be used for interprovincial comparisons. While the incidence rates for some cancers appear to be consistent across jurisdictions (e.g. breast), the rates for others (e.g. prostate) appear to vary more widely. Interpretation of these variations must be done with caution, however, because a variety of reasons could account for these observations. First, if the cancer is rare, the number of cases occurring annually in a given province may be so small that rate estimates may be unreliable. Second, correlations found between the incidence of disease and the prevalence of risk factors for a given geographical location can be misleading. Proof of a causal association between a risk factor and a disease necessitates more detailed studies of individuals. Third, for many cancers, there is a long interval between exposure to a risk factor and the occurrence of disease and often the information on the prevalence of risk factors from previous decades is inadequate. Fourth, the availability of screening programs (e.g. breast) differs between provinces and the availability of diagnostic procedures may differ regionally. Finally, there may be differences in the reporting procedures used in cancer registration. Nevertheless, these comparisons may prove useful in some instances for generating hypotheses which lead to further epidemiologic studies, which may reveal true differences and causal associations that have significant importance for cancer control planning.

## GEOGRAPHIC PATTERNS OF CANCER OCCURRENCE

**Table 2**

**Estimated Population, New Cases and Deaths for All Cancers by Sex, Canada and Provinces/Territories, 1999**

Province	Population (000s) 1999 Estimates <sup>1</sup>			New Cases 1999 Estimates <sup>2</sup>			Deaths 1999 Estimates <sup>2</sup>		
	Total	M	F	Total	M	F	Total	M	F
<b>Canada<sup>3</sup></b>	<b>31,128</b>	<b>15,411</b>	<b>15,718</b>	<b>129,300</b>	<b>66,500</b>	<b>62,800</b>	<b>63,400</b>	<b>33,600</b>	<b>29,800</b>
Newfoundland	580	290	290	2,100	1,150	960	1,200	680	500
Prince Edward Island	136	67	69	660	330	330	340	190	150
Nova Scotia	947	467	480	4,700	2,500	2,200	2,400	1,350	1,100
New Brunswick	765	378	387	3,600	2,100	1,550	1,750	960	800
Quebec	7,606	3,751	3,855	33,500	17,500	16,000	16,900	9,100	7,800
Ontario	11,891	5,877	6,014	48,600	24,400	24,200	23,400	12,200	11,200
Manitoba	1,148	569	579	5,300	2,700	2,600	2,500	1,300	1,200
Saskatchewan	1,005	499	506	4,200	2,200	2,000	2,200	1,250	1,000
Alberta	2,903	1,453	1,450	9,800	4,900	4,900	4,700	2,500	2,200
British Columbia	4,040	2,005	2,035	16,500	8,600	7,900	7,800	4,100	3,700
Yukon	37	19	18	85	40	40	40	20	20
Northwest Territories	70	36	34	120	60	60	85	50	40

<sup>1</sup> 1999 population projections were provided by the Census and Demographics Branch, Statistics Canada.

<sup>2</sup> Figures exclude non-melanoma skin cancer (ICD-9 173).

<sup>3</sup> Canada totals may not add due to rounding.

Source: Cancer Bureau, LCDC, Health Canada

## GEOGRAPHIC PATTERNS OF CANCER OCCURRENCE

**Table 3**

**Estimated New Cases for Major Cancer Sites by Sex, Canada and Provinces, 1999**

	New Cases										
	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
<b>Males</b>											
<b>All Cancers</b>	<b>66,500</b>	<b>1,150</b>	<b>330</b>	<b>2,500</b>	<b>2,100</b>	<b>17,500</b>	<b>24,400</b>	<b>2,700</b>	<b>2,200</b>	<b>4,900</b>	<b>8,600</b>
Prostate	16,600	270	100	550	610	3,700	6,100	700	610	1,300	2,700
Lung	12,000	150	60	450	370	4,000	4,100	450	340	810	1,300
Colorectal	8,800	230	40	310	240	2,200	3,400	360	300	660	1,050
Bladder	3,600	90	15	170	110	1,350	1,050	150	170	160	320
Non-Hodgkin's Lymphoma	3,200	35	15	100	95	810	1,200	130	110	240	400
Kidney	2,400	45	15	75	75	600	900	100	75	210	270
Oral	2,200	80	10	75	45	580	810	100	80	170	260
Leukemia	1,900	20	5	45	40	490	750	65	100	170	190
Melanoma	1,850	45	10	80	65	250	740	75	65	200	310
Stomach	1,750	55	10	70	55	450	620	70	55	130	220
Pancreas	1,450	10	10	40	50	390	510	60	50	130	180
Brain	1,250	15	5	40	25	350	490	45	35	100	160
Larynx	1,050	15	10	30	35	390	350	35	20	50	110
Multiple Myeloma	920	15	10	35	15	270	350	45	25	60	110
<b>Females</b>											
<b>All Cancers</b>	<b>62,800</b>	<b>960</b>	<b>330</b>	<b>2,200</b>	<b>1,550</b>	<b>16,000</b>	<b>24,200</b>	<b>2,600</b>	<b>2,000</b>	<b>4,900</b>	<b>7,900</b>
Breast	18,700	330	85	550	510	4,500	7,400	680	650	1,500	2,500
Lung	8,500	75	40	240	210	2,500	3,000	350	230	620	1,150
Colorectal	7,800	170	50	300	210	2,100	3,000	310	250	500	910
Body of Uterus	3,400	65	15	110	70	830	1,300	160	110	290	420
Ovary	2,600	30	10	80	45	700	1,000	95	100	160	350
Non-Hodgkin's Lymphoma	2,600	40	15	95	90	640	1,050	110	85	200	310
Melanoma	1,650	45	10	60	45	280	620	60	55	200	260
Pancreas	1,550	5	10	55	50	420	560	65	60	150	190
Thyroid	1,550	40	5	35	40	290	770	40	25	120	170
Cervix	1,500	25	10	65	35	290	600	60	65	140	180
Kidney	1,450	30	10	55	45	350	550	60	50	130	160
Leukemia	1,450	15	5	40	35	380	600	55	70	110	140
Bladder	1,250	25	5	75	40	460	360	55	55	60	100
Stomach	1,050	40	5	30	25	300	360	40	35	75	130
Brain	1,000	5	5	25	25	300	410	40	40	75	100
Oral	990	10	5	30	20	220	420	45	30	65	150
Multiple Myeloma	760	5	5	15	15	210	310	25	30	50	95

**Note:** Canadian totals may not add due to rounding. New prostate cancer cases were estimated based on data years 1980-1989. The Canada and provincial totals for all cancers exclude an estimated 66,000 cases of non-melanoma skin cancer (ICD-9 173). Due to changes and improvements in source data and in methodology, the 1999 estimates may not be directly comparable to estimates published prior to 1995. Please refer to Appendix I: Methods for further details. These estimates may vary from actual figures. Please contact provincial cancer registries for the most current actual data.

**Source:** Cancer Bureau, LCDC, Health Canada

# GEOGRAPHIC PATTERNS OF CANCER OCCURRENCE

**Table 4**

**Estimated Age-Standardized Incidence Rates for Major Cancer Sites by Sex, Canada and Provinces, 1999**

	Rate per 100,000										
	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
<b>Males</b>											
<b>All Cancers</b>	<b>444</b>	<b>398</b>	<b>455</b>	<b>499</b>	<b>501</b>	<b>485</b>	<b>422</b>	<b>467</b>	<b>368</b>	<b>399</b>	<b>436</b>
Prostate	114	90	144	133	145	108	105	134	80	110	156
Lung	80	51	87	94	96	108	70	76	60	67	61
Colorectal	60	80	55	64	61	61	59	61	54	54	51
Bladder	22	33	23	35	30	37	18	25	28	10	12
Non-Hodgkin's											
Lymphoma	20	11	16	21	23	21	20	22	15	18	19
Kidney	16	15	20	15	18	16	15	21	13	16	13
Oral	14	28	7	15	11	15	13	17	14	12	12
Leukemia	12	5	8	9	11	14	13	11	14	13	9
Stomach	11	19	10	13	14	11	10	11	8	10	10
Melanoma	11	10	16	16	16	6	12	12	12	14	14
Pancreas	9	2	16	8	12	10	9	10	8	10	9
Brain	8	5	5	8	5	9	8	7	7	8	8
Larynx	6	5	8	5	9	10	6	6	3	3	5
Multiple Myeloma	6	4	10	7	4	7	6	7	4	4	5
<b>Females</b>											
<b>All Cancers</b>	<b>343</b>	<b>302</b>	<b>396</b>	<b>368</b>	<b>334</b>	<b>338</b>	<b>344</b>	<b>365</b>	<b>323</b>	<b>329</b>	<b>324</b>
Breast	105	97	106	108	107	96	105	117	103	101	102
Lung	45	23	50	51	45	50	42	48	36	42	46
Colorectal	39	53	68	46	37	41	40	39	33	33	35
Body of Uterus	18	20	14	19	15	17	19	23	18	20	17
Ovary	14	9	10	14	9	15	14	13	15	10	11
Non-Hodgkin's											
Lymphoma	14	11	15	15	18	13	15	15	12	13	13
Melanoma	9	11	12	11	9	6	9	11	9	13	11
Thyroid	9	9	8	6	9	7	11	8	6	8	7
Pancreas	8	2	5	9	9	8	7	7	7	10	7
Cervix	8	7	15	12	6	6	9	10	8	9	8
Kidney	8	8	8	9	10	7	8	10	8	8	7
Leukemia	7	4	4	6	7	8	8	8	10	8	6
Oral	6	3	1	5	5	5	6	6	4	4	6
Bladder	6	3	6	11	8	9	5	7	8	3	4
Brain	6	2	5	4	5	7	6	5	6	5	4
Stomach	5	12	5	4	4	6	5	4	4	4	5
Multiple Myeloma	4	2	5	2	3	4	4	3	4	3	4

**Note:** Rates for prostate cancer were estimated based on data years 1980-1989. Rates exclude non-melanoma skin cancer (ICD-9 173) and are adjusted to the age distribution of the 1991 Canadian population. (Prior to 1995, rates were adjusted to the World Standard Population.) For this reason, and due to changes and improvements in source data and in methodology, the 1999 estimates may not be directly comparable to estimates published prior to 1995. Please refer to Appendix I: Methods for further details.

**Source:** Cancer Bureau, LCDC, Health Canada

## GEOGRAPHIC PATTERNS OF CANCER OCCURRENCE

**Table 5**

**Estimated Deaths for Major Cancer Sites by Sex, Canada and Provinces, 1999**

	Deaths										
	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
<b>Males</b>											
<b>All Cancers</b>	<b>33,600</b>	<b>680</b>	<b>190</b>	<b>1,350</b>	<b>960</b>	<b>9,100</b>	<b>12,200</b>	<b>1,300</b>	<b>1,250</b>	<b>2,500</b>	<b>4,100</b>
Lung	10,600	230	55	450	330	3,400	3,500	370	340	700	1,200
Prostate	4,100	75	40	170	120	870	1,550	180	220	370	530
Colorectal	3,400	65	15	100	70	1,050	1,250	140	120	240	350
Pancreas	1,500	20	10	55	50	380	540	55	60	120	190
Non-Hodgkin's											
Lymphoma	1,300	20	5	60	40	300	520	60	55	95	160
Stomach	1,200	45	5	45	40	360	400	45	40	65	140
Leukemia	1,200	10	5	35	25	290	480	50	50	95	150
Bladder	980	25	5	35	25	250	350	40	45	70	130
Brain	860	10	5	35	25	250	280	35	30	75	110
Kidney	830	25	5	35	30	220	270	40	30	65	100
Oral	730	15	5	25	15	230	250	25	20	50	90
Multiple Myeloma	630	10	5	30	20	150	230	30	25	45	90
Melanoma	460	5	5	20	10	80	210	20	15	40	60
Larynx	430	5	5	15	15	160	140	15	15	20	40
<b>Females</b>											
<b>All Cancers</b>	<b>29,800</b>	<b>500</b>	<b>150</b>	<b>1,100</b>	<b>800</b>	<b>7,800</b>	<b>11,200</b>	<b>1,200</b>	<b>1,000</b>	<b>2,200</b>	<b>3,700</b>
Lung	6,800	95	45	250	150	1,900	2,400	220	240	530	970
Breast	5,400	95	25	200	150	1,450	2,100	200	170	420	610
Colorectal	3,000	45	20	100	65	1,000	1,050	120	110	160	290
Pancreas	1,600	25	15	65	55	400	570	65	70	140	220
Ovary	1,500	25	5	50	35	350	560	75	55	130	200
Non-Hodgkin's											
Lymphoma	1,200	15	10	55	35	260	470	65	55	80	160
Leukemia	910	15	5	35	20	220	360	40	45	70	100
Stomach	800	30	5	30	20	250	260	35	25	60	90
Body of Uterus	650	10	5	25	20	180	250	30	15	50	65
Brain	650	5	5	20	20	200	230	30	20	45	90
Multiple Myeloma	570	15	-	20	10	150	220	25	20	45	60
Kidney	550	10	5	15	25	160	180	35	30	35	60
Bladder	440	5	-	15	15	110	160	20	15	30	65
Cervix	420	10	5	20	10	85	170	20	10	40	55
Melanoma	310	5	-	5	5	60	140	10	10	30	40
Oral	300	5	-	10	5	65	120	20	10	25	40

- Fewer than 5 cases

**Note:** Canadian totals may not add due to rounding. The Canada and provincial totals for all cancers exclude non-melanoma skin cancer (ICD-9 173). Due to changes and improvements in source data and in methodology, the 1999 estimates may not be directly comparable to estimates published prior to 1995. Please refer to Appendix I: Methods for further details. These estimates may vary from actual figures.

**Source:** Cancer Bureau, LCDC, Health Canada



# GEOGRAPHIC PATTERNS OF CANCER OCCURRENCE

**Table 6**

**Estimated Age-Standardized Mortality Rates for Major Cancer Sites by Sex, Canada and Provinces, 1999**

	Rate per 100,000										
	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
<b>Males</b>											
<b>All Cancers</b>	<b>228</b>	<b>261</b>	<b>271</b>	<b>275</b>	<b>252</b>	<b>258</b>	<b>219</b>	<b>221</b>	<b>216</b>	<b>208</b>	<b>199</b>
Lung	70	86	81	92	88	94	61	62	60	59	57
Prostate	30	29	42	36	32	28	30	30	37	33	26
Colorectal	23	25	19	21	17	30	22	23	21	20	17
Pancreas	10	7	11	11	12	10	10	8	10	9	9
Non-Hodgkin's											
Lymphoma	9	6	10	11	10	8	9	10	9	7	8
Stomach	8	17	10	9	7	10	7	7	6	5	7
Leukemia	8	5	7	6	6	8	9	8	8	8	7
Bladder	7	9	5	8	6	8	6	6	7	6	6
Kidney	6	9	6	7	8	6	5	9	5	5	5
Oral	5	5	5	5	4	6	4	5	3	4	4
Brain	5	3	4	7	5	7	5	5	6	5	5
Multiple Myeloma	4	5	6	6	4	4	4	5	4	4	4
Larynx	3	2	3	3	3	4	2	2	3	2	2
Melanoma	3	1	5	4	3	2	3	3	2	3	3
<b>Females</b>											
<b>All Cancers</b>	<b>152</b>	<b>153</b>	<b>167</b>	<b>172</b>	<b>159</b>	<b>157</b>	<b>150</b>	<b>158</b>	<b>142</b>	<b>147</b>	<b>142</b>
Lung	36	27	52	41	38	38	33	39	34	35	37
Breast	28	29	23	30	29	29	28	26	25	27	23
Colorectal	14	13	16	15	12	19	13	14	9	10	10
Pancreas	8	7	13	10	9	8	7	7	8	9	8
Ovary	8	7	5	8	7	7	8	10	7	8	8
Non-Hodgkin's											
Lymphoma	6	5	6	8	7	5	6	8	7	5	6
Stomach	4	8	2	4	4	5	3	3	3	3	3
Brain	4	1	3	2	4	4	3	4	3	3	4
Leukemia	4	5	1	5	3	4	5	4	6	5	4
Body of Uterus	3	3	3	4	4	3	3	4	2	3	2
Multiple Myeloma	3	4	1	3	2	3	3	3	2	3	2
Kidney	3	2	2	2	4	3	2	4	4	2	2
Melanoma	2	-	1	1	1	1	2	2	1	2	2
Cervix	2	3	3	3	1	2	2	2	1	3	2
Bladder	2	2	-	1	2	2	2	3	2	2	2
Oral	1	-	1	2	-	1	2	2	1	2	1

- Estimated age-standardized mortality rate is fewer than 0.5 per 100,000

**Note:** Rates exclude non-melanoma skin cancer (ICD-9 173) and are adjusted to the age distribution of the 1991 Canadian population. (Prior to 1995, rates were adjusted to the World Standard Population.) For this reason, and due to changes and improvements in source data and in methodology, the 1999 estimates may not be directly comparable to estimates published prior to 1995. Please refer to Appendix I: Methods for further details.

**Source:** Cancer Bureau, LCDC, Health Canada

## TRENDS IN INCIDENCE AND MORTALITY

**R**ecent trends in incidence and mortality for major types of cancer are assessed by comparing annual age-standardized rates. Figure 2 presents the number of new cases and deaths, together with the corresponding age-standardized rates for Canadian men and women from 1970-1994 with estimates to year 1999. Detailed depictions of the trends in annual rates for selected sites since 1970 are presented in Figures 3 and 4, with the data points provided in Tables 7 and 8. The average annual percent changes in site-specific incidence and mortality rates since 1986 are listed in Table 9 and plotted in Figure 5.

The process of age-standardization permits comparisons between calendar years, since it accounts for changes that have occurred over time in the age distribution of the population. Rates in this publication have been standardized to the 1991 Canadian population and cannot be compared directly to those in editions prior to 1995. Note also that the rapid increase in incidence rates throughout the 1970s displayed in Figure 2 largely reflects improved registration of new cases during this period in several provincial registries. Registration levels, however, have generally stabilized since 1981 due to increasing consistency of cancer reporting procedures across Canada.<sup>2,18</sup>

### All Sites

Among men, the cancer mortality rate, after reaching a peak in 1988 (Figure 2.2, Table 7.2), is declining slowly due to decreases in mortality rates for lung, colorectal and other cancers. In contrast, the cancer incidence rate rose slightly in the early 1990s due to the sharp increase in incidence of prostate cancer and more recently has begun to level off or decline slightly. Among women, however, trends in cancer incidence and mortality rates have remained relatively stable since 1985 (Figure 2, Table 8).

Figure 2 shows that despite the relative stability in the age-standardized rates, the numbers of new cases and deaths continue to rise steadily as the Canadian population ages. The numbers of new cases and deaths, as opposed to rates, are an important measure of the cancer burden on the Canadian population and health care system. In 1999, the number of new cases is estimated to be 129,300, and the number of new deaths to be 63,400. These numbers can be used to plan patient services and health care facilities to meet the increasing demand.

Figure 6 plots an index of age-standardized mortality rates since 1971 for all sites combined and for all sites excluding lung cancer. Among men, lung cancer was responsible for the increase in cancer mortality rates until overall rates peaked in 1988. Since then, overall cancer mortality rates among men declined by similar percentages, whether or not lung cancer rates were included. Among women, the index shows that overall cancer mortality rates varied less than three percent between 1971 and 1984. However, cancer mortality for all sites other than lung cancer dropped by 15 percent since 1971.

## Trends by Selected Sites

Time trends of incidence and mortality rates since 1970 for selected cancer sites are shown for men in Figures 3.1 and 3.2 and for women in Figures 4.1 and 4.2, with the corresponding data points tabulated in Tables 7.1, 7.2, 8.1 and 8.2. Average annual percent changes for the set of cancer sites examined in this publication are summarized in Table 9 and Figure 5. In general, incidence and mortality rates for the majority of cancer sites have stabilized or declined during the past decade, with some notable exceptions.

Among women, lung cancer incidence and mortality rates continue their rapid increase and are now almost five times as high as rates in 1970. Estimated rates for lung cancer incidence and mortality among women in 1999 are about half as high as those for men. In contrast, among men, lung cancer rates levelled off in the mid-1980s and have since consistently declined, reflecting men's drop in tobacco consumption beginning in the mid-1960s. Among women, however, smoking rates declined only slightly in the past three decades.<sup>11</sup>

After years of steady increases, incidence rates for prostate cancer rose particularly sharply from 1989 to 1993. By contrast, mortality rates have risen since 1985, but at a much slower rate, and this increase appears to have stabilized in the early 1990s. Increased incidence of prostate cancer prior to 1990 is at least partly due to increased detection of cancers following trans-urethral resection of the prostate (TURP) for suspected benign prostatic hypertrophy.<sup>9</sup> The sharp increase since 1990 is predominantly the result of increased early detection using PSA (determination of the prostate specific antigen level).<sup>8</sup> This rate is now starting to show a decline (expected on theoretical grounds and illustrated by the experience to date in the United States<sup>23</sup>) probably because early detection has now exhausted the pool of prevalent cancers in the population. Despite the sharp increase in incidence it is especially relevant to note that, at this time, there has not been any substantial associated change in mortality rates, i.e. the increase in incidence has not had a significant impact on mortality in either a positive or a negative direction. To reflect these patterns, a conservative estimate for prostate cancer incidence was derived from rates in an earlier period (see *Appendix I: Methods*). Other methods of early detection that have been considered include digital rectal examination and transrectal ultrasonography.<sup>4</sup> While much of the past increase in incidence is likely due to early detection, changes in risk or protective factors might also account for some of the increases. However, no such factors have yet been identified that could explain these changes.<sup>8</sup>

Breast cancer incidence among women also rose steadily over the past decade; this increase may be due, in part, to the rising number of mammographic examinations since the mid-1980s, but may also be affected by reproductive histories. However, while incidence is rising, mortality rates for breast cancer declined slightly since 1985 and particularly since 1990. The most recent actual data of 1996 showed the breast cancer mortality rate similar to 1995 and to be at its lowest since 1950.<sup>5</sup> Similar declines are also occurring in the United States, the United Kingdom, and Australia.<sup>5</sup> Further research is needed to determine whether early detection through screening, improved treatment, or changes in risk or protective factors are responsible for this decline.

## TRENDS IN INCIDENCE AND MORTALITY

Of all of the cancers analysed in this report, the incidence of just one cancer among men and two cancers among women have increased at an average rate greater than 2 percent annually since 1987 (Figure 5). These were cancers of the prostate (6.9%) among men, and lung (2.6%) and thyroid cancer (5.9%) among women. The increasing rate of thyroid cancer is largely unexplained but has also been noted in Europe and parts of the U.S. As modern treatment achieves normal survival in the majority of patients it is unlikely that the mortality rate will increase. The only other cancer showing a significant increase, but of less than 2 percent annually, was non-Hodgkin's lymphoma.

For mortality, lung cancer among women increased at 2.9% per year and melanoma skin cancer among men at 2.3% per year – the only causes of cancer death where the average annual percent change exceeded 2.0%. Only one other cancer – non-Hodgkin's lymphoma – showed a statistically significant increase in mortality (1.3% among men and 1.4% among women).

Rates for many other cancer sites generally declined. Incidence and mortality rates for colorectal cancer continue to decrease, particularly among women, although the reasons are not completely understood. Some evidence suggests that lifestyle changes such as diet may have contributed to the declines. In addition, consensus is emerging internationally about the benefits of population-based screening for colorectal cancer. This is under consideration in Canada at both provincial and national levels. However, casual screening is already prevalent in Canada and may have contributed to the reduction in mortality rates. This can best be evaluated by the establishment and evaluation of organized screening programs.

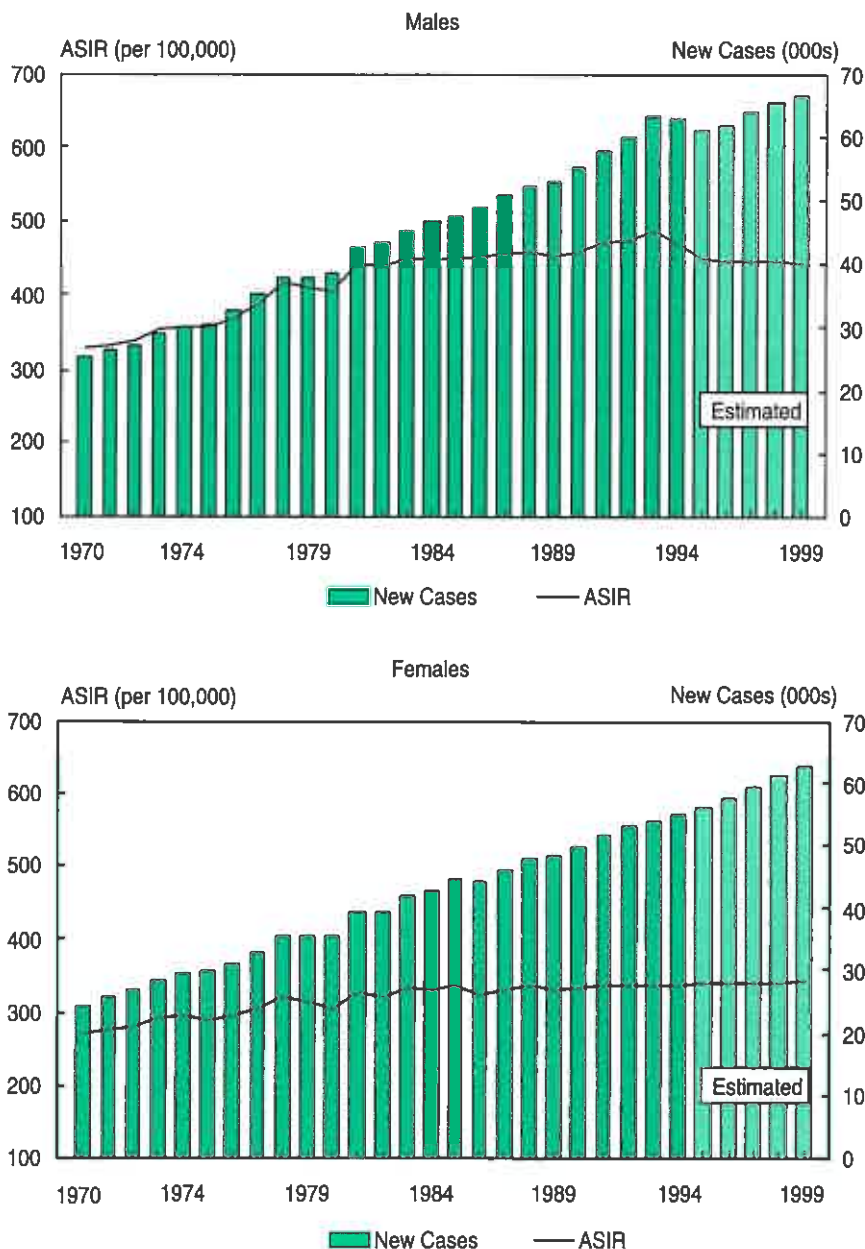
Rates of bladder cancer have declined since 1987 by about 2% per year for both men and women for incidence and by over 1% per year among men for mortality. Part of the decline in incidence can be attributed to changing reporting procedures among registries in Canada.<sup>18</sup> However, the fact that mortality is also declining, but at a slower pace, may indicate improved survival, or possibly a true decline in incidence.

Mortality rates have also dropped dramatically for testicular cancer and Hodgkin's disease as a result of improved treatment methods. The lower mortality has occurred despite stable or increasing incidence rates, indicating improved survival. Continuing large declines in incidence and mortality for stomach cancer may reflect improved diets, while lower rates of invasive cervical cancer may reflect the impact of early detection through Pap smear screening programs. Smaller, but statistically significant, declines in incidence and mortality also occurred for leukemia in both sexes, and oral cancers, cancers of the larynx, pancreas, and kidney (mortality) among men. Likewise small, but statistically significant declines in mortality rates have occurred in oral cancers, malignant brain tumours and body of the uterus among women.

## TRENDS IN INCIDENCE AND MORTALITY

**Figure 2.1**

**New Cases and Age-Standardized Incidence Rates (ASIR) for All Cancers, Canada, 1970-1999**

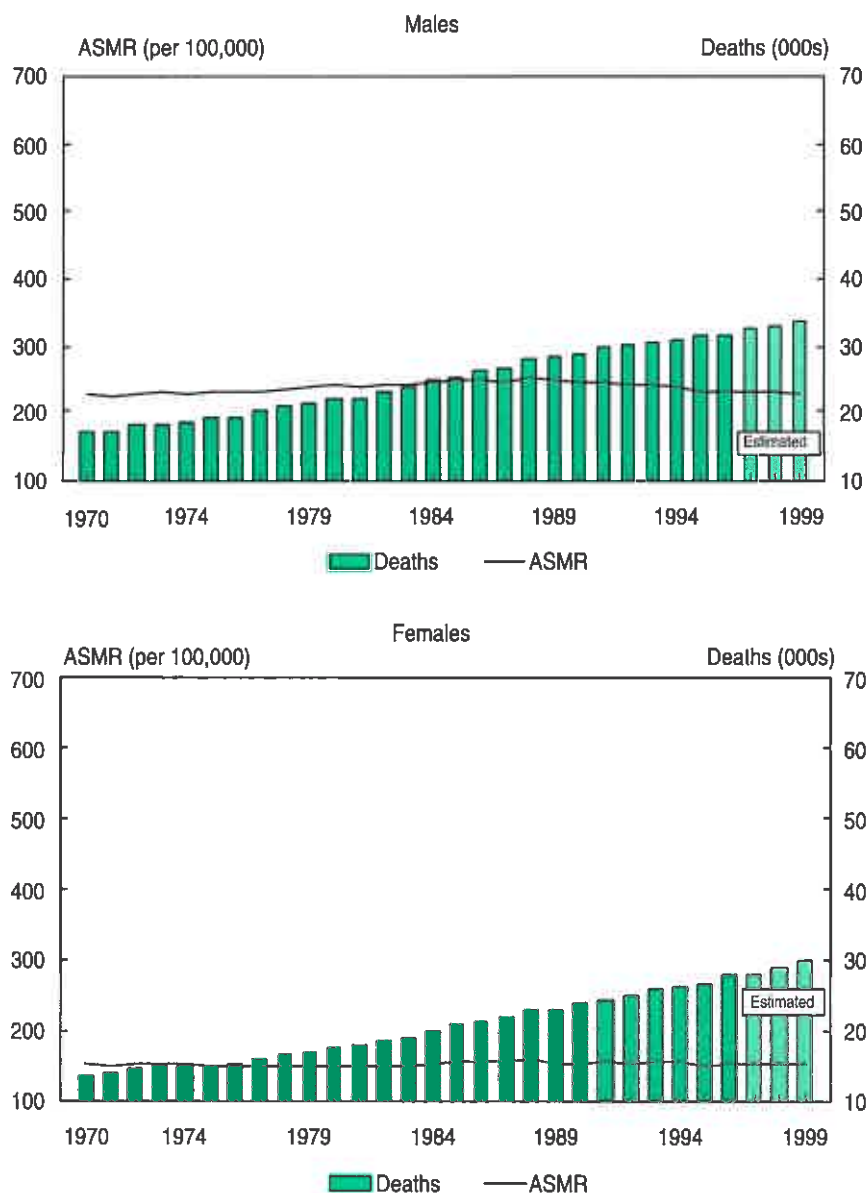


**Note:** All cancers exclude non-melanoma skin cancer (ICD-9 173). Rates are standardized to the 1991 Canadian population.  
**Source:** Cancer Bureau, LCDC, Health Canada

## TRENDS IN INCIDENCE AND MORTALITY

**Figure 2.2**

**Deaths and Age-Standardized Mortality Rates (ASMR) for All Cancers, Canada, 1970-1999**



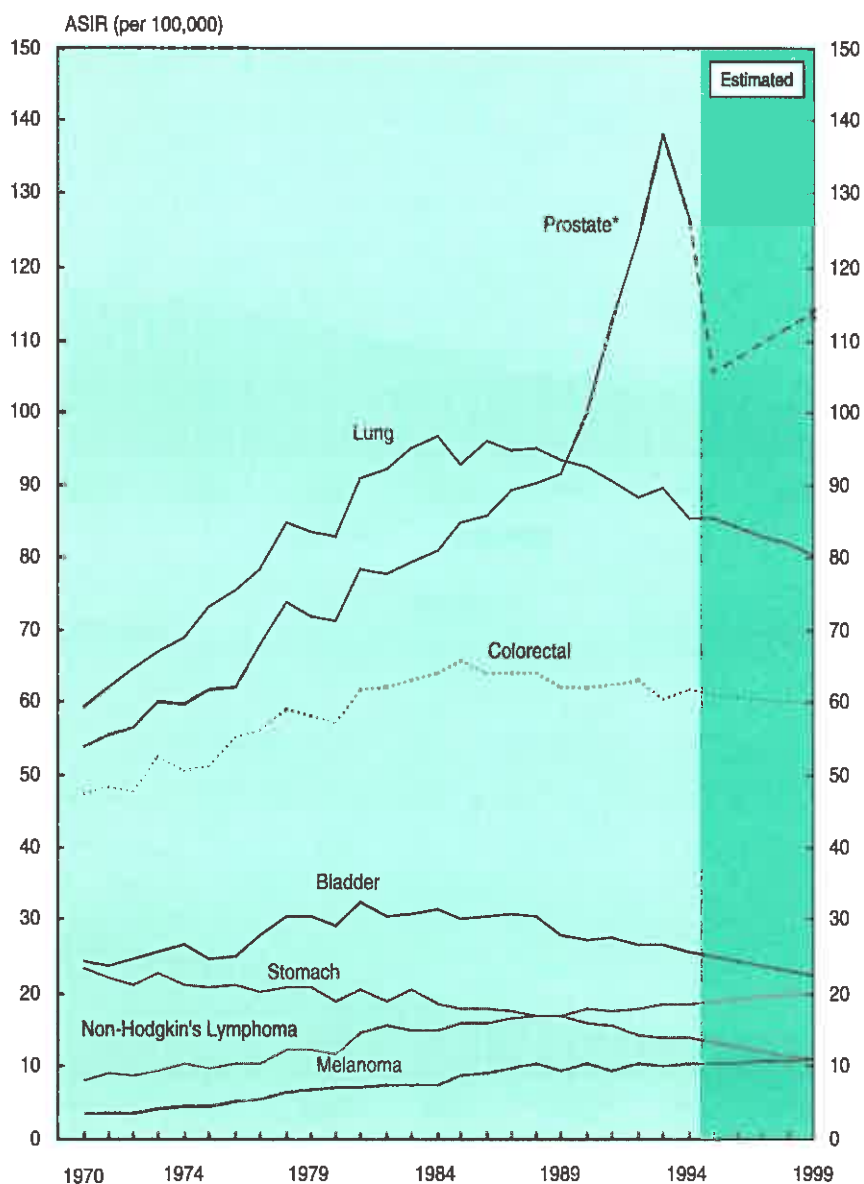
**Note:** All cancers exclude non-melanoma skin cancer (ICD-9 173). Rates are standardized to the 1991 Canadian population.  
**Source:** Cancer Bureau, LCDC, Health Canada



## TRENDS IN INCIDENCE AND MORTALITY

**Figure 3.1**

**Age-Standardized Incidence Rates (ASIR) for Selected Cancer Sites, Males, Canada, 1970-1999**



\* The rate for prostate cancer is based on data from 1980 to 1989. Please refer to Appendix I: Methods for further details.

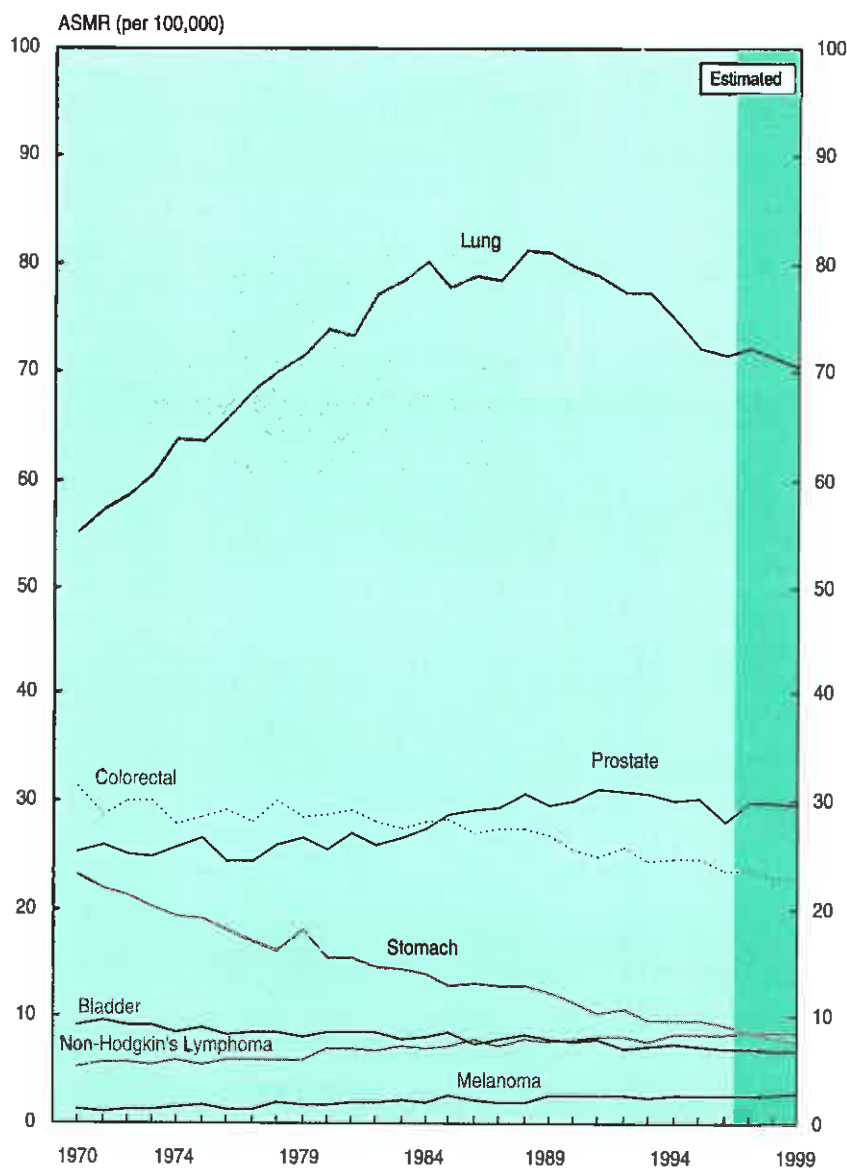
Note: Rates are standardized to the age distribution of the 1991 Canadian population. See Table 7.1 for data points.

Source: Cancer Bureau, LCDC, Health Canada

## TRENDS IN INCIDENCE AND MORTALITY

**Figure 3.2**

**Age-Standardized Mortality Rates (ASMR) for Selected Cancer Sites, Males, Canada, 1970-1999**

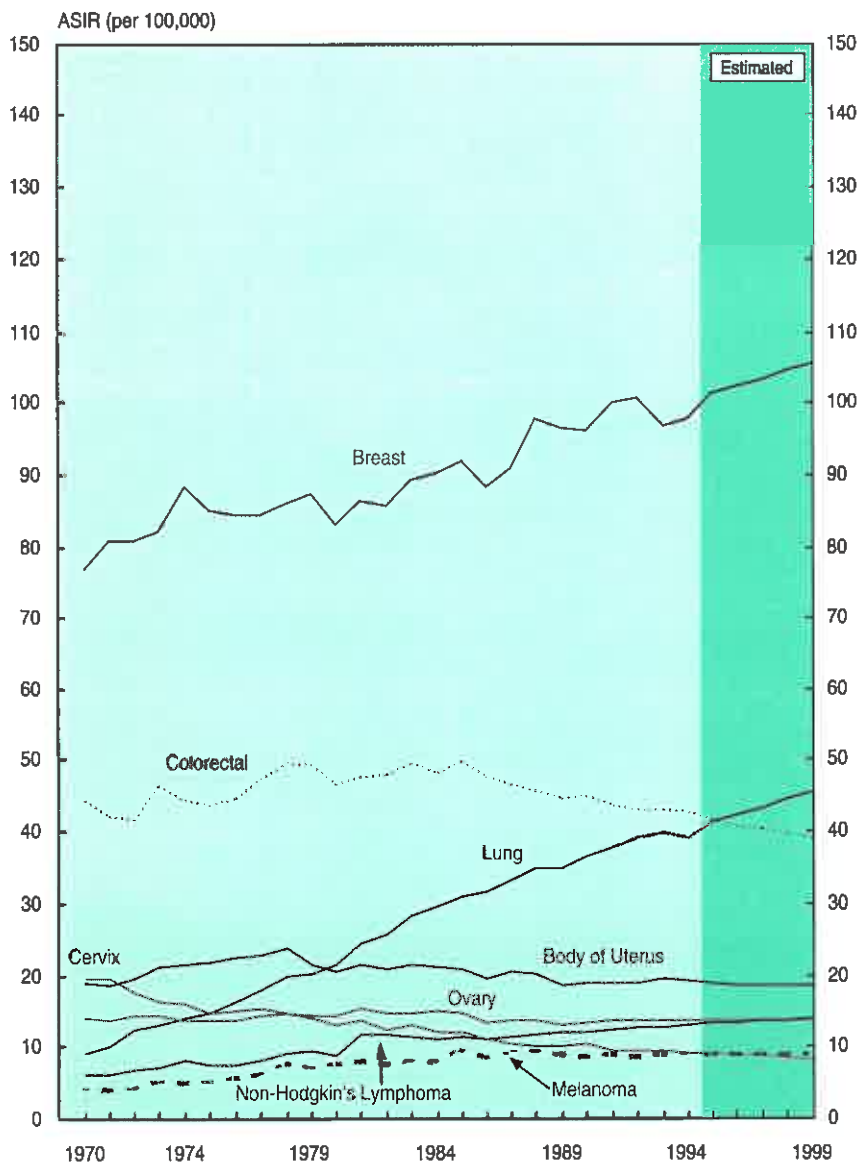


**Note:** Rates are standardized to the age distribution of the 1991 Canadian population. See Table 7.2 for data points.  
**Source:** Cancer Bureau, LCDC, Health Canada

## TRENDS IN INCIDENCE AND MORTALITY

**Figure 4.1**

**Age-Standardized Incidence Rates (ASIR) for Selected Cancer Sites, Females, Canada, 1970-1999**



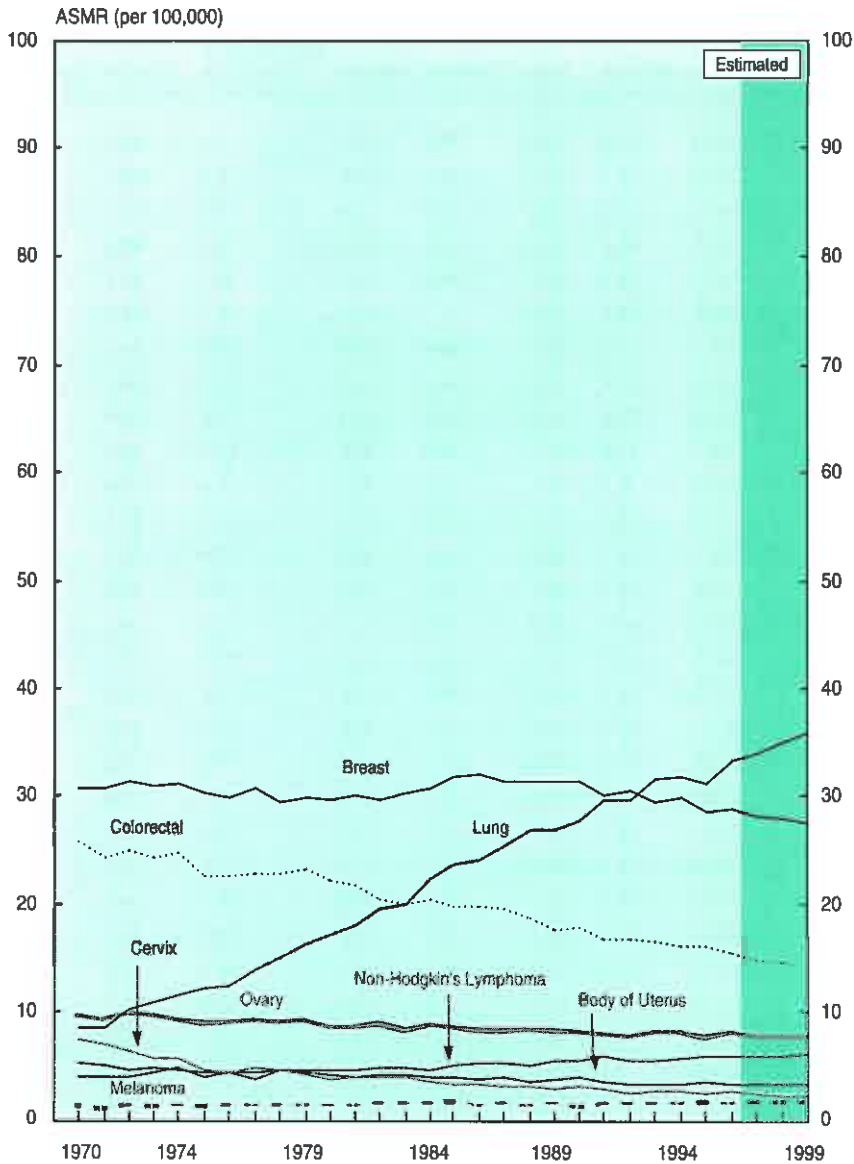
**Note:** Rates are standardized to the age distribution of the 1991 Canadian population. See Table 8.1 for data points.

**Source:** Cancer Bureau, LCDC, Health Canada

## TRENDS IN INCIDENCE AND MORTALITY

**Figure 4.2**

**Age-Standardized Mortality Rates (ASMR) for Selected Cancer Sites, Females, Canada, 1970-1999**



**Note:** Rates are standardized to the age distribution of the 1991 Canadian population. See Table B.2 for data points.

**Source:** Cancer Bureau, LCDC, Health Canada

# TRENDS IN INCIDENCE AND MORTALITY

**Table 7.1**

**Age-Standardized Incidence Rates for Selected Cancer Sites, Males, Canada, 1970-1999**

Year	Rate per 100,000							
	All Cancers	Prostate	Lung	Colorectal	Bladder	Non-Hodgkin's Lymphoma	Stomach	Melanoma
1970	330.3	53.8	59.5	47.5	24.4	7.9	23.4	3.4
1971	333.9	55.7	62.0	48.4	23.9	9.0	22.1	3.5
1972	337.6	56.6	64.3	47.7	24.4	8.6	21.1	3.5
1973	354.9	60.2	66.8	52.5	25.5	9.5	22.5	4.1
1974	358.9	59.8	68.8	50.6	26.4	10.1	21.1	4.5
1975	356.9	61.6	72.9	51.1	24.7	9.7	20.9	4.6
1976	371.0	62.0	75.5	55.2	25.0	10.1	21.1	5.1
1977	390.5	67.8	78.5	56.2	27.9	10.5	20.1	5.5
1978	416.3	73.8	85.0	59.2	30.5	12.5	20.8	6.4
1979	409.0	71.9	83.7	58.4	30.6	12.4	20.7	6.8
1980	405.5	71.3	83.1	57.2	29.1	11.6	19.0	6.9
1981	441.5	78.5	91.1	61.5	32.5	14.7	20.5	7.0
1982	440.1	77.7	92.5	61.8	30.3	15.6	18.7	7.5
1983	447.6	79.5	95.1	62.9	30.8	14.9	20.4	7.6
1984	449.3	80.8	97.0	63.9	31.7	14.9	18.3	7.4
1985	448.9	84.9	93.0	65.3	30.1	15.7	18.0	8.7
1986	451.0	85.9	96.2	63.7	30.5	15.9	18.0	9.0
1987	455.6	89.5	94.9	63.9	30.8	16.6	17.4	9.6
1988	458.0	90.4	95.4	63.7	30.3	17.0	17.0	10.4
1989	451.3	91.9	93.6	62.1	27.9	16.7	16.8	9.3
1990	457.7	99.9	92.7	62.2	27.2	17.6	15.8	10.1
1991	469.4	112.5	90.8	62.4	27.5	17.4	15.6	9.1
1992	474.7	124.2	88.5	63.0	26.6	17.7	14.4	10.2
1993	485.3	138.1	89.7	60.5	26.8	18.4	14.1	10.0
1994	470.5	126.8	85.5	61.7	25.7	18.5	13.8	10.5
1995*	447.4	..	85.5	61.0	24.9	18.8	13.1	10.4
1996*	446.5	..	84.3	60.7	24.3	19.1	12.6	10.5
1997*	445.6	..	83.0	60.3	23.7	19.4	12.0	10.6
1998*	444.7	..	81.7	60.0	23.1	19.7	11.5	10.7
1999*	443.8	113.9	80.5	59.7	22.4	20.0	10.9	10.8

.. Estimates not provided. Please refer to Appendix I: Methods for further details.

\* Estimated Rates

**Note:** The rate for prostate cancer was estimated based on data years 1980-1989. Please refer to Appendix I: Methods for further details. Rates exclude non-melanoma skin cancer (ICD-9 173) and are standardized to the age distribution of the 1991 Canadian population.

**Source:** Cancer Bureau, LCDC, Health Canada

## TRENDS IN INCIDENCE AND MORTALITY

**Table 7.2**

**Age-Standardized Mortality Rates for Selected Cancer Sites, Males, Canada, 1970-1999**

Year	Rate per 100,000							
	All Cancers	Lung	Prostate	Colorectal	Non-Hodgkin's Lymphoma	Stomach	Bladder	Melanoma
1970	228.4	55.1	25.4	31.4	5.3	23.2	9.0	1.3
1971	225.3	57.2	26.1	28.8	5.6	22.0	9.5	1.2
1972	227.7	58.6	25.2	30.0	5.6	21.1	9.1	1.4
1973	230.1	60.6	25.0	30.1	5.6	20.2	9.0	1.4
1974	228.6	63.8	25.8	28.0	5.9	19.4	8.4	1.6
1975	229.8	63.5	26.7	28.6	5.6	19.1	8.8	1.7
1976	229.6	65.6	24.6	29.2	6.0	18.1	8.3	1.5
1977	233.0	68.3	24.6	28.2	5.9	16.9	8.4	1.5
1978	235.9	70.0	26.0	30.1	5.9	16.0	8.3	1.9
1979	238.9	71.6	26.7	28.6	5.9	18.0	8.1	1.7
1980	240.3	73.8	25.7	28.9	7.0	15.5	8.6	1.7
1981	238.9	73.1	27.1	29.2	6.9	15.3	8.6	2.1
1982	243.2	77.3	25.9	28.2	6.8	14.6	8.3	2.1
1983	242.6	78.3	26.7	27.6	7.2	14.3	7.8	2.3
1984	247.4	80.1	27.4	28.2	7.0	13.9	8.0	2.1
1985	248.5	77.9	28.8	28.5	7.1	13.0	8.6	2.5
1986	248.5	78.8	29.3	27.2	7.7	13.1	7.4	2.3
1987	247.9	78.5	29.4	27.5	7.1	12.8	7.9	2.0
1988	254.5	81.2	30.7	27.5	7.8	12.8	8.3	2.1
1989	249.5	81.1	29.7	26.8	7.7	12.3	7.8	2.6
1990	246.6	79.6	30.1	25.7	7.9	11.3	7.5	2.6
1991	247.4	78.8	31.2	25.1	8.1	10.3	7.7	2.6
1992	244.0	77.4	30.9	25.9	8.1	10.7	6.9	2.6
1993	240.9	77.4	30.8	24.5	7.6	9.7	7.3	2.4
1994	238.9	74.8	30.2	24.7	8.3	9.6	7.5	2.7
1995	234.8	72.1	30.3	24.7	8.2	9.5	7.0	2.7
1996	231.2	71.6	28.1	23.8	8.3	9.2	7.0	2.5
1997*	232.4	72.2	29.9	23.5	8.4	8.4	6.9	2.8
1998*	230.4	71.3	29.8	23.2	8.5	8.0	6.8	2.8
1999*	228.5	70.4	29.8	22.8	8.6	7.6	6.8	2.9

\* Estimated Rates

**Note:** Rates are standardized to the age distribution of the 1991 Canadian population.

**Source:** Cancer Bureau, LCDC, Health Canada



# TRENDS IN INCIDENCE AND MORTALITY

**Table 8.1**

**Age-Standardized Incidence Rates for Selected Cancer Sites, Females, Canada, 1970-1999**

Year	Rate per 100,000									
	All Cancers	Breast	Lung	Colorectal	Body of Uterus	Non-Hodgkin's Lymphoma	Ovary	Melanoma	Cervix	Stomach
1970	272.0	77.0	9.3	44.2	18.9	6.2	14.1	4.1	19.4	11.2
1971	275.6	80.9	10.2	42.1	18.6	6.2	13.6	4.0	19.4	11.2
1972	279.8	81.0	12.4	41.9	19.5	6.9	14.2	4.1	17.8	10.1
1973	291.2	82.1	12.9	46.1	21.1	7.2	14.4	5.2	16.3	10.6
1974	294.5	88.1	14.0	44.3	21.5	8.0	13.8	5.0	16.1	9.9
1975	289.9	85.0	14.7	43.7	21.8	7.5	13.7	5.1	14.8	10.4
1976	294.6	84.5	16.3	44.5	22.7	7.5	13.9	5.6	15.2	9.3
1977	305.7	84.3	17.9	47.1	23.0	8.3	14.4	6.0	15.4	9.3
1978	319.0	86.0	20.0	49.5	23.9	9.2	14.9	7.6	14.7	9.5
1979	313.4	87.2	20.3	49.0	21.7	9.6	14.4	7.1	14.2	9.2
1980	305.2	83.2	21.6	46.8	20.8	8.8	14.3	7.5	13.0	8.6
1981	327.7	86.5	24.2	47.8	21.6	11.6	15.3	7.8	13.8	9.8
1982	320.5	85.9	25.9	47.9	21.0	11.6	14.7	7.5	12.3	8.7
1983	332.3	89.1	28.3	49.4	21.6	11.5	14.8	8.0	12.9	8.7
1984	328.9	90.2	29.5	48.2	21.1	11.3	15.0	7.7	12.1	8.1
1985	334.9	92.0	30.8	49.7	20.8	11.4	14.6	9.4	12.3	8.0
1986	324.2	88.4	31.6	47.3	19.4	11.3	13.2	8.3	10.9	8.3
1987	330.2	90.9	33.2	46.8	20.5	11.5	13.7	9.3	10.4	8.0
1988	335.7	97.7	34.7	45.4	20.1	11.7	13.6	9.2	10.2	7.2
1989	329.9	96.4	35.0	44.7	18.7	12.2	13.0	8.6	10.0	7.2
1990	333.3	96.1	36.5	45.1	19.0	12.1	13.4	8.5	10.4	6.9
1991	337.3	100.2	37.7	43.5	18.9	12.4	13.6	8.8	9.6	6.4
1992	337.8	100.6	39.2	43.0	18.9	12.5	13.7	8.6	9.4	6.5
1993	334.7	96.9	39.5	43.0	19.6	12.6	13.9	8.7	9.4	6.2
1994	335.0	97.6	39.1	42.4	19.1	13.2	13.5	8.9	9.3	6.3
1995*	338.7	101.3	41.3	41.6	18.9	13.2	13.7	8.8	9.0	5.7
1996*	339.8	102.3	42.4	41.0	18.8	13.5	13.8	8.8	8.8	5.5
1997*	340.9	103.4	43.4	40.4	18.7	13.7	13.8	8.8	8.7	5.2
1998*	342.0	104.4	44.4	39.8	18.6	13.9	13.9	8.8	8.5	5.0
1999*	343.1	105.5	45.4	39.1	18.5	14.1	13.9	8.8	8.3	4.7

\* Estimated Rates

**Note:** Rates exclude non-melanoma skin cancer (ICD-9 173) and are standardized to the age distribution of the 1991 Canadian population.

**Source:** Cancer Bureau, LCDC, Health Canada

## TRENDS IN INCIDENCE AND MORTALITY

**Table 8.2**

**Age-Standardized Mortality Rates for Selected Cancer Sites, Females, Canada, 1970-1999**

Year	Rate per 100,000									
	All Cancers	Lung	Breast	Colorectal	Ovary	Non-Hodgkin's Lymphoma	Stomach	Body of Uterus	Cervix	Melanoma
1970	152.1	8.4	30.7	25.8	9.7	3.9	11.3	5.3	7.3	1.1
1971	148.8	8.6	30.6	24.4	9.2	3.9	10.8	5.0	6.9	1.0
1972	152.7	10.2	31.4	24.8	9.8	4.1	9.9	4.7	6.3	1.3
1973	151.9	10.9	30.9	24.3	9.6	4.3	9.6	4.8	5.6	1.1
1974	152.3	11.7	31.1	24.6	9.1	4.8	9.0	4.7	5.6	1.3
1975	147.1	12.1	30.3	22.4	8.8	4.0	8.8	4.3	4.7	1.1
1976	145.8	12.4	29.8	22.5	9.1	4.4	8.5	4.3	4.3	1.3
1977	147.0	13.9	30.6	22.6	9.1	3.8	7.4	4.4	4.8	1.2
1978	147.4	15.0	29.5	22.6	9.0	4.5	7.4	4.6	4.7	1.3
1979	150.0	16.3	29.8	23.2	9.1	4.4	7.2	4.3	4.2	1.2
1980	148.3	17.1	29.6	22.1	8.6	4.6	6.8	4.2	3.7	1.2
1981	148.8	17.9	30.1	21.5	8.5	4.5	7.5	4.1	3.9	1.3
1982	149.1	19.5	29.7	20.3	8.8	4.9	6.7	4.1	3.9	1.5
1983	149.1	19.9	30.3	19.9	8.2	4.9	6.5	4.2	3.9	1.5
1984	151.6	22.1	30.7	20.4	8.7	4.7	5.7	4.0	3.5	1.5
1985	154.5	23.7	31.7	19.7	8.5	5.0	6.0	3.8	3.3	1.6
1986	154.0	24.0	31.9	19.7	8.2	5.1	6.1	3.6	3.2	1.3
1987	153.7	25.3	31.3	19.5	8.2	5.2	5.7	4.1	3.0	1.5
1988	155.2	26.9	31.3	18.7	8.4	5.0	5.1	3.5	3.0	1.3
1989	153.1	27.0	31.2	17.6	8.1	5.5	5.5	3.7	2.9	1.4
1990	153.2	27.6	31.3	17.7	8.1	5.5	5.0	3.9	3.0	1.2
1991	153.7	29.6	30.1	16.8	7.8	5.7	4.9	3.5	2.9	1.4
1992	152.8	29.6	30.4	16.6	7.8	5.5	4.8	3.5	2.4	1.5
1993	154.1	31.6	29.2	16.5	8.0	5.5	4.5	3.4	2.6	1.5
1994	154.0	31.7	29.8	15.9	8.1	5.7	4.5	3.2	2.7	1.4
1995	150.4	31.1	28.4	16.0	7.6	5.8	4.5	3.6	2.4	1.6
1996	153.1	33.3	28.6	15.5	8.1	5.7	4.3	3.4	2.6	1.5
1997*	152.2	34.0	28.2	14.8	7.8	5.9	4.1	3.3	2.4	1.6
1998*	152.1	34.9	27.9	14.4	7.8	6.0	3.9	3.2	2.3	1.6
1999*	151.9	35.8	27.5	14.0	7.7	6.0	3.8	3.2	2.2	1.6

\* Estimated Rates

**Note:** Rates are standardized to the age distribution of the 1991 Canadian population.

**Source:** Cancer Bureau, LCDC, Health Canada

## TRENDS IN INCIDENCE AND MORTALITY

**Table 9**

**Average Annual Percent Change (AAPC) in Age-Standardized Incidence (1987-1994) and Mortality (1987-1996) Rates for Selected Cancer Sites, Canada**

	AAPC In Incidence 1987-1994		AAPC In Mortality 1987-1996	
	Males	Females	Males	Females
<b>All Cancers</b>	<b>0.8*</b>	<b>0.2</b>	<b>-0.9**</b>	<b>-0.1</b>
Oral	-1.8**	0.2	-1.9**	-1.7 *
Stomach	-3.5**	-3.3**	-4.0**	-2.7**
Colorectal	-0.5*	-1.3**	-1.5**	-2.3**
Pancreas	-1.9**	-0.4	-1.6**	-0.3
Larynx	-2.3**	-2.1	-2.3**	-1.8
Lung	-1.5**	2.6**	-1.3**	2.9**
Melanoma	0.7	-0.6	2.3 *	1.4
Female Breast	-	0.7	-	-1.2**
Body of Uterus	-	-0.7	-	-1.8 *
Cervix	-	-1.6**	-	-2.4**
Ovary	-	0.3	-	-0.5
Prostate	6.9**	-	-0.2	-
Testis	1.9	-	-4.5	-
Bladder	-2.3**	-2.6*	-1.6**	-1.1
Kidney	0.8	-0.2	-0.7 *	-0.7
Brain	-0.5	0.2	-0.8	-1.2 *
Thyroid	2.5	5.9**	0.7	0.8
Non-Hodgkin's Lymphoma	1.6**	1.8**	1.3**	1.4**
Hodgkin's Disease	-1.0	-0.4	-5.5**	-4.0 *
Multiple Myeloma	0.3	0.7	0.6	1.1
Leukemia	-1.8**	-1.3*	-1.3 *	-1.8**

- not applicable

\* significant at p=0.05

\*\* significant at p=0.01

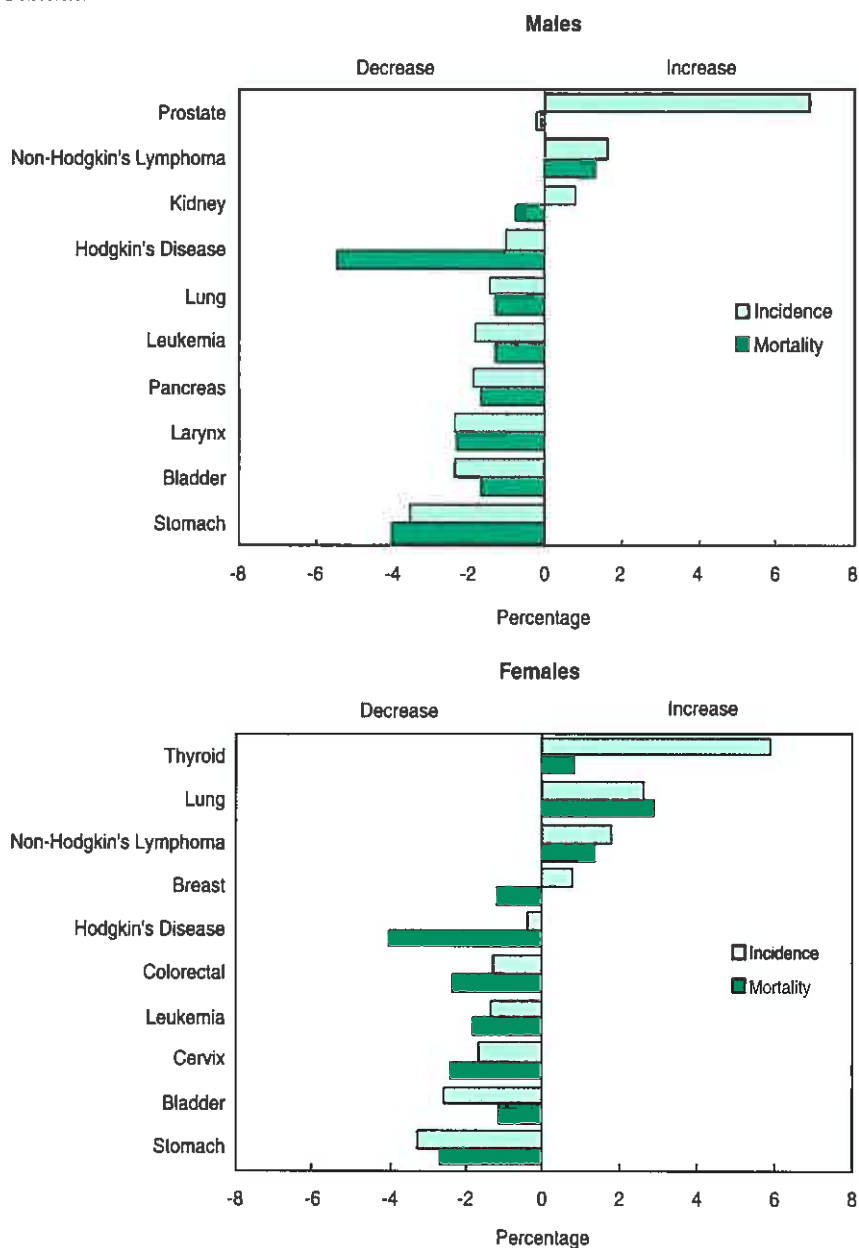
**Note:** Average Annual Percent Change is calculated assuming a log linear model; incidence rates exclude non-melanoma skin cancer (ICD-9 173).

**Source:** Cancer Bureau, LCDC, Health Canada

## TRENDS IN INCIDENCE AND MORTALITY

**Figure 5**

**Average Annual Percent Change (AAPC) in Age-Standardized Incidence (1987-1994) and Mortality (1987-1996) Rates for Selected Cancer Sites, Canada**

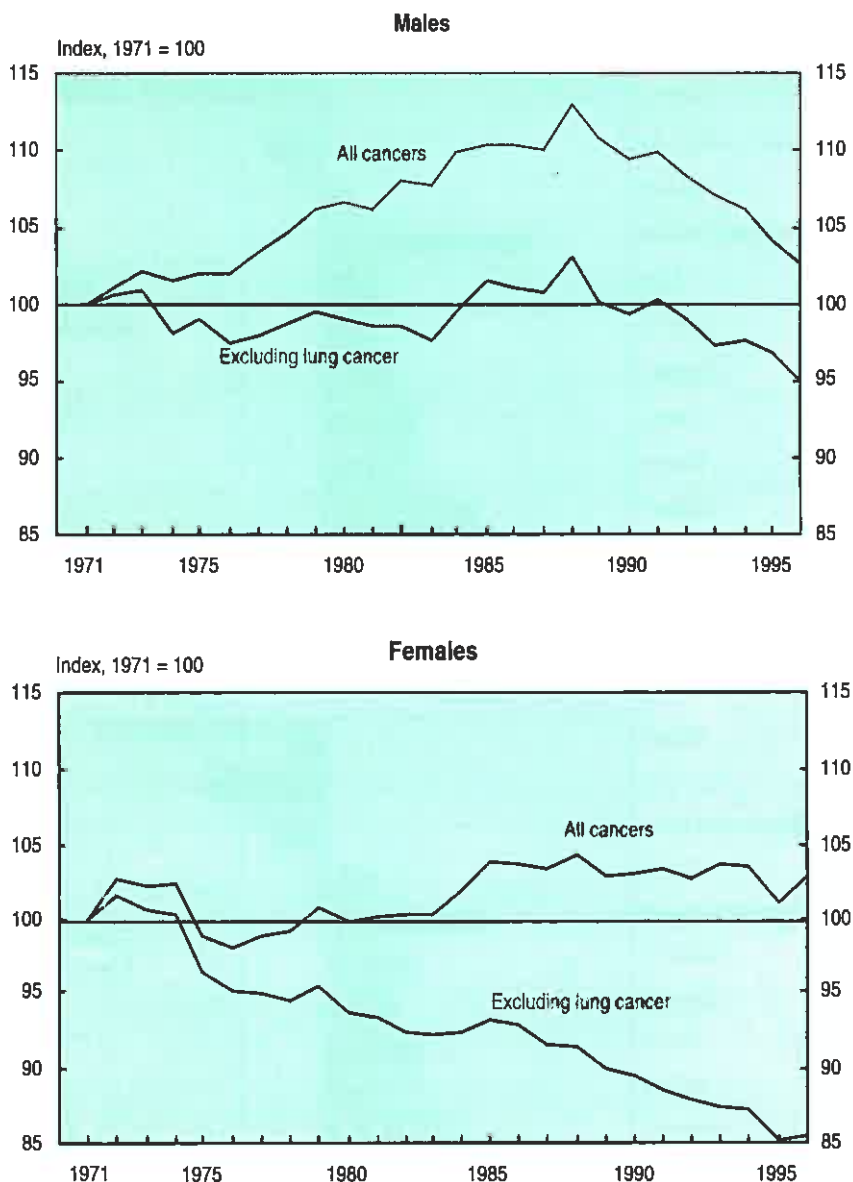


**Notes:** See Table 9 for percent change for all sites. Sites are ranked in decreasing order of incidence.

**Source:** Cancer Bureau, LCDC, Health Canada

**Figure 6**

**Index of Age-Standardized Mortality Rates Including and Excluding Lung Cancer, Canada, 1971-1996**



**Note:** Rates are standardized to the age distribution of the 1991 Canadian population. See also the Glossary and Appendix I: Methods.

**Source:** Cancer Bureau, LCDC, Health Canada

## AGE AND SEX DISTRIBUTION OF CANCER

This section shows estimates for 1999 by ten-year age groups for all sites combined (Table 10) and for the four leading types of cancer (Table 11). Cancer is primarily a disease of the elderly. Estimates for 1999 shown in Table 10 indicate that 58,700 (45%) of new cases and 36,600 (58%) of cancer deaths occur in Canadians aged 70 years or more, while an additional 31,800 (25%) new cases and 14,400 (23%) deaths occur in those aged 60-69. By contrast, just 1% of new cases and only 0.3% of deaths occur prior to age 20. Estimates for leading sites for people aged 20 or more presented in Table 11 show that close to 50% or more of all newly diagnosed cancers of the lung, prostate, colon and rectum occur among Canadians aged 70 or more. This is especially true for prostate cancer, with 64% of cases (and 83% of deaths) occurring in men over 70. In the case of breast cancer, 22% of cases occur in women under age 50, 45% occur in women aged 50 to 69 and 32% in women aged 70 and over.

Age specific rates of cancer incidence and mortality by five-year age groups are graphed using actual data for cancer incidence for 1994 and mortality for 1996, the most recent years for which complete data are available (Figure 8). Cancer incidence and mortality increase substantially with age in both sexes with 15 times as many new cases occurring in those over 80-years-old than among those under 20 despite a 89% drop in population. Although incidence rates are somewhat higher in women than in men between 20 and 59 years of age, for all other age groups incidence is higher among men. The change in sex ratio for older men is due to the higher incidence of cancers of the breast and genital organs in women of reproductive age, and the higher incidence of most types of cancer in older men.

Trends since 1970 in rates of incidence and mortality for all cancers by four age groups are graphed using an arithmetic scale using actual and estimated rates (Figure 7). Since 1981 increases in cancer incidence have occurred primarily in Canadians aged 50 or over with the trend being stronger among men than among women. This difference is almost certainly due to the rapid increases observed in prostate cancer. For Canadians aged 70 or more, both cancer incidence and mortality have been stable since 1984. At least some of the increases in incidence rates in the 1970s in men and women aged 50 and over is due to improved cancer registration in the elderly, particularly with respect to cases first discovered through death certificates.

Most encouraging is the fairly steady decline since 1988 in mortality occurring among both Canadian men and women in all age groups under 70 years. Mortality rates generally declined substantially since 1970 among Canadians aged 0-29 with more moderate declines in the 20-49 age group. Among 50-69 year-old men and women, decreases in mortality rates have occurred primarily since the late 1980s.

## AGE AND SEX DISTRIBUTION OF CANCER

**Table 10**

**Distribution of Cancer by Age Group and Sex, Canada, 1999**

Age Group	Population (000s) 1999 Estimates			New Cases 1999 Estimates			Deaths 1999 Estimates		
	Total	M	F	Total	M	F	Total	M	F
0-19	8,204	4,206	3,998	1,400	730	660	220	120	100
20-29	4,261	2,164	2,097	1,650	760	890	240	130	110
30-39	5,185	2,618	2,567	4,800	1,850	2,900	910	370	530
40-49	4,862	2,429	2,433	10,900	3,700	7,200	3,300	1,400	1,900
50-59	3,488	1,741	1,748	20,100	8,800	11,200	7,700	4,000	3,700
60-69	2,391	1,159	1,232	31,800	18,300	13,500	14,400	8,400	6,000
70-79	1,808	785	1,024	37,200	21,700	15,600	20,200	11,400	8,900
80+	929	309	620	21,500	10,700	10,800	16,400	7,900	8,500
<b>All Ages</b>	<b>31,128</b>	<b>15,411</b>	<b>15,718</b>	<b>129,300</b>	<b>66,500</b>	<b>62,800</b>	<b>63,400</b>	<b>33,600</b>	<b>29,800</b>

**Note:** Incidence figures exclude non-melanoma skin cancer (ICD-9 173). Totals may not add due to rounding. Please refer to Appendix I: Methods for further details. 1999 population projections were provided by the Census and Demographics Branch, Statistics Canada.

**Source:** Cancer Bureau, LCDC, Health Canada



## AGE AND SEX DISTRIBUTION OF CANCER

**Table 11**

**Distribution of Cancer for Selected Cancer Sites by Age Group and Sex, Canada, 1999**

Age Group	Lung			Colorectal			Prostate	Breast
	Total	M	F	Total	M	F	M	F
<b>New Cases</b>								
20-29	35	25	10	40	15	25	-	85
30-39	220	100	120	240	120	120	10	870
40-49	1,050	490	580	910	480	430	80	3,300
50-59	3,200	1,700	1,500	2,400	1,350	990	1,100	4,400
60-69	6,200	3,800	2,400	4,200	2,600	1,650	4,900	4,000
70-79	6,800	4,200	2,600	5,300	2,800	2,400	7,100	3,800
80+	3,000	1,750	1,250	3,600	1,450	2,100	3,500	2,200
<b>Ages 20+</b>	<b>20,500</b>	<b>12,000</b>	<b>8,500</b>	<b>16,600</b>	<b>8,800</b>	<b>7,700</b>	<b>16,600</b>	<b>18,700</b>
<b>Deaths</b>								
20-29	5	5	5	10	5	5	-	10
30-39	120	45	80	65	30	35	-	160
40-49	750	350	400	250	130	120	20	600
50-59	2,300	1,300	980	710	420	290	120	910
60-69	4,900	3,100	1,800	1,350	850	500	590	990
70-79	6,200	3,900	2,300	2,000	1,150	860	1,500	1,350
80+	3,100	1,850	1,250	1,950	810	1,150	1,900	1,400
<b>Ages 20+</b>	<b>17,400</b>	<b>10,600</b>	<b>6,800</b>	<b>6,300</b>	<b>3,400</b>	<b>3,000</b>	<b>4,100</b>	<b>5,400</b>

- Fewer than 5 cases

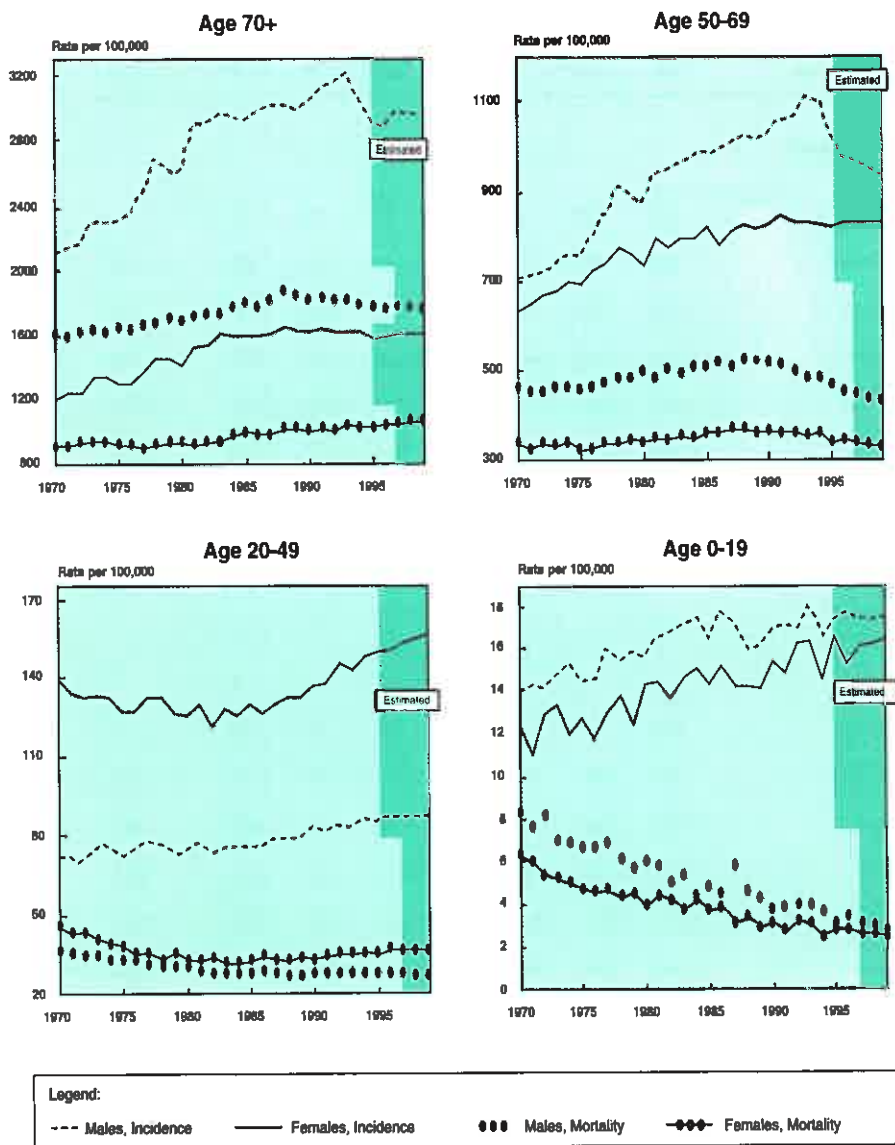
**Note:** Figures exclude non-melanoma skin cancer (ICD-9 173). Totals may not add due to rounding. Please refer to Appendix I: Methods for further details.

**Source:** Cancer Bureau, LCDC, Health Canada

# AGE AND SEX DISTRIBUTION OF CANCER

**Figure 7**

**Age-Specific Incidence and Mortality Rates, All Cancers, 1970-1999**



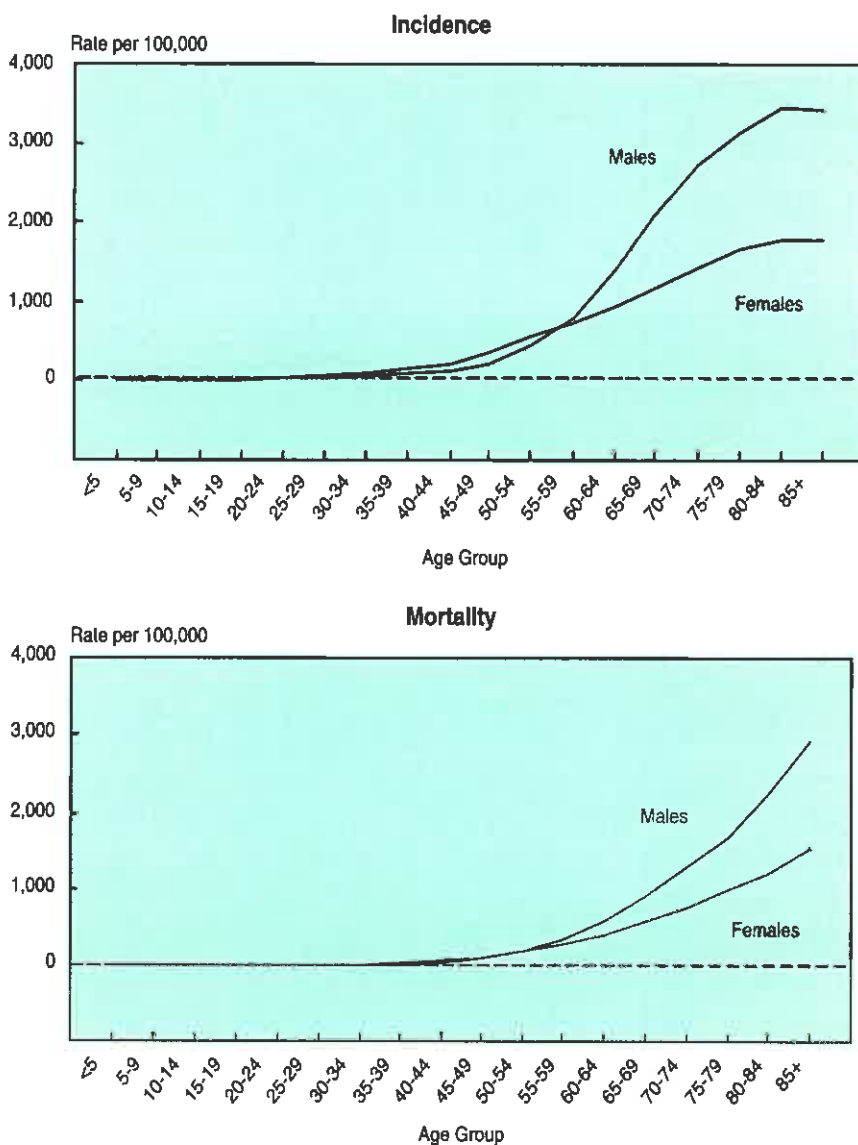
**Note:** Incidence figures exclude non-melanoma skin cancer (ICD-9 173).

**Source:** Cancer Bureau, LCDC, Health Canada

## AGE AND SEX DISTRIBUTION OF CANCER

**Figure 8**

**Age-Specific Incidence (1994) and Mortality (1996) Rates for All Cancers by Sex, Canada.**



**Note:** Incidence rates exclude non-melanoma skin cancer (ICD-9 173).

**Source:** Cancer Bureau, LCDC, Health Canada

## PROBABILITY OF DEVELOPING/DYING FROM CANCER

Table 12 presents the probability (expressed as a percentage) of Canadians developing the more common cancers within specific decades of age, as well as the lifetime probability of developing, or dying from, one of these cancers. The calculation of these probabilities models the occurrence of cancer in a hypothetical cohort. For example, if a cohort of 1000 men of age 50 are followed until they reach the end of age 59, 58 of them, or 5.8% (1 in 17), will develop some kind of cancer within this ten year period; this percentage therefore describes the risk of a 50-year-old man developing some kind of cancer before age 60. Similarly, a 60-year-old woman has a 9.8% (1 in 10) chance of developing some kind of cancer before age 70. For the lifetime probability of developing cancer, the data are presented both as the probability, expressed as a percentage, of developing cancer, and as the inverse of that probability. For example, men have a lifetime probability of 0.418 (41.8%) of developing cancer, while the inverse of that probability is 2.4. Thus, approximately two of every five men are expected to develop cancer of some site during life. Similarly, one in 2.8 women (slightly more than one of every three women) will develop cancer during life. One in 3.7 men and one in 4.4 women (i.e. more than one in four and one in five respectively) will die of cancer.

Whereas Table 12 displays numbers that are precise to one decimal place, the following discussion will use approximations derived from these numbers to discuss highlights of the table.

During their lifetimes, 1 in 9 women are expected to develop breast cancer, the most common cancer (excluding non-melanoma skin cancer) to afflict women, and 1 in 25 women are expected to die from it. 1 in 18 women will develop colorectal cancer, but only 1 in 39 will die from it. 1 in 21 will develop lung cancer, and 1 in 22 will die from this disease, making it the most likely cause of cancer death in Canadian women. Over their lifetimes, 1 in 8 men will develop prostate cancer, but only 1 in 27 will die from it. 1 in 11 men will develop lung cancer and 1 in 12 will die from this condition. Lung cancer is thus by far the leading cause of cancer deaths in Canadian men.

The probability of developing cancer within the next ten years gives a useful indication of the short-term risk of cancer. Although the lifetime risk of developing breast cancer is approximately 11% (1 in 9), and although the risk increases with age, the risk of a 60-year-old woman developing breast cancer before age 70 is only 2.8% (1 in 36); this figure may be more meaningful, for a 60-year-old woman contemplating her risk of breast cancer, than is the lifetime probability statistic. Table 12 shows how steeply the risk of developing prostate cancer rises with age. A man has very little probability of developing prostate cancer by age 50. However, a 70-year-old man has a 7.5% (1 in 13) chance of developing prostate cancer by age 80; this percentage represents the highest risk for either men or women of developing a specific cancer in any decade of life.

The decrease in the probability of very old persons (80-89) developing, or dying from, many cancers, in contrast to the general increasing risk with increasing age, is due to the increase in the probability of death from other causes at very advanced age.

# PROBABILITY OF DEVELOPING/DYING FROM CANCER

**Table 12**

**Probability of Developing Cancer by Age, and Lifetime Probability of Developing and Dying from Cancer, Canada**

	Probability (%) of Developing Cancer in next 10 years by age group						Lifetime Probability (%) of: Developing			
	30-39	40-49	50-59	60-69	70-79	80-89	%	One in:	%	One in:
<b>Male</b>										
<b>All Cancers</b>	0.7	1.6	5.8	15.2	22.2	18.8	41.8	2.4	27.0	3.7
Prostate	-	0.1	1.1	4.7	7.5	5.8	12.9	7.8	3.7	27.3
Lung	-	0.2	1.1	3.2	4.6	3.3	9.1	11.0	8.3	12.1
Colorectal	-	0.2	0.8	2.1	3.1	2.9	6.5	15.5	2.8	35.5
Bladder	-	0.1	0.3	0.8	1.4	1.4	2.7	36.5	0.9	113.6
Lymphoma	0.1	0.2	0.4	0.7	1.1	0.9	2.7	37.5	1.4	69.0
Oral	-	0.1	0.3	0.6	0.6	0.5	1.6	64.1	0.5	185.2
Kidney	-	0.1	0.3	0.5	0.6	0.4	1.5	65.8	0.6	158.7
Stomach	-	0.1	0.2	0.4	0.7	0.8	1.5	66.7	1.1	91.7
Leukemia	-	0.1	0.1	0.3	0.6	0.6	1.3	75.2	1.0	100.0
Pancreas	-	-	0.1	0.3	0.5	0.6	1.1	87.7	1.2	80.6
Melanoma	0.1	0.1	0.2	0.3	0.3	0.2	1.0	102.0	0.3	370.4
<b>Female</b>										
<b>All Cancers</b>	1.1	3.0	6.1	9.8	13.3	11.0	35.6	2.8	22.8	4.4
Breast	0.3	1.3	2.2	2.8	3.2	2.4	10.7	9.4	4.0	24.9
Colorectal	0.1	0.2	0.6	1.3	2.3	2.3	5.7	17.5	2.6	38.6
Lung	0.1	0.2	0.8	1.6	1.9	1.1	4.9	20.5	4.5	22.0
Lymphoma	0.1	0.1	0.3	0.6	0.8	0.7	2.3	43.3	1.3	75.2
Body of Uterus	-	0.1	0.5	0.7	0.8	0.4	2.2	45.7	0.5	185.2
Ovary	0.1	0.1	0.3	0.4	0.5	0.3	1.5	65.4	1.1	89.3
Pancreas	-	-	0.1	0.3	0.5	0.5	1.2	84.0	1.3	75.2
Leukemia	-	-	0.1	0.2	0.3	0.4	1.0	101.0	0.8	132.5
Kidney	-	0.1	0.1	0.2	0.3	0.3	0.9	108.7	0.4	227.3
Bladder	-	-	0.1	0.2	0.3	0.3	0.9	114.9	0.4	264.6
Stomach	-	-	0.1	0.2	0.3	0.4	0.9	116.3	0.7	138.9
Melanoma	0.1	0.1	0.2	0.2	0.2	0.1	0.9	116.3	0.2	526.3
Cervix	0.1	0.1	0.1	0.1	0.2	0.1	0.8	122.0	0.3	322.6
Oral	-	-	0.1	0.2	0.2	0.2	0.7	142.9	0.2	434.8

- Value <0.05

**Note:** The probability of developing cancer is calculated based on age- and sex-specific cancer incidence and mortality rates for Canada in 1994 and on life tables based on 1993-1995 all cause mortality rates. 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 1996. See Appendix I: Methods for details.

**Source:** Cancer Bureau, LCDC, Health Canada

## POTENTIAL YEARS OF LIFE LOST DUE TO CANCER

Figure 9 shows the rank order of the 12 leading causes of potential years of life lost (PYLL) in Canada in 1996. This shows that cancer was the leading cause of potential years of life lost for men and women. 917,000 potential years were lost due to cancer, representing 29% of the PYLL resulting from all causes of death. Lung cancer was responsible for 241,000 years of potential life lost, representing 26% of the premature mortality caused by cancer (Table 13). Diseases of the heart were the second leading cause of potential years of life lost. As in recent years, among children aged 0-14, cancer ranked as the fifth leading cause of potential years of life lost after perinatal causes, congenital anomalies, other accidents and motor vehicle accidents. The total potential years of life lost due to cancer deaths in children aged 0-14 in 1996 was 13,514 years.

The potential years of life lost due to various types of cancer are presented in Table 13. For men in 1996, the three leading cancers were lung, colorectal, and prostate, accounting for 48% of the potential years of life lost due to cancer. The three leading cancers for women were breast, lung, and colorectal, accounting for 52% of potential years of life lost due to cancer. The ranking by relative importance of these cancers for men and women with respect to potential years of life lost has been consistent in recent years. For women, however, the PYLL due to lung cancer, which is almost equal to that for breast cancer, reflects the high rates of lung cancer mortality in women aged 50-79. Among men, although prostate cancer is more common than lung cancer, the PYLL due to lung cancer is four times that due to prostate cancer, reflecting higher mortality rates for lung cancer and the younger age at which men develop and die from lung cancer.

The more common the cancer, the earlier the age of onset and the more quickly it leads to death, the higher the premature mortality that results. The potential years of life lost resulting from breast cancer at 98,000 years far exceed the potential years of life lost for prostate cancer at 33,000 years, reflecting the relatively young age at which women die from breast cancer. In contrast, the potential years of life lost for Hodgkin's disease at 3,000 reflects a cancer that is less common and relatively curable.

While the number of men who die from cancer each year exceeds the number of women, the potential years of life lost for women is slightly higher than that for men. This is because women generally live longer than men, and some of the deaths due to female cancers occur at younger ages.

For tobacco use exposure, which is known to be the single greatest risk factor for cancer, the PYLL are shown graphically in Figure 9. Among men smoking is responsible for about one-third of PYLL due to all cancers, for about one-quarter of PYLL due to diseases of the heart and for about one-half of PYLL due to respiratory disease. Among women, smoking is responsible for about one-fifth of PYLL due to all cancers.

# POTENTIAL YEARS OF LIFE LOST DUE TO CANCER

**Table 13**

**Potential Years of Life Lost Due to Cancer, Canada, 1996**

	Potential Years of Life Lost (PYLL)					
	Total		Males		Females	
	Years	%	Years	%	Years	%
<b>ALL CAUSES</b>	3,101,000	-	1,693,000	-	1,408,000	-
<b>All Cancers</b>	917,000	100	440,000	100	477,000	100
<b>Childhood Cancer (Ages 0-14)</b>	13,514	1.5	6,766	1.5	6,748	1.4
<b>Cancer Site</b>						
Lung	241,000	26.3	136,000	30.8	105,000	22.1
Breast	98,000	10.7	-	-	98,000	20.6
Colorectal	86,000	9.4	43,000	9.9	43,000	9.0
Pancreas	42,000	4.6	20,000	4.7	22,000	4.6
Non-Hodgkin's Lymphoma	38,000	4.1	20,000	4.5	18,000	3.8
Leukemia	37,000	4.0	19,000	4.4	17,000	3.6
Brain	35,000	3.8	19,000	4.3	16,000	3.4
Prostate	33,000	3.6	33,000	7.5	-	-
Stomach	30,000	3.2	17,000	4.0	12,000	2.6
Ovary	26,000	2.9	-	-	26,000	5.5
Kidney	20,000	2.2	12,000	2.7	8,000	1.7
Oral	16,000	1.7	11,000	2.5	5,000	1.0
Multiple Myeloma	15,000	1.6	8,000	1.7	7,000	1.5
Bladder	14,000	1.6	10,000	2.3	4,000	0.9
Melanoma	13,000	1.5	7,000	1.7	6,000	1.3
Cervix	11,000	1.2	-	-	11,000	2.3
Body of Uterus	9,000	1.0	-	-	9,000	1.9
Larynx	7,000	0.8	6,000	1.3	1,000	0.3
Hodgkin's Disease	3,000	0.3	2,000	0.4	1,000	0.3
Testis	2,000	0.2	2,000	0.4	-	-

- Not applicable

**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 due to rounding and to the exclusion of other sites. Childhood cancers are also included within the relevant sites.

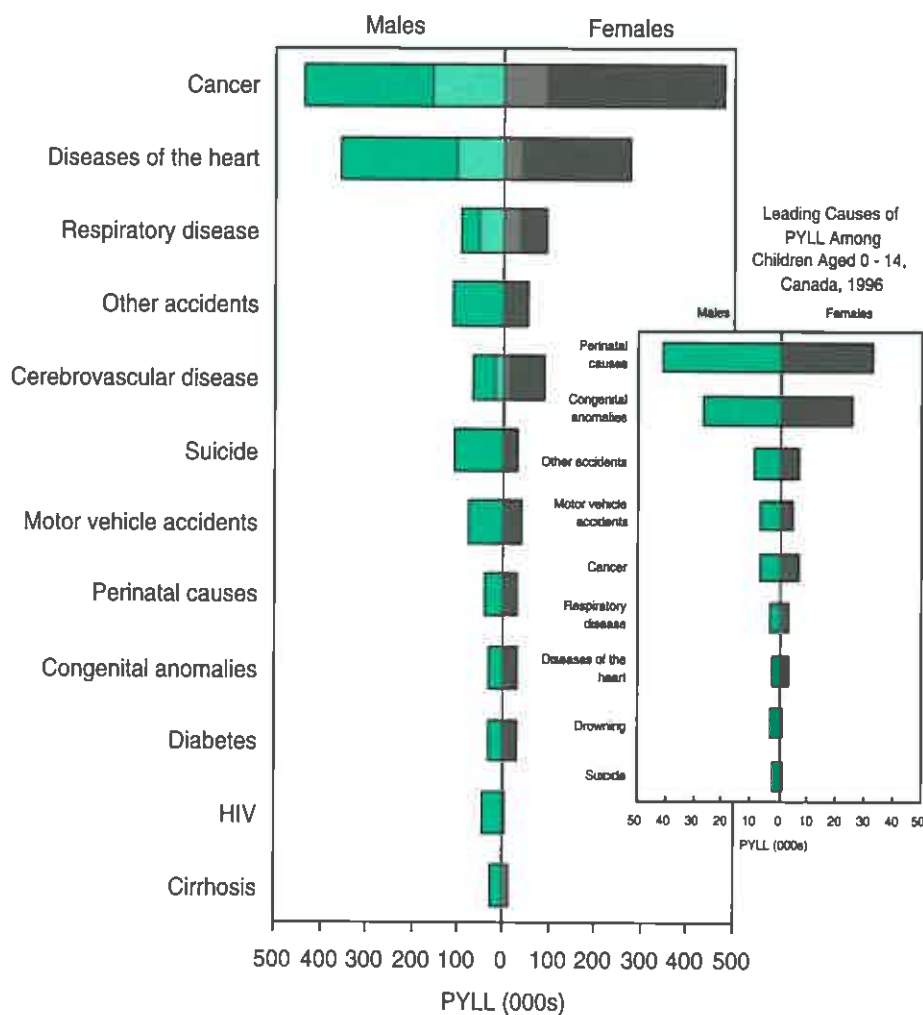
**Source:** Cancer Bureau, LCDC, Health Canada



## POTENTIAL YEARS OF LIFE LOST DUE TO CANCER

**Figure 9**

**Leading Causes of Potential Years of Life Lost (PYLL), Canada, 1996**



PYLL Attributable to smoking



Male



Female

**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 due to rounding and to the exclusion of other sites. Childhood cancers are also included within the relevant sites. Smoking attributable PYLL are based on relative risk estimates from follow up of CPS-II cohort and 1996 Canadian smoking prevalence estimates.<sup>2,3</sup> See Appendix 1: Methods for details.

**Source:** Cancer Bureau, LCDC, Health Canada

## CANCER IN CHILDREN AGED 0-14 YEARS

The number of new cases of cancer and age-standardized incidence rates (1990-1994) and number of deaths due to cancer and age-standardized mortality rates (1992-1996) for children aged 0-14, in Canada, are shown in Table 14. For these periods, an average of 879 children were diagnosed with cancer every year in Canada, and 176 died each year from their disease. Leukemia accounts for 31% of new cases and deaths due to cancer in children, and remains the most common of the childhood cancers. Cancers of the brain and spinal cord, the second most common group of childhood cancers, constitute approximately 19% of new cases and 29% of deaths, while lymphomas account for 11% of new cases and just over 5% of deaths.

An indication of disease prognosis is provided by the ratio of the number of deaths to the number of cases and can be calculated using the data available from Table 14. The deaths to cases ratio for all childhood cancers combined is approximately 0.20, although this is an underestimation because deaths occurring after the age of 14 years are not included in the calculation. The highest ratios ( $>0.27$ ) are found in children with liver (hepatic) cancer, tumours of the sympathetic nervous systems, particularly neuroblastoma, and tumours of the brain and spinal cord. The high ratio for neuroblastoma reflects the advanced stage at which this disease is frequently diagnosed. Soft tissue sarcomas (0.28), particularly rhabdomyosarcoma (0.32), also have relatively poor prognosis. The ratio for acute non-lymphocytic leukemia (0.40) was much higher than that observed for acute lymphocytic leukemia (0.11), resulting in a relatively high overall ratio for leukemia. While the lymphomas have a relatively good prognosis overall, Hodgkin's disease (0.02) has a very low death to cases ratio compared to non-Hodgkin's lymphoma (0.09). The low ratios observed for retinoblastoma and germ cell tumours indicate the low fatality associated with these tumours.

# CANCER IN CHILDREN AGED 0-14 YEARS

**Table 14**

**New Cases and Age-Standardized Incidence Rates (1990-1994) and Deaths and Age-Standardized Mortality Rates (1992-1996) by Histologic Cell Type of Cancer for Children Aged 0-14 Years, Canada**

Diagnostic Group <sup>a</sup>	New cases (1990-1994) <sup>1</sup>		ASIR per 1,000,000 per year	Deaths (1992-1996)		ASMR per 1,000,000 per year	Deaths/ Cases Ratio
	Number	%		Number	%		
<b>Leukemia</b>	<b>1,383</b>	<b>31.5</b>	<b>46.96</b>	<b>274</b>	<b>31.1</b>	<b>9.19</b>	<b>0.20</b>
Lymphoid	1,121	25.5	38.04	122	13.8	4.08	0.11
Acute non-lymphocytic	174	4.0	5.93	70	7.9	2.34	0.40
<b>Lymphoma</b>	<b>476</b>	<b>10.8</b>	<b>16.08</b>	<b>48</b>	<b>5.4</b>	<b>1.61</b>	<b>0.10</b>
Hodgkin's disease	190	4.3	6.43	3	0.3	0.10	0.02
Non-Hodgkin's lymphoma	152	3.5	5.14	14	1.6	0.47	0.09
All other lymphomas	134	3.0	4.52	31	3.5	1.04	0.23
<b>Brain and Spinal</b>	<b>844</b>	<b>19.2</b>	<b>28.70</b>	<b>252</b>	<b>28.6</b>	<b>8.47</b>	<b>0.30</b>
Ependymoma	78	1.8	2.65	30	3.4	1.01	0.38
Astrocytoma	438	10.0	14.90	56	6.4	1.88	0.13
Primitive neuroectodermal	175	4.0	5.93	56	6.4	1.88	0.32
<b>Sympathetic Nervous System</b>	<b>366</b>	<b>8.3</b>	<b>12.58</b>	<b>108</b>	<b>12.3</b>	<b>3.64</b>	<b>0.30</b>
Neuroblastoma	353	8.0	12.13	108	12.3	3.64	0.31
<b>Retinoblastoma</b>	<b>107</b>	<b>2.4</b>	<b>3.65</b>	<b>0</b>	<b>0.0</b>	<b>0.00</b>	<b>0.00</b>
<b>Renal Tumours</b>	<b>266</b>	<b>6.1</b>	<b>9.06</b>	<b>26</b>	<b>3.0</b>	<b>0.87</b>	<b>0.10</b>
Wilm's tumour	247	5.6	8.41	23	2.6	0.77	0.09
<b>Hepatic Tumours</b>	<b>64</b>	<b>1.5</b>	<b>2.17</b>	<b>18</b>	<b>2.0</b>	<b>0.61</b>	<b>0.28</b>
<b>Bone</b>	<b>203</b>	<b>4.6</b>	<b>6.92</b>	<b>52</b>	<b>5.9</b>	<b>1.73</b>	<b>0.26</b>
Osteosarcoma	105	2.4	3.58	28	3.2	0.93	0.27
Ewing's sarcoma	74	1.7	2.52	19	2.2	0.63	0.26
<b>Soft Tissue</b>	<b>278</b>	<b>6.3</b>	<b>9.45</b>	<b>77</b>	<b>8.7</b>	<b>2.60</b>	<b>0.28</b>
Rhabdomyosarcoma	148	3.4	5.02	47	5.3	1.58	0.32
Fibrosarcoma	47	1.1	1.61	7	0.8	0.23	0.15
<b>Germ Cell</b>	<b>149</b>	<b>3.4</b>	<b>5.10</b>	<b>3</b>	<b>0.3</b>	<b>0.10</b>	<b>0.02</b>
Gonadal germ cell tumours	68	1.5	2.32	1	0.1	0.03	0.01
<b>Carcinoma</b>	<b>172</b>	<b>3.9</b>	<b>5.88</b>	<b>12</b>	<b>1.4</b>	<b>0.40</b>	<b>0.07</b>
Thyroid	54	1.2	1.85	0	0.0	0.00	0.00
Melanoma	39	0.9	1.33	4	0.5	0.13	0.10
<b>Other cancers</b>	<b>87</b>	<b>2.0</b>	<b>2.99</b>	<b>11</b>	<b>1.2</b>	<b>0.37</b>	<b>0.13</b>
<b>Total (5 years)</b>	<b>4,395</b>	<b>100.0</b>	<b>149.55</b>	<b>881</b>	<b>100.0</b>	<b>29.58</b>	<b>0.20</b>
<b>Average per year</b>	<b>879</b>			<b>176</b>			

<sup>1</sup> Data are shown for the most recent five-year period available and exclude non-melanoma skin cancer (ICD-9 173) and in-situ carcinomas (ICD-9 230-234). Data are grouped according to the International Classification Scheme for Childhood Cancer, World Health Organization (1996). Rates are age-standardized to the 1991 Canadian population and are expressed per million children per year.

<sup>2</sup> Only major subcategories within each group are included. Approximately 99% of lymphoid leukemia cases are acute lymphocytic leukemia. All other lymphomas includes Burkitt's lymphoma, miscellaneous lymphoreticular neoplasms and unspecified lymphomas. The neuroblastoma category includes ganglioneuroblastoma; Wilm's tumour includes rhabdoid and clear cell sarcoma; rhabdomyosarcoma includes embryonal sarcoma and fibrosarcoma includes other fibromatous neoplasms.

Source: Cancer Bureau, LCDC, Health Canada and Health Statistics Division, Statistics Canada

## FACTORS CONTRIBUTING TO THE POPULATION BURDEN OF CANCER INCIDENCE AND MORTALITY

Earlier in this publication, it was shown that the total number of new cancer cases and deaths in Canada has continued to increase steadily with each passing year, while age-standardized rates remained relatively unchanged. In the situation where rates have been stable, the increase in the number of cancer cases or deaths can be attributed to changes in either the size or age-distribution of the population. To better understand the impact of changes in the population and disease risk, trends in the number of cases and deaths were re-examined after calculating the number attributable to: (1) changes in disease risk (i.e. age-specific rates); (2) growth in the population (i.e. the total number of men or women); and (3) changes in the age-structure of the population (i.e. aging of the population).

Figures 10 and 11 depict the relative contribution to the change in the total number of cancer cases or deaths due to changes in rates, population size, and the aging of the population. The lines plotted in Figures 10 and 11 present comparisons in which the first year, 1971, was set as a baseline for examining subsequent trends (as indicated by the dashed line). The interpretation and method of calculating the three sets of estimates are: (1) The lower-most plot of estimates in Figures 10 and 11 represents the total number of cases (or deaths) that would have occurred each year if only the rates changed, such that the population was the same as it was in 1971. To calculate this hypothetical figure, the annual age-specific rate was multiplied by the corresponding 1971 population. (2) The middle line represents the number of cases (or deaths) that would have occurred each year if the actual annual rates acted upon a population that grew larger, but did not grow older, such that it continued to have the 1971 age distribution. These hypothetical numbers were calculated by applying the age and sex distribution of the 1971 population to the current year, then multiplying by the annual age- and sex-specific rates and summing over all age groups. (3) The top line represents the number of cases (or deaths) that actually occurred, thus it reflects the combined impact of the changing rates, the larger number of people in the population, and the aging of the population. This is the number of cases actually observed, which can also be estimated from the age-specific rates and age-specific populations for each year.

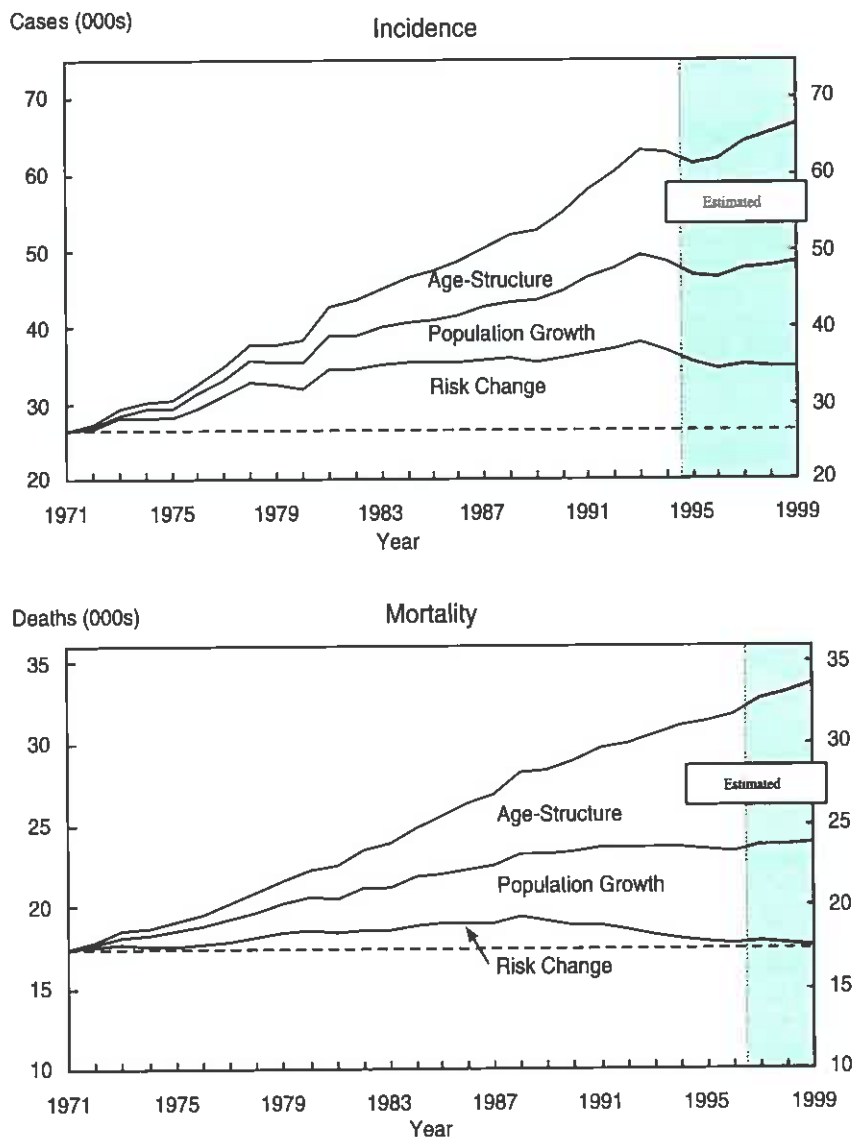
The differences between each set of estimates in Figures 10 and 11 indicate the relative contributions to the change in the number of cases and deaths since 1971. Population features were the major determinants of the increase in incidence and mortality since the early 1980s, and among these, changes in "age-structure" had a slightly greater impact than "population growth". Due to their stability or recent declines, variation in disease risk contributed little or not at all to the increasing number of cancer cases or deaths. With the contribution of "risk change" being constant or declining, the relative contributions of the population features increased over time, particularly in the past decade. For example, regarding incidence estimates for males in 1999 (Figure 10), a total of 66,500 cases are expected, which is an overall increase of 40,100 over the 1971 level. If the only difference after 1971 had been cancer risk (i.e., incidence rate), then an additional 8,400 would be expected, which accounts for 21% of the overall increase. In contrast, the contribution of 13,700 additional cases due to population growth and 18,000 cases due to population aging account for 34% and 45% of the overall difference, respectively.

These figures demonstrate that changes in the population have been the major determinants of the increasing burden of cancer among Canadians. Important implications include that as the Canadian population continues to age and grow in size, there will be a concordant increase in the number of cases which require care from the health services system.

## FACTORS CONTRIBUTING TO THE POPULATION BURDEN OF CANCER INCIDENCE AND MORTALITY

**Figure 10**

**The Total Number of New Cases or Deaths, Showing the Contribution of Change in Cancer Risk, Population Growth, and Change in Population Age-Structure (1971 reference), All Cancers, All Ages, Males, Canada 1971-1999**



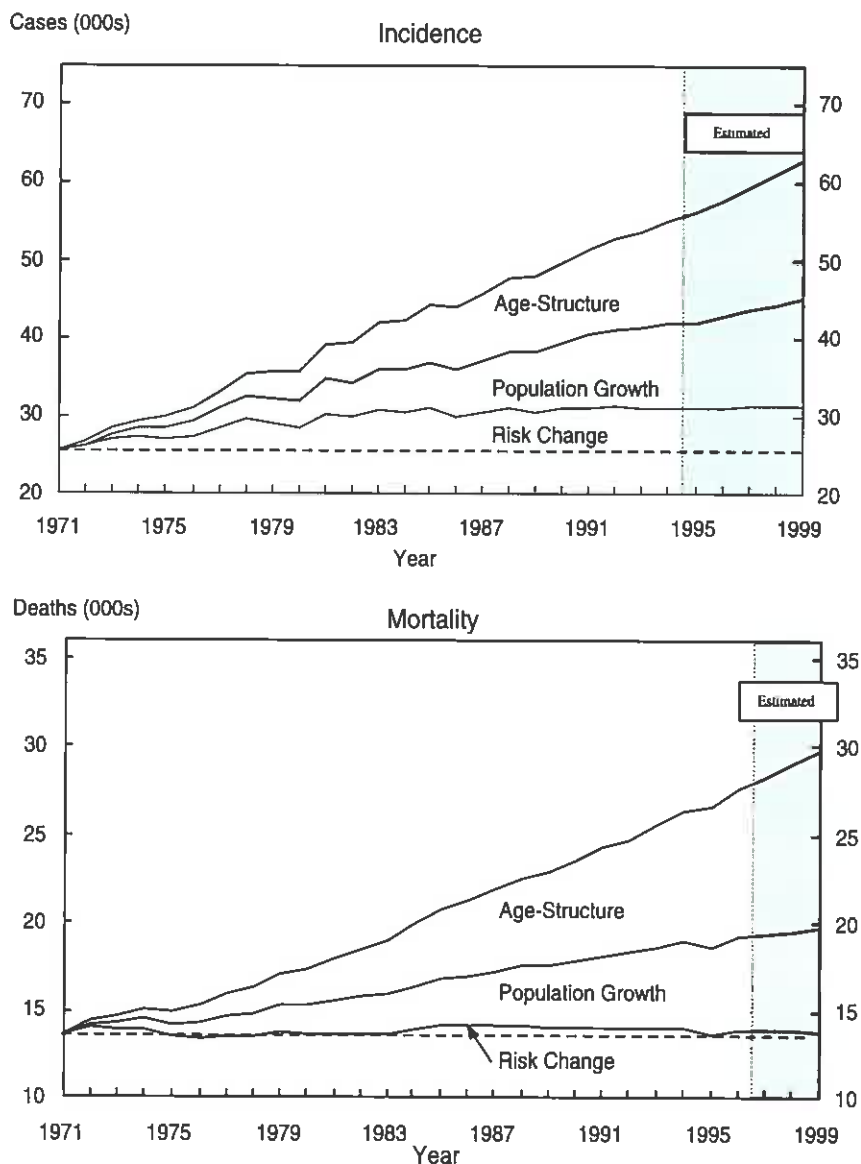
**Note:** Incidence figures exclude non-melanoma skin cancer (ICD-9 173). Magnitude of area represents the number of cases/death due to each change. Please refer to Appendix I: Methods for further details.

**Source:** Cancer Bureau, LCDC, Health Canada

## FACTORS CONTRIBUTING TO THE POPULATION BURDEN OF CANCER INCIDENCE AND MORTALITY

**Figure 11**

**The Total Number of New Cases or Deaths, Showing the Contribution of Change in Cancer Risk, Population Growth, and Change in Population Age-Structure (1971 reference), All Cancers, All Ages, Female, Canada, 1971-1999**



**Note:** Incidence figures exclude non-melanoma skin cancer (ICD-9 173). Magnitude of area represents the number of cases/death due to each change. Please refer to Appendix I: Methods for further details

**Source:** Cancer Bureau, LCDC, Health Canada

## A NEW NATIONAL CANCER SURVEILLANCE SYSTEM FOR CANADA

Canada has long been a world leader in collecting and analyzing cancer incidence and mortality statistics, through its provincial cancer registries and national databases. However, the systems have collectively fallen short of providing aggregate statistics of several parameters that are important to cancer control planning at the provincial and national levels. For example, data on staging, critical to evaluation of treatment programs, are not collected on a population basis. Many individual systems collecting and storing cancer data operate relatively independently of each other; these include the provincial and territorial cancer registries, Statistics Canada, Health Canada, and Canadian Institute for Health Information (CIHI), and there is some variation among systems in approaches to data collection and analysis. Recently, these organizations have worked together to establish a consortium, the Canadian Coalition on Cancer Surveillance (CCOCS), with the mission of developing an integrated system across the nation to provide the information that the cancer control planners, policy-makers and providers of today and tomorrow require.

Figure 12 describes the vision of the new national cancer surveillance system proposed by CCOCS.

Sets of core data elements relevant to patient management, population health and costs, will be developed. Explicit in this process is universal agreement on common data elements. The proposed data elements are considerably more extensive than those collected at present. Patient management data elements will include complete staging information, essential details of treatments, and will track patient outcomes. Population data elements will include risk factors for cancer and screening behaviours. A model for collection and analysis of direct and indirect costs of flow of individuals through cancer control programs is under development for integration into the system.

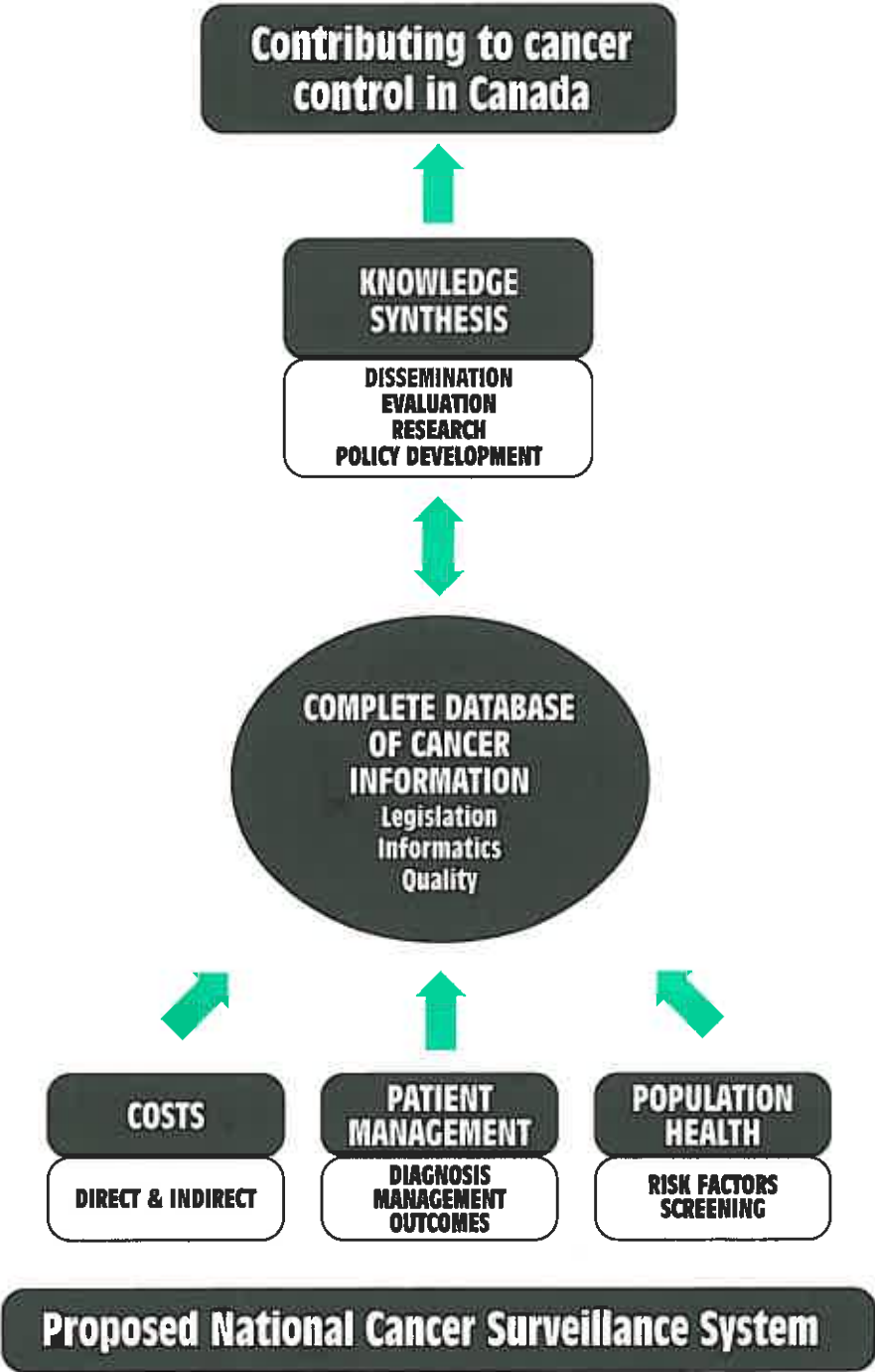
The national database will be achieved by linking existing provincial and national systems; in effect creating a “network of networks”. The shared database will be supported by appropriate information systems and rigorous quality management practices to ensure the integrity and utility of data. New legislative changes will be recommended to control collection of cancer data elements, flow of information among databases, and access to information, with provision for security and protection of the privacy of individuals.

The system will include a process for regular production and publication of data to disseminate information on cancer in Canada. It will support knowledge synthesis activities including program evaluation, research and policy development aimed at reducing the burden of cancer in Canada. It is expected that the expanded data elements and the full integration of the new system will encourage and enhance these activities.

The CCOCS expects to have the new system operational by the year 2003. Further information can be obtained from:  
<http://www.hc-sc.gc.ca/hpb/lcdc/bc/ccocs/index.html>



Figure 12





## GLOSSARY

<b>Age:</b>	The age of the patient (in completed years) at the time of diagnosis or death.
<b>ICD-9:</b>	The Ninth Revision of the International Classification of Diseases. <sup>24</sup>
<b>Incidence:</b>	The number of new cases of a given type of cancer diagnosed during the year. The basic unit of reporting is a new case of cancer rather than an individual patient.
<b>Mortality:</b>	The number of deaths attributed to the particular type of cancer and that occurred during the year. Included are deaths of patients diagnosed in earlier years, persons newly diagnosed during the year, and patients for whom a diagnosis of cancer is made only after death.
<b>Province/ Territory:</b>	For cancer incidence and mortality data, this is the province/territory of the patient's permanent residence at time of diagnosis or death, which may or may not correspond to the province/territory in which the new case of cancer or the cancer death was registered.

### Incidence and Mortality Rates:

<b>Crude rate:</b>	The number of new cases of cancer or cancer deaths during the year, expressed as a rate per 100,000 persons in the population.
<b>Age-specific rate:</b>	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.
<b>Age-standardized rate:</b>	The number of new cases of cancer 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.
<b>Index of age-standardized rates:</b>	The age-standardized rate of the base year, 1971, is set at 100. Index values for subsequent years are derived by multiplying the age-standardized rate for the year by 100 and then dividing by the 1971 rate.

## GLOSSARY

### Site Definitions:

Cancer data presented in this monograph are classified according to the following site groupings, except where otherwise noted.

Site	ICD - 9	Site	ICD - 9
Oral	140-149	Prostate	185
Esophagus/Oesophagus	150	Testis	186
Stomach	151	Bladder	188
Colorectal	153-154	Kidney	189
Pancreas	157	Brain	191-192
Larynx	161	Thyroid	193
Lung	162	Lymphoma	200-203
Melanoma	172	Hodgkin's Disease	201
Female Breast	174	Multiple Myeloma	203
Cervix	180	Non-Hodgkin's Lymphoma	200,202
Body of Uterus	179,182	Leukemia	204-208
Ovary	183	All Cancers excluding Lung	140-208 excluding 173,162
		All Other Cancers	All sites between 155-199 not listed above
All Cancers	140 - 208 excluding 173		

### 1991 Canadian Population/World Standard Population:

The population used to standardize rates had the following age distribution.

Population			Population			Population		
Age Group	Canadian	World Standard	Age Group	Canadian	World Standard	Age Group	Canadian	World Standard
0-4	6,946.4	12,000	30-34	9,240.0	6,000	60-64	4,232.6	4,000
5-9	6,945.4	10,000	35-39	8,338.8	6,000	65-69	3,857.0	3,000
10-14	6,803.4	9,000	40-44	7,606.3	6,000	70-74	2,965.9	2,000
15-19	6,849.5	9,000	45-49	5,953.6	6,000	75-79	2,212.7	1,000
20-24	7,501.6	8,000	50-54	4,764.9	5,000	80-84	1,359.5	500
25-29	8,994.4	8,000	55-59	4,404.1	4,000	85+	1,023.7	500
TOTAL 100,000.0								

**Source:** The Canadian population distribution is based on the final post-censal estimates of the July 1, 1991 Canadian population, adjusted for census undercoverage. The World Standard Population is used in Cancer Incidence in Five Continents.<sup>2</sup>

### Data Sources and Processing

The actual cancer incidence and mortality data used in this monograph were obtained from four sources: mortality data files (1969-1996),<sup>20</sup> the National Cancer Incidence Reporting System (NCIRS, 1969-1991),<sup>2,18</sup> the Canadian Cancer Registry (CCR, 1992-1996)<sup>18</sup> and the *fichier des tumeurs du Québec* (1992, 1993, 1994).<sup>3</sup> Except for the Quebec file, these data bases are all maintained by the Health Statistics Division at Statistics Canada. Actual mortality data were available for all of the provinces and territories for the period 1969 to 1996. By contrast, actual cancer incidence data at the Canadian level were available for the period 1969-1994. In addition, 1995 incidence data were available for all provinces except Quebec. Data for Prince Edward Island, Nova Scotia, New Brunswick, Manitoba, Alberta, British Columbia and for the Yukon Territory and Northwest Territories were available to 1996.

**Records from each province were extracted and then classified by gender, age group and selected cancer sites defined in the *Glossary*. Canada totals for selected sites were then determined as the sum of the ten provinces and two territories.**

Population figures for Canada, provinces and territories were taken from intercensal estimates for the period 1969 to 1990,<sup>21,22</sup> from postcensal estimates for the period 1991-1997,<sup>16</sup> and from the Scenario 2 population projections for 1998 and 1999.<sup>17</sup> The population estimates from 1971 to 1997 and the population projections include non-permanent residents as part of the population. In addition, adjustments are made for net census undercoverage and returning Canadians, and the reference date for the annual estimates is July 1 instead of June 1. In addition, the population projections incorporate assumptions of natural increase, immigration and internal migration, which closely reflect the Canadian reality. These assumptions are regularly updated to take into account the most recent changes.

Incidence and mortality estimates for 1999 were obtained from models that were fitted to a subset of the data described above. The data series were selected so that they begin in 1986 for both incidence and mortality. This allows consistency between the mortality and incidence estimates and ensures that the estimates accurately account for current trends. For mortality estimates, data from 1986 to 1996 were used. For incidence estimates, data from 1986 to the latest year of available data were used.

For the current edition of *Canadian Cancer Statistics*, it has been judged that the quality of the incidence estimates would be improved if all the data series started at the same year. For the province of Quebec, incidence data prior to 1983 were considered to be of insufficient quality.<sup>2,13</sup> For Nova Scotia, estimates were less accurate for some sites due in part to the use of data from years prior to 1986, when death certificates were not used as a source.<sup>2</sup> So the estimates in this edition are based on a data series, which start in 1986 (except for prostate cancer, to be explained later). This represents a departure from the 1996 edition in which the data were selected so that the data series used to compute incidence estimates were at least 10 years in length. For this edition, the data series used to compute incidence estimates are at most 10 years in length: 1986 to 1994 for Quebec; 1986 to 1995 for Newfoundland, Ontario and Saskatchewan; 1986 to 1996 for Prince Edward Island, Nova Scotia, New Brunswick, Manitoba, Alberta, British Columbia, Yukon and Northwest Territories.

Actual crude incidence and mortality rates for each province/territory, gender, site and year were computed by dividing the number of cases by the corresponding provincial/territorial population figures. These rates were computed for the “under 45” and the “45 and over” age groups separately. In order to study the age distributions for all cancers and for the leading types of cancer (lung, colorectal, prostate, and breast), age-specific rates were computed for the age groups 0-19, 20-29, 30-39, 40-49, 50-59, 60-69, 70-79, and 80 years and over.

Age-standardized incidence and mortality rates for each site were calculated using the age distribution of the 1991 Canadian population. The World Standard Population<sup>12</sup> was used in publications prior to 1995. It was replaced because it is much younger than the 1991 Canadian population.

### Incidence Estimates (New Cases) for 1999

The number of new cases was estimated for each age group, site and gender assuming a Poisson distribution, fitting maximum likelihood models to the Provincial and Territorial yearly values. It is also assumed that the annual incidence counts follow independent Poisson distributions with mean equal to the product of the population size for a particular year and the (true) annual incidence rate.

Incidence estimates were calculated separately for the “under 45” and the “45 and over” age groups. For selected sites, age-specific estimates were calculated for the following age groups: 20-29, . . . , 80 and over. In particular, the estimates for 1999 were obtained by applying the crude incidence rates to the demographic projections for the same year. For each province and territory, age group, gender and site, a linear model for crude incidence rates was used, with year as the only independent variable. Since longer data series for some provinces were available, estimates for Canada were computed as the sum of the estimates for each province.

Occasionally, in cases where the original data show large fluctuations, it has been impossible to obtain from the model results of satisfactory precision. For these exceptions, new cases for 1999 were estimated (after consultation with the provinces), by a five-year average of the most recent available data or by the estimate provided by the province: Prince Edward Island (male all cancers, prostate and lung and female breast); Nova Scotia (lung, prostate and breast); New Brunswick (prostate and female lung, colorectal and cervix); Manitoba (male prostate and kidney and female breast, kidney, thyroid and melanoma); Saskatchewan (male prostate, non-Hodgkin's lymphoma and melanoma and female colorectal and cervix) British Columbia (bladder, male all sites and prostate, female ovarian); Yukon (all cancers); Northwest Territories (all cancers).

Prostate cancer presented a special challenge this year because there was evidence that the recent increase in incidence due to early detection would continue no longer. For those provinces, which were able to provide actual incidence data up to 1996, these counts of new cases in most instances showed a rapid decline after having reached a peak in 1993. A linear model using most recently available data going back to 1986 would not fit such data well or offer acceptable 1999 predictions, so non-linear models were attempted in order to capture this peak and decline trend without much success. However, more

## APPENDIX I: METHODS

reasonable predictions of 1999 incidence counts were obtained by fitting a linear model just to data from 1980-1989. Actual data from 1990 was therefore considered to be a “blip” in an otherwise smooth trend, and this “blip” was caused by an increase in the use of earlier detection and screening techniques. Incidence counts of prostate cancer in the United States, where a similar “blip” occurred earlier, showed that after reaching the peak, the decline period lasts only a few years, after which the earlier trend continued.<sup>23</sup> A similar situation is therefore expected for Canada.

The estimates of incidence counts for ‘total all cancers’ therefore use these new linear model estimates of prostate cancer (using data from 1980-1989) instead of the original linear model (using data from 1986 onwards).

### Mortality Estimates (Deaths) for 1999

The number of deaths was estimated for each age group, site and gender using a similar method to that used for incidence. For each province and territory, a linear model was used for death rates, with year as the only independent variable. Mortality counts by site for Canada were obtained from the estimates of the Provincial and Territorial counts.

In cases where the original data show large fluctuations, it has been impossible to obtain from the model results of satisfactory precision. For these exceptions, deaths for 1999 were estimated (after consultation with the provinces), by a five-year average of the most recent available data or the estimate provided by the province: New Brunswick (male stomach and melanoma and female lung and non-Hodgkin’s lymphoma); Manitoba (male kidney, female lung and multiple myeloma); Saskatchewan (female colorectal); Yukon (all cancers).

### Estimated Age-Standardized Incidence Rates (ASIRs) and Mortality Rates (ASMRs) for 1999

Incidence and mortality rates were generally estimated using weighted least squares regression, with some exceptions as noted below. Weights were taken as the inverse of the estimated variances of the actual age-standardized rates. Variances were calculated under the assumption that the age-specific counts used in the computation of the age-standardized rates follow independent Poisson distributions. Regressions were performed for Canada and each province or territory for each site and gender using a linear model, with year as the only independent variable.

Again, in some cases where the original data show large fluctuations, it has been impossible to obtain from the model results of satisfactory precision. For these reasons, annual age-standardized incidence rates for 1999 were estimated by actual age-standardized incidence rates calculated over a five-year period for Prince Edward Island (prostate and female lung).

As was the case with incidence count estimates, prostate cancer was more difficult to estimate this year. For those provinces which were able to provide actual incidence data beyond 1994, most of them showed a strong decline in their age-standardized incidence rates after reaching a peak in 1993. A linear model in each province/territory using the most recently available data going back to 1986 would not fit these data well or offer acceptable 1999 predictions, so non-linear models were attempted in order to capture this peak and recent downward trend with unsatisfactory results. More satisfactory predictions, however, resulted from

keeping a linear model fitted in each province/territory to the actual 1980-1989 data. This is similar to the methodology used to estimate prostate incidence counts.

### Accuracy and Precision of Estimates

The accuracy of an estimate relates to the question of bias; whether or not an estimate is targeting the value of interest. The precision of an estimate refers to the fact that any estimate has a certain variability to it; one cannot “know” an estimate exactly and therefore the estimate serves only to provide insight into the real unknown value of interest.

The standard error and coefficient of variation, as well as a confidence interval, are calculated to evaluate the precision of each estimate. The standard error is an estimate of the extent to which an estimate will vary, while the coefficient of variation relates this variation to the actual size of the quantity being estimated. Confidence intervals use the standard error to create a range of plausible values for the quantity being estimated. These values are available upon request from the Cancer Bureau, Health Canada. Together, these quality measures assess the precision (or imprecision) of a particular estimate but not the accuracy of the estimates. Note that any estimates are subject to error, and the degree of precision depends primarily on the number of observed cases and population size for each site-gender-province combination, while the accuracy is related to the adequacy of the model used in the estimation process.

Due to changes and improvements in the cancer incidence data provided by the provinces, as well as changes in the population estimates and the methodology for producing the estimates of cancer incidence and deaths, **estimates in the 1999 report may not be directly comparable to those published in previous years.** More detailed information on these methods can be found in technical papers available from Statistics Canada.<sup>1,10</sup>

Estimates of incidence and mortality have been rounded as follows: counts between 0 and 99 to the nearest 5, counts between 100-999 to the nearest 10, counts between 1000 and 1999 to the nearest 50 and counts greater or equal to 2000 to the nearest 100. Percentages, age-standardized and age-specific rates were rounded to the nearest tenth except in tables 4 and 6 where space restrictions forced rounding to the nearest whole number.

### Average Annual Percent Change (AAPC) in Cancer Incidence and Mortality

The AAPC values were calculated for each site by fitting a model that assumed a constant rate of change in the ASIRs or ASMRs, that is, a linear model applied to the ASIRs and ASMRs after logarithmic transformation. The estimated resulting slope of that model was then transformed back to represent a percentage increase or decrease.

Data from 1986 to 1994 were used for incidence and from 1986 to 1996 for mortality. These series were long enough to create estimates of AAPCs that were both reliable and current.

## APPENDIX I: METHODS

### Estimates of Non-Melanoma Skin Cancer for 1999 in Canada

The pathology laboratories in B.C. send all diagnostic reports of non-melanoma skin cancer to the provincial registry. It is assumed that non-melanotic skin cancer is under-reported to some extent. The age- and gender-specific incidence rates in B.C. for 1985-1994 (in 20-year age groups) have been projected to the current year and applied to the Canadian population estimates to generate a minimal estimate of the number of cases for Canada as a whole.

### Probability of Developing/Dying from Cancer

Probabilities were calculated based on the age- and gender-specific cancer incidence and mortality rates for Canada in 1994, and on life tables based on 1993-1995 all-cause mortality rates. The methodology used was that of Zdeb<sup>25</sup> and Seidman.<sup>15</sup> The life table procedures used assumed that the rate of cancer incidence for various age groups in a given chronological period will prevail throughout the future lifetime of a person as he/she advances in 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 of the actual ones.

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 1996. The indicator was calculated by determining the proportion of deaths attributed to specific types of cancer for each gender and age group, multiplying this proportion by the corresponding number of deaths in the life table, summing the life table deaths over all gender and age groups, and dividing by the number of survivors at birth to obtain the probability of dying from each cause.

### The Total Number of New Cases or Deaths, Showing the Contribution of Change in Cancer Risk, Population Growth and Change in Population Age-structure

Figures 10 and 11 display the determinants of increases in incidence and mortality for males and females, respectively. All three series plotted on each graph use data from 1971 as a baseline. The upper most series is a plot of the actual counts observed or projected. The middle series is an estimate of what the cancer counts or deaths would have been if the age distribution of 1971 was held constant through time. In other words, if the total population of each year, although growing, were forced to have the same percentages in each age range as what was present in 1971. This redistribution of the population into 1971 percentages is then multiplied by the annual age- and sex-specific rates and then summed over all the age groups to produce an estimate for that year. The final series was produced by summing over all the age groups the product of the age- and sex-specific population counts of 1971 with the corresponding rates in the current year.

### Potential Years of Life Lost (PYLL)

The indicator was calculated by obtaining deaths for ages <1, 1-4, 5-9, ..., 90+ for Canada in 1996, and life expectancy at the midpoints of the age groups. The PYLL is the total number of years of life lost obtained by multiplying, for each age group, the number of deaths by the life expectancy of survivors.<sup>14</sup>



## Population Attributable Risk (PAR)

Population attributable risk (PAR) estimates used in the PYLL calculations were formed by combining mortality data, smoking prevalence and relative risk estimates by sex, age, and disease. Smoking prevalence was estimated using Statistics Canada's General Social Survey<sup>26</sup>, while relative risk estimates were obtained using SAMMEC II.<sup>27</sup>

Smoking-attributable mortality (SAM) was calculated<sup>28</sup> for disease components with known elevated relative risks within the specific disease range. SAM was estimated as the product of the smoking-attributable fraction (SAF) and the number of deaths in each sex, age group, and disease component. SAF was calculated as follows:

$$SAF = ([P_0 + P_1(RR_1) + P_2(RR_2)] - 1) / [P_0 + P_1(RR_1) + P_2(RR_2)],$$

where:  $P_0$ ,  $P_1$ , and  $P_2$  denote never, current and former smoking prevalence, respectively and  $RR_1$  and  $RR_2$  denote relative risk estimates for current and former smokers, respectively.

PAR was then calculated as the total SAM divided by the total number of deaths for each sex, age, and disease grouping.



## APPENDIX II: ACTUAL DATA FOR NEW CASES AND DEATHS

**Table 1**

**New Cases of Cancer by Site and Sex, Canada, 1994**

Site	ICD-9	Total	Males	Females
<b>All cancer sites</b>	<b>140-208</b>	<b>117,988</b>	<b>62,841</b>	<b>55,147</b>
<b>Oral (Buccal cavity and pharynx)</b>	<b>140-149</b>	<b>3,081</b>	<b>2,133</b>	<b>948</b>
Lip	140	582	476	106
Tongue	141	550	363	187
Salivary gland	142	301	168	133
Floor of Mouth	144	270	182	88
Pharynx	146, 147, 148	785	594	191
Other and unspecified	143, 145, 149	593	350	243
<b>Digestive organs</b>	<b>150-159</b>	<b>25,213</b>	<b>13,684</b>	<b>11,529</b>
Esophagus	150	1,142	805	337
Stomach	151	2,907	1,820	1,087
Small intestine	152	352	201	151
Large intestine	153	10,389	5,220	5,169
Rectum	154	5,086	2,970	2,116
Liver and biliary passages	155, 156	1,827	997	830
Pancreas	157	2,873	1,386	1,487
Other and unspecified	158, 159	637	285	352
<b>Respiratory system</b>	<b>160-165</b>	<b>19,644</b>	<b>12,827</b>	<b>6,817</b>
Larynx	161	1,233	1,015	218
Lung	162	17,855	11,428	6,427
Other and unspecified	160, 163, 164, 165	556	384	172
<b>Bone tissue and skin</b>	<b>170-172</b>	<b>3,803</b>	<b>2,010</b>	<b>1,793</b>
Bone	170	255	138	117
Connective Tissue	171	663	388	275
Skin (melanoma)	172	2,885	1,484	1,401
<b>Breast</b>	<b>174, 175</b>	<b>15,957</b>	<b>97</b>	<b>15,860</b>
<b>Genital organs</b>	<b>179-187</b>	<b>24,648</b>	<b>17,482</b>	<b>7,166</b>
Cervix	180	1,432	-	1,432
Body of uterus	182	2,991	-	2,991
Ovary	183	2,186	-	2,186
Prostate	185	16,588	16,588	-
Other and unspecified	179, 181, 184, 186, 187	1,451	894	557
<b>Urinary organs</b>	<b>188-189</b>	<b>7,770</b>	<b>5,421</b>	<b>2,349</b>
Bladder	188	4,499	3,373	1,126
Kidney and other urinary	189	3,271	2,048	1,223
<b>Eye</b>	<b>190</b>	<b>240</b>	<b>130</b>	<b>110</b>
<b>Brain and central nervous system</b>	<b>191-192</b>	<b>2,046</b>	<b>1,113</b>	<b>933</b>
<b>Endocrine glands</b>	<b>193-194</b>	<b>1,682</b>	<b>464</b>	<b>1,218</b>
Thyroid	193	1,514	375	1,139
Other endocrine	194	168	89	79
<b>Leukemia</b>	<b>204-208</b>	<b>3,068</b>	<b>1,753</b>	<b>1,315</b>
<b>Other blood and lymph tissues</b>	<b>200-203</b>	<b>6,985</b>	<b>3,803</b>	<b>3,182</b>
Hodgkin's disease	201	821	463	358
Multiple myeloma	203	1,452	789	663
Non-Hodgkin's lymphoma	200, 202	4,712	2,551	2,161
<b>All other and unspecified sites</b>	<b>195-199</b>	<b>3,851</b>	<b>1,924</b>	<b>1,927</b>

- Not applicable

**Note:** ICD-9 refers to the Ninth Revision of the International Classification of Diseases. Figures exclude non-melanoma skin cancer (ICD-9 173).

**Source:** Cancer Bureau, LCDC, Health Canada

## APPENDIX II: ACTUAL DATA FOR NEW CASES AND DEATHS

**Table 2**

**Cancer Deaths by Site and Sex, Canada, 1996**

Site	ICD-9	Total	Males	Females
<b>All cancer sites</b>	<b>140-208</b>	<b>59,241</b>	<b>31,655</b>	<b>27,586</b>
<b>Oral (Buccal cavity and pharynx)</b>	<b>140-149</b>	<b>952</b>	<b>685</b>	<b>267</b>
Lip	140	25	22	3
Tongue	141	218	149	69
Salivary gland	142	72	49	23
Floor of Mouth	144	47	39	8
Pharynx	146, 147, 148	274	194	80
Other and unspecified	143, 145, 149	316	232	84
<b>Digestive organs</b>	<b>150-159</b>	<b>15,950</b>	<b>8,686</b>	<b>7,264</b>
Esophagus	150	1,207	886	321
Stomach	151	2,077	1,266	811
Small intestine	152	110	54	56
Large intestine	153	4,825	2,473	2,352
Rectum	154	1,333	776	557
Liver and biliary passages	155, 156	1,705	958	747
Pancreas	157	2,991	1,474	1,517
Other and unspecified	158, 159	1,702	799	903
<b>Respiratory system</b>	<b>160-165</b>	<b>16,368</b>	<b>10,437</b>	<b>5,931</b>
Larynx	161	477	401	76
Lung	162	15,708	9,915	5,793
Other and unspecified	160, 163-165	183	121	62
<b>Bone tissue and skin</b>	<b>170-172</b>	<b>1,057</b>	<b>589</b>	<b>468</b>
Bone	170	123	79	44
Connective Tissue	171	307	143	164
Skin (melanoma)	172	627	367	260
<b>Breast</b>	<b>174, 175</b>	<b>5,110</b>	<b>36</b>	<b>5,074</b>
<b>Genital organs</b>	<b>179-187</b>	<b>6,258</b>	<b>3,656</b>	<b>2,602</b>
Cervix	180	442	-	442
Body of uterus	182	324	-	324
Ovary	183	1,419	-	1,419
Prostate	185	3,588	3,588	-
Other and unspecified	179, 181, 184, 186, 187	485	68	417
<b>Urinary organs</b>	<b>188-189</b>	<b>2,576</b>	<b>1,687</b>	<b>889</b>
Bladder	188	1,286	910	376
Kidney and other urinary	189	1,290	777	513
<b>Eye</b>	<b>190</b>	<b>38</b>	<b>23</b>	<b>15</b>
<b>Brain and central nervous system</b>	<b>191-192</b>	<b>1,491</b>	<b>846</b>	<b>645</b>
<b>Endocrine glands</b>	<b>193-194</b>	<b>220</b>	<b>91</b>	<b>129</b>
Thyroid	193	131	46	85
Other endocrine	194	89	45	44
<b>Leukemia</b>	<b>204-208</b>	<b>2,075</b>	<b>1,186</b>	<b>889</b>
<b>Other blood and lymph tissues</b>	<b>200-203</b>	<b>3,387</b>	<b>1,791</b>	<b>1,596</b>
Hodgkin's disease	201	127	67	60
Multiple myeloma	203	1,060	563	497
Non-Hodgkin's lymphoma	200, 202	2,200	1,161	1,039
<b>All other and unspecified sites</b>	<b>173, 195-199</b>	<b>3,759</b>	<b>1,942</b>	<b>1,817</b>

- Not applicable

Note: ICD-9 refers to the Ninth Revision of the International Classification of Diseases.

Source: Cancer Bureau, LCDC, Health Canada

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## FOR FURTHER INFORMATION

**F**or general information regarding cancer statistics or any other aspect of cancer (such as cancer prevention, screening, diagnosis, treatment and care, etc.), contact the **Canadian Cancer Society's Cancer Information Service at 1-888-939-3333**. A list of the offices of the CCS – the National Office and the Divisional offices – is provided on page 72. Your local CCS office is listed in the white pages of the telephone directory.

For information regarding cancer research sponsored by the **National Cancer Institute of Canada (NCIC)**, with funds provided by the CCS and The Terry Fox Foundation, contact the NCIC at the address listed on page 72.

Information on risk assessment and surveillance in the epidemiology of cancer is available from the Director, Cancer Bureau, **Health Canada**, Tunney's Pasture, Ottawa, Ontario, K1A 0L2. Tel. (613) 957-0327, Fax. (613) 941-2057.

**Cancer Surveillance On-Line** is an interactive, web-based tool for easy access to cancer surveillance data. It allows the user to generate data according to choice of parameters such as cancer site, geographic area, period of time and choice of presentation mode such as tables, charts and maps. See the Health Canada website noted below for the URL.

Detailed Standard Tables or custom tabulations are available on a cost recovery basis upon request from the Health Statistics Division, **Statistics Canada**, National Enquiries Line: 1-800-263-1136; Health Statistics Division: (613) 951-1746. Analytical articles appear regularly in *Health Reports*, *Statistics Canada*, *Catalogue 82-003*, *Quarterly*.

Cancer incidence data are supplied to Statistics Canada by provincial/territorial cancer registries. Detailed information regarding the statistics for each province or territory are available from the relevant registry. (See page 73 for addresses, telephone numbers and fax numbers.)

### Websites:

- ◆ Canadian Cancer Society (CCS)  
<http://www.cancer.ca>
- ◆ National Cancer Institute of Canada (NCIC)  
<http://www.ncic.cancer.ca>
- ◆ Health Canada  
<http://www.hc-sc.gc.ca/hpb/lcdc/webmap> (select cancer button)
- ◆ Statistics Canada  
<http://www.statcan.ca>

The data contained in this document are available on the CCS and NCIC websites (<http://www.cancer.ca> or <http://www.ncic.cancer.ca>)

## **NATIONAL CANCER INSTITUTE OF CANADA CANADIAN CANCER SOCIETY**

### **National Office**

Canadian Cancer Society &  
National Cancer Institute of Canada  
10 Alcorn Avenue, Suite 200  
Toronto, Ontario  
M4V 3B1  
Tel. (416) 961-7223  
Fax. (416) 961-4189

### **Newfoundland & Labrador Division**

Canadian Cancer Society  
Crosbie Building, 2nd Floor  
P.O. Box 8921  
1 Crosbie Place, Crosbie Road  
St. John's, Newfoundland A1B 3R9  
Tel. (709) 753-6520  
Fax. (709) 753-9314

### **Prince Edward Island Division**

Canadian Cancer Society  
1 Rochford Street, Suite #1  
Charlottetown, Prince Edward Island  
C1A 9L2  
Tel. (902) 566-4007  
Fax. (902) 628-8281

### **Nova Scotia Division**

Canadian Cancer Society  
5826 South Street, Suite 1  
Halifax, Nova Scotia B3H 1S6  
Tel. (902) 423-6183  
Fax. (902) 429-6563

### **New Brunswick Division**

Canadian Cancer Society  
133 Prince William Street  
P.O. Box 2089  
Saint John, New Brunswick  
E2L 3T5  
Tel. (506) 634-6272  
Fax. (506) 634-3808

### **Québec Division**

Maison de la société canadienne  
du cancer  
5151 Boul. l'Assomption  
Montréal (Québec) H1T 4A9  
Tel. (514) 255-5151  
Fax. (514) 255-2808

### **Ontario Division**

Canadian Cancer Society  
1639 Yonge Street  
Toronto, Ontario  
M4T 2W6  
Tel. (416) 488-5400  
Fax. (416) 488-2872

### **Manitoba Division**

Canadian Cancer Society  
193 Sherbrook Street  
Winnipeg, Manitoba  
R3C 2B7  
Tel. (204) 774-7483  
Fax. (204) 774-7500

### **Saskatchewan Division**

Canadian Cancer Society  
1870 Albert Street, Suite 340  
Regina, Saskatchewan  
S4P 4B7  
Tel. (306) 757-4260  
Fax. (306) 569-2133

### **Alberta/N.W.T. Division**

Canadian Cancer Society  
#200, 2424-4th Street S.W.  
Calgary, Alberta  
T2S 2T4  
Tel. (403) 228-4487  
Fax. (403) 228-4506

### **British Columbia & Yukon Division**

Canadian Cancer Society  
565 West Tenth Avenue  
Vancouver, British Columbia  
V5Z 4J4  
Tel. (604) 872-4400  
Fax. (604) 879-4533

## **CANADIAN COUNCIL OF CANCER REGISTRIES**

### **NEWFOUNDLAND**

Chief Executive Officer  
Newfoundland Cancer Treatment  
and Research Foundation  
Murphy Cancer Centre  
Health Sciences Centre  
300 Prince Philip Drive  
St. John's, Newfoundland A1B 3V6  
Tel: 709-737-4235 Fax: 709-753-0927

### **PRINCE EDWARD ISLAND**

Director  
Oncology Clinic and P.E.I. Cancer Registry  
Queen Elizabeth Hospital  
Riverside Drive  
Charlottetown, Prince Edward Island C1A 8T5  
Tel: 902-894-2042 Fax: 902-894-2187  
Registry No.: 902-894-2027

### **NOVA SCOTIA**

Acting Coordinator of Cancer Registry  
Nova Scotia Cancer Registry  
Cancer Treatment and Research  
Foundation of Nova Scotia  
Room 553, Bethune Building  
1278 Tower Road  
Halifax, Nova Scotia B3H 2Y9  
Tel: 902-473-6058 Fax: 902-473-4425

### **NEW BRUNSWICK**

Provincial Epidemiologist  
Director of Provincial Epidemiology Service  
Department of Health and  
Community Services  
P.O. Box 5100, 520 King Street, 2<sup>nd</sup> Floor  
Fredericton, New Brunswick E3B 5G8  
Tel: 506-453-3092 Fax: 506-453-2780

### **QUÉBEC**

Fichier des tumeurs du Québec  
Ministère de la Santé et des Services sociaux  
Service du portrait et surveillance de la santé et  
du bien-être  
Direction de l'analyse et surveillance de la santé  
et du bien-être  
1075, Chemin Ste-Foy, 2<sup>e</sup> étage  
Québec, Québec G1S 2M1  
Tel: 418-646-4745 Fax: 418-528-2651  
www.msss.gouv.qc.ca/fr/statisti/indisp/  
tumeurs/cadnor.pdf

### **ONTARIO**

Director  
Ontario Cancer Registry  
Epidemiology and Statistics  
Cancer Care Ontario  
620 University Avenue  
Toronto, Ontario M5G 2L7  
Tel: 416-971-9800 Fax: 416-971-6888  
www.cancercare.on.ca

### **MANITOBA**

Director  
Department of Preventive Oncology  
and Epidemiology  
Manitoba Cancer Treatment and  
Research Foundation  
100 Olivia Street, Winnipeg, Manitoba R3E 0V9  
Tel: 204-787-2174 Fax: 204-783-6875  
www.mctrf.ca/epi/epi\_home.html

### **SASKATCHEWAN**

Associate Director  
Epidemiology & Preventive Oncology  
Saskatchewan Cancer Foundation  
Allan Blair Cancer Centre  
4101 Dewdney Avenue  
Regina, Saskatchewan S4T 7T1  
Tel: 306-766-7516 Fax: 306-766-2179

### **ALBERTA**

Director  
Epidemiology, Prevention and Screening  
Alberta Cancer Board  
c/o Room 382  
Heritage Medical Research Bldg.  
3330 Hospital Drive, N.W.  
Calgary, Alberta T2N 4N1  
Tel: 403-220-4302 Fax: 403-270-3898  
Tel: 403-262-4460

### **BRITISH COLUMBIA**

Director, Cancer Registry  
Vancouver Cancer Clinic  
B.C. Cancer Agency  
600 West Tenth Avenue  
Vancouver, British Columbia V5Z 4E6  
Tel: 604-877-6000 Local 4602  
Fax: 604-877-0702  
www.bccancer.bc.ca/

### **NORTHWEST TERRITORIES**

Medical Officer and Director  
Cancer Registry  
Department of Health  
Government of the N.W.T.  
Box 1320, 5022 49<sup>th</sup> Street  
Centre Square Tower, 6<sup>th</sup> Floor  
Yellowknife, Northwest Territories X1A 2L9  
Tel: 867-920-3231 Fax: 867-873-0442

### **YUKON**

Director of Insured Health Services  
Yukon Cancer Registry  
Health Services Branch  
Yukon Government  
Box 2703, Whitehorse, Yukon Y1A 2C6  
Tel: 867-667-5620  
Fax: 867-667-6486

### **STATISTICS CANADA**

Director  
Health Statistics Division  
18-F, R.H. Coats Building  
Tunney's Pasture, Ottawa, Ontario K1A 0T6  
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## ORDER AND EVALUATION FORM

**P**lease help us improve this publication. Your feedback on the contents of this report will be used to prepare future editions. It would be helpful for planning if you complete and return this form by August 31, 1999 to:

**Canadian Cancer Statistics  
Canadian Cancer Society National Office  
10 Alcorn Ave., Suite 200, Toronto, Ont. M4V 3B1**

**However, we will be pleased to receive your completed form at any time.**

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3. In which of your professional activities does this publication assist you?  
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4. What use will you make of the information in Canadian Cancer Statistics 1999?  
☐ as a reference document for current data on cancer  
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	not useful	somewhat useful	very useful
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## ORDER AND EVALUATION FORM

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