Canadian Cancer Statistics 1995

Produced by:
National Cancer Institute of Canada
Statistics Canada
Provincial Cancer Registries
Health Canada

Canadian Cancer Statistics 1995

Steering Committee Members:

Jane F. Gentleman, Ph.D., Health Statistics Division, Statistics Canada

Peter Hayles, Information Systems, British Columbia Cancer Agency, and Canadian Council of Cancer Registries

Elizabeth Kaegi, M.B.Ch.B., M.Sc., Medical Affairs and Cancer Control, Canadian Cancer Society and National Cancer Institute of Canada

Jack Laidlaw, M.D., Ph.D., F.R.C.P.(C), Research and Education, Ontario Cancer Treatment and Research Foundation

Isra Levy, M.B.B.Ch, M.Sc, F.R.C.P.(C), Bureau of Chronic Disease Epidemiology, Laboratory Centre for Disease Control, Health Canada

John R. McLaughlin, (Chair) Ph.D., National Cancer Institute of Canada, Epidemiology Unit, University of Toronto

Managing Editors:

Leslie A. Gaudette, B.Sc., Health Statistics Division, Statistics Canada

Judy Lee, M.A., Health Statistics Division, Statistics Canada

January 1995
ISSN 0835-2976

Additional copies available from Divisions of the Canadian Cancer Society or Regional Reference Centres of Statistics Canada (see page 87).

Version française de cette publication disponible sur demande.

ACKNOWLEDGEMENTS

This monograph was developed by a steering committee reporting to the Advisory Committee on Cancer Control of the National Cancer Institute of Canada. The committee includes representatives from the National Cancer Institute of Canada, the Canadian Cancer Society, Statistics Canada, Health Canada, and the Canadian Council of Cancer Registries.

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

- The provincial and territorial cancer registries supply the cancer incidence data used to produce the statistics in this report. The Committee wishes to acknowledge the essential contribution of the staff of the registries.

- The Fichier des tumeurs du Québec contributed to this edition. Gilles Pelletier provided the survival data and Michel Beaupré reviewed the French translation.

- Statistics Canada staff produced the estimates of current incidence and mortality. The work of Martin Renaud of Social Survey Methods Division, Methodology Branch is particularly appreciated.

- The Health Statistics Division, Statistics Canada developed the Tables and Figures and several sections of the text. Dr. Ru-Nie Gao developed the tables and charts on childhood cancer.

- The Bureau of Chronic Disease, Health Canada contributed to various sections of the text. John Silins provided text for PYLL. Chris Waters and Robert Semenciw provided statistical support.

- Dr. Ron Barr, Professor of Pediatrics, Pathology and Medicine, McMaster University, reviewed the text for childhood cancer.

- The National Cancer Institute of Canada supports the work of the Steering Committee and the publication of the monograph with charitable funds collected by volunteers of the Canadian Cancer Society.

- The monograph is distributed by the Canadian Cancer Society and Statistics Canada.

TABLE OF CONTENTS

TABLE OF CONTENTS – Continued

TABLE OF CONTENTS – Continued

TABLE OF CONTENTS – Concluded

INTRODUCTION

This monograph is published by the National Cancer Institute of Canada in collaboration with Statistics Canada, Health Canada and provincial cancer registries. 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 policymakers 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.

Each year the monograph contains information on cancer incidence and mortality by age, sex, time period and province. In addition, one or more Special Topics are usually included. This year, the Special Topics include data on prevalence of cancer and a review of colorectal cancer. In recent years the Special Topics have included: breast cancer in women (1993); survival rates in British Columbia (1992) and Ontario (1991); cancer in aboriginal populations (1991); smoking prevalence and lung cancer (1991); age-specific trends in selected sites among women (1990); cancer mortality by income level; and the economic burden of cancer (1990).

Information on cancer incidence and mortality comes from the provincial cancer registries and offices of vital statistics, which send their data to Statistics Canada for compilation at the national level. The processes of collecting complete information about cancer cases in each province and then compiling this information at the national level result 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 (1990 for incidence; 1992 for mortality), and in addition, estimated values for years up to 1995. 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.

Note: The statistical methodology used for this edition differs from that used in previous years because the standardization of incidence and mortality rates is now based on the 1991 Canadian population rather than the World Standard Population. Readers will note that the age-standardized rates reported in this monograph are higher than those reported in the 1994 edition. This does not mean that there has been a sudden increase in the number of cancer cases and deaths. It reflects the fact that rates are now standardized to the 1991 Canadian population rather than the World Standard Population. The Canadian population has a much higher proportion of people in the older age groups, in which cancer is much more common. The steering committee felt that this new approach would be more relevant and useful to those concerned with cancer in Canada. **It is not appropriate to compare age-standardized rates presented herein to those presented in previous years.**

Details of the statistical methods used to produce the projections are described in the Methodologic Appendix. **It is important to emphasize that the figures provided for 1995 are estimates, rather than actual data.**

The statistics contained herein refer to all types of cancer, defined according to a standardized classification system 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 appendix entitled "For Further Information", which indicates how to contact the various agencies involved, including Statistics Canada, Health Canada, the Canadian Cancer Society, and provincial cancer agencies. Related information can also be found in other publications, including: reports from provincial cancer registries; Cancer in Canada and Health Reports, published by Statistics Canada; Cancer Incidence in Five Continents, published by the International Agency for Research on Cancer; and a collaborative monograph titled The Making of the Canadian Cancer Registry.

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 evaluation form is included on the final page of the report).

HIGHLIGHTS

Current Incidence and Mortality

- An estimated 125,400 new cases of cancer and 61,500 deaths from cancer will occur in Canada in 1995.
- Three types of cancer account for more than 55% of the new cases of cancer. Among women these are breast, colorectal and lung cancers, and among men these are prostate, lung and colorectal cancers.
- In 1995, 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 Canadian women and men in 1995.

Changes in Statistical Methodology

- The incidence and mortality rates presented in this edition are based on a new statistical methodology, thereby making it inappropriate to compare these to rates published in previous editions. This change in the process of age standardization was implemented in order to make the published data even more relevant to those who are interested in cancer control in Canada.

Trends in Cancer Incidence and Mortality

- Since the mid-1980s incidence and mortality rates for lung cancer in men have levelled off, likely reflecting the fall in tobacco consumption among men which began in the 1960s. In contrast, incidence and mortality rates in women have continued their steady climb.
- Among Canadian women, the incidence and mortality rates for cancers of the cervix, body of the uterus and ovaries have continued to decline steadily.
- Among Canadian men, incidence rates for prostate cancer have increased rapidly, while mortality rates increased only slightly. These trends in incidence are due, in part, to the widespread use of medical procedures that enable the detection of early staged tumours.

Age and Sex Distribution of Cancer

- Cancer is primarily a disease of older Canadians, with 72% of new cancer cases and 80% of deaths due to cancer occurring among those who are at least 60 years old.

Probability of Developing/Dying from Cancer

- About 1 in 9 women will develop breast cancer over their entire lifetime; 1 in 16 will develop colorectal cancer and 1 in 22, lung cancer. More than 1 in 10 men will be diagnosed with prostate cancer, most after the age of 70. Lung cancer will affect 1 in 11 men during their lives.

Potential Years of Life Lost due to Cancer

- Cancer is the leading cause of lost years of potential life in Canada, as 859,000 life-years were lost due to cancer in 1992.

Relative Cancer Survival

- For cases diagnosed in Quebec, the relative survival rate five years after diagnosis for of all types of cancer combined was 54% for females and 40% for males.

Cancer in Children

- Acute lymphocytic leukemia is the most common childhood cancer, except for infants under one year of age, among whom neuroblastoma is the most commonly occurring cancer. Many childhood cancers have a relatively good prognosis in terms of long-term survival.

Cancer Prevalence

- At the end of 1990, more than 413,000 people living in Canada had been diagnosed with cancer in the previous 10 years.

Colorectal Cancer

- Since 1985, incidence rates for colorectal cancer have declined rapidly for women after years of relatively stable rates; among men incidence rates have declined slightly after years of slight but steady increases. Similarly, greater declines in mortality rates have occurred among women than men, with declines occurring at a more rapid pace since 1985.

CURRENT INCIDENCE AND MORTALITY

Three measures of the importance of different forms of cancer in Canada in 1995 are 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** (or 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 7 are **estimates** based on extrapolations of trends in cancer incidence, mortality and population data since 1983, and are rounded to the nearest 5, 10, 50 or 100. Readers requiring more accurate actual data, or information on less common sites of cancer, may refer to Appendix Tables 1 and 2 or to source publications.[2,18,12] Some problems inherent in using the above statistics are considered below.

Sources of Data

Incidence figures are collected by provincial and territorial cancer registries. 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. Cancer sites 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 differ 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 60,800 cases of non-melanoma skin cancer for Canada in 1995.** *

Provincial and territorial cancer incidence data are brought together by Statistics Canada to form the National Cancer Incidence Reporting System, which has evolved into the Canadian Cancer Registry for cases diagnosed beginning in 1992. These data are published annually in **Cancer In Canada,**[18] every five years in the series entitled **Cancer Incidence In Five Continents**, which is produced by the International Agency for Research on Cancer,[12] and in occasional reports.[2]

Cancer mortality statistics are derived from death records maintained by the provincial registrars of vital statistics for persons resident in that province 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. Although these

---

* *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.*

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 may be the result of cancers diagnosed in previous years.

Estimates for Cancer Incidence and Mortality, Canada, 1995

An estimated 125,400 new cases of cancer and 61,500 deaths from cancer will occur in Canada in 1995. Men outnumber women for both new cases and deaths, as shown by sex ratios (male:female) of 1.1 for incidence and 1.2 for mortality (Table 1).

Three types of cancer account for at least 55% of the new cases in each sex: prostate, lung, and colorectal cancers in males, and breast, colorectal, and lung cancers in females. A third of the cancer deaths in men, and one-fifth in women, are due to lung cancer alone (Figures 1.1 and 1.2).

Lung cancer continues as the leading cause of cancer death among Canadian women in 1995, accounting for an estimated 5,800 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 remained stable. Lung cancer **incidence** among women also continues to rise. The estimated 7,300 new cases of lung cancer puts it close behind colorectal cancer, which, at 7,500 cases is the second leading form of cancer diagnosed in Canadian women.

Among Canadian men in 1995, prostate cancer continues as the leading form of cancer incidence, with an estimated 16,100 newly diagnosed cases compared to 12,700 lung cancers. This likely reflects in part the rapid increase in the numbers of prostate cancers being detected in all provinces across Canada as a result of the widespread rise in the use of earlier detection techniques. Nevertheless, lung cancer will remain the leading cause of cancer death among Canadian men in 1995; the estimated 11,000 lung cancer deaths exceed the 4,200 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 greater in males than 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 33% or less - breast, prostate, bladder, melanoma, body of the uterus, cervix); those with a fair prognosis (a ratio greater than 33% but less than 66% - colorectal, lymphoma, kidney, leukemia, oral, ovary, larynx); and those with a poor prognosis (ratio greater than 66% - lung, stomach, pancreas, brain).

These ratios are generally quite similar for males and females within each site. The overall ratio of deaths to new cases of 49% would be considerably lower if non-melanoma skin cancer cases were included, as this disease is readily cured.

Table 1
Estimated New Cases and Deaths for Major Cancer Sites by Sex, Canada, 1995

Site	New Cases 1995 Estimate			Deaths 1995 Estimate			Deaths/Cases ratio 1995 Estimate		
	Total	M	F	Total	M	F	Total	M	F
All Cancers	**125,400**	**66,400**	**59,000**	**61,500**	**33,700**	**27,800**	**0.49**	**0.51**	**0.47**
Lung	20,000	12,700	7,300	16,800	11,000	5,800	0.84	0.87	0.79
Female Breast	17,700	...	17,700	5,400	...	5,400	0.31	...	0.31
Colorectal	16,300	8,800	7,500	6,300	3,400	2,900	0.39	0.39	0.39
Prostate	16,100	16,100	...	4,200	4,200	...	0.26	0.26	...
Lymphoma	7,300	4,000	3,300	3,450	1,800	1,650	0.47	0.45	0.50
Bladder	4,650	3,500	1,150	1,320	920	400	0.28	0.26	0.35
Kidney	3,950	2,400	1,550	1,350	820	530	0.34	0.34	0.34
Leukemia	3,250	1,850	1,400	2,050	1,150	900	0.63	0.62	0.64
Oral	3,220	2,300	920	1,080	770	310	0.34	0.33	0.34
Melanoma	3,050	1,600	1,450	620	390	230	0.20	0.24	0.16
Stomach	3,000	1,950	1,050	2,060	1,250	810	0.69	0.64	0.77
Body of Uterus	3,000	...	3,000	620	...	620	0.21	...	0.21
Pancreas	2,850	1,350	1,500	2,850	1,400	1,450	1.00	1.04[1]	0.97
Ovary	2,200	...	2,200	1,350	...	1,350	0.61	...	0.61
Brain	2,160	1,200	960	1,470	800	670	0.68	0.67	0.70
Larynx	1,390	1,100	290	580	480	100	0.42	0.44	0.34
Cervix	1,300	...	1,300	370	...	370	0.28	...	0.28
All other sites	13,980	7,550	6,430	9,630	5,320	4,310	0.69	0.70	0.67

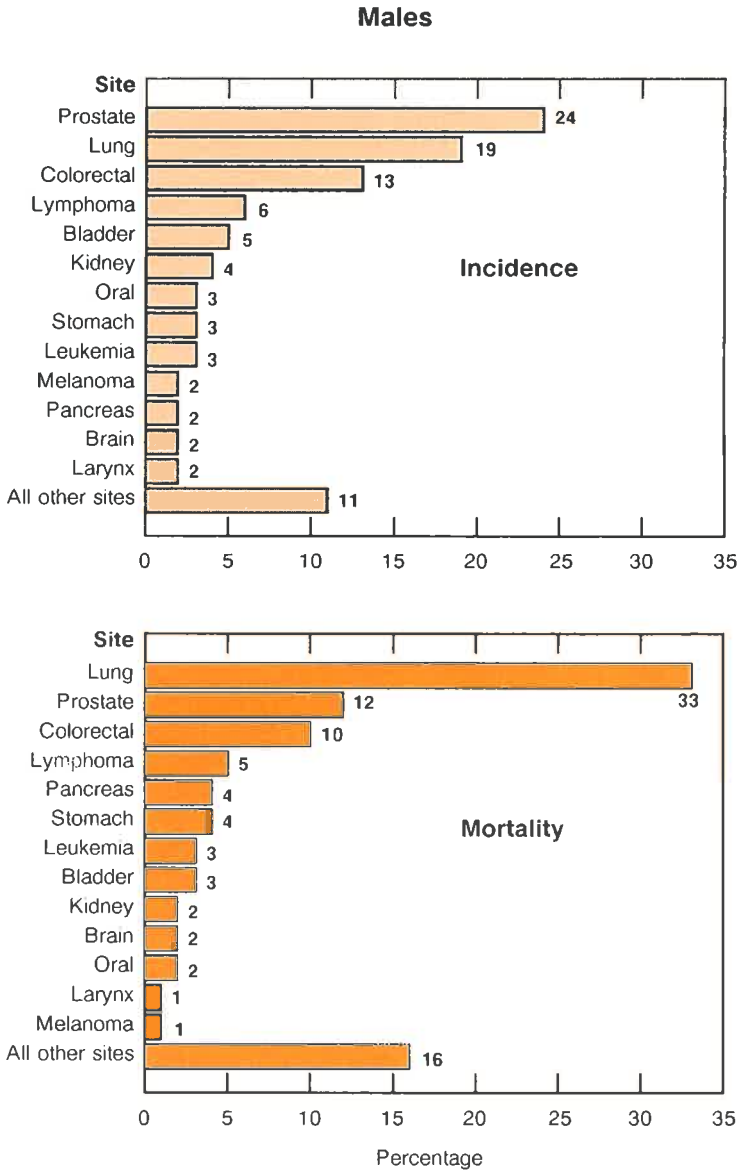
[1] *The high ratio (in excess of 1.0) for cancer of the pancreas may result from incomplete registration of pancreatic cancer before death, or may be due to incorrect reporting of this cancer on death certificates.*

Note: *Figures exclude an estimated 60,800 cases of non-melanoma skin cancer (ICD-9 173).*
... Not Applicable.

Source: *Health Statistics Division, Statistics Canada*

Figure 1.1

Percent Distribution of Estimated New Cases and Deaths for Major Cancer Sites, Males, Canada, 1995

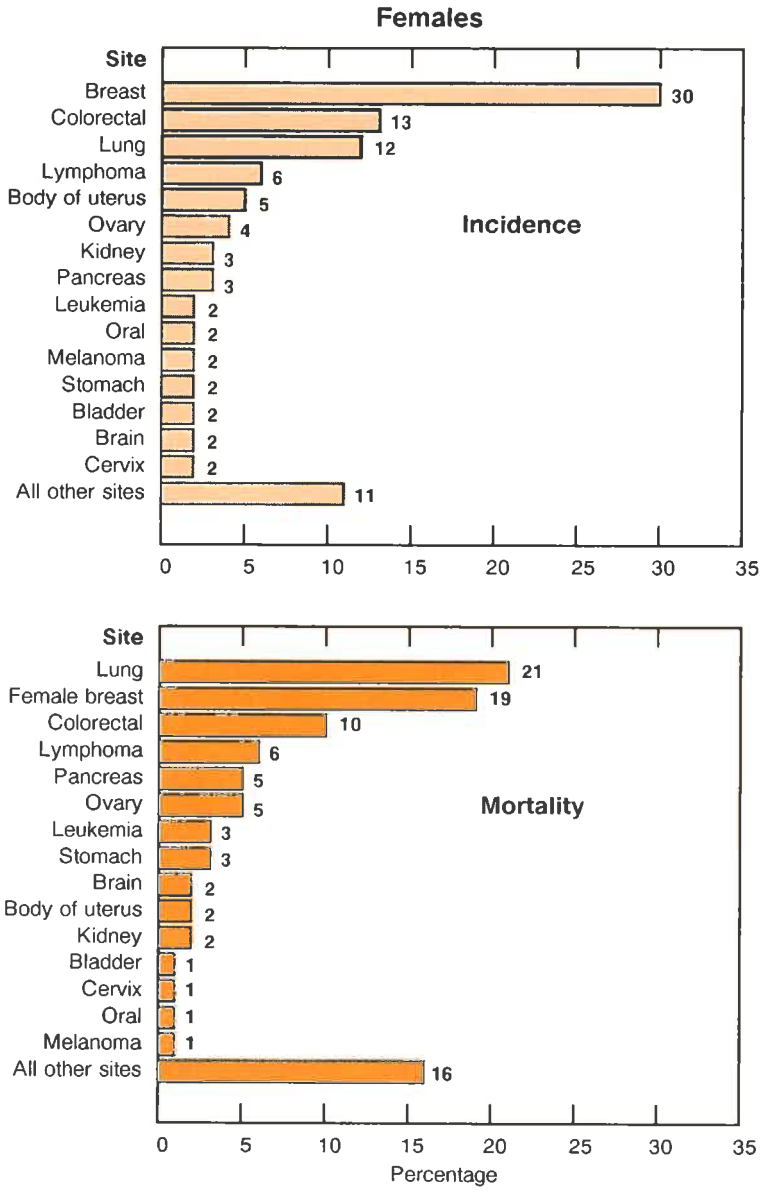


Note: *All figures exclude an estimated 60,800 cases of non-melanoma skin cancer (ICD-9 173) in both sexes combined.*

Source: *Health Statistics Division, Statistics Canada.*

Figure 1.2

Percent Distribution of Estimated New Cases and Deaths for Major Cancer Sites, Females, Canada, 1995



Note: *All figures exclude an estimated 60,800 cases of non-melanoma skin cancer (ICD-9 173) in both sexes combined.*

Source: *Health Statistics Division, Statistics Canada.*

GEOGRAPHIC PATTERNS OF CANCER OCCURRENCE

Table 2 presents estimates of population, new cases and deaths for all sites of cancer combined, by sex and by province or territory for 1995. For each province and for each specific type of cancer, the number of new cases estimated for 1995 is shown in Table 3. Estimates of the age-standardized incidence rates in Table 4 take into account the differences between the size and age distribution of each province's population, thereby facilitating inter-provincial comparisons.

The 1991 Canadian population is used as the standard for calculating standardized rates (see glossary).

Tables 5 and 6 present data in a similar way for the number of deaths and for age-standardized mortality rates, respectively.

Table 7 lists ten cancers for which there is a statistically significant difference of at least 20% between a provincial rate and the Canadian average. The pattern of higher rates of lung cancer in Quebec males is consistent with higher levels of tobacco use in that province. The variability in the rates of prostate cancer may be related to differences in early detection activities. Low rates of breast cancer and high rates of cervical cancer in Newfoundland may be influenced by screening programs, reproductive patterns and socio-economic factors in that region. The relatively high rates of stomach cancer in Newfoundland are consistent with greater use, historically, of salted and smoked foods. Low rates were reported for a number of sites including bladder, lymphoma and leukemia for one or both sexes, which may be due to differences in diagnostic procedures available in the region, or to reporting procedures used in cancer registration.

The interpretation of inter-provincial differences in the rates for a particular type of cancer must be made with caution. In particular, there are several reasons why it is difficult to attribute such differences to variation in known risk factors for that cancer site. First, due to the rarity of some forms of cancer, the number of cases occurring in some provinces during a one year period may be so small that the resultant rate estimates may be unreliable. For this reason, Table 7 referred to incidence data covering a five year period, 1986-1990, and incorporated a test of statistical significance to rule out chance variation. Second, correlations between the incidence of disease and the prevalence of risk factors in geographical areas can be misleading. To prove a causal association between a factor and a disease, it is necessary to perform more detailed studies. Third, for many cancers there is a long interval between exposure to a risk factor and the occurrence of disease, and information on the prevalence of risk factors in previous decades is often lacking. Fourth, there are differences between provinces in the availability of screening or early detection programs (e.g., for breast and cervical cancers).

Table 2
Estimated Population, New Cases and Deaths for All Cancers, by Sex, Canada and Provinces/Territories, 1995

Province	Population ('000's) 1995 Estimates[1]			New Cases 1995 Estimates[2]			Deaths 1995 Estimates[2]		
	Total	M	F	Total	M	F	Total	M	F
Canada[3]	**29,563**	**14,640**	**14,923**	**125,400**	**66,400**	**59,000**	**61,500**	**33,700**	**27,800**
Newfoundland	582	291	291	1,980	1,100	880	1,120	660	460
Prince Edward Island	133	66	68	630	330	300	340	200	140
Nova Scotia	932	460	473	5,000	2,600	2,400	2,350	1,300	1,050
New Brunswick	757	375	382	3,450	1,900	1,550	1,720	960	760
Quebec	7,346	3,620	3,727	30,300	16,200	14,100	16,800	9,400	7,400
Ontario	11,120	5,495	5,626	48,500	25,300	23,200	22,400	12,100	10,300
Manitoba	1,127	559	569	5,300	2,800	2,500	2,550	1,400	1,150
Saskatchewan	1,003	498	505	4,600	2,500	2,100	2,210	1,250	960
Alberta	2,750	1,382	1,368	9,100	4,700	4,400	4,500	2,500	2,000
British Columbia	3,712	1,844	1,868	16,400	8,800	7,600	7,500	4,000	3,500
Yukon[4]	34	18	20	45	25	20	30	15	10
Northwest Territories[4]	65	34	30	85	45	40	50	25	20

[1] 1995 Population Projections were provided by the Census and Demographics Branch, Statistics Canada.
[2] Figures exclude an estimated 60,800 cases of non-melanoma skin cancer (ICD-9 173).
[3] Canada totals may not add due to rounding.
[4] Estimates of new cases and deaths for Yukon and Northwest Territories are based on the most recent five years for which data are available.
***Source:** Health Statistics Division, Statistics Canada.*

Table 3
Estimated New Cases for Major Cancer Sites by Sex, Canada and Provinces, 1995

	New Cases										
	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Males											
All Cancers	**66,400**	**1,100**	**330**	**2,600**	**1,900**	**16,200**	**25,300**	**2,800**	**2,500**	**4,700**	**8,800**
Prostate	16,100	200	100	540	450	3,000	6,000	840	670	1,150	3,200
Lung	12,700	200	55	560	420	3,900	4,500	470	420	810	1,450
Colorectal	8,800	180	35	400	250	2,100	3,500	380	300	600	1,000
Lymphoma	4,000	55	10	110	100	1,000	1,600	170	160	300	470
Bladder	3,500	100	15	160	160	1,150	1,000	170	180	300	280
Kidney	2,400	40	15	120	50	590	920	90	110	200	250
Oral	2,300	90	20	95	50	490	920	110	75	160	280
Stomach	1,950	60	15	95	50	500	720	80	65	120	210
Leukemia	1,850	20	5	60	40	490	800	70	90	100	160
Melanoma	1,600	10	10	70	65	190	760	50	65	150	240
Pancreas	1,350	5	15	70	25	330	510	60	40	130	160
Brain	1,200	10	5	40	30	330	490	45	40	100	120
Larynx	1,100	30	5	50	40	350	380	20	30	70	110
Females											
All Cancers	**59,000**	**880**	**300**	**2,400**	**1,550**	**14,100**	**23,200**	**2,500**	**2,100**	**4,400**	**7,600**
Breast	17,700	260	85	660	430	4,000	6,800	730	690	1,450	2,600
Colorectal	7,500	140	40	360	220	1,900	3,000	330	280	450	820
Lung	7,300	60	55	290	190	1,950	2,700	320	230	460	1,100
Lymphoma	3,300	45	20	130	95	830	1,350	140	120	230	380
Body of Uterus	3,000	60	15	100	75	720	1,150	140	90	240	380
Ovary	2,200	35	5	80	45	520	970	70	75	150	270
Kidney	1,550	30	10	80	60	390	590	60	45	120	150
Pancreas	1,500	5	10	70	20	370	590	55	70	120	190
Melanoma	1,450	20	10	75	55	190	600	65	40	160	250
Leukemia	1,400	20	5	50	40	370	610	45	70	95	120
Cervix	1,300	30	5	70	25	220	580	45	50	130	150
Bladder	1,150	25	10	60	45	350	380	50	55	110	85
Stomach	1,050	30	10	60	20	290	390	50	30	55	120
Brain	960	--	5	25	40	260	400	35	10	70	110
Oral	920	15	5	35	10	180	420	45	25	70	120

Note: *Canadian totals may not add due to rounding. The Canada and provincial totals for all cancers exclude an estimates 60,800 cases of non-melanoma skin cancer (ICD-9 173). Due to changes and improvements in source data and in methodology, the 1995 estimates are not directly comparable to estimates published in previous years. Please refer to methodological appendix for further details. These estimates may vary from actual figures by about 5 to 15 percent. Please contact provincial cancer registries for the most current actual data.*

-- Less than 5 cases.

Source: *Health Statistics Division, Statistics Canada.*

Table 4
Estimated Age-Standardized Incidence Rates for Major Cancer Sites, by Sex, Canada and Provinces, 1995

	Rate per 100,000										
	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Males											
All Cancers	**465**	**418**	**477**	**572**	**508**	**483**	**481**	**487**	**441**	**414**	**451**
Prostate	110	77	132	115	121	94	118	141	116	108	166
Lung	92	73	79	119	112	115	83	81	74	73	73
Colorectal	62	66	49	86	66	62	66	64	52	51	51
Lymphoma	28	19	19	24	27	29	30	30	29	24	24
Bladder	25	38	23	35	42	35	18	29	32	26	15
Kidney	17	15	18	26	13	17	17	16	20	17	13
Oral	16	35	19	20	13	14	17	19	13	14	14
Stomach	13	23	21	21	13	15	14	14	11	11	10
Leukemia	13	8	9	14	10	15	15	12	17	9	8
Melanoma	12	3	16	15	17	5	14	9	13	11	12
Pancreas	9	7	18	14	7	10	10	10	6	12	8
Brain	8	4	9	10	8	9	9	8	7	8	6
Larynx	7	11	8	10	9	10	7	4	5	6	6
Females											
All Cancers	**335**	**294**	**372**	**415**	**338**	**318**	**356**	**349**	**330**	**325**	**335**
Breast	103	87	113	116	97	93	106	108	116	108	117
Lung	42	20	40	51	43	44	41	45	37	35	47
Colorectal	41	48	39	57	46	41	43	45	39	32	34
Lymphoma	19	14	17	23	19	19	21	19	19	17	17
Body of Uterus	17	20	18	19	17	16	18	21	15	18	17
Ovary	12	11	3	14	9	12	15	10	13	11	12
Melanoma	9	6	13	14	13	5	10	11	7	12	12
Kidney	9	7	8	13	13	9	9	9	7	9	7
Pancreas	8	5	9	10	7	8	8	7	8	8	7
Cervix	8	10	10	13	7	5	10	8	9	9	7
Leukemia	8	6	4	8	9	9	9	5	10	7	5
Bladder	6	8	9	9	9	8	5	7	8	8	3
Stomach	6	9	10	9	4	6	5	6	3	3	5
Brain	6	4	9	5	9	6	6	6	4	5	5
Oral	5	5	4	6	4	4	6	6	3	5	6

Note: ***Rates exclude non-melanoma skin cancer, (ICD-9 173) and are adjusted to the age distribution of the 1991 Census of Canada population.(In previous years, rates were adjusted to the world standard population.)*** *For this reason, the 1995 estimates are not directly comparable to estimates published in previous years. Please refer to the methodological appendix for further details.*

Source: *Health Statistics Division, Statistics Canada*

Table 5
Estimated Deaths for Major Cancer Sites by Sex, Canada and Provinces, 1995

	Deaths										
	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Male											
All Cancers	**33,700**	**660**	**200**	**1,300**	**960**	**9,400**	**12,100**	**1,400**	**1,250**	**2,500**	**4,000**
Lung	11,000	210	55	440	340	3,500	3,600	390	340	730	1,300
Prostate	4,200	80	45	170	110	940	1,500	220	190	350	570
Colorectal	3,400	65	15	100	60	1,050	1,250	140	120	240	320
Lymphoma	1,800	30	5	55	60	460	680	85	85	150	210
Pancreas	1,400	20	10	60	40	360	510	60	40	140	170
Stomach	1,250	40	5	50	30	380	430	55	55	75	140
Leukemia	1,150	15	5	40	25	330	440	45	40	85	110
Bladder	920	25	5	30	25	230	350	45	35	65	110
Kidney	820	20	10	35	20	220	270	35	40	70	100
Brain	800	15	5	25	25	220	290	25	30	65	95
Oral	770	10	10	30	15	270	260	25	20	40	90
Larynx	480	5	–	15	10	190	180	10	15	20	40
Melanoma	390	--	10	15	15	60	180	5	10	30	55
Females											
All Cancers	**27,800**	**460**	**140**	**1,050**	**760**	**7,400**	**10,300**	**1,150**	**960**	**2,000**	**3,500**
Lung	5,800	60	40	240	160	1,500	2,100	250	190	380	870
Breast	5,400	90	15	190	140	1,450	2,000	200	200	430	630
Colorectal	2,900	45	15	80	65	980	1,050	130	95	170	280
Lymphoma	1,650	25	10	65	50	450	600	90	70	100	170
Pancreas	1,450	10	10	60	30	390	540	55	60	110	190
Ovary	1,350	15	--	40	40	310	550	50	45	110	190
Leukemia	900	10	5	30	25	270	340	35	30	55	95
Stomach	810	30	10	35	20	240	280	35	20	60	85
Brain	670	10	--	25	20	210	230	20	10	55	90
Body of Uterus	620	10	--	15	20	210	200	25	10	50	65
Kidney	530	15	5	25	20	140	160	30	15	60	70
Bladder	400	10	5	15	10	110	130	15	15	30	60
Cervix	370	10	5	25	5	75	150	15	15	30	45
Oral	310	5	--	10	5	70	130	15	10	25	50
Melanoma	230	–	--	5	5	45	75	5	5	10	25

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 1995 estimates are not directly comparable to estimates published in previous years. Please refer to methodological appendix for further details. These estimates may vary from actual figures by about 5 to 15 percent.*

– Less than 5 cases.

Source: *Health Statistics Division, Statistics Canada.*

Table 6
Estimated Age-Standardized Mortality Rates for Major Cancer Sites by Sex, Canada and Provinces, 1995

	Rate per 100,000 Population										
	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Males											
All Cancers	**247**	**264**	**282**	**284**	**264**	**290**	**238**	**237**	**216**	**225**	**209**
Lung	79	81	76	95	94	106	70	67	60	66	67
Prostate	33	36	43	38	31	33	32	38	33	34	31
Colorectal	25	24	24	22	17	33	24	23	21	21	17
Lymphoma	13	10	7	12	15	14	13	15	15	13	11
Pancreas	10	8	17	12	10	11	10	10	7	13	9
Stomach	9	17	9	11	8	12	8	10	9	7	7
Leukemia	8	6	7	9	7	10	9	7	7	7	6
Bladder	7	11	6	7	7	8	7	8	6	5	6
Kidney	6	7	11	8	4	7	5	6	7	6	5
Brain	6	5	8	6	6	6	5	4	5	5	5
Oral	5	2	7	7	4	8	5	4	4	3	5
Larynx	3	3	3	3	2	6	3	3	3	1	2
Melanoma	3	1	4	4	4	2	3	1	2	3	3
Females											
All Cancers	**154**	**153**	**154**	**176**	**160**	**163**	**152**	**154**	**140**	**148**	**148**
Lung	33	21	47	42	35	34	32	35	29	28	38
Breast	31	31	18	33	30	32	31	27	30	32	27
Colorectal	15	14	12	12	12	21	15	16	12	12	11
Lymphoma	9	8	7	10	11	10	9	11	10	7	7
Pancreas	8	3	8	9	6	8	8	7	8	8	8
Ovary	8	6	2	6	8	7	8	6	7	8	8
Leukemia	5	4	4	5	5	6	5	4	4	4	4
Stomach	4	10	6	5	4	5	4	4	3	4	3
Brain	4	3	3	4	5	5	4	3	2	4	4
Body of Uterus	3	4	2	2	5	5	3	3	1	4	3
Kidney	3	5	2	4	4	3	2	3	2	4	3
Cervix	2	3	1	4	1	2	2	2	3	2	2
Bladder	2	3	1	2	1	2	2	2	2	2	2
Oral	2	1	1	1	1	1	2	2	1	2	2
Melanoma	1	--	1	1	1	1	1	1	1	1	1

Note: ***Rates exclude non-melanoma skin cancer (ICD-9 173) and are standardized to the age distribution of the 1991 Census of Canada population. (In previous years, rates were adjusted to the world standard population.)*** *Due in part to this, and to changes and improvements in source data and methodology, the 1995 estimates are not directly comparable to estimates published in previous years. Please refer to methodological appendix for further details.*

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

Source: *Health Statistics Division, Statistics Canada*

Table 7
Province to Canada Ratios of Age-standardized Incidence Rates by Sex and Selected Sites, 1986-1990

Site	Rate Ratio (≤0.80)			Rate Ratio (≥1.20)		
	Province	Male	Female	Province	Male	Female
Lung	Alta.	0.78	...	Que.	1.26	...
	Nfld.	...	0.50			
Prostate	Nfld.	0.67		B.C.	1.29	...
Breast	Nfld.	...	0.79	...	...	...
Cervix	...	...	...	Nfld.	...	1.44
				N.S.	...	1.26
Melanoma	Man.	0.75		B.C.	1.27	1.44
	Que.	0.45	0.45	N.S.	1.21	1.32
	Nfld.	0.39	0.64			
Stomach	...	...	...	Nfld.	1.89	1.63
Bladder	B.C.	0.63	0.68	...	...	...
Lymphoma	P.E.I	0.72		...	...	...
	Nfld.	0.64	0.71	...	...	...
Leukemia	N.B.	0.73	...	...	...	...
	Nfld.	0.57	0.67	...	...	...
Oral	Que.	...	0.78	Nfld.	1.53	...
	N.B.	...	0.67	Man.	1.20	...

Note: *Rate ratios are shown only for those provinces whose rates are significantly different from the Canadian rate at the p = .01 level, and whose rates are* ≤.80 and ≥1.20.
... Not Applicable.
Source: *Health Statistics Division, Statistics Canada.*

TRENDS IN INCIDENCE AND MORTALITY

Recent incidence and mortality trends for major types of cancer are assessed by comparing annual age-standardized rates. The average annual percent changes in site-specific incidence and mortality rates since 1983 are listed in Table 8 and plotted in Figure 2. More detailed depictions of the trends in annual rates since 1969 are presented in Figures 3 to 6.

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 can not be compared directly to those in previous editions.** Rates standardized to the 1991 Canadian population are generally about 30 to 50 percent higher than those standardized to the World population used in previous years, because the 1991 Canadian population is older. This does not mean that there has been a sudden increase in the number of cancer cases and deaths. The 1991 Canadian population is preferred because rates standardized to this population more closely reflect the actual burden of cancer per 100,000 Canadian men or women.

All Sites

Trends of incidence and mortality rates for all cancer sites combined have remained relatively stable since 1983, as the average annual percent changes for these rates are close to zero (Table 8). The rapid increases in incidence rates throughout the 1970s displayed in Figure 3 largely reflect improved registration of new cases during this period in several provincial registries.[2,18]

Figure 4 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 mortality rates for all cancer sites combined during this period. However, the more recent data indicate that cancer mortality rates among men may have declined very slightly from a peak in 1988, whether or not lung cancer rates are included. Among women, overall cancer mortality rates have been stable, while mortality for all sites excluding lung cancer has declined steadily.

Despite the relative stability in the age-standardized rates, the numbers of new cases and deaths continue to rise because the Canadian population is aging. The actual numbers are important for such purposes as planning for cancer care facilities. In 1995, the estimated 125,400 new cases of cancer diagnosed in Canadians represents an increase of 37 percent from the 91,841, cases diagnosed ten years earlier in 1985. Similarly, the estimated 61,500 cancer deaths in 1995 represent a 33 percent increase from the 46,333 cancer deaths recorded a decade ago. On average, therefore, an additional 3,500 new cases of cancer and 1,500 deaths have occurred annually over the last decade.

Trends by Selected Sites

Time trends of incidence and mortality rates since 1969 for selected cancer sites are shown for men in Figures 5.1 and 5.2 and for women in Figures 6.1 and 6.2. Tables 9 and 10 present the data points plotted in Figures 5 and 6. The trends over the past decade for the set of cancer sites examined in this publication are summarized in Table 8 and Figure 2. This year, trends for the majority of cancer sites have stabilized or declined.

Of the more commonly occurring cancers, just four among men and two among women have increased at an average rate greater than 2 percent annually since 1983. Among men, these are melanoma (4.5% per year), prostate (3.1%), kidney (2.5%) and non-Hodgkin's lymphoma (2.4%), and among women, lung (3.7%) and kidney (3.3%). Patterns of exposure to sunlight may affect melanoma rates, while the increase in non-Hodgkin's lymphoma is at least partly related to the increased levels of HIV infection. Risk factors for cancer of the kidney include cigarette smoking as well as use of certain pain-relieving medications, however the influence of other factors is difficult to determine.

Incidence and mortality rates for lung cancer among men levelled off in the mid-1980s and by the early 1990s show a small decline, likely reflecting the fall in tobacco consumption among men which began in the mid-1960s. In contrast, incidence and mortality rates of lung cancer in women continue to increase steadily and are now more than four times as high as the 1970 rate.

Breast cancer incidence among women has also risen somewhat in the past decade; this increase may be due, in part, to the rising number of mammographic examinations since the mid-1980s. Mortality rates for breast cancer remain stable.

Age-standardized incidence rates for prostate cancer have steadily increased over the past 25 years (Figure 5.1). Given that prostate cancer is the most frequently occurring type of cancer among men, with 16,100 new cases expected in 1995 (Table 1), these trends have important implications regarding the health of Canadian men and their health service requirements. It should be noted that the aging of the population is not an explanation for the observed trends in rates because the incidence rates shown in Figure 5.1 are age-standardized. The observed trends in Canadian prostate cancer rates have been attributed largely to increases in the detection of cancer, which has followed from the use of transurethral resection of the prostate in the treatment of benign prostatic disease.[6] More recently, these trends have been influenced by the widespread use of procedures that enable the early detection of prostate cancer, such as digital rectal examination and a blood test for prostatic specific antigen (PSA).[7] The overall value of such screening tests for prostate cancer is not clear at present, and was one of the topics examined at a recent Canadian Workshop from which recommendations have been published regarding future research and screening program development.[7] Given the importance of prostate cancer in Canada, and the recent initiatives in the area of screening and early detection, prostate cancer trends will be examined in detail as a "Special Topic" in the 1996 edition of Canadian Cancer Statistics.

Since 1983, mortality rates have declined for testicular cancer, childhood cancer and Hodgkin's disease, reflecting improved treatment methods in the face of stable or increasing incidence rates. The declines in incidence and mortality for stomach cancer reflect improved diets, while declines in invasive cervical cancer may reflect the impact of early detection through Pap smear screening programs.

Data in Table 8 and Figures 5 to 6 can be used to infer whether the observed trends are due to changes in incidence or survival among those who have cancer. Based on their trends over the past decade in incidence and mortality, specific sites may be categorized as follows:

- **Cancers with stable incidence and mortality rates** (e.g., changing less than about 2% per year):
  e.g., lung (M); oral (M,F); and brain (M,F).
  Conclusion: little change in either incidence or survival.

- **Cancers where both incidence and mortality rates have increased:**
  e.g., lung (F); melanoma (M); and prostate.
  Conclusion: the increase in mortality is due in part to the increase in incidence.

- **Cancers where both incidence and mortality rates have decreased:**
  e.g., stomach (M,F); cervix; and pancreas (M).
  Conclusion: the decline in mortality is due mainly to a decline in incidence rates.

- **Cancers with stable or increasing incidence rates and decreasing mortality rates**:
  e.g., childhood cancer and Hodgkin's disease (M,F); testis; and colorectal (F).
  Conclusion: the mortality trend is due to increased survival rates.

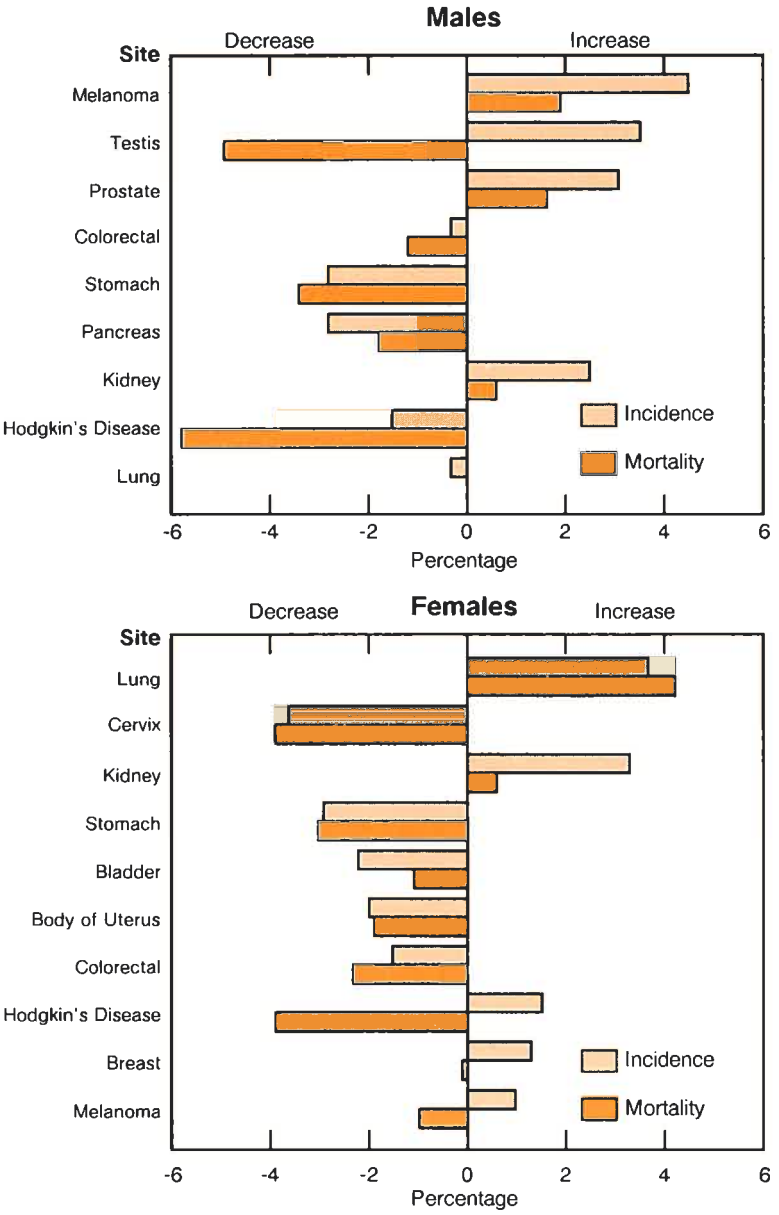
Table 8
Average Annual Percent Change in Age-standardized Incidence (1983-90) and Mortality (1983-92) Rates for Selected Cancer Sites, Canada

	Incidence 1983-1990		Mortality 1983-1992	
	Males	Females	Males	Females
All Cancers	**0.3**	**0.1**	**0.1**	**0.2**
Oral	-1.8	-0.6	-0.9	-1.0
Stomach	-2.8	-2.9	-3.4	-3.0
Colorectal	-0.3	-1.5	-1.2	-2.3
Pancreas	-2.8	-0.6	-1.8	-0.8
Larynx	-1.8	1.6	0.1	1.1
Lung	-0.3	3.7	0	4.2
Melanoma	4.5	1.0	1.9	-1.0
Female Breast	...	1.3	...	-0.1
Cervix	...	-3.6	...	-3.9
Body of Uterus	...	-2.0	...	-1.6
Ovary	...	-1.7	...	-0.9
Prostate	3.1	...	1.6	...
Testis	3.5	...	-4.9	...
Bladder	-1.8	-2.2	-1.1	-1.1
Kidney	2.5	3.3	0.6	0.6
Brain	-0.2	-0.2	-0.6	0.2
Hodgkin's Disease	-1.5	1.5	-5.8	-3.9
Multiple Myeloma	-0.1	-0.7	1.1	0.3
Non-Hodgkin's Lymphoma	2.4	-1.0	1.6	1.9
Leukemia	-1.6	-1.4	-0.9	-1.2
All Childhood Cancers	**Both Sexes**		**Both Sexes**	
Age 0-14	0.1		-4.4	

Note: *Average Annual Percent Change is calculated assuming a log linear model and excludes non-melanoma skin cancer (ICD-9 173).*
... Not Applicable.
Source: *Health Statistics Division, Statistics Canada.*

Figure 2

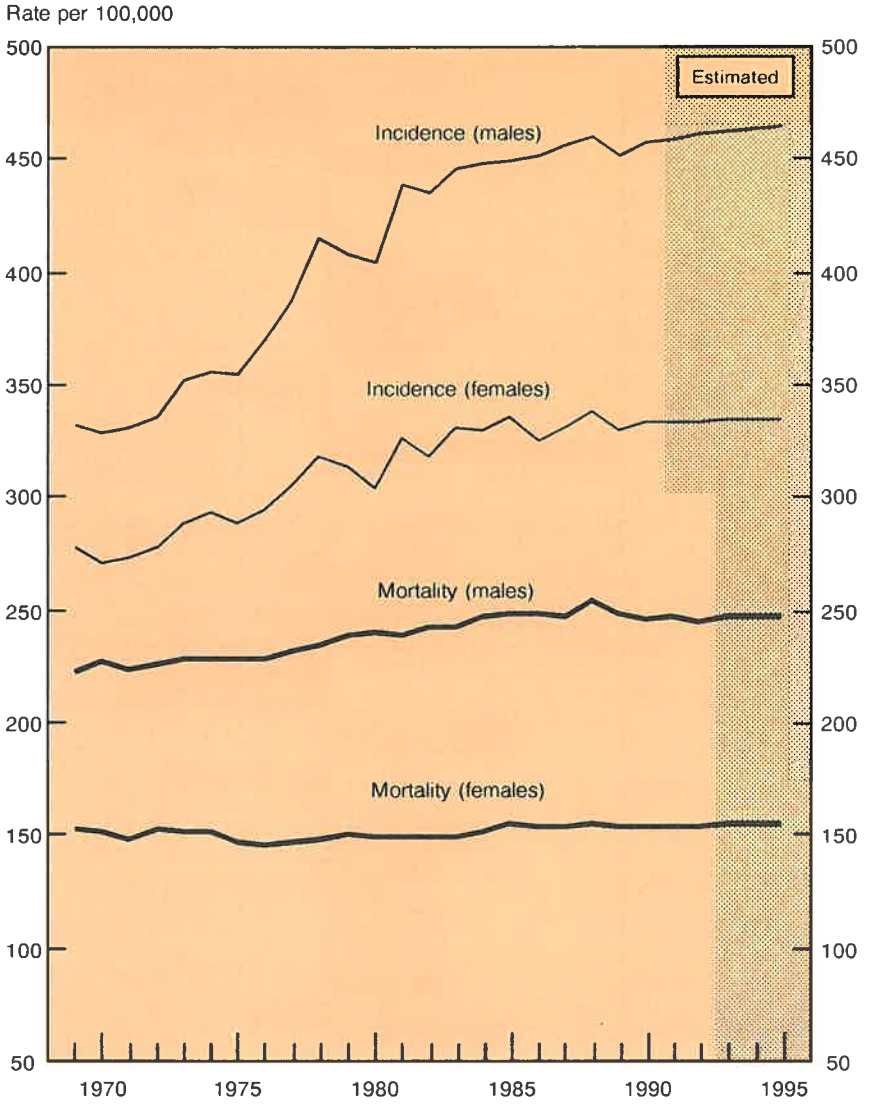
Average Annual Percent Change in Age-Standardized Incidence (1983-1990) and Mortality (1983-1992) Rates for Selected Cancer Sites, Canada



Note: *See Table 8 for percent change for all sites.*
Source: *Health Statistics Division, Statistics Canada.*

Figure 3

Age-Standardized Incidence and Mortality Rates for All Cancers, Canada, 1969-1995

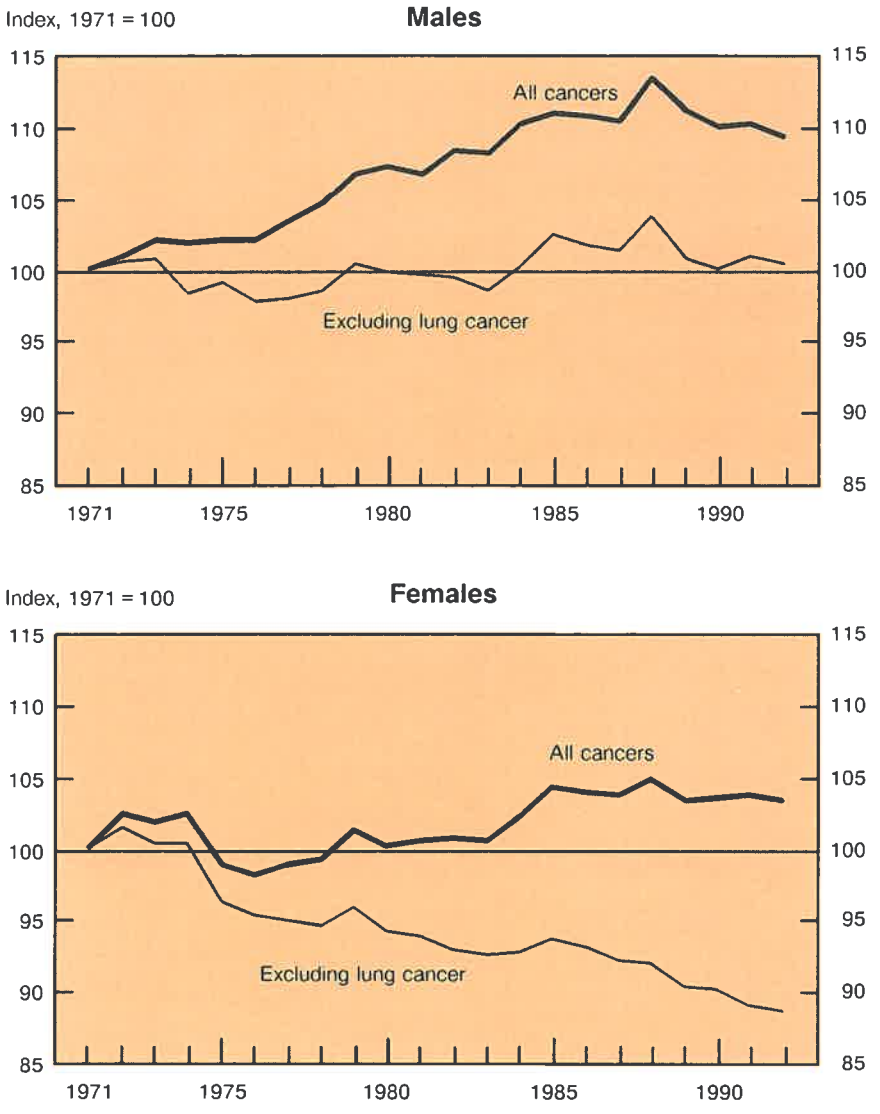


Note: *Rates are standardized to the age distribution of the 1991 Census of Canada population; figure excludes non-melanoma skin cancer (ICD-9 173).*

Source: *Health Statistics Division, Statistics Canada.*

Figure 4

Index[1] of Age-Standardized Mortality Rates[2] Including and Excluding Lung Cancer, Canada, 1971-1992



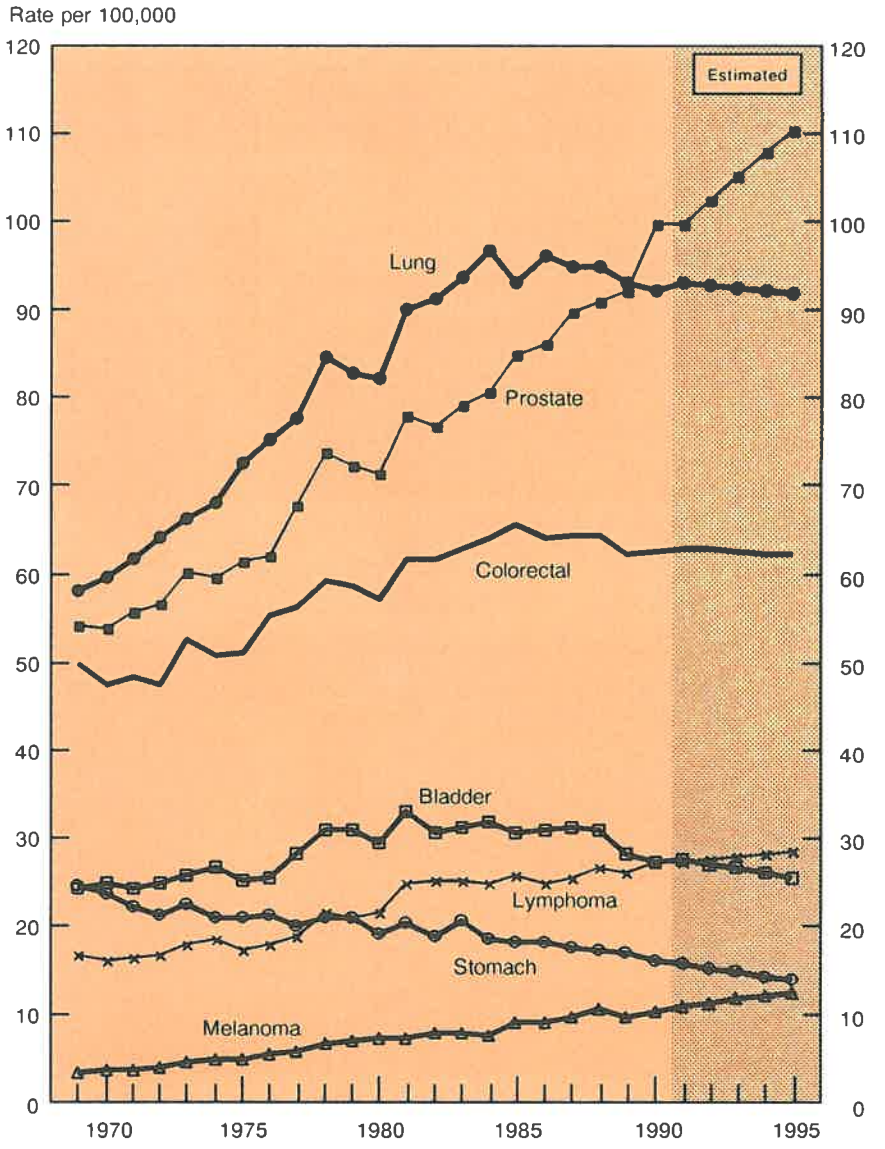
[1] *Base year, 1971 = 100.*

Note: *Rates are standardized to the age distribution of the 1991 Census of Canada population; all figures exclude non-melanoma skin cancer (ICD-9 173). See also the Glossary and the Methodological Appendix.*

Source: *Health Statistics Division, Statistics Canada.*

Figure 5.1

Age-Standardized Incidence Rates for Selected Cancer Sites, Males, Canada, 1969-1995

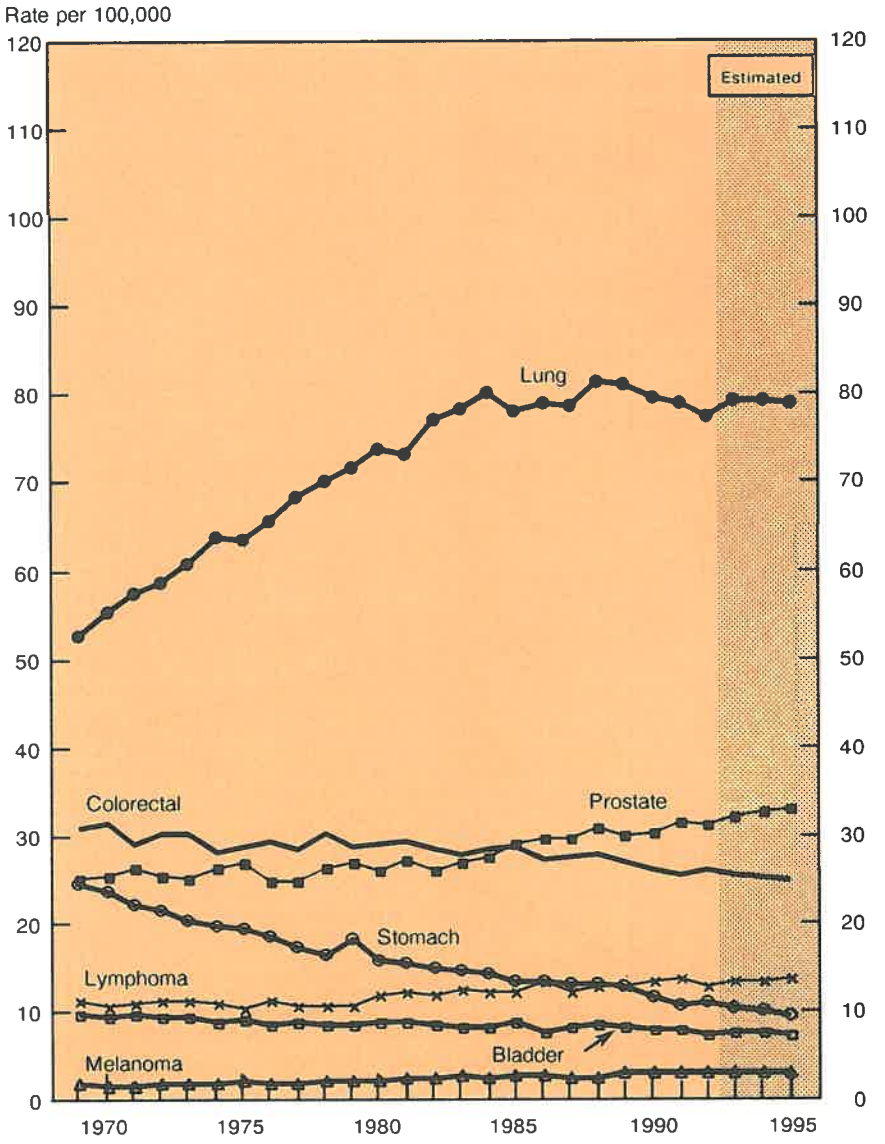


Note: *Rates are standardized to the age distribution of the 1991 Census of Canada population.*

Source: *Health Statistics Division, Statistics Canada.*

Figure 5.2

Age-Standardized Mortality Rates for Selected Cancer Sites, Males, Canada, 1969-1995

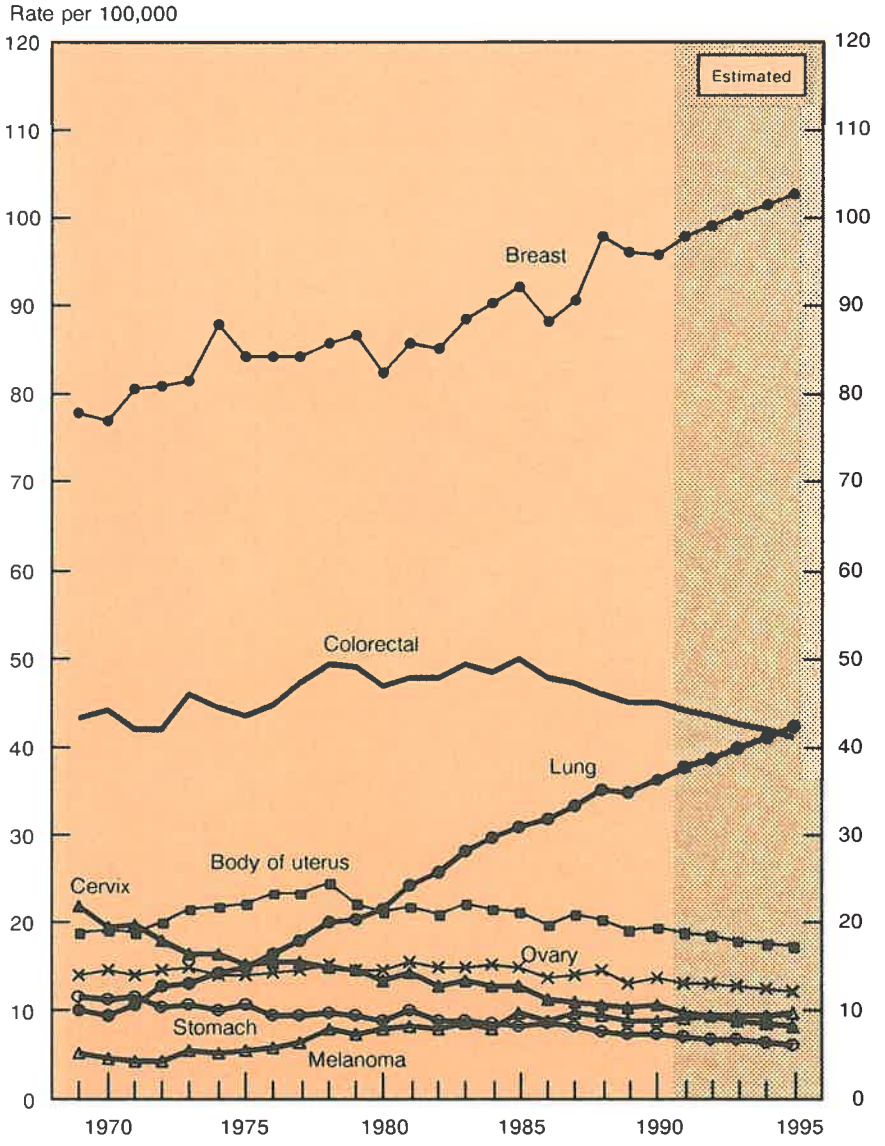


Note: *Rates are standardized to the age distribution of the 1991 Census of Canada population.*

Source: *Health Statistics Division, Statistics Canada.*

Figure 6.1

Age-Standardized Incidence Rates for Selected Cancer Sites, Females, Canada, 1969-1995

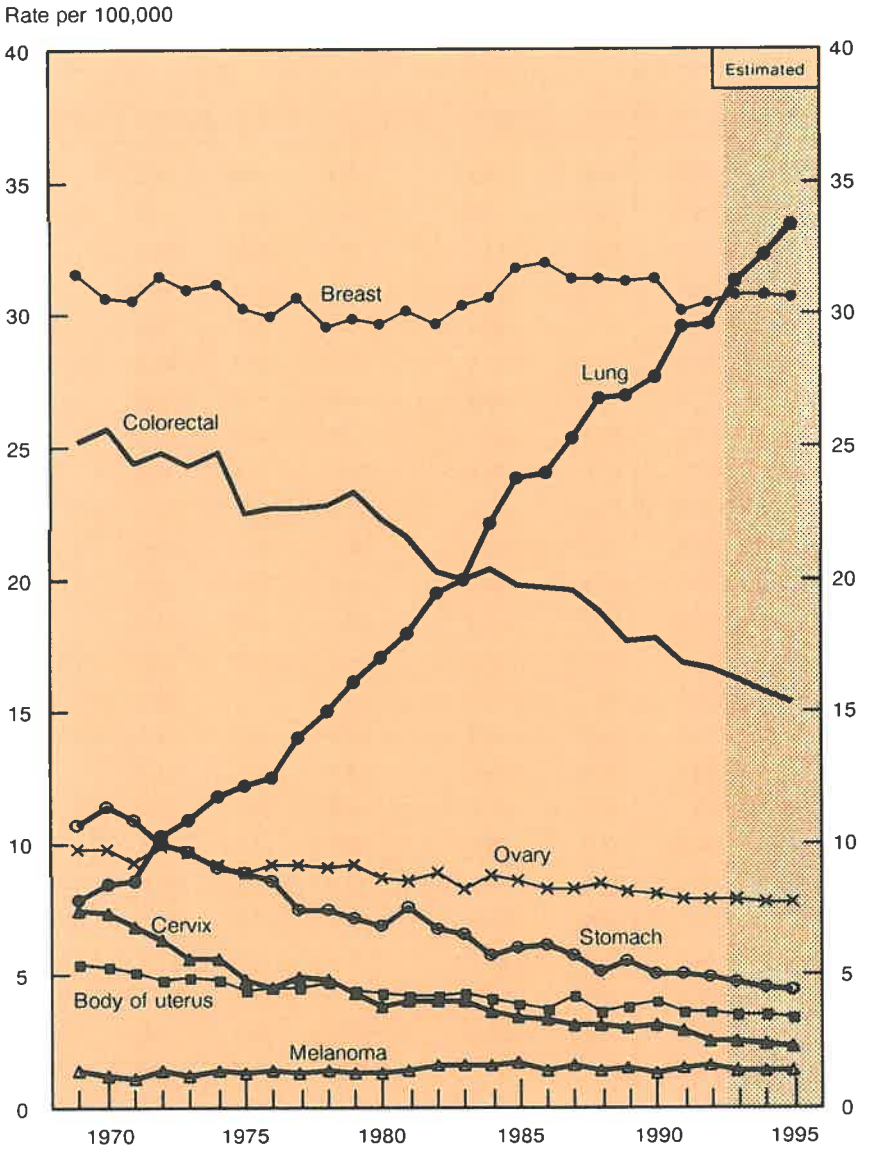


Note: *Rates are standardized to the age distribution of the 1991 Census of Canada population.*

Source: *Health Statistics Division, Statistics Canada.*

Figure 6.2

Age-Standardized Mortality Rates for Selected Cancer Sites, Females, Canada, 1969-1995



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

Source: *Health Statistics Division, Statistics Canada.*

Table 9.1
Age-standardized Incidence Rates for Selected Cancer Sites, Males, Canada, 1969-1995

Year	Rate per 100,000 Population							
	All Cancers	Lung	Prostate	Colorectal	Lymphoma	Bladder	Stomach	Melanoma
1969	332.1	58.0	54.0	49.8	16.5	23.8	24.2	3.1
1970	328.5	59.4	53.7	47.3	15.7	24.4	23.2	3.4
1971	331.2	61.5	55.4	48.1	16.0	23.8	21.9	3.4
1972	334.9	63.8	56.3	47.3	16.3	24.4	20.8	3.5
1973	352.2	66.1	60.1	52.3	17.7	25.5	22.1	4.1
1974	355.8	68.0	59.5	50.5	18.1	26.4	20.7	4.4
1975	354.1	72.3	61.2	51.0	16.9	24.7	20.6	4.6
1976	369.3	75.1	61.9	55.2	17.7	25.2	21.0	5.1
1977	387.6	77.7	67.5	56.1	18.5	27.9	19.8	5.4
1978	414.9	84.5	73.5	59.2	21.2	30.6	20.7	6.4
1979	408.0	82.8	72.0	58.4	20.7	30.5	20.6	6.8
1980	403.9	82.1	71.3	57.1	21.1	29.1	18.9	6.9
1981	438.5	90.0	77.9	61.4	24.6	32.6	20.1	7.0
1982	435.4	91.2	76.7	61.6	24.8	30.2	18.5	7.5
1983	445.8	93.7	79.1	62.7	24.7	31.0	20.2	7.5
1984	448.3	96.7	80.7	64.0	24.5	31.5	18.3	7.4
1985	449.1	92.9	84.8	65.6	25.4	30.3	18.0	8.7
1986	451.4	96.1	86.2	64.0	24.6	30.5	17.9	8.9
1987	455.9	95.0	89.7	64.2	25.3	30.9	17.4	9.5
1988	459.3	95.0	90.9	64.3	26.3	30.7	17.0	10.3
1989	451.2	93.1	92.0	62.1	25.9	27.9	16.7	9.3
1990	456.9	92.1	99.8	62.4	27.1	27.0	15.7	9.9
1991*	458.9	92.9	99.8	62.8	27.0	27.4	15.4	10.6
1992*	460.4	92.6	102.5	62.6	27.3	26.8	14.9	11.0
1993*	461.9	92.3	105.1	62.4	27.6	26.3	14.4	11.4
1994*	463.4	92.0	107.8	62.2	28.0	25.7	14.0	11.8
1995*	464.9	91.7	110.4	62.0	28.3	25.1	13.5	12.2

* *Estimated Rates*
Note: *Rates exclude non-melanoma skin cancer (ICD-9 173) and are adjusted to the age distribution of the 1991 Census of Canada population.*
Source: *Health Statistics Division, Statistics Canada.*

Table 9.2
Age-standardized Mortality Rates for Selected Cancer Sites, Males, Canada, 1969-1995

Year	Rate per 100,000 Population							
	All Cancers	Lung	Prostate	Colorectal	Lymphoma	Stomach	Bladder	Melanoma
1969	222.2	52.4	24.9	30.5	10.9	24.2	9.5	1.4
1970	225.9	55.1	25.3	31.3	10.2	23.2	9.0	1.3
1971	223.0	57.2	26.1	28.7	10.7	21.9	9.5	1.2
1972	225.3	58.4	25.1	30.0	10.8	21.1	9.0	1.4
1973	227.6	60.5	25.0	30.0	10.8	20.1	9.0	1.5
1974	227.1	63.7	26.0	28.0	10.7	19.3	8.4	1.6
1975	227.7	63.4	26.7	28.6	10.0	19.1	8.8	1.7
1976	227.4	65.5	24.6	29.1	10.9	18.1	8.3	1.5
1977	230.7	68.2	24.5	28.2	10.3	16.9	8.4	1.5
1978	233.4	69.9	26.0	30.0	10.4	16.0	8.3	1.9
1979	238.0	71.5	26.6	28.5	10.4	18.0	8.1	1.7
1980	239.2	73.7	25.7	28.8	11.5	15.4	8.6	1.7
1981	238.1	73.0	27.1	29.2	11.9	15.3	8.6	2.1
1982	241.9	77.1	25.9	28.2	11.6	14.6	8.3	2.1
1983	241.5	78.2	26.6	27.6	12.1	14.3	7.8	2.3
1984	246.1	80.0	27.3	28.2	11.8	13.9	8.0	2.1
1985	247.5	77.8	28.8	28.5	11.8	13.0	8.6	2.5
1986	247.3	78.7	29.3	27.1	13.0	13.1	7.4	2.3
1987	246.5	78.5	29.3	27.4	11.9	12.8	7.9	2.0
1988	253.1	81.1	30.7	27.5	12.4	12.8	8.3	2.2
1989	248.2	81.0	29.7	26.8	12.4	12.3	7.8	2.6
1990	245.4	79.4	30.1	25.7	13.0	11.3	7.5	2.6
1991	246.1	78.7	31.2	25.1	13.2	10.3	7.7	2.6
1992	243.9	77.4	30.9	25.9	12.5	10.6	6.9	2.6
1993*	246.9	79.0	31.8	25.2	13.0	10.0	7.3	2.6
1994*	247.0	79.0	32.3	24.9	13.1	9.6	7.2	2.6
1995*	247.1	78.9	32.7	24.6	13.2	9.2	7.1	2.7

* *Estimated Rates*
Note: *Rates exclude non-melanoma skin cancer (ICD-9 173) and are adjusted to the age distribution of the 1991 Census of Canada population.*
Source: *Health Statistics Division, Statistics Canada.*

Table 10.1
Age-standardized Incidence Rates for Selected Cancer Sites, Females, Canada, 1969-1995

Year	Rate per 100,000 Population								
	All Cancers	Breast	Lung	Colorectal	Body of Uterus	Ovary	Melanoma	Cervix	Stomach
1969	277.2	77.9	9.6	42.9	18.5	13.6	4.7	21.6	11.2
1970	269.8	76.9	9.2	44.0	18.8	14.1	4.1	19.2	11.0
1971	273.2	80.6	10.2	41.8	18.5	13.5	4.0	19.4	11.1
1972	277.3	80.8	12.3	41.7	19.6	14.2	4.0	17.6	9.9
1973	288.6	81.6	12.7	45.9	21.1	14.4	5.1	16.1	10.4
1974	292.6	87.9	13.9	44.1	21.5	13.7	4.9	16.1	9.6
1975	287.5	84.3	14.6	43.4	21.8	13.6	5.1	14.8	10.2
1976	293.5	84.3	16.2	44.4	22.9	13.9	5.6	15.2	9.2
1977	304.1	84.1	17.7	47.0	22.9	14.3	6.1	15.3	9.2
1978	317.4	85.7	19.8	49.2	24.1	14.9	7.6	14.6	9.4
1979	312.4	86.8	20.0	48.7	21.9	14.3	7.1	14.2	9.1
1980	303.2	82.5	21.2	46.6	20.8	14.1	7.5	12.9	8.5
1981	325.8	85.9	24.0	47.6	21.4	15.2	7.9	13.8	9.7
1982	318.1	85.2	25.4	47.5	20.7	14.5	7.5	12.5	8.6
1983	331.1	88.5	27.8	49.2	21.7	14.5	8.1	12.9	8.6
1984	329.0	90.2	29.5	48.3	21.3	15.0	7.7	12.3	8.1
1985	335.1	92.0	30.6	49.8	20.9	14.6	9.5	12.4	8.0
1986	324.5	88.2	31.5	47.5	19.5	13.2	8.4	10.9	8.2
1987	330.2	90.5	33.0	47.0	20.5	13.6	9.3	10.5	8.0
1988	338.0	97.8	34.7	45.7	20.1	14.2	9.2	10.4	7.3
1989	329.8	96.2	34.6	44.8	18.7	12.8	8.5	10.1	7.1
1990	333.3	95.9	36.1	45.0	19.0	13.3	8.4	10.4	6.9
1991*	333.2	97.8	37.5	43.9	18.4	12.8	8.9	9.4	6.7
1992*	333.6	99.1	38.6	43.2	18.1	12.6	9.0	9.0	6.5
1993*	334.0	100.3	39.8	42.5	17.7	12.4	9.1	8.6	6.3
1994*	334.4	101.5	40.9	41.8	17.3	12.1	9.2	8.2	6.0
1995*	334.8	102.7	42.1	41.0	16.9	11.9	9.3	7.8	5.8

* *Estimated Rates*

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

Source: *Health Statistics Division, Statistics Canada.*

Table 10.2
Age-standardized Mortality Rates for Selected Cancer Sites, Females, Canada 1969-1995

Year	Rate per 100,000 Population								
	All Cancers	Lung	Colorectal	Breast	Body of Uterus	Cervix	Ovary	Stomach	Melanoma
1969	152.4	7.8	25.2	31.5	5.4	7.4	9.7	10.6	1.3
1970	151.0	8.4	25.7	30.6	5.3	7.3	9.7	11.3	1.1
1971	147.6	8.5	24.3	30.5	5.1	6.8	9.2	10.8	1.0
1972	151.3	10.2	24.7	31.4	4.7	6.3	9.8	9.9	1.3
1973	150.4	10.8	24.2	30.9	4.8	5.6	9.6	9.6	1.1
1974	151.2	11.7	24.7	31.1	4.7	5.6	9.1	9.0	1.3
1975	146.1	12.1	22.4	30.2	4.3	4.7	8.8	8.8	1.2
1976	144.9	12.4	22.6	29.9	4.4	4.4	9.1	8.5	1.3
1977	146.0	13.9	22.6	30.6	4.4	4.8	9.1	7.4	1.2
1978	146.6	15.0	22.7	29.5	4.6	4.7	9.0	7.4	1.3
1979	149.5	16.1	23.2	29.8	4.3	4.2	9.1	7.1	1.2
1980	147.9	17.0	22.2	29.6	4.2	3.7	8.6	6.8	1.2
1981	148.4	17.9	21.5	30.1	4.1	3.9	8.5	7.5	1.3
1982	148.6	19.4	20.2	29.6	4.1	3.9	8.8	6.7	1.5
1983	148.5	19.9	19.9	30.3	4.2	3.9	8.2	6.5	1.5
1984	151.0	22.0	20.3	30.6	4.0	3.5	8.7	5.7	1.5
1985	154.0	23.7	19.7	31.7	3.8	3.3	8.5	6.0	1.6
1986	153.5	23.9	19.6	31.9	3.6	3.2	8.2	6.1	1.3
1987	153.3	25.3	19.5	31.3	4.1	3.0	8.2	5.7	1.5
1988	154.7	26.8	18.7	31.3	3.5	3.0	8.4	5.1	1.3
1989	152.6	26.9	17.6	31.2	3.7	2.9	8.1	5.5	1.4
1990	152.8	27.6	17.7	31.3	3.9	3.0	8.0	5.0	1.2
1991	153.2	29.5	16.8	30.1	3.5	2.8	7.8	4.9	1.4
1992	152.6	29.6	16.6	30.4	3.5	2.4	7.8	4.8	1.5
1993*	154.0	31.2	16.2	30.7	3.4	2.4	7.8	4.6	1.3
1994*	154.2	32.2	15.7	30.7	3.4	2.3	7.7	4.4	1.3
1995*	154.5	33.3	15.3	30.6	3.3	2.2	7.7	4.3	1.3

* *Estimated Rates*
Note: *Rates exclude non-melanoma skin cancer (ICD-9 173) and are adjusted to the age distribution of the 1991 Census of Canada population.*
Source: *Health Statistics Division, Statistics Canada.*

AGE AND SEX DISTRIBUTION OF CANCER

This section shows estimates for 1995 by ten-year age groups for all sites combined (Table 11) and for the four leading types of cancer (Table 12), and age-specific rates for cancer incidence and mortality based on actual data (Figure 7).

Cancer is primarily a disease of elderly Canadians. Estimates for 1995 shown in Table 11 indicate that 90,000 (72%) of new cases and 49,600 (80%) of cancer deaths occur in Canadians 60 years or more, while less than 2% of new cases and less than 1% of deaths occur prior to age 20. Estimates for leading sites presented in Table 12 show that close to 50% or more of all cancers of the lung, prostate, and colon and rectum occur among Canadians aged 70 or more. This is especially true for prostate cancer, with 65% of cases occurring in men over 70. By contrast, female breast cancer is more frequent at earlier ages, with about one-third of cases occurring in women aged 40-59 and another third in women aged 70 or older.

Age-specific rates of cancer incidence and mortality by 5-year age group are graphed using actual data for cancer incidence for 1990 and mortality for 1992, the most recent years for which complete data are available (Figure 7). Cancer incidence rises steeply with age in both sexes. Incidence is slightly higher in women than in men up to age 50, after which the sex ratio changes. This 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.

Table 11
Estimated New Cases of Cancer and Cancer Deaths by Age Group and Sex, Canada, 1995

	Age Group*								
	0-19	20-29	30-39	40-49	50-59	60-69	70-79	80 +	Total
	('000)								
Population									
Total	8,006.1	4,263.7	5,247.8	4,387.2	2,879.7	2,327.5	1,639.3	811.3	29,562.5
Male	4,101.7	2,160.7	2,647.1	2,196.2	1,438.0	1,120.6	700.0	275.3	14,639.5
Female	3,904.6	2,103.0	2,600.7	2,190.9	1,441.7	1,206.8	939.3	536.0	14,923.0
New Cases									
Total	1,400	1,700	4,600	10,300	17,400	32,900	36,600	20,500	125,400
Male	750	810	1,800	3,800	8,500	19,200	21,100	10,500	66,400
Female	650	890	2,800	6,500	8,900	13,700	15,500	10,000	59,000
Deaths									
Total	240	260	1,000	3,200	7,300	15,300	19,300	15,000	61,500
Male	140	140	410	1,400	3,900	9,100	11,000	7,600	33,700
Female	100	120	590	1,800	3,400	6,200	8,300	7,400	27,800

* *Age groupings are for a variable number of years.*
Note: *Figures exclude non-melanoma skin cancer (ICD9 173).*
Estimated total may not add due to rounding. Please refer to methodological appendix for further details.
Source: *Health Statistics Division, Statistics Canada.*

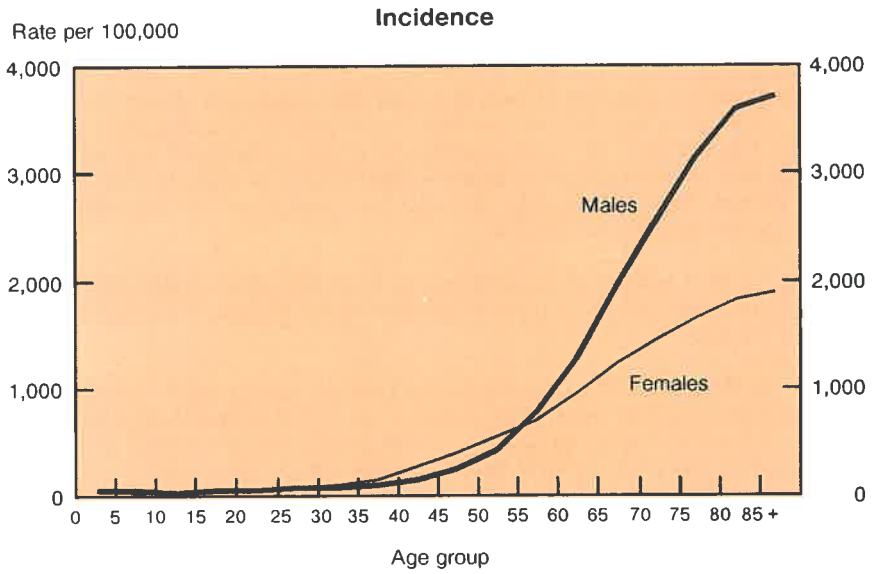
Table 12
Estimated New Cases and Deaths for Selected Cancer Sites by Age Group and Sex, Canada, 1995

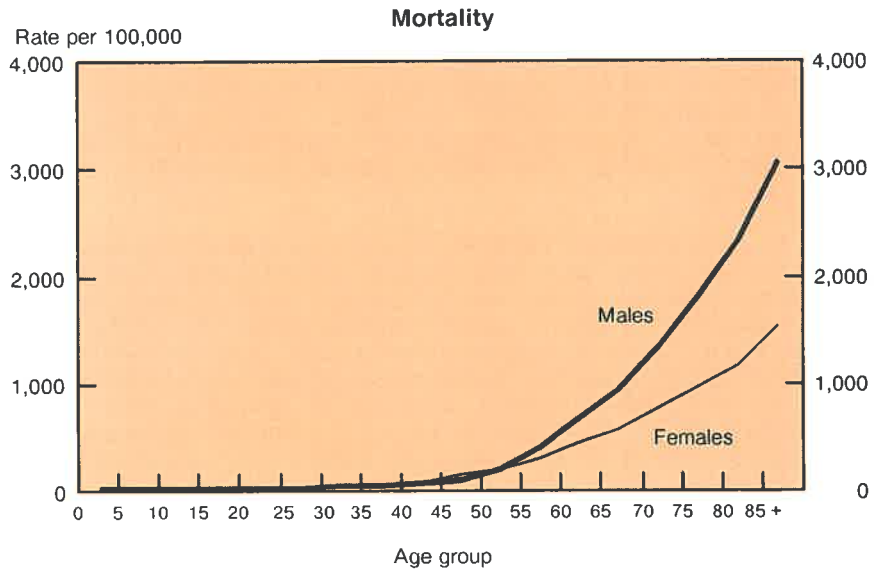
Age Group*	Lung			Colorectal			Prostate	Breast
	Total	M	F	Total	M	F	M	F
New Cases								
0 - 19*	10	5	5	10	--	10	5	--
20 - 29	15	5	10	35	10	25	--	90
30 - 39	145	50	95	165	95	70	--	940
40 - 49	980	490	490	860	480	380	60	3,100
50 - 59	3,050	1,900	1,150	2,270	1,350	920	940	3,200
60 - 69	6,700	4,400	2,300	4,300	2,600	1,700	4,700	4,200
70 - 79	6,600	4,300	2,300	5,200	2,800	2,400	6,800	4,100
80 +	2,570	1,650	920	3,350	1,400	1,950	3,600	2,100
All Ages	**20,000**	**12,700**	**7,300**	**16,300**	**8,800**	**7,500**	**16,100**	**17,700**
Deaths								
0 - 19*	5	5	--	--	--	--	--	--
20 - 29	10	5	5	10	5	5	--	15
30 - 39	115	50	65	45	25	20	--	210
40 - 49	720	370	350	235	140	95	10	580
50 - 59	2,290	1,400	890	680	420	260	120	850
60 - 69	5,200	3,500	1,700	1,480	920	560	690	1,200
70 - 79	5,700	3,800	1,900	1,910	1,050	860	1,550	1,350
80 +	2,690	1,800	890	1,900	800	1,100	1,750	1,150
All Ages	**16,800**	**11,000**	**5,800**	**6,300**	**3,400**	**2,900**	**4,200**	**5,400**

* *Age groupings are for a variable number of years.*
Note: *Figures exclude non-melanoma skin cancer (ICD9 173).*
Estimated total may not add due to rounding. Please refer to methodological appendix for further details.
-- Less than 5.
Source: *Health Statistics Division, Statistics Canada.*

Figure 7

Age-Specific Incidence (1990) and Mortality (1992) Rates for All Cancers by Sex, Canada





Note: *All figures exclude non-melanoma skin cancer (ICD-9 173).*
Source: *Health Statistics Division, Statistics Canada.*

PROBABILITY OF DEVELOPING / DYING FROM CANCER

Table 13 shows the probability, expressed as a percent, of a man or woman developing the major types of cancer by specific ages, and during the whole lifetime. The table also shows the lifetime probability of dying from various cancers. The inverses of the probabilities are also presented. For example, for males, the lifetime probability of developing cancer is .402 (40.2%), and the inverse of that probability is 2.5, i.e., 40.2% of males, or 1 in 2.5 males will develop cancer during their lifetime.

More than 1 in 3 women in Canada can now be expected to develop cancer during their lifetime, and this number is even higher in men. One in 4 people will die of cancer.

About 1 in 9 women will develop breast cancer during their lifetime. This probability is calculated from birth to end of life and represents an average of the risks faced by individual women. To illustrate, imagine 1,000 women at birth, then imagine them aging together until all women have died and assume that current rates of incidence and mortality will apply. On average, 107 of these 1,000 women, or one in nine, will develop breast cancer during their life. And 42 of these same 1,000 women, or one in 24, will die from it. Similarly, one in 16 women will develop colorectal cancer, one in 22 will develop lung cancer, and one in 25 will die of lung cancer.

More than 1 in 10 men will be diagnosed with prostate cancer during their lives, though the probability of being diagnosed prior to age 70 is relatively small: only 3%, or 1 in 33. One in 26 men will die of prostate cancer. Lung cancer, on the other hand, will affect 1 in 11 men - 1 in 22 by the age of 70 - and will kill 1 in 12. Colorectal cancer is also a major threat to both men and women, with 1 in 16 people developing the disease during their lives, and 1 in 35 dying from it.

Figures 8.1 and 8.2 compare the lifetime probabilities of developing cancer for men and women in 1971 and 1990. For men, the probabilities of developing the three most common cancers, lung, prostate and colorectal, have increased substantially during this period. Notably, prostate cancer has overtaken lung cancer as that most likely to occur during a man's life. A similar trend is seen in the three top female cancers: breast, colorectal and lung, with the rate of change in the lifetime probability of a woman developing lung cancer especially pronounced. During the same period, probabilities declined for only three cancers: stomach and those of the oral cavity in men, and stomach and cervical cancer in women.

For both men and women, the lifetime chances of developing any kind of cancer (excluding non-melanoma skin cancer) have increased from about 1 in 4 in 1971 to more than 1 in 3 today.

Table 13
Probability of Developing Cancer by Age and Lifetime Probability of Developing (1989-1991) and Dying (1992) from Cancer, Canada

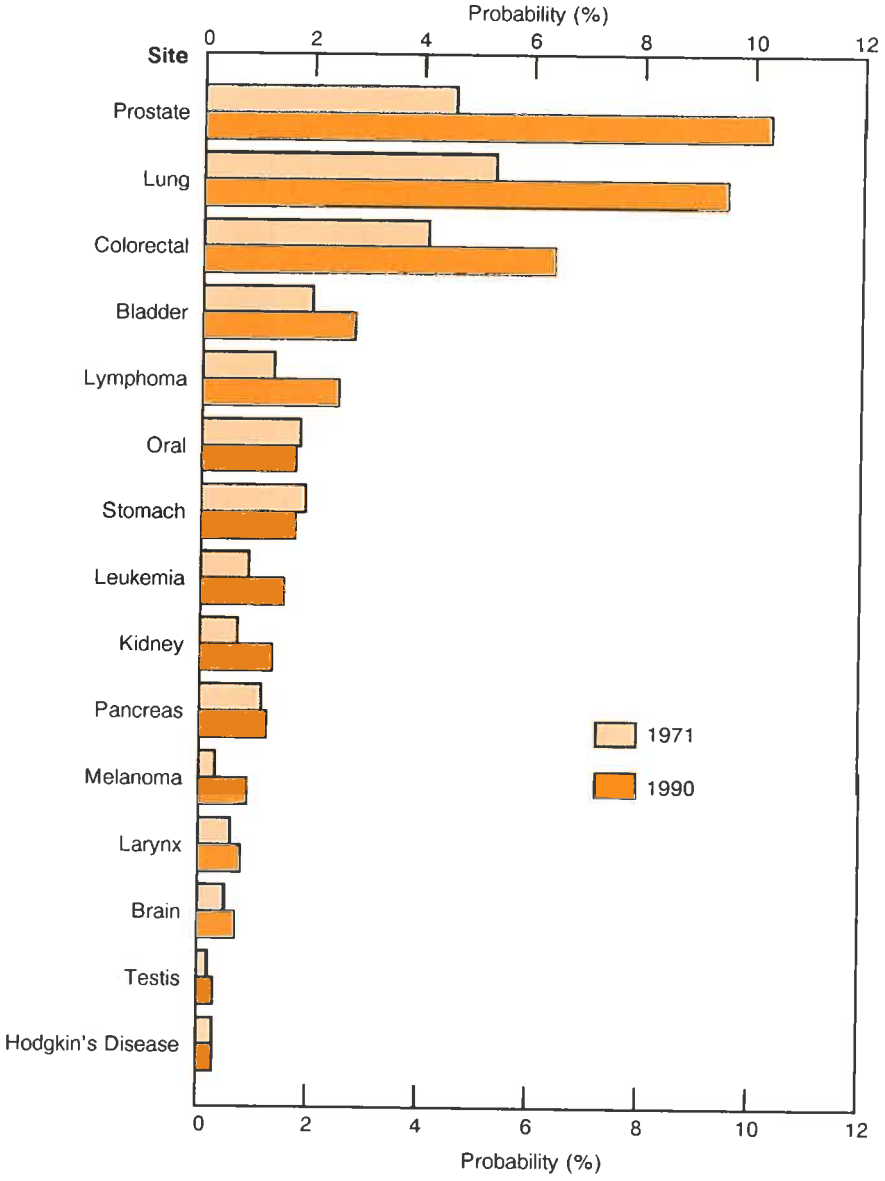
	Probability of Developing Cancer by Age:							Lifetime Probability (all ages) Developing		Dying	
	30	40	50	60	70	80	90	(%)	Inverse	(%)	Inverse
Male											
All Cancers	**0.7**	**1.3**	**3.0**	**7.9**	**19.3**	**32.4**	**39.1**	**40.2**	**2.5**	**27.2**	**3.7**
Prostate	0.0	0.0	0.0	0.5	3.0	7.3	9.8	10.3	9.8	3.8	26.3
Lung	0.0	0.0	0.3	1.6	4.6	7.8	9.3	9.5	10.5	8.5	11.8
Colorectal	0.0	0.1	0.3	1.1	2.7	4.9	6.1	6.4	15.7	2.9	34.5
Bladder	0.0	0.0	0.1	0.4	1.1	2.1	2.7	2.8	35.6	0.8	125.0
Lymphoma	0.2	0.3	0.5	0.9	1.4	2.1	2.5	2.5	39.4	1.3	74.6
Oral	0.0	0.1	0.2	0.5	1.0	1.4	1.7	1.7	58.1	0.6	156.3
Stomach	0.0	0.0	0.1	0.3	0.6	1.2	1.6	1.7	60.2	1.2	83.3
Kidney	0.0	0.1	0.1	0.4	0.8	1.2	1.4	1.5	69.0	0.6	163.9
Leukemia	0.1	0.2	0.2	0.3	0.6	1.0	1.3	1.3	75.2	0.9	111.1
Pancreas	0.0	0.0	0.1	0.2	0.5	0.8	1.1	1.2	86.2	1.3	76.9
Melanoma	0.0	0.1	0.2	0.4	0.6	0.8	0.9	0.9	111.1	0.3	400.0
Female											
All Cancers	**0.7**	**1.8**	**4.7**	**10.1**	**18.5**	**28.0**	**34.5**	**36.4**	**2.7**	**22.6**	**4.4**
Breast	0.0	0.4	1.7	3.6	6.2	8.7	10.3	10.7	9.3	4.2	23.8
Colorectal	0.0	0.1	0.3	0.9	2.2	4.1	5.8	6.3	15.8	2.8	35.6
Lung	0.0	0.0	0.3	1.0	2.3	3.7	4.3	4.5	22.4	4.0	25.0
Lymphoma	0.1	0.2	0.3	0.6	1.0	1.7	2.2	2.3	43.5	1.3	77.5
Body of Uterus	0.0	0.0	0.2	0.6	1.3	1.9	2.2	2.3	43.5	0.6	181.8
Ovary	0.0	0.1	0.2	0.5	0.9	1.3	1.5	1.6	64.1	1.1	94.3
Pancreas	0.0	0.0	0.0	0.1	0.4	0.7	1.1	1.2	80.6	1.3	78.7
Leukemia	0.1	0.1	0.2	0.3	0.5	0.7	1.0	1.1	89.3	0.8	125.0
Stomach	0.0	0.0	0.0	0.1	0.3	0.6	0.9	1.0	97.1	0.8	126.6
Bladder	0.0	0.0	0.1	0.1	0.3	0.6	0.9	1.0	97.1	0.4	250.0
Kidney	0.0	0.0	0.1	0.2	0.5	0.7	0.9	1.0	99.0	0.4	256.4
Cervix	0.1	0.2	0.4	0.5	0.7	0.8	0.9	1.0	104.2	0.3	294.1
Melanoma	0.1	0.1	0.3	0.4	0.6	0.7	0.8	0.8	122.0	0.2	555.6

Note: *The probability of developing cancer is based on 1989-1991 data and calculated by selected age groups; the probability of dying from cancer is based on 1992 data. The probability for all ages is calculated from birth to the end of life. Non-melanoma skin cancer is excluded from the calculations. See methodological appendix for details.*

Source: *Bureau of Chronic Disease Epidemiology, Health Canada.*

Figure 8.1

Lifetime Probability of Developing Cancer, Males, Canada, 1971 and 1990

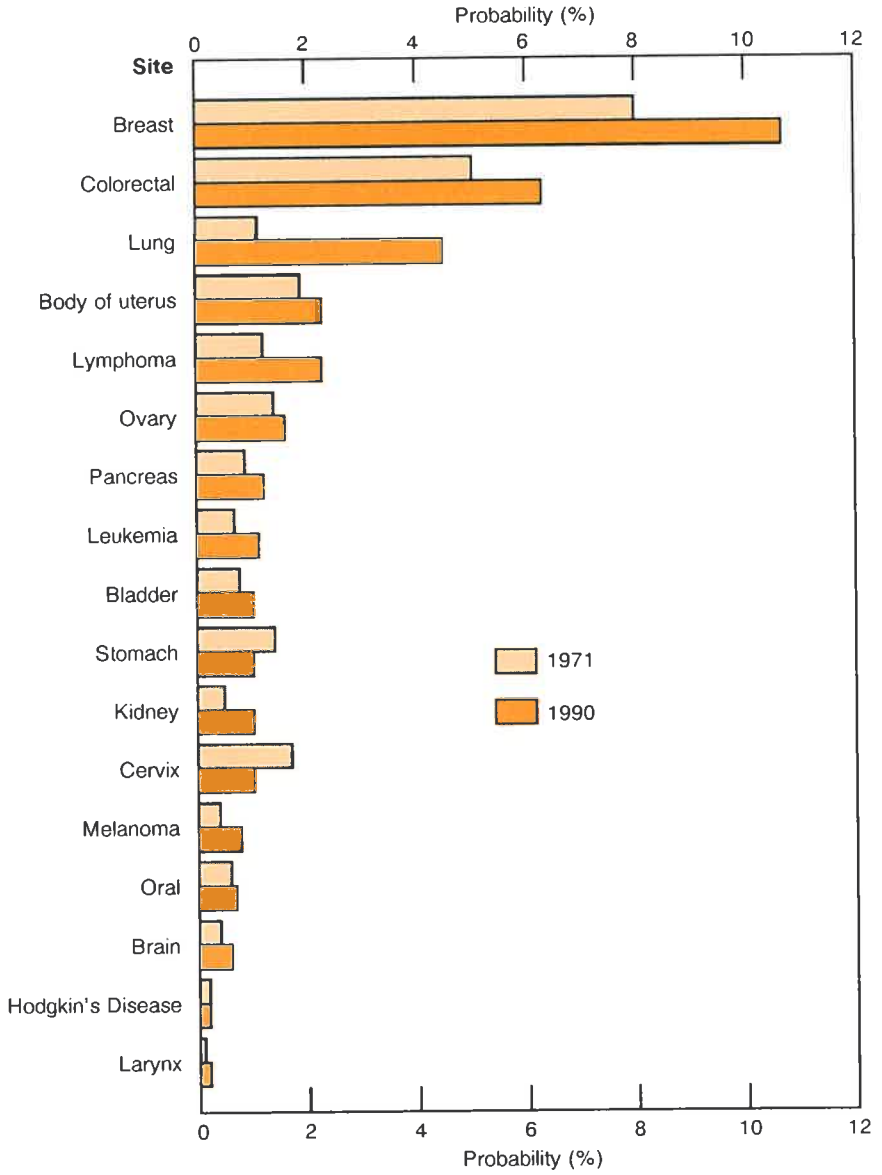


Note: *Life time probabilities are calculated from birth to end of life, based on cancer incidence rates for 1971 and 1990.*

Source: *Bureau of Chronic Disease Epidemiology, Health Canada.*

Figure 8.2

Lifetime Probability of Developing Cancer, Females, Canada, 1971 and 1990



Note: *Life time probabilities are calculated from birth to end of life, based on cancer incidence rates for 1971 and 1990.*

Source: *Bureau of Chronic Disease Epidemiology, Health Canada.*

POTENTIAL YEARS OF LIFE LOST DUE TO CANCER

Figure 9 shows that in 1992, 859,000 life years were lost from cancer, for both men and women. This represents 29% of premature mortality from all causes. Diseases of the heart were the second leading cause of potential years of life lost at 621,000 years. For children under 15 years of age, cancer was the fifth leading cause of potential years of life lost following perinatal causes, congenital anomalies, non-motor vehicle accidents and motor vehicle accidents. This ranking has remained unchanged in recent years.

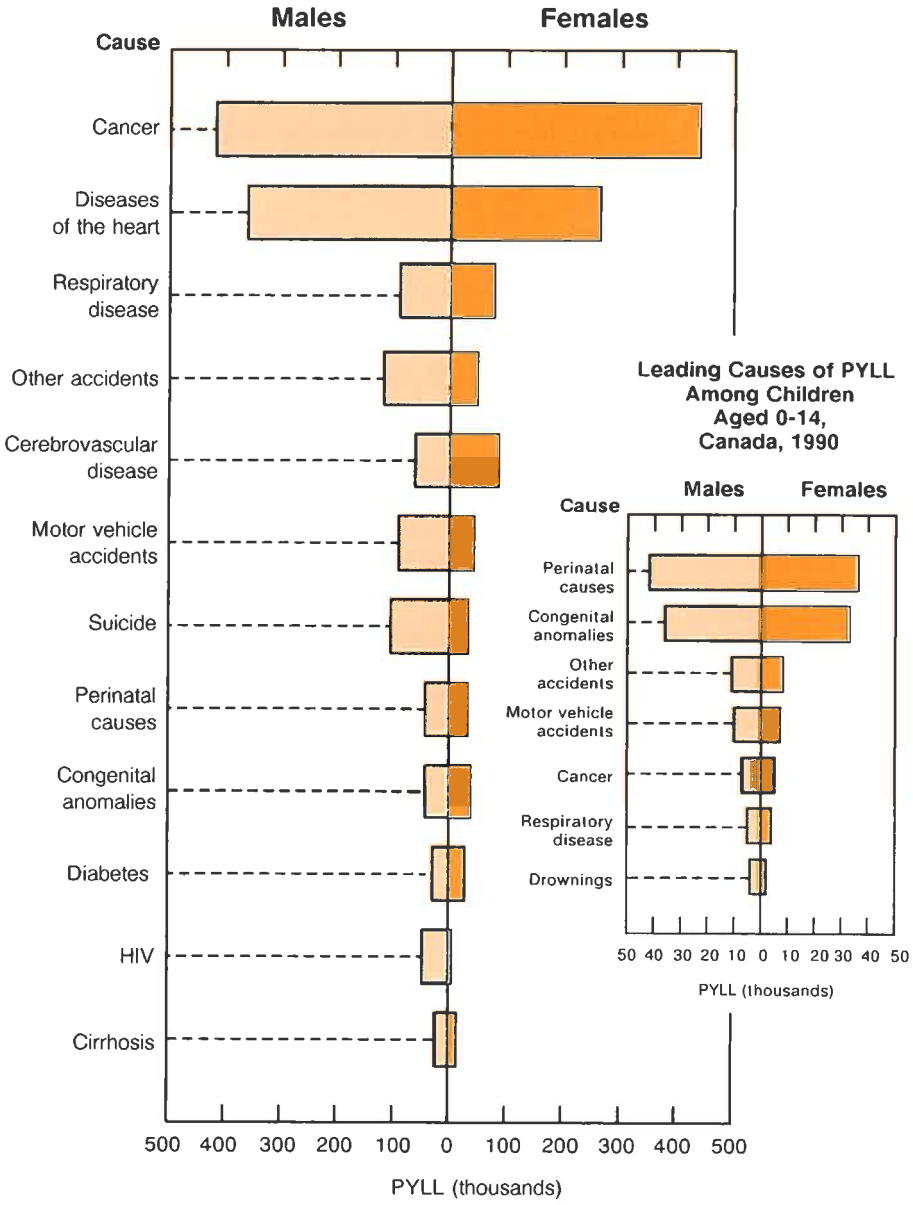
Table 14 shows potential life years lost from major types of cancer for men and women. For men, in 1992, the three leading cancers, lung, colorectal, and prostate, account for 50 percent of potential years of life lost. For women, the three leading cancers, breast, lung, and colorectal, account for 51 percent. The relative importance of the leading cancers for men and women in terms of potential of life lost has remained the same during the last 5 years.

Since 1987, the potential years of life lost for men has decreased for stomach cancer. Life years lost have remained unchanged for pancreatic cancer, leukemia, kidney cancer and laryngeal cancer. For women the potential life years lost have decreased for colorectal cancer and remained unchanged for cancers of the pancreas, brain, stomach, kidney, melanoma, and larynx. The potential life years lost for the other major sites shown in Table 14 have increased for both women and men.

Although more men than women die from cancer evey year, women generally live longer than men and many of the cancer deaths among women occur at younger ages, such as those due to cancers of the breast and reproductive organs. This results in slightly higher loss of potential years of life for women than for men.

Figure 9

Leading Causes of Potential Years of Life Lost (PYLL), Canada, 1992



Note: *Figures are presented in descending rank order of the 10 leading causes (both sexes combined).*

Source: *Bureau of Chronic Disease Epidemiology, Health Canada.*

Table 14
Potential Years of Life Lost Due to Cancer, Canada, 1992

	Potential Years of Life Lost (PYLL)					
	Total		Males		Females	
	Males	%	Years	%	Years	%
All Causes	**2,981,000**	...	**1,662,000**	...	**1,319,000**	...
All cancers	**859,000**	**100.0**	**420,000**	**100.0**	**439,000**	**100.0**
Lung	224,000	26.1	136,000	32.4	88,000	20.0
Female Breast	95,000	11.1	...	...	95,000	21.6
Colorectal	82,000	9.55	41,000	9.76	41,000	9.34
Lymphoma	51,000	5.94	26,000	6.19	25,000	5.69
Pancreas	39,000	4.54	19000	4.52	20,000	4.56
Leukemia	34,000	3.96	18,000	4.29	16,000	3.64
Prostate	32,000	3.73	32,000	7.62	...	...
Brain	33,000	3.84	18,000	4.29	15,000	3.42
Stomach	29,000	3.38	17,000	4.05	12,000	2.73
Ovary	24,000	2.79	...	...	24,000	5.47
Kidney	18,000	2.10	11,000	2.62	7,000	1.59
Oral	17,000	1.98	12,000	2.86	5,000	1.14
Bladder	13,000	1.51	9,000	2.14	4,000	0.91
Melanoma	13,000	1.51	7,000	1.67	6,000	1.37
Cervix	9,000	1.05	...	...	9,000	2.05
Body of Uterus	9,000	1.05	...	...	9,000	2.05
Larynx	7,000	0.81	6,000	1.43	1,000	0.23
Hodgkin's Disease	5,000	0.58	3,000	0.71	2,000	0.46

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. All figures exclude non-melanoma skin cancer. (ICD-9 173).*
... Not Applicable.
Source: *Bureau of Chronic Disease Epidemiology, Health Canada.*

RELATIVE CANCER SURVIVAL

Survival rates provide the most direct indication of the severity of disease and the impact of cancer treatment. Population-based survival rates such as those presented here are considered to be representative of the total cancer experience in specified geographic areas. Changes in survival reflect a variety of factors, including improvements in treatment and care, changes in diagnostic technology that have led to earlier detection, and declining proportions of patients lost to follow-up in recent years. Differences in overall survival among different populations reflect differences in screening, diagnostic and treatment patterns, incidence rates, health care systems, patient characteristics, and reporting methods used by cancer registries.

The relative five-year survival rates shown in Table 15, and Figures 10, 11.1 and 11.2 were provided by the Quebec Tumour Registry based on incidence data from 1984-1986. In previous years, survival rates have been presented from registries in Alberta, Ontario, Saskatchewan and British Columbia both separately and pooled among the last three registries. While it is difficult to compare rates among different populations, the data presented in this edition from Quebec are generally similar to those previously published.

Unless otherwise specified, all rates shown are relative survival rates. Relative survival rates are calculated by adjusting the observed survival rates according to the normal life expectancy in the general population. For example, a five-year relative survival rate of 51% in Quebec men diagnosed with colorectal cancer in the period 1984-1986 means that a man diagnosed with colorectal cancer during that period is approximately half as likely to survive five years after his diagnosis as a man in the general population in his age group. By contrast, **observed** survival rates, which are shown in Table 15 for all cancers, tend to be lower than relative survival rates as they reflect the actual risk of dying within 5 years of diagnosis, unadjusted for life expectancy.

The lower observed survival rates are most noticeable in the older age groups, as relative survival rates are very similar to observed rates for those aged less than 65 years. Figure 10 presents relative survival by age group. Interestingly, although five-year relative survival rates decline steadily by age among women (from 71% in women aged 0-44 to 41% in those aged 75+), rates for men drop considerably from 57% among those aged 0-44, to 38% in the 45-54 age group, then remain at about 40% in the remaining age groups up to 75+.

Table 15 further demonstrates that although relative survival rates differ markedly among cancer types, the survival rate is generally higher for women than for men. From 1984-1986 in Quebec, the relative survival five years after diagnosis was higher for women (54%) than for men (40%). The difference in the survival rates of men and women is primarily due to the greater occurrence of cancers with low survival rates, such as lung cancer, among men, and the relatively favourable survival for cancers most frequently occurring among women, such as breast cancer. This is not the complete explanation since for cancer types that do occur in both sexes, the survival rates are also generally higher among women.

Figures 11.1 and 11.2 illustrate the relative survival for major cancer sites by sex over a five year period after initial diagnosis. As evident in the figure, for many types of cancer, a large proportion of excess deaths associated with a cancer diagnosis occurs in the first year after diagnosis, and a much smaller proportion between one to five years post diagnosis. While relative survival rates for most cancer sites tend to level off after five years, breast and prostate cancers are important exceptions: their relative survival rates continue to decrease for as long as 20 years after diagnosis.

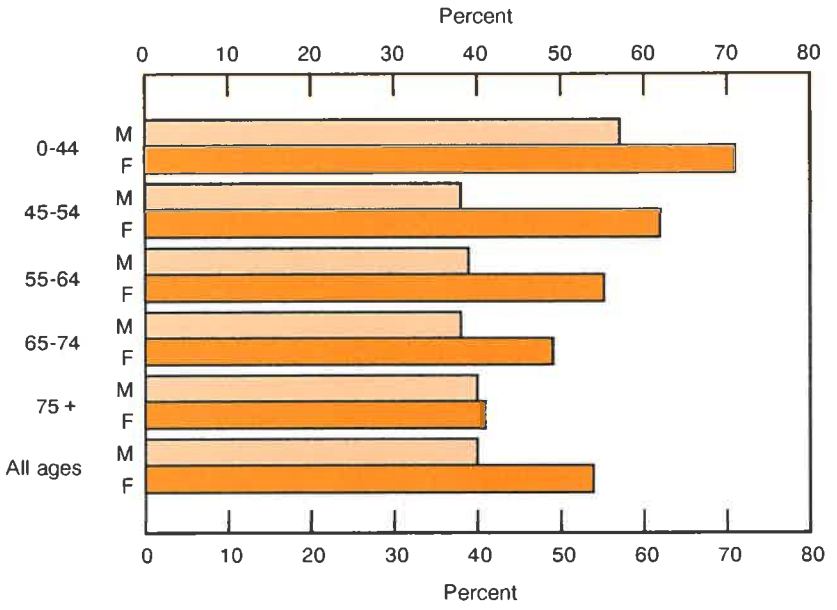
Table 15
Five Year Relative Survival Rates for Selected Cancer Sites by Age Group at Diagnosis and Sex, Quebec, 1984-1986

	Five year survival (%)											
	All ages		0-44 years		45-54 years		55-64 years		65-74 years		75+	
	M	F	M	F	M	F	M	F	M	F	M	F
Observed Rate												
All Cancers	**32**	**48**	**57**	**70**	**37**	**61**	**35**	**52**	**29**	**43**	**21**	**27**
Relative Rate												
All Cancers	**40**	**54**	**57**	**71**	**38**	**62**	**39**	**55**	**38**	**49**	**40**	**41**
Oral	49	59	67	75	51	60	44	62	46	47	56	50
Stomach	22	26	28	42	23	33	25	29	19	28	21	19
Colorectal	51	53	55	59	50	57	52	55	50	52	52	49
Pancreas	6	7	3	13	8	13	4	5	5	6	6	7
Larynx	62	65	87	74	64	73	68	69	53	52	44	47
Lung	15	20	22	30	16	22	18	22	13	15	11	13
Melanoma	57	77	64	83	54	85	60	72	42	73	52	58
Female Breast	...	73	...	74	...	76	...	71	...	73	...	70
Cervix	...	74	...	87	...	72	...	67	...	57	...	47
Body of Uterus	...	81	...	88	...	91	...	83	...	77	...	67
Ovary	...	42	...	70	...	49	...	36	...	31	...	24
Prostate	68	...	50	...	61	...	69	...	71	...	62	...
Testis	83	...	83	...	92	...	87	...	51	...	52	...
Bladder	78	78	92	93	87	95	80	84	77	80	68	59
Kidney	53	57	74	68	50	76	57	65	48	52	41	34
Brain	24	27	48	48	15	27	8	17	7	12	14	12
Hodgkin's Disease	75	76	82	88	64	79	61	59	57	49	18	8
Multiple Myeloma	20	26	23	31	28	49	19	27	20	25	15	19
Non-Hodgkin's Lymphoma	49	51	61	74	50	61	48	58	41	44	32	27
Leukemia	29	34	35	47	30	21	28	26	29	34	24	27

Note: *All rates exclude non-melanoma skin cancer (ICD-9 173).*
... Not Applicable.
Source: *Ministère de la Santé et des Service Sociaux, Québec.*

Figure 10

Relative Five Year Cancer Survival by Age Group and Sex, All Cancers, Quebec, 1984-1986

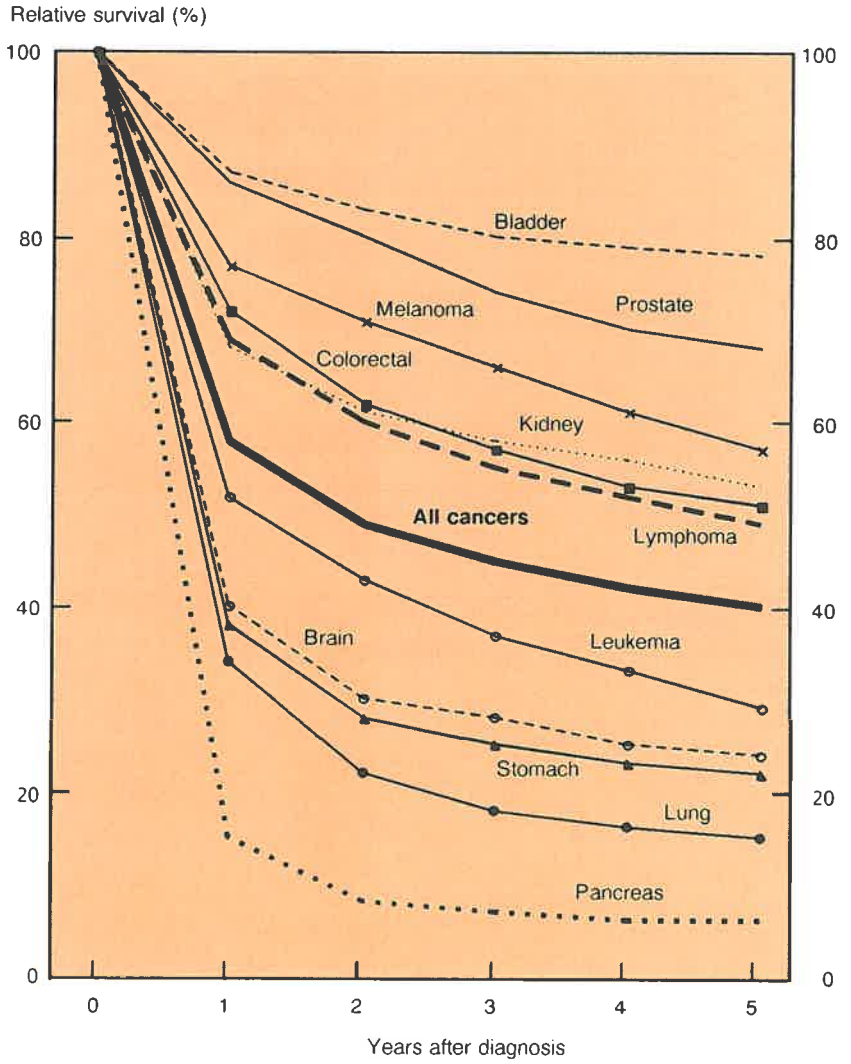


Note: *All cancers excludes non-melanoma skin cancer (ICD9 173).*

Source: *Ministère de la Santé et des services sociaux, Québec.*

Figure 11.1

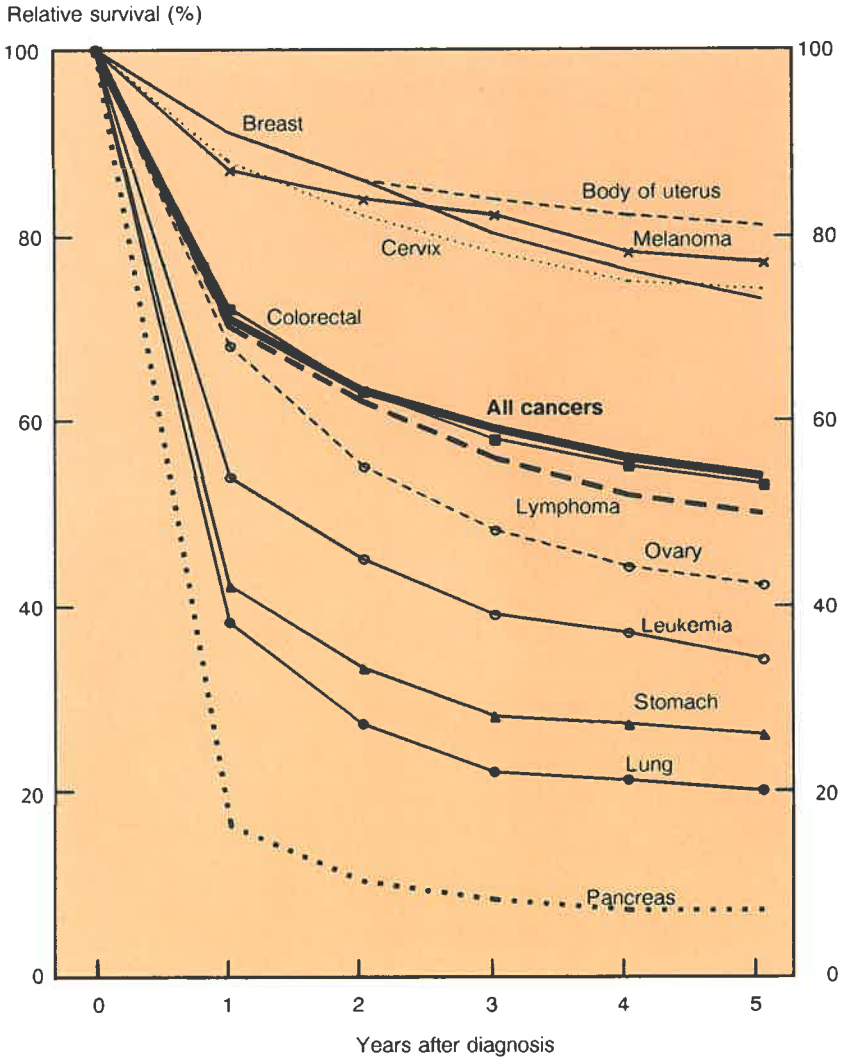
Relative Survival Rates for First Five Years after Diagnosis, Selected Cancer Sites, Males, Quebec, 1984-1986



Note: *All cancers excludes non-melanoma skin cancer (ICD-9 173).*
Source: *Ministère de la Santé et des services sociaux, Québec.*

Figure 11.2

Relative Survival Rates for First Five Years after Diagnosis, Selected Cancer Sites, Females, Quebec, 1984-1986



Note: *All cancers excludes non-melanoma skin cancer (ICD-9 173).*
Source: *Ministère de la Santé et des services sociaux, Québec.*

CANCER IN CHILDREN AGED 0-14 YEARS

Cancer incidence and mortality trends over time for children aged 0-14 years are shown in Figure 12. There has been a gradual increase in incidence rates for all cancers combined, accompanied by a gradual decline in mortality rates. Much of the decline in mortality is attributable to improvements in treatment and better survival rates for leukemia. The decline in mortality from other forms of cancer (e.g., brain tumours) is less remarkable.

Figure 13 shows cancer incidence and mortality trends for different age groups of children over the two decades ending in 1992. While mortality has declined in all age groups the rise in incidence appears to have occurred to a greater extent in the younger age groups (i.e., children less than 5 years of age). Cancer has consistently been more common in children under 5 than in those aged 5-14 years. This implicates genetic, or intrauterine exposures, as the major etiologies of cancers afflicting children.

Table 16 shows the number of new cases (1986-1990) and the number of deaths (1988-1992) occurring in children aged 0-14 in Canada. During these periods approximately 850 children were diagnosed with a malignancy every year in this country, and close to 200 died from their disease.* Leukemia remains the most common type of childhood cancer, accounting for more than 30% of new cases and almost 36% of cancer deaths among children, while the lymphomas account for more than 10% of new cases and about 6% of deaths. The second most common group of childhood cancer is of the brain and spinal cord, with 780 cases occurring during the specified five year period, or 18% of new cases and 27% of deaths.

Figure 14 shows the relative proportions of new cancers occurring in children in Canada between 1986 and 1990. Acute lymphocytic leukemia is by far the most frequent malignancy of childhood, followed by astrocytomas and neuroblastomas. However, this pattern is not consistent for all age groups (Figure 15). Neuroblastoma is the most common tumour in children under 1 year, while acute lymphocytic leukemia is relatively uncommon during the first year of life. Astrocytoma, unlike neuroblastoma, becomes relatively more frequent in older children, and the lymphomas manifest predominantly in children 10-14 years of age.

---

* *Some death statistics presented in this table differ substantially from those presented in Canadian Cancer Statistics 1994. Note that the years for which statistics are presented here are updated by three years, not one year.*

The ratio of the number of deaths to the number of cases provides a crude indication of the disease prognosis and can be calculated from the data provided in the table. All childhood cancers combined have a deaths to cases ratio of 22%, although this ratio may be underestimated because deaths occurring after the age of 14 are not included. The highest ratios are in children with liver cancer, advanced neuroblastoma and tumours of the brain and nervous system. The leukemias overall have a relatively high ratio of 25%, although the low ratio seen in acute lymphocytic leukemia is inflated in the overall estimate by the higher ratio observed in non-lymphocytic leukemias. Hodgkin's disease and other lymphomas have low deaths to cases ratios, while non-Hodgkin's lymphoma have higher ratios. Retinoblastomas, gonadal and germ cell cancers and the epithelial cancers also have a relatively good prognosis (i.e., low deaths to cases ratios).

The relatively good prognosis for many of the tumours seen in children, as suggested by these data, indicates that many children who formerly might have died at an early age will now survive into adulthood. Statistics relating to subtle, non-catastrophic outcomes of childhood cancer and its treatment will become progressively more important for the purposes of service planning and the identification of treatment and disease related research priorities. Such statistics are being collected by the Childhood Cancer Control Program at Health Canada as of 1994.

Table 16
New Cases(1986-1990) and Deaths(1988-1992) by Histologic Cell Type of Cancer For Children Aged 0-14, Canada

Diagnostic Group[2]	New cases 1986-1990[1]		Death 1988-1992	
	Number	Percent	Number	Percent
Leukemia	**1,316**	**30.9**	**335**	**35.4**
Acute lymphocytic	1,041	24.5	164	17.3
Acute non-lymphocytic	170	4.0	66	7.0
Lymphomas	**462**	**10.9**	**52**	**5.5**
Hodgkin's disease	168	3.9	4	0.4
Non-Hodgkin's lymphoma	132	3.1	24	2.5
All other lymphomas	162	3.8	24	2.5
Brain & Spinal	**780**	**18.3**	**258**	**27.3**
Astrocytoma	370	8.7	43	4.6
Medulloblastoma	124	2.9	54	5.7
Symphathetic Nervous System	**299**	**7.0**	**112**	**11.8**
Neuroblastoma	286	6.7	111	11.7
Retinoblastoma	**93**	**2.2**	**3**	**0.3**
Kidney	**260**	**6.1**	**18**	**1.9**
Wilms' tumour	232	5.4	16	1.7
Liver	**67**	**1.6**	**18**	**1.9**
Bone	**196**	**4.6**	**41**	**4.3**
Osteosarcoma	97	2.3	21	2.2
Ewing's sarcoma	74	1.7	15	1.6
Soft Tissue Sarcoma	**261**	**6.1**	**59**	**6.2**
Rhabdomyosarcoma	133	3.1	39	4.1
Gonadal & Germ Cell	**142**	**3.3**	**5**	**0.5**
Epithelial Cancers	**135**	**3.2**	**15**	**1.6**
Other cancers	**248**	**5.8**	**30**	**3.2**
Total (5 years)	**4,257**	**100**	**946**	**100.0**
Average per year	**851**		**189**	

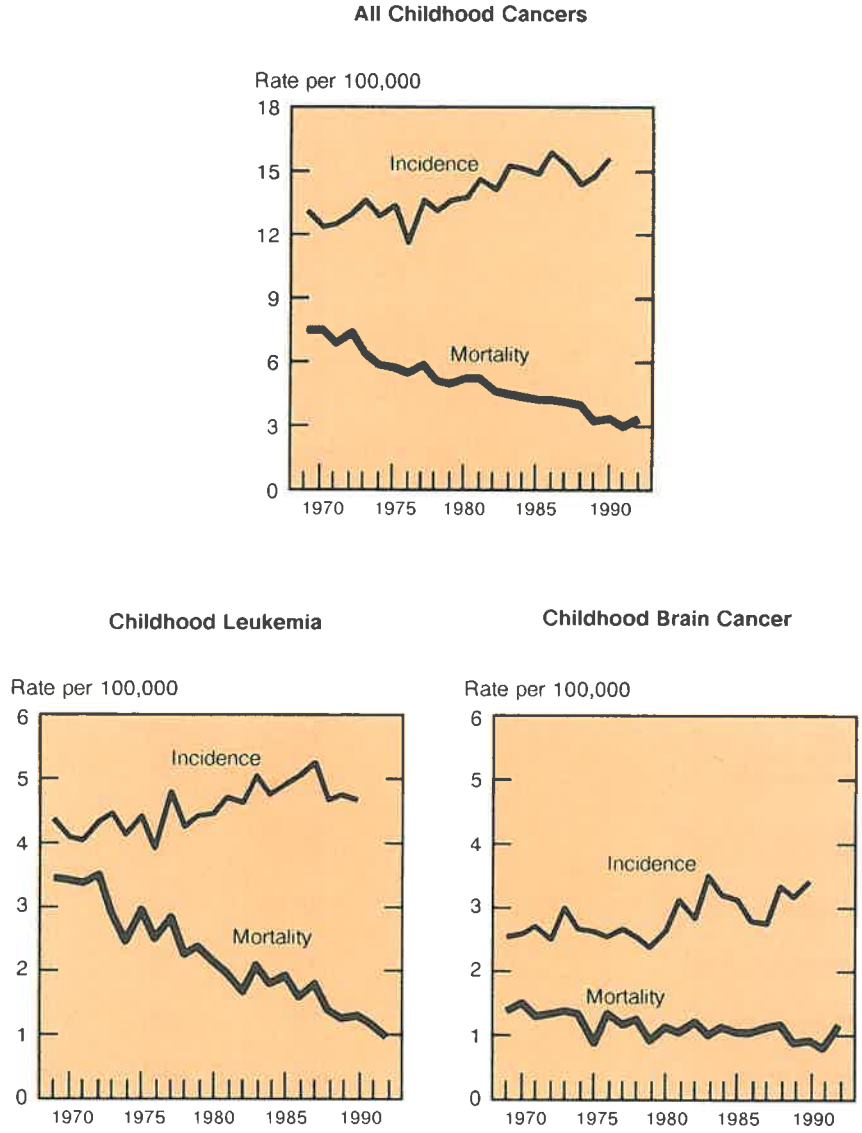
1 *Data are shown for the most recent five year period available and exclude non-melanoma skin cancer (ICD-9 173) and in situ carcinomas (ICD-9 230-234). Data are grouped according to the International Classification Scheme for Childhood Cancer, World Health Organization.*

2 *Only major subcategories within each group are included.*

Source: *Health Statistics Division, Statistics Canada.*

Figure 12

Age-Standardized Incidence (1969-1990) and Mortality (1969-1992) Rates for Selected Cancer Sites, Children Aged 0-14, Canada

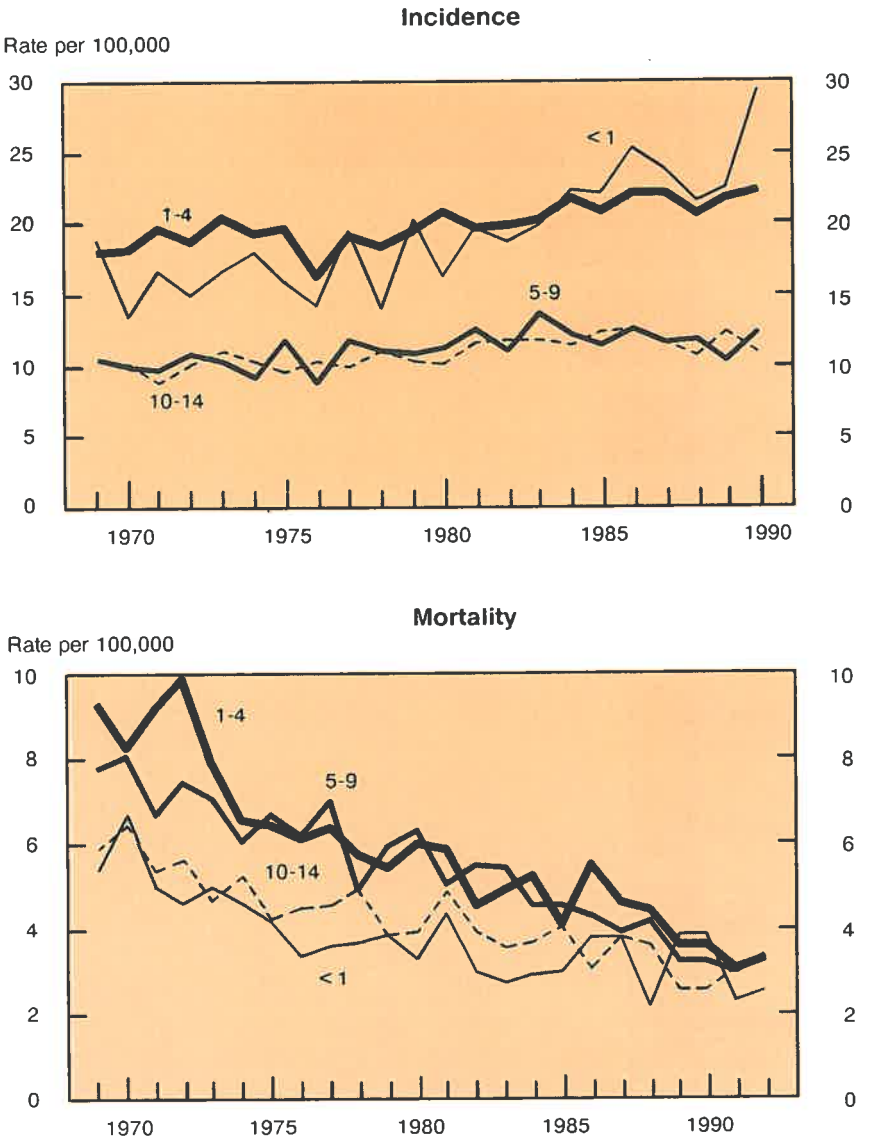


Note: *Rates are standardized to the age distribution of the 1991 Census of Canada population and exclude non-melanoma skin cancer (ICD-9 173).*

Source: *Health Statistics Division, Statistics Canada.*

Figure 13

Age-Specific Incidence (1969-1990) and Mortality (1969-1992) Rates for All Cancers, Children Aged 0-14, Canada

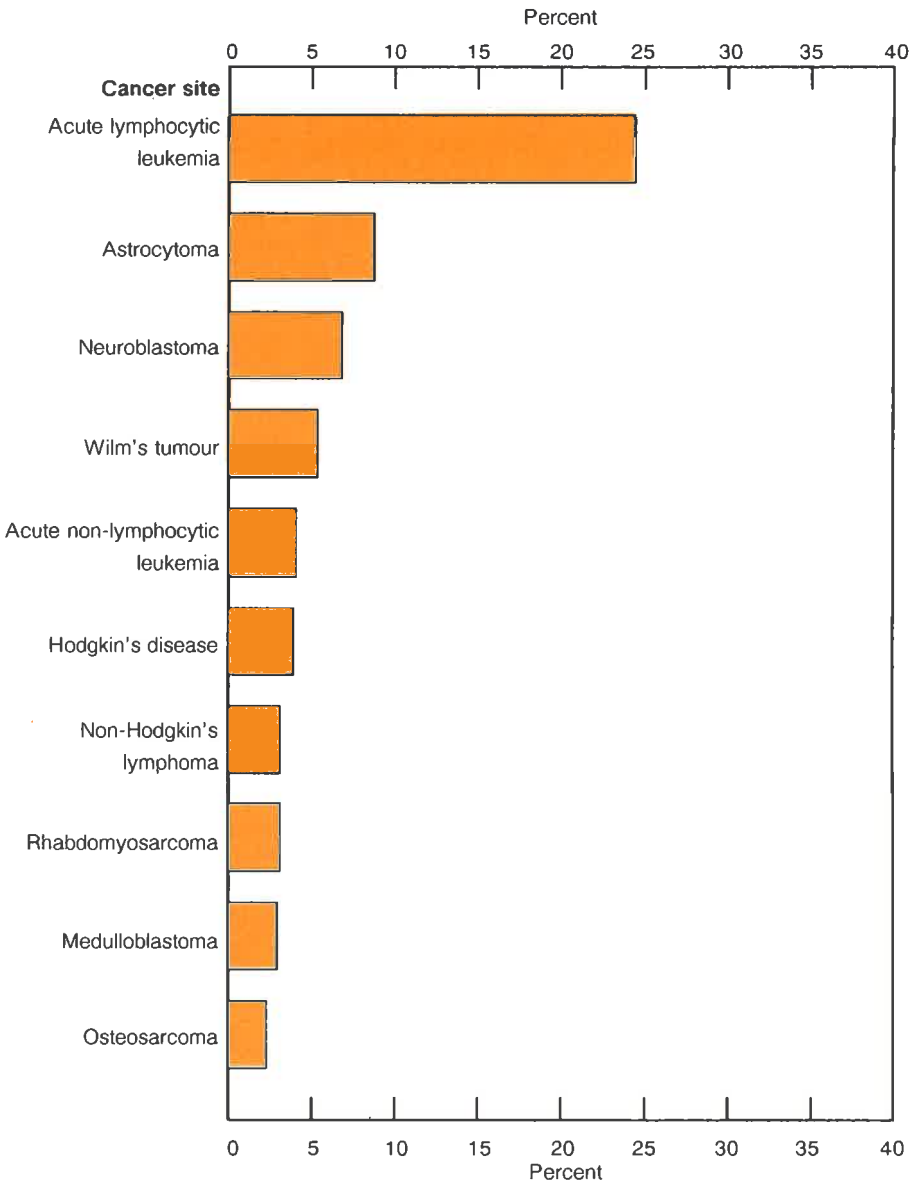


Note: *All cancers exclude non-melanoma skin cancer (ICD-9 173).*

Source: *Health Statistics Division, Statistics Canada.*

Figure 14

Percent Distribution of Leading Cancer Types among Children Aged 0-14 Years, Canada, 1986-1990

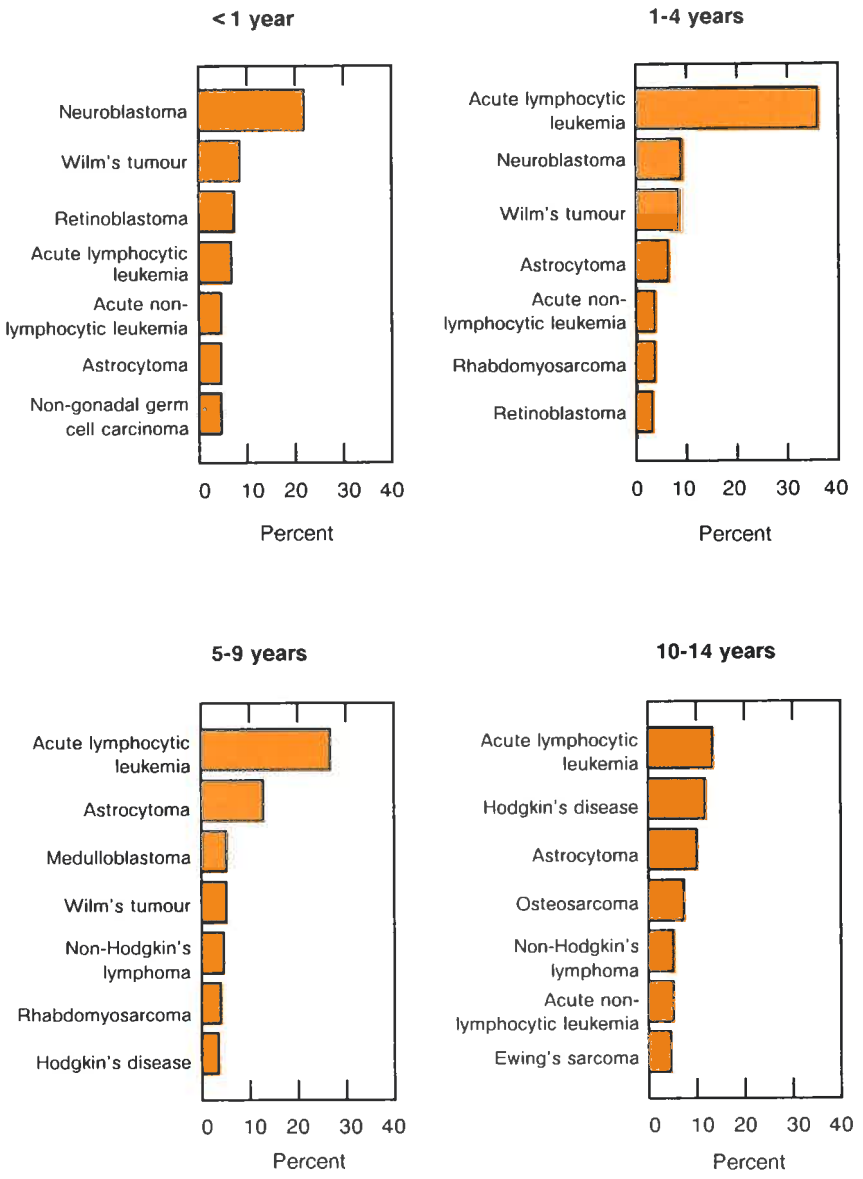


Note: *Figure excludes percentages for cancer types not listed.*

Source: *Health Statistics Division, Statistics Canada.*

Figure 15

Percentage Distribution of Leading Childhood Cancer by Age Groups, Canada, 1986-1990



Note: *Figures exclude percentages for cancer types not listed.*

Source: *Health Statistics Division, Statistics Canada.*

PREVALENCE OF CANCER

The prevalence of cancer is the number of people alive, at a point in time, who have cancer. An estimate of this number would, ideally, exclude those people who have been treated for cancer and are considered to be cured, as well as ensuring that people diagnosed with a second new cancer were not counted twice. Prevalence is an important indicator of the human suffering and burden of cancer on individuals and society. The number reflects both the incidence of cancer and cancer survival rates. Prevalence can, therefore, be expected to increase over time due to the growth and aging of the Canadian population as well as to an overall increase in the incidence of certain forms of cancer. Improvements in survival rates for successfully treated cancers will also increase the prevalence statistics.

The number of people living with cancer can be assumed to be the number of people alive who were diagnosed within the previous five years. This assumption has a major limitation, in that the natural histories of certain common cancers (e.g., breast and prostate) are such that people surviving longer than five, or even ten, years cannot be considered cured. Table 17 shows estimates for five year and ten year prevalences at the end of 1990. The table must be interpreted with caution, as cases of cancer diagnosed prior to the ten year point are not included, so the numbers may be somewhat underestimated. On the other hand, the estimates are moderately high, as they have not been adjusted for people with second cancers.

At the end of 1990 more than 413,000 people living in Canada are estimated to have been diagnosed with cancer in the previous ten years, excluding those who had non-melanoma skin cancer. Of these, nearly 270,000 had been diagnosed in the previous five years, and approximately 143,000 people had survived more than five years. These numbers would be significantly higher if the common, and relatively benign, non-melanoma skin cancers were also included.

Frequently occurring cancers, with relatively good survival, show the highest prevalences (e.g. female breast and prostate cancers). The poor prognosis associated with lung cancer explains the relatively low prevalence in both sexes, despite the relatively high incidence of this disease.

Table 17
Prevalence of Cancer by Site and Sex, Canada, 1990

Site	5 Years			10 Years		
	Total	Male	Female	Total	Male	Female
All Cancers	**268,400**	**124,500**	**143,800**	**413,600**	**183,800**	**229,800**
Female Breast	53,200	...	53,200	84,100	...	84,100
Colorectal	39,200	19,900	19,300	60,900	30,000	30,900
Prostate	34,400	34,400	...	48,100	48,100	...
Lung	18,700	12,000	6,700	24,700	15,900	8,800
Lymphoma	16,500	8,700	7,700	25,100	13,200	11,900
Bladder	15,800	11,900	3,900	26,100	19,400	6,700
Body of Uterus	11,000	...	11,000	20,000	...	20,000
Melanoma	10,000	4,700	5,300	16,300	7,200	9,000
Kidney	7,900	4,700	3,200	11,900	7,000	4,800
Oral	6,800	4,500	2,300	10,800	6,800	4,000
Leukemia	6,300	3,600	2,700	9,400	5,300	4,100
Cervix	5,500	...	5,500	10,400	...	10,400
Ovary	4,600	...	4,600	7,500	...	7,500
Stomach	4,000	2,400	1,600	5,900	3,500	2,300
Brain	3,200	1,700	1,400	4,900	2,600	2,300
Testis	2,600	2,600	...	4,500	4,500	...
Pancreas	1,500	700	800	2,100	1,000	1,100

Note: *Figures show the estimated number of people alive at December 31, 1990 who ever developed cancer since 1986 (5yrs) or 1981(10 yrs). Totals may not add due to rounding.*
... Not Applicable.

COLORECTAL CANCER

Colorectal cancer is the third most common site in terms of cancer incidence, and the second-ranked cause of cancer death among Canadians. In 1995, 16,300 new cases of colorectal cancer (or 13% of all new cases) are expected to be diagnosed in Canadian men and women, compared to 20,000 new cases of lung cancer, 17,000 female breast and 16,100 prostate cancers. The estimated 6,300 deaths from colorectal cancer in 1993 place it ahead of the expected 5,400 deaths due to breast cancer and 4,200 prostate cancer deaths. Cancers of the colon and rectum therefore represent an important health problem for Canadians although the trends are frequently overshadowed by the more dramatic trends occurring in recent years for cancers of the lung, prostate and breast.

Age-standardized rates for colorectal cancer are somewhat higher among men than women, although the sex ratio is closer to 1 than for many forms of cancer occurring in both sexes. As with many cancers, the incidence of colorectal cancer does not start to rise until after age 40 or 45, while mortality rates do not increase substantially until after age 55 (Figure 16). For most age groups, the number of new cases and deaths is greater among men. However, because more Canadian women than men live to advanced ages, the **number** of new cases of, and deaths due to, colorectal cancer among women aged 80 or over exceeds that of men (Table 12).

Trends in age-standardized rates for incidence and mortality of colorectal cancer appear to have changed over the past decade, with trends in incidence rates for both men and women showing a peak in 1985 (Figures 5.1 and 6.1, Tables 9.1 and 10.1). Incidence rates of colorectal cancer among men have declined slightly since 1985 after many years of steady increases, whereas among women incidence rates are now declining rapidly, after years of relatively stable rates. Mortality rates have continued to decline for both men and women but at a somewhat more rapid pace since 1985, with rates declining faster among women than among men. Although subtle, these changes are encouraging, as they signal steady improvements in our ability to control colorectal cancer.

Figure 16 shows that the decline in age-specific incidence rates since 1985 has been most marked in both men and women aged 80 years or more, with changes in trend also occurring in the 70-79 and 60-69 age groups. Declines in mortality have also been most pronounced in the oldest age groups, with declines among women generally greater than among men.

As shown in Figure 17, trends in age-standardized incidence and mortality rates also changed in the United States in 1985. Mortality rates in Canada, while higher in the 1970s, are now comparable to U.S. rates. Incidence rates are similar in the two countries among women, but are lower among Canadian men. (Note that rates for cancer incidence in Canada prior to 1982 are affected by under-registration of cases in several registries.) Declines in incidence and mortality for colorectal cancer may well be due to reasons similar to those

reported in the United States,[4,8] where it appears that more widespread use of methods for early detection may allow for more effective treatment for earlier staged disease, particularly among the elderly. Also, some evidence suggests that lifestyle changes such as diet may have contributed to the declines in incidence. More research is needed in Canada, however, to determine the relative importance of these factors on Canadian rates.

Survival from colorectal cancer tends to be more favourable than for most forms of cancer, particularly among men. The five-year relative survival rate is just over 50 percent for both men (51%) and women (53%) based on recent data from the Quebec Tumour Registry. By contrast, five-year relative survival for all forms of cancer is 40% among men and 54% among women (Table 15).

Currently, one in 16 Canadian men and women can expect to develop colorectal cancer during their lifetime. One in 35 men and in 36 women will die of the disease (Table 13, Figure 8.1 and 8.2).

Geographic Variation

According to the most recently available data from **Cancer Incidence in Five Continents,** incidence rates for colorectal cancer in Canada are among the highest in the World. Figures 18 and 19 show that rates for colorectal cancer in Canadian registries, while comparable to those reported from the United States and Western European countries, are as much as ten times higher than those reported for South-East Asian and African countries. As with breast cancer, colorectal cancer tends to be associated with Western lifestyles.

Although most provinces report similar rates for incidence and mortality of colorectal cancer, a slight east-to-west gradient does exists. The lowest rates tend to be found in the Western provinces, and higher rates in the Atlantic provinces.

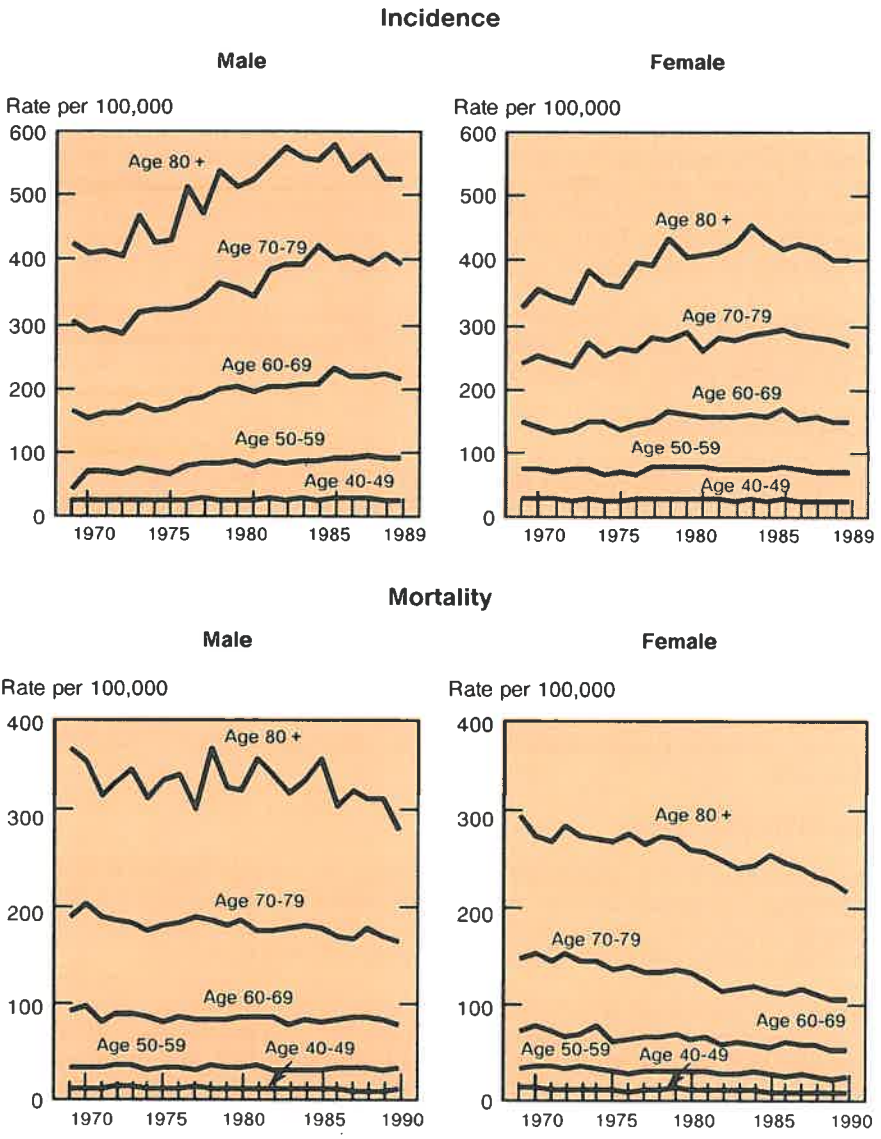
Research Directions

Colorectal cancer is a significant component of the cancer burden in Canada accounting for almost 10% of the potential years of life lost for both sexes. Despite this, it is a form of cancer that has a relatively low profile among the scientific and medical communities, the media, and the public.

While there have been significant improvements in the incidence and mortality of colorectal cancer in the past 10-15 years, the reasons for these positive changes and the variation in the rates by age and sex are incompletely understood. Research to determine the relative importance of genetic factors, dietary changes, regular exercise, the introduction of new diagnostic and treatment methods as well as the influence of as yet unidentified factors is needed. Results of such studies will lead to more effective prevention and treatment interventions for colorectal cancer and may also lead to improved outcomes for other cancers.

Figure 16

Age-Specific Incidence and Mortality Rates for Colorectal Cancer, Canada, 1969-1990

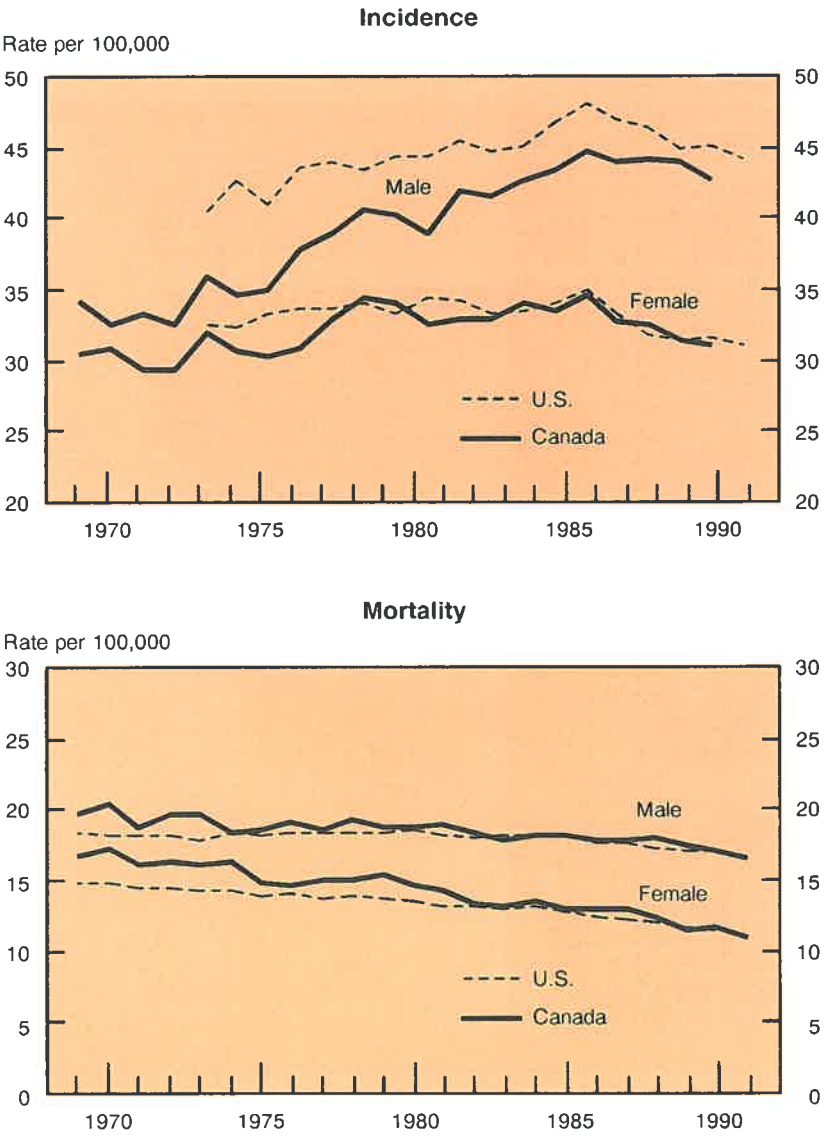


Note: *Rates not shown for age groups under 40.*

Source: *Health Statistics Division, Statistics Canada.*

Figure 17

Age-standardized Incidence and Mortality Rates for Colorectal Cancer, Canada and US, 1969-1991

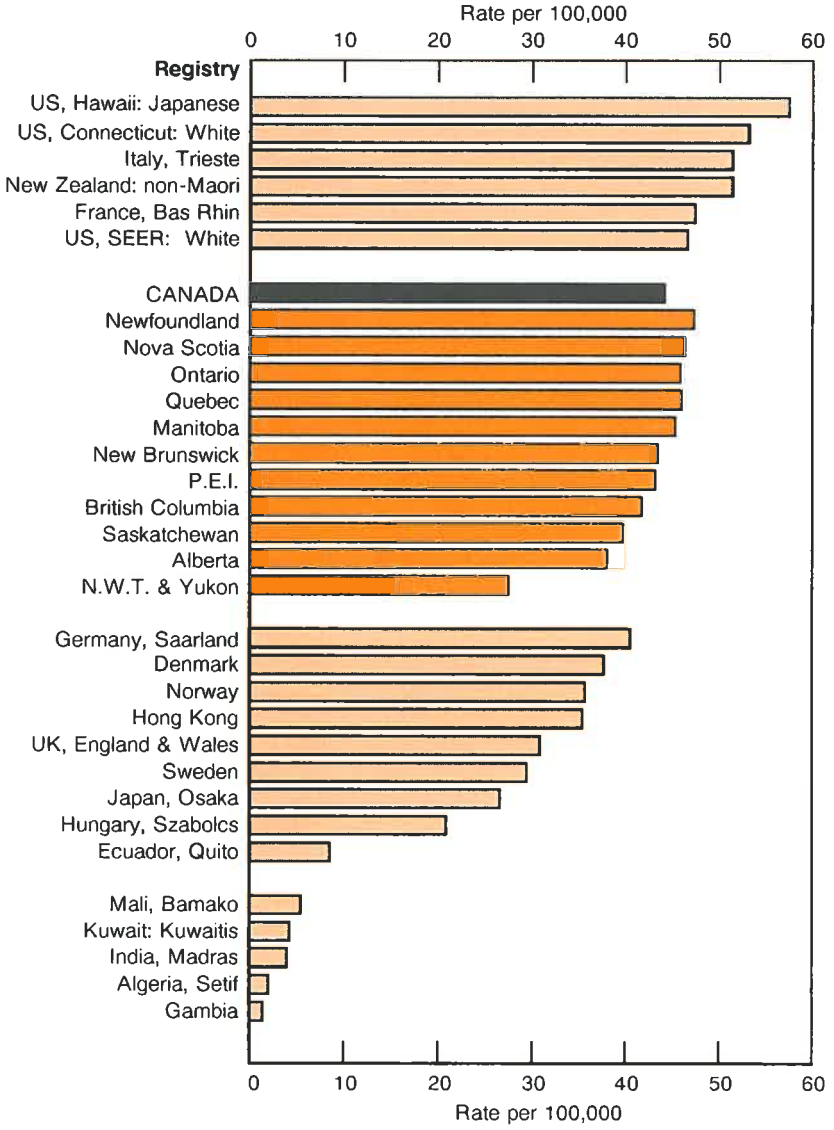


Note: *U.S. incidence data are from the SEER program which covers about 10% of the U.S. population. Rates are standardized to the age distribution of the World Standard Population.*

Source: *Health Statistics Division, Statistics Canada.*

Figure 18

Age-Standardized Incidence Rates for Male Colorectal Cancer, Canada and Selected Cancer Registries, 1983-1987

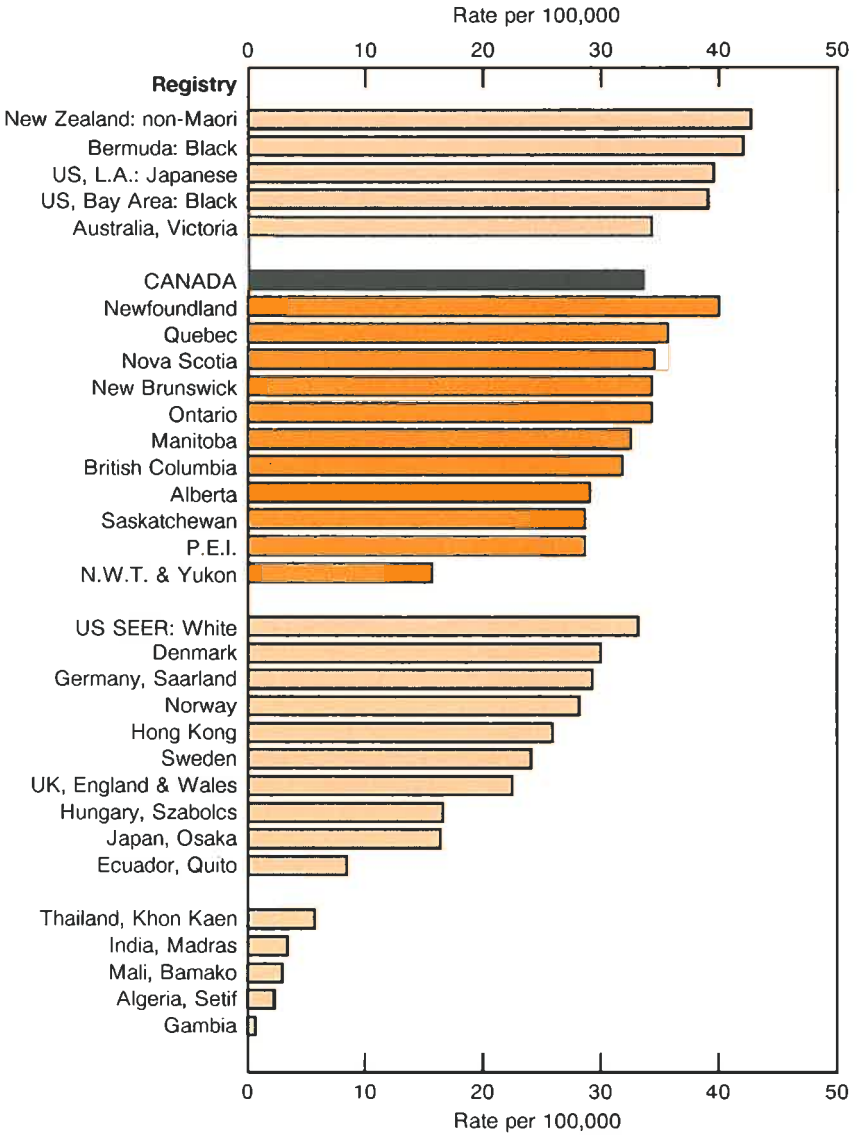


Note: *Rates are standardized to the age distribution of the World Standard Population. Figure includes registries with the five highest and lowest rates, plus selected registries with intermediate rates.*

Source: *Cancer Incidence in Five Continents, Vol. VI, International Agency for Research in Cancer.*

Figure 19

Age-Standardized Incidence Rates for Female Colorectal Cancer, Canada and Selected Cancer Registries, 1983-1987



Note: *Rates are standardized to the age distribution of the World Standard Population. Figure includes registries with the five highest and lowest rates, plus selected registries with intermediate rates.*

Source: *Cancer Incidence in Five Continents, Vol. VI, International Agency for Research in Cancer.*

GLOSSARY

Age: The age of the patient (in completed years) at the time of diagnosis or death.

ICD-9: The Ninth Revision of the International Classification of Diseases.[20]

Incidence: 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.

Mortality: The number of deaths attributed to the particular type of cancer that occurred during the year.

Included are deaths of patients diagnosed in earlier years, persons newly diagnosed during the year as well as patients for whom a diagnosis of cancer is made only after death.

Province: For cancer incidence and mortality data, this is the province of the patient's permanent residence at time of diagnosis or death, which may or may not be identical to the province in which the new case of cancer or the cancer death was registered.

Incidence and Mortality Rates:

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

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

Age-standardized rate
The number of new cases of cancer or cancer deaths per 100,000 that would have been observed in the 1991 Census of Canada population if the actual age-specific rates observed in the province for a specific year had prevailed in the 1991 population.

Index of Age-standardized rates
The age-standardized rate of the base year, 1971, is set at 100. Index points for subsequent years are derived by multiplying the age-standardized rate for that year by 100 and then dividing by the 1971 rate.

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
Stomach	151	Testis	186
Colorectal	153-154	Bladder	188
Pancreas	157	Kidney	189
Larynx	161	Brain	191-192
Lung	162	Lymphoma	200-203
Melanoma	172	Hodgkin's Disease	201
Female Breast	174	Multiple Myeloma	203
Cervix	180	Non-Hodgkin's	
Body of Uterus	179,182	Lymphoma	200, 202
Ovary	183	Leukemia	204-208
		All Cancers minus Lung	140-208 minus 173, 162
		All Other Cancers	All sites between 150-199 not listed above
All Cancers	**140-208 minus 173**		

1991 Census of Canada Population: The population used to standardize rates has the following age distribution.

Age Group	Population (thousands)	Age Group	Population (thousands)	Age Group	Population (thousands)
0-4	6,946.4	30-34	9,239.7	60-64	4,232.8
5-9	6,945.0	35-39	8,338.9	65-69	3,857.2
10-14	6,803.5	40-44	7,606.5	70-74	2,966.2
15-19	6,849.5	45-49	5,954.0	75-79	2,213.0
20-24	7,500.6	50-54	4,765.2	80-84	1,359.7
25-29	8,993.2	55-59	4,404.3	85 +	1,023.8
				TOTAL	**100,000.0**

APPENDIX I: METHODOLOGY

Data Sources and Processing

The actual cancer incidence (1969-1990) and mortality (1969-1992) data used in this monograph were obtained from two sources maintained by the Health Status Section of the Health Statistics Division, Statistics Canada: mortality data files (1969-1992), and the National Cancer Incidence Reporting System (NCIRS,1969-1991).[18,19] Actual 1991 incidence data were not available at the Canadian level, and data for New Brunswick were available only up to 1990.[18]

Records from each province and sex were extracted and then classified into selected cancer sites defined in the Glossary. Canada totals for major sites were then determined as the sum of the ten provinces. For Northwest Territories and Yukon, the 1987-1991 records were also extracted from these data bases to calculate a five year average of cancer incidence and mortality. These averages were used as 1995 estimates for the two territories.

Population figures for Canada and the provinces were taken from a new series of censal, intercensal, and post-censal estimates for 1969-1993[22,23] and from the Scenario 2 population projections for 1994 and 1995.[24] The Scenario 2 projections were chosen because they are based on the assumptions of natural increase, immigration and internal migration which most closely reflect the Canadian reality.[24] The new population series and its corresponding projections, both produced by Demography Division of Statistics Canada in 1993, include as part of the Canadian population, non-permanent residents plus adjustments to account for estimated net undercoverage of Canadian Censuses and returning Canadians. The adjustments began in 1971, the year in which the reference date changed to July 1 from the June 1 date used prior to 1971.[22]

Incidence and mortality estimates for 1995 were obtained from models which were fitted to a subset of the data described above. Specifically, data from 1983 to 1991 (1983 to 1990 for New Brunswick) were used to compute incidence estimates, and data from 1983 to 1992 for mortality estimates. Incidence data from 1984 onwards were used for Quebec because data were less accurate in prior years. For Nova Scotia, estimates may be less accurate in some sites due in part to data years prior to 1986 when death certificates were unavailable and pathology data less available. From 1992 onwards, simpler models have been used than were employed in previous editions of Canadian Cancer Statistics.

Actual crude incidence and mortality rates for each province, sex, site and year were computed by dividing the number of cases by the corresponding provincial population figures. These rates were computed for the "under 45" and the "45 and over" age groups separately. For childhood sites (brain, leukemia, cancers other than brain and leukemia, and all cancers), crude rates were computed for both sexes combined for the 0-14 years age group. **Age-standardized incidence and mortality rates for each site were calculated using the 1991 Canadian population**. It replaced the World Standard Population (used in previous editions of Canadian Cancer Statistics)[12] whose distribution was much younger than that of the 1991 Canadian population.

Therefore, age-standardized rates calculated using the 1991 Canadian population are about 30 to 50 percent higher than those calculated using the World Standard population.[18]

Mortality Estimates (Deaths) for 1995 (Tables 1, 2, 5 & Figure 1)

These were estimated for each site and sex by fitting maximum likelihood models to the provincial and Canadian yearly values. (The yearly counts were assumed to follow independent Poisson distributions, with mean values equal to the product of yearly population sizes and crude annual death rates.) Then, crude mortality rates were modelled separately for the "under 45" and the "45 and over" age groups to obtain corresponding predicted crude rates. These projected rates were then applied to the 1995 population projection figures to obtain the 1995 projected counts. For all sites, a linear model was used for death rates, with year as the only independent variable. Mortality counts by site for Canada are directly obtained from the counts for Canada as a whole. Then, every provincial estimate is adjusted such that their sum corresponds to the Canadian estimates.

Incidence Estimates (New Cases) for 1995 (Tables 1, 2, 3, & Figure 1)

These were estimated for each site and sex in a similar manner to that used for mortality. For each of the province, a linear model for estimated crude incidence rates, calculated separately for "under 45" and the "45 and over" age groups, was used for all sites, 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.

Age-Standardized Incidence Rates (ASIRs) and Mortality Rates (ASMRs) for 1995 (Tables 4,6 & Figures 3-6, 10)

These 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 followed independent Poisson distributions. Regressions were performed for Canada and each province for each site and sex, using year as the independent variable.

For mortality estimates, regressions were performed on data from 1983 to 1992. Due to large fluctuations in the source data, a five-year average (1987-1991) was used to estimate the following rates: Newfoundland, melanoma, M and F; Prince Edward Island, larynx, M, and leukemia, M and F; New Brunswick, melanoma, F; Manitoba, larynx, M.

For incidence estimates, regressions used data from 1983 onward with the following exceptions. First, for Quebec, data from 1984 onward were used. Second, a five-year average (1987-1991) was used to estimate the following rates: Newfoundland, brain, F, and pancreas, M and F; Prince Edward Island, lung, F, and larynx, M; New Brunswick, pancreas and oral, F; and Saskatchewan, brain, F.

Accuracy and Precision

The standard error and coefficient of variation were computed to measure the accuracy of each estimate. These values are available upon request from the Health Status Section of the Health Statistics Division, Statistics Canada. Note that any estimates are subject to error and the degree of precision depends on the adequacy of the model as well as the number of observed cases and population size for each site, sex, and province combination.

Due to changes and improvements in the cancer incidence data provided by the provinces, as well as the changes in the methodology for producing the estimates of cancer incidence and deaths, **estimates in the 1995 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 the Health Status Section of the Health Statistics Division, Statistics Canada.[1,11]

Comparison of Five Year Average of Canadian and Provincial ASIRs (Table 7)

Five year average ASIRs were calculated with data from 1986 to 1990. Significant differences between Canadian and provincial average ASIRs were estimated by computing a standardized test statistic (Z) for the difference between the two rates. If the absolute value of the calculated Z statistic was larger than the critical point of the standard normal distribution, then a significant difference between the two rates existed at a significance level of P = .01. The significance test accounted for non-independence of the provincial ASIR and the Canadian rate by incorporating their correlation. The correlation coefficients were estimated with the age-standardized rates from 1983 to 1990 because for earlier years, data were not of sufficient quality to be reliable.

Average Annual Percent Change (AAPC) in Cancer Incidence and Mortality (Table 8, Figure 2)

The AAPC values were calculated for each site by fitting a model that assumes 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 is then transformed back to represent a precentage increase or decrease.

Probability of Developing/Dying from Cancer (Table 13, Figure 8)

Probabilities were calculated based on the age and sex-specific cancer incidence and mortality rates for Canada in 1990, and all cause mortality rates for 1989-1991. The methodology used was that of Zdeb[21] and Seidman.[17] As was noted by Seidman the life table procedures used assume 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 1992. The indicator was calculated by determining the proportion of deaths attributed to specific types of cancer for each sex and age group, multiplying this proportion by the corresponding number of deaths in the life table, summing the life table deaths over all sex and age groups, and dividing by the number of survivors at birth to obtain the probability of dying from each cause.

Potential Years of Life Lost (Table 14, Figure 9)

This indicator was calculated by obtaining deaths for ages < 1, 1-4, 5-9, ..., 90 + for Canada in 1992, and life expectancy for the midpoint 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.[15]

Cancer Survival (Table 15, Figure 10 and 11)

Survival data provided by the Fichier des tumeurs du Québec for new cases diagnosed in 1984, 1985 and 1986 were analyzed to determine observed and relative survival rates at one, two, three, four and five years post-diagnosis for selected age groups and sites of cancer.[14] Observed and relative survival rates were calculated using actuarial methods.[3] Cases diagnosed in Québec who moved outside the province were removed from the cohort at the time of their departure, according to records from la Régie de l'assurance maladie du Québec.

Childhood Cancer (Table 16, Figure 12-15)

The classification system used to record the occurrence of childhood cancer in this publication is that developed by the International Agency for Research on Cancer, and is a modification of the Manchester system for the classification of childhood cancer.[13] Appropriately for the childhood cancers, this classification system places greater emphasis on the morphology of the tumours than the ICD classification system which emphasizes topography. In this system, the category "lymphomas" includes: Hodgkin's lymphoma, non-Hodgkin's lymphoma, and other lymphomas which comprise Burkitt's lymphoma, Histiocytosis X, unspecified lymphomas, and other reticuloendothelial neoplasms.

Histologic confirmation of the diagnosis is obtained for most, though not all, childhood cancer cases recorded in the National Cancer Incidence Reporting System.

Prevalence of Cancer (Table 17)

Monthly relative survival by site, and for three age groups, was calculated using registry data with follow up for British Columbia, Saskatchewan and Ontario cases diagnosed between 1970-1974 and 1980-1984. Relative survival rates, up to 10 years after diagnosis, were calculated by adjusting the observed survival rate according to the normal life expectancy in persons from the general population in the same age and sex category, and time period of observation.[5]

The number of prevalent cases, within 5 years, of a specific cancer at the end of 1990 was estimated by summing the estimated number of cases expected to survive from the month of diagnosis to the end of 1990. Monthly incident cases were estimated by dividing the annual counts by 12, and for each month the number of cases expected to survive was obtained by multiplying the lifetable expected survival by the relative survival. A similar calculation was performed to obtain prevalent cases within 10 years.

APPENDIX II: ACTUAL DATA

Table 1
New Cases of Cancer, by Site and Sex, Canada, 1990

Site	ICD-9	Total	Males	Females
All cancer sites	**140-208**	**104,653**	**54,803**	**49,850**
Oral (Buccal cavity and pharynx)	**140-149**	**3,016**	**2,169**	**847**
Lip	140	717	588	129
Tongue	141	535	381	154
Salivary gland	142	230	128	102
Floor of Mouth	144	295	206	89
Pharynx	146,147,148	724	541	183
Other and unspecified	143,145,149	515	325	190
Digestive Organs	**150-159**	**23,368**	**12,582**	**10,786**
Esophagus	150	992	693	299
Stomach	151	2,931	1,856	1,075
Small intestine	152	277	142	135
Large intestine	153	9,638	4,736	4,902
Rectum	154	4,755	2,700	2,055
Liver and biliary passages	155,156	1,636	882	754
Pancreas	157	2,567	1,287	1,280
Other and unspecified	158,159	572	286	286
Respiratory system	**160-165**	**18,313**	**12,537**	**5,776**
Larynx	161	1,179	973	206
Lung	162	16,594	11,191	5,403
Other and unspecified	160,163-165	540	373	167
Bone tissue and skin	**170-172**	**3,421**	**1,794**	**1,627**
Bone	170	289	159	130
Connective Tissue	171	659	371	288
Skin (melanoma)	172	2,473	1,264	1,209
Breast	**174,175**	**14,193**	**96**	**14,097**
Genital organs	**179-187**	**18,832**	**12,152**	**6,680**
Cervix	180	1,493	...	1493
Body of uterus	182	2,701	...	2701
Ovary	183	1,966	...	1966
Prostate	185	11,377	11,377	...
Other and unspecified	179,181,184, 186,187	1,295	775	520
Urinary organs	**188-189**	**7,256**	**4,976**	**2280**
Bladder	188	4,288	3,186	1,102
Kidney and other urinary	189	2,968	1,790	1,178
Eye	**190**	**248**	**132**	**116**
Brain and central nervous system	**191-192**	**1,958**	**1,086**	**872**
Endocrine glands	**193-194**	**1,258**	**357**	**901**
Thyroid	193	1,114	287	827
Other endocrine	194	144	70	74
Leukemia	**204-208**	**2,886**	**1,614**	**1272**
Other blood and lymph tissues	**200-203**	**6,196**	**3,394**	**2,802**
Hodgkin's disease	201	846	471	375
Multiple myeloma	203	1,313	699	614
Other lymphomas	200,202	4,037	2,224	1813
All other and unspecified sites	**195-199**	**3,708**	**1,914**	**1,794**

Note: *ICD-9 refers to the Ninth Revision of the International Classification of Diseases. Figures include data from Yukon and Northwest Territories and exclude non-melanoma skin cancer (ICD-9 173).*
... Not Applicable.

Source: *Cancer in Canada (Annual). Health Statistics Division, Statistics Canada.*

Table 2
Cancer Deaths by Site and Sex, Canada, 1992

Site	ICD-9	Total	Males	Females
All cancer sites	**140-208**	**54,689**	**29,951**	**24,738**
Oral (Buccal cavity and pharynx)	**140-149**	**1,000**	**696**	**304**
Lip	140	11	9	2
Tongue	141	207	152	55
Salivary gland	142	76	47	29
Floor of the mouth	144	43	32	11
Pharynx	146,147,148	282	209	73
Other and unspecified	143,145,149	381	247	134
Digestive organs	**150-159**	**14,962**	**8,228**	**6,734**
Esophagus	150	1,106	804	302
Stomach	151	2,111	1,299	812
Small intestine	152	102	50	52
Large intestine	153	4,603	2,366	2,237
Rectum	154	1,323	781	542
Liver and biliary passages	155,156	1,551	826	725
Pancreas	157	2,709	1,384	1,325
Other and unspecified	158,159	1,457	718	739
Respiratory system	**160-165**	**15,081**	**10,287**	**4,794**
Larynx	161	478	413	65
Lung	162	14,425	9,748	4,677
Other and unspecified	160,163-165	178	126	52
Bone tissue and skin	**170-172**	**980**	**538**	**442**
Bone	170	138	74	64
Connective Tissue	171	268	127	141
Skin (melanoma)	172	574	337	237
Breast	**174,175**	**4,865**	**35**	**4,830**
Genital organs	**179-187**	**5,847**	**3,550**	**2,297**
Cervix	180	368	...	368
Body of uterus	182	289	...	289
Ovary	183	1,215	...	1,215
Prostate	185	3,494	3,494	...
Other and unspecified	179,181,184, 186,187	456	56	400
Urinary organs	**188-189**	**2,312**	**1,528**	**784**
Bladder	188	1,127	798	329
Kidney and other urinary	189	1,185	730	455
Eye	**190**	**33**	**15**	**18**
Brain and central nervous system	**191-192**	**1,360**	**753**	**607**
Endocrine glands	**193-194**	**217**	**88**	**129**
Thyroid	193	133	46	87
Other endocrine	194	84	42	42
Leukemia	**204-208**	**1,864**	**1,018**	**846**
Other blood and lymph tissues	**200-203**	**3,010**	**1,578**	**1,432**
Hodgkin's disease	201	158	95	63
Multiple myeloma	203	915	451	464
Other lymphomas	200,202	1,937	1,032	905
All other and unspecified sites	**195-199**	**3,158**	**1,637**	**1,521**

Note: *ICD-9 refers to the Ninth Revision of the International Classification of Diseases. Figures include data from Yukon and Northwest Territories and exclude non-melanoma skin cancer (ICD-9 173).*
... Not Applicable.
Source: *Causes of Death (Annual). Health Statistics Division, Statistics Canada.*

REFERENCES

1. Atwell K. *Methodology Report: The Production of Cancer Mortality and Incidence Estimates for Canada.* Social Survey Methods Division, Statistics Canada, 1992.

2. Band PR, Gaudette LA, Hill GB, Holowaty EJ, Huchcroft SA, Johnston GM, Markomaski Illing EM, Mao Y, Semenciw R. *The Making of the Canadian Cancer Registry: Cancer Incidence in Canada and its Regions, 1969 to 1988.* Canadian Council of Cancer Registries, Health Canada, Statistics Canada, Ottawa, 1993.

3. Bernard P-M, Lapointe C. *Mesures statistiques en épidémiologie.* Presses de l'Université du Québec, QC. 1987, 170-171

4. Chu KC, Tarone RE, Chow W-H, Hankey BF, Ries LAG. Temporal patterns in colorectal cancer incidence, survival and mortality from 1950 through 1990. *JNCI 1994;86:997-1006.*

5. Ederer F, Axtell LM, Cutler SJ. *The Relative Survival Rate - A Statistical Methodology*. National Cancer Institute Monograph 1961;6:101-121.

6. Levy IG, Gibbons L, Collins JP, et al. Prostate cancer trends in Canada: rising incidence or increased detection? *Can Med Assoc J 1993: 149;617-24.*

7. Fradet Y, Meyer F (eds.). Canadian Workshop on Screening for Prostate Cancer, *Canadian Journal of Oncology, 1994.* (special supplement)

8. Miller BA, Ries LAG, Hankey BF, Kosary CL, Harras A, Devesa SS, Edwards BK (eds.). *SEER Cancer Statistics Review 1973-1990.* National Cancer Institute. NIH Pub. No. 93-2789, Bethesda MD,1993.

9. Miller AB. Planning Cancer Control Strategies. *Chronic Diseases in Canada, 1992; 13:1 Supplement*. Health Canada.

10. Miller BA, Ries LA, Hankey BF, Kosary CL, Edwards BK. *Cancer Statistics Review 1973-1989.* US Department of Health and Human Services NIH Publication 92-2789, Bethesda MD 1992.

11. Morin C. *Rapport Methodologique: Estimation de l'incidence du cancer et des décès causés par le cancer pour les années 1990 et 1991 au Canada.* Social Survey Methods Division, Statistics Canada.

12. Parkin DM, Muir CS, Whelan SL, Gao Y, Ferlay J, Powell J. *Cancer Incidence in Five Continents, Volume VI.* IARC Scientific Publication No. 120, International Agency for Research, Lyon, 1992.

REFERENCES – Concluded

13. Parkin DM, Stiller CA, Draper GJ, Bieber CA, Terracini B, Young JL, eds. *International Incidence of Childhood Cancer.* IARC Scientific Publication No. 87, International Agency for Research on Cancer, Lyon, 1988.

14. Pelletier G. *La survie relié au cancer: étude des nouveaux cas déclarés au Québec au cours des années 1984, 1985 et 1986.* Ministère de la santé et des services sociaux, Gouvernement du Québec, Québec, QC 1993.

15. Peron Y, Stromenger C. *Demographic and Health Indicators*. Statistics Canada, Catalogue 82-543E, 1985:182-189, 155-157.

16. Perreault J, ed. *Population Projections for Canada, Provinces and Territories, 1989-2011*. Statistics Canada, Catalogue 91-520 (Bilingual), 1990.

17. Seidman H et al. Probabilities of eventually developing and dying of cancer. *CA - A Cancer Journal for Clinicians 1978;28:33-46.*

18. Statistics Canada. *Cancer in Canada (Annual).* Health Statistics Division, Statistics Canada, Catalogue 82-218.

19. Statistics Canada. *Mortality - Summary List of Causes, Vital Statistics Volume III, (Annual).* Health Statistics Division, Statistics Canada, Table 82-003S12.

20. World Health Organization. *International Classification of Diseases. 1975 Revision*. Volumes 1 and 2, Geneva, 1977.

21. Zdeb MS. The probability of developing cancer. *Am J Epidemiology 1977;106:6-16.*

22. Statistics Canada. *Revised Intercensal Population and Family Estimates, July 1, 1971-1991.* Catalogue 91-537, Occasional, Ottawa, 1994.

23. Statistics Canada. *Annual Demographic Statistics, 1993.* Catalogue 91-213, Annual, Ottawa, 1994.

24. Statistics Canada. *Population Projections for Canada, Provinces and Territories, 1993-2016.* Catalogue 91-520, Occasional, Ottawa, Forthcoming.

FOR FURTHER INFORMATION

Detailed Standard Tables are available upon request from Statistics Canada Reference Centres or the Health Statistics Division, Statistics Canada. Information on cancer incidence and mortality can be obtained annually from Cancer in Canada, Catalogue 82-218. Also, hospital statistics on cancer can be obtained from Hospital Morbidity, Catalogue 82-216. Analytical articles appear regularly in Health Reports, Statistics Canada, Catalogue 82-003, Quarterly.

Please contact the **Statistics Canada Reference Centre** nearest you for further information.

St. John's	(1-800-565-7192)	Winnipeg	(204) 983-4020
Halifax	(902) 426-5331	Regina	(306) 780-5405
Montreal	(514) 283-5725	Edmonton	(403) 495-3027
Ottawa	(613) 951-8116	Calgary	(403) 292-6717
Toronto	(416) 973-6586	Vancouver	(604) 666-3691

Health Statistics Division
Statistics Canada, Ottawa **(613) 951-1746**

Toll-free is provided in all provinces and territories, **for users who reside outside the local dialing area** of any of the regional reference centres:

Newfoundland, Labrador, Nova Scotia, New Brunswick and Prince Edward Island	1-800-565-7192
Quebec	1-800-361-2831
Ontario	1-800-263-1136
Manitoba, Saskatchewan, Alberta and Northwest Territories	1-800-563-7828
British Columbia and Yukon	1-800-663-1551
Telecommunications Device for the Hearing Impaired	1-800-363-7629

Cancer incidence data are supplied to Statistics Canada by provincial/territorial cancer registries who may be contacted for up-to-date detailed data for their areas. (See next page.)

Information on risk assessment and surveillance in the epidemiology of cancer is available from the Director, Bureau of Chronic Disease Epidemiology, Laboratory Centre for Disease Control, Health Canada, Tunney's Pasture, Ottawa, Ontario, K1A 0L2. Tel. (613) 957-0327; FAX (613) 941-2057.

DIVISIONS OF THE CANADIAN CANCER SOCIETY

Newfoundland & Labrador Division,
Canadian Cancer Society,
Chimo Building, 2nd floor,
P.O. Box 8921,
Freshwater & Crosbie Road,
St. John's, Newfoundland
A1B 3R9
Tel. (709) 753-6320 Fax. (709) 753-9314

Prince Edward Island Division,
Canadian Cancer Society,
1 Rochford Street
Suite # 1
Charlottetown, Prince Edward Island
C1A 3T1
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,
63 Union Street,
P.O. Box 2089,
Saint John, New Brunswick
E2L 3T5
Tel. (506) 634-6272 Fax. (506) 634-3808

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

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

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,
201-2445 13th Avenue,
Regina, Saskatchewan
S4P 0W1
Tel. (306) 757-4260
Fax. (306) 569-2133

Alberta & N.W.T. Division,
Canadian Cancer Society,
2424-4th Street S.W., 2nd floor,
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

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

PROVINCIAL/TERRITORIAL CANCER REGISTRIES

Newfoundland
Executive Officer, Information Services
Newfoundland Cancer Treatment and Research Foundation,
25 Kenmount Road,
100 Olivia Street,
St. John's Newfoundland
A1B 1W1
Tel. (709) 753-2599
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) 566-6027 (Registry) 566-6167
Fax. (902) 566-6384600

Nova Scotia
Registry Coordinator, Nova Scotia Cancer Registry,
Cancer Treatment and Research Foundation of Nova Scotia,
5820 University Avenue,
Halifax, Nova Scotia B3H 1V7
Tel. (902) 428-4011 Fax. (902) 428-4277

New Brunswick
Director, Health Promotion and Disease Prevention
Dept. of Health & Community Services,
P.O. Box 5001,
Fredericton, New Brunswick E3B 5G8
Tel. (506) 453-3092 Fax. (506) 453-2726

Quebec
Chef du service des études opérationelles,
Ministère de la santé et des services sociaux,
1075, chemin Ste-Foy, 3ième étage,
Québec, (Québec) G1S 2M1
Tel. (418) 643-9936 Fax. (418) 643-1956

Manitoba
Director, Oncology Records and Registry,
Manitoba Cancer Treatment and Research Foundation
Winnipeg, Manitoba R3E 0V9
Tel. (204) 787-4187 Fax. (204) 783-6875

Saskatchewan
Director of Data Services,
Saskatchewan Cancer Foundation,
2631-28th Avenue,
Regina, Saskatchewan S4S 6X3
Tel. (306) 791-2767 Fax. (306) 584-2733

Alberta
Director, Epidemiology, Prevention and Screening
Alberta Cancer Board
#120, 1040 - 7th Avenue, S.W.
Calgary, Alberta T2P 3G9
Tel. (403) 262-4768 Fax. (403) 262-4460

British Columbia
Operations Administrator
British Columbia Cancer Agency,
West Tenth Avenue,
Vancouver, British Columbia V5Z 4E6
Tel. (604) 877-6000 Fax. (604) 872-4596

Northwest Territories
Medical Officer, Department of Health,
Government of the Northwest Territories,
P.O. Box 1320,
Yellowknife, N.W.T. X1A 2L9
Tel. (403) 920-8946 Fax. (403) 873-5072

Ontario
Director, Ontario Cancer Registry,
The Ontario Cancer Treatment and Research Foundation,
620 University Avenue,
Toronto, Ontario M5G 2L7
Tel. (416) 971-9800 Fax. (416) 971-6888

Yukon
Assistant Deputy Minister,
Health and Social Services,
Health and Human Resources,
P.O. Box 2703: H1,
Whitehorse, Yukon Y1A 2C6
Tel. (403) 667-5686
Fax. (403) 667-3096

ORDER AND EVALUATION FORM

1) Limited additional copies of this report (1995) are available from local offices of the Canadian Cancer Society. For the office nearest you, check your phone directory under "Canadian Cancer Society". The Divisional offices for the Society are listed on page 85. Copies are also available from Statistics Canada Regional Reference Centres listed on page 84.

2) Canadian Cancer Statistics is published annually. If you would like to receive the next edition of this report (1996), please fill out this form by November 30, 1995 and mail to:

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

Name_____

Title_____

Organization_____

Address_____

City, Province & Postal Code_____

_____

Note: This form must be completed each year to remain on our mailing list.

3) **Evaluation:** Your feedback on the contents of this report will be used to plan future editions. Please supply the following information.

What information did you find most/least useful?_____

_____

What additional information would you like to see in the next issue?

_____

_____

Any other suggestions?

_____

_____

Thank you for your cooperation.

Distributed by:

CANADIAN CANCER SOCIETY | SOCIÉTÉ CANADIENNE DU CANCER

111620