

# Cancer incidence and mortality across Canada

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## Abstract

### Objectives

This article analyses provincial and territorial patterns in incidence and mortality rates for selected cancer sites.

### Data sources

Cancer incidence data were obtained from the National Cancer Incidence Reporting System and from the Canadian Cancer Registry. Mortality data are from the Canadian Vital Statistics Data Base.

### Analytical techniques

Age-standardized incidence and mortality rates were calculated for Canada and each province/territory for men and women for major cancer sites for the 1991-1993 period.

### Main results

Geographic variations in cancer incidence and mortality rates are strongly influenced by trends in the four leading cancers: lung, colorectal, prostate and breast. Cancer rates tended to be significantly high in Quebec and Nova Scotia and significantly low in the three westernmost provinces. These patterns generally reflect provincial/territorial variations in smoking prevalence, dietary habits, and the extent of cancer control programs, such as screening.

### Key words

neoplasms, smoking, mass screening, geographic variation

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Cancer incidence and mortality rates are not uniform across Canada. Rates tend to be above average in Quebec and the Maritime provinces and low in the three westernmost provinces. To a large degree, these variations reflect geographic differences in the prevalence of risk factors and in the implementation of screening programs for various types of cancer.

This article uses three years of data (1991 to 1993) to analyze patterns of cancer incidence and mortality across Canada (see *Methods* and *Definitions*). Provincial and territorial rates that differ significantly from national levels may be used to stimulate further investigations of the impact of risks related to environmental or lifestyle factors and to monitor the impact of screening and treatment.<sup>1-4</sup>

## Methods

### Data sources

Cancer incidence data for 1991 were obtained from the National Cancer Incidence Reporting System, and for 1992 and 1993, from the Canadian Cancer Registry, as reported annually by the provincial and territorial cancer registries to the Health Statistics Division at Statistics Canada, which maintains these data bases.<sup>5</sup> Mortality data, compiled from the vital statistics registries in each province and territory, are from the Canadian Vital Statistics Data Base at Statistics Canada.<sup>6</sup>

Incidence and mortality rates are based on post-censal population estimates, adjusted for net census undercoverage, which were produced by the Demography Division at Statistics Canada.

Incidence and mortality rates are shown for selected cancer sites. Together, the sites analyzed account for almost 90% of all new cases and cancer deaths that occur each year. Most sites chosen for analysis are the more common forms of cancer. For some of the less common sites, the extent of geographic variation was also considered.

### Analytical techniques

Both cancer incidence and mortality counts were modelled as Poisson random variables with the mean estimated as the product of the crude rate and the population count. This mean was assumed to be different for each specific combination of province, age group, sex, time period, and cancer site. The Poisson-distributed counts were assumed to be independent through time and between age groups and to be reasonably well approximated by a normal distribution.

Data for a three-year period were used to calculate standardized rates. This period was considered short enough to adequately reflect recent changes in rates occurring in some sites, but long enough to provide an acceptable degree of precision in the estimates. For each age group, the quotient of the standard population proportion and the population count was squared, then multiplied by the associated number of cases. These quantities were then summed over age groups to create the desired variance estimate for the standardized rate.

A Z test was used to determine whether the difference between a given provincial/territorial ( $x$ ) and the national ( $y$ ) age-standardized rate for a particular cancer site was statistically significant:

$$Z = (\text{rate}_x - \text{rate}_y) / \sqrt{\text{var}_x + \text{var}_y - 2\text{cov}(x,y)}$$

Because the rates for large provinces appreciably influence the national rate, an assumption of independence between these rates and the national rate is not tenable. To account for the degree of correlation between a given provincial/territorial rate and the national rate, estimated covariances were calculated between the two rates

and entered into the variance formula for the difference between the rates.

The focus is on differences between national cancer incidence and mortality rates and those for each province and territory. Confidence intervals were calculated to assess the variation of each provincial/territorial rate.

This article presents recently revised data from the Nova Scotia Cancer Registry,<sup>5</sup> which may limit comparisons with previously published reports. These data include information on about 3% more cases, which were found by comparing information from the Nova Scotia registry against national mortality files.

### Limitations

In general, registration procedures have improved to the point where cancer registration since 1984 is considered to be relatively consistent across Canada, and coverage for Canadian incidence data has been estimated to be 95% or more.<sup>5</sup> This is an overall estimate and may vary by province and site.<sup>7</sup> Because of the small number of cases in the less populous provinces and in the territories, it may not be possible to detect geographical differences, particularly for less common cancer sites.

Cancer incidence may be under- or over-reported as a result of variations in procedures and sources used to register cases.<sup>5</sup> Incidence might be low in a province where registration is based on pathology reports and high in another jurisdiction where hospital records are used without the confirmation of a histological diagnosis. For instance, variations in incidence rates for leukemia may be partly due to under- or over-registration of cases, either because only very precise methods of diagnosis were used or because of over-reliance on less dependable sources such as unconfirmed hospital records.<sup>1,5</sup>

As well, different definitions may be used to determine what is an invasive cancer.<sup>8</sup> For example, definitions used to register multiple primary cancers are not consistent across the country. This could affect the comparability of rates in Ontario and Quebec, both of which use the most restrictive definitions. Thus, low rates of breast cancer in Quebec may be influenced by reporting procedures, since registration is restricted to one breast cancer primary per woman. But the fact that Ontario also employs this rule argues against the hypothesis.<sup>2</sup>

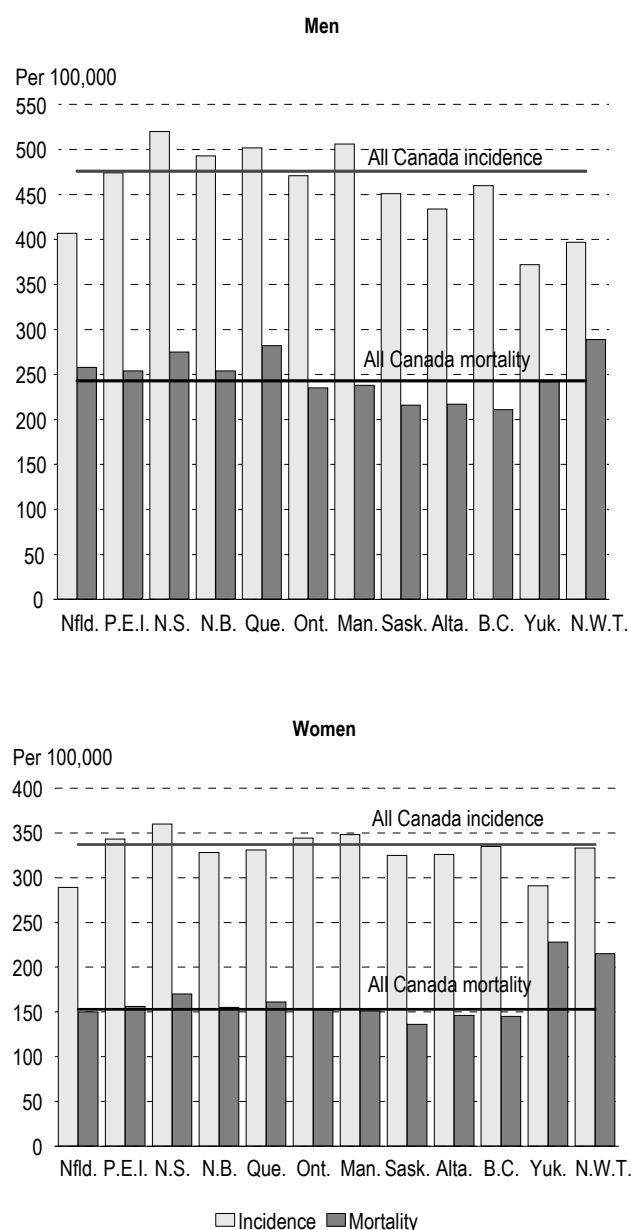
Much of the geographical variation in bladder cancer incidence rates results from differing definitions. British Columbia, Ontario, and more recently, several other registries code non-invasive papillary transitional cell carcinomas of the bladder as in situ rather than invasive cancers.<sup>2,5</sup> Rates will be low for these provinces, as in situ cancers are not included in this analysis.

### Rates vary across the country

For the 1991-1993 period, annual age-standardized cancer incidence rates for all sites combined were much higher among Canadian men than women: 476 new cases were diagnosed per 100,000 men, compared with 337 per 100,000 women. Similarly,

the age-standardized male mortality rate exceeded the female rate: 243 versus 153 deaths per 100,000. These rates, however, varied considerably by province and territory (Chart 1).

Chart 1  
Annual age-standardized cancer incidence and mortality rates, all cancer sites, by sex, Canada, provinces and territories, 1991-1993



**Source:** Canadian Cancer Registry, National Cancer Incidence Reporting System, Canadian Vital Statistics Data Base  
**Note:** Rates are age-standardized to the 1991 Canadian population adjusted for net census undercoverage.

For men, overall cancer incidence rates were significantly higher than the national rate in Nova Scotia, New Brunswick, Quebec and Manitoba (Table 1). Rates were significantly below the national level in Newfoundland, Ontario, the three westernmost provinces and the two territories.

The overall incidence of cancer among women showed less geographic variation. Rates were well above the national level in Nova Scotia, and slightly above it in Ontario and Manitoba. Rates were well

### Definitions

Cancer sites for the incidence and mortality data in this article were classified according to the International Classification of Diseases, Ninth Revision (ICD-9).<sup>9</sup>

All cancers (140-208, except 173)	Cervix (180)
Oral cavity (141-149)	Body of uterus (179, 182)
Esophagus (150)	Ovary (183)
Stomach (151)	Prostate (185)
Colorectal (153-154)	Bladder (188)
Pancreas (157)	Kidney (189)
Larynx (161)	Non-Hodgkin's lymphoma (200, 202)
Lung (162)	Leukemia (204-208)
Melanoma (172)	
Breast (174)	

**Incidence:** Number of new cases of a given type of cancer diagnosed during the year.

**Mortality:** Number of deaths during the year attributed to a particular type of cancer, based on the underlying cause of death.

**Age-standardized rate:** Cancer incidence or mortality per 100,000 that would have occurred in the standard population (1991 Canadian population) if the actual age-specific rates observed in a given population had prevailed in the standard population. In this article, age-specific rates used to calculate age-standardized incidence and mortality rates were calculated by aggregating counts of new cases or deaths for the 1991 to 1993 period and dividing by the correspondingly aggregated population for each geographical area and age group.

below average in Newfoundland and slightly below average in Quebec, Saskatchewan and Alberta.

A rather pronounced provincial east-to-west pattern emerges for mortality rates. The age-standardized cancer mortality rate among men was significantly high in Newfoundland, Nova Scotia, New Brunswick and Quebec, and significantly low in Ontario, Saskatchewan, Alberta and British Columbia.

Geographic variations in female mortality rates were similar, with significantly high rates in Nova Scotia, Quebec and the two territories, and

Table 1  
Annual age-standardized cancer incidence and mortality rates differing significantly from national rates, all sites, by province and sex, 1991-1993

		Significantly higher* than national rate		Significantly lower* than national rate	
		Incidence	Mortality	Incidence	Mortality
Newfoundland	Men		x	x	
	Women			x	
Prince Edward Island	Men				
	Women				
Nova Scotia	Men	x	x		
	Women	x	x		
New Brunswick	Men	x	x		
	Women				
Quebec	Men	x	x		
	Women		x	x	
Ontario	Men			x	x
	Women	x			
Manitoba	Men	x			
	Women	x			
Saskatchewan	Men			x	x
	Women			x	x
Alberta	Men			x	x
	Women			x	x
British Columbia	Men			x	x
	Women				x
Yukon	Men			x	
	Women		x		
Northwest Territories	Men			x	
	Women		x		

**Source:** National Cancer Incidence Reporting System, Canadian Cancer Registry, Canadian Vital Statistics Data Base

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

\*  $p < 0.05$

significantly low rates in Saskatchewan, Alberta and British Columbia.

Interprovincial differences in cancer incidence and mortality typically reflect patterns in the leading types of cancer—lung, colorectal, prostate and female breast—which together accounted for over half of total cancer incidence and mortality in the 1991-1993 period (Appendix Tables A to D).

## Rates generally high in east

### Quebec

In Quebec, cancer incidence and mortality rates among men were well above national levels, largely because of high rates of lung and colorectal cancer (Table 2). In fact, excess mortality from lung cancer among Quebec men accounted for more than half of their overall increased mortality. As well, male incidence and mortality rates were significantly elevated for several other smoking-related sites (kidney, oral cavity and larynx), for cancers of the bladder, pancreas and stomach, and for leukemia. The incidence rates for just two cancers—prostate and melanoma—were low among Quebec men, and mortality rates were low for melanoma and cancer of the esophagus.

Quebec women had mortality rates well above the national average for colorectal cancer, for cancers of the larynx, uterus and stomach, and for leukemia. Their slightly, but significantly, elevated lung cancer incidence and mortality rates represent a change from previously below-average levels.<sup>1,2,10</sup> Incidence rates were substantially above the national level for cancers of the larynx, bladder, and stomach. Incidence rates were low for cancer of the cervix and oral cavity and for melanoma. Although the incidence rate for breast cancer was low, the mortality rate was significantly high. Quebec women had significantly low mortality rates for just four cancers—ovary, cervix, esophagus and melanoma.

### Nova Scotia

High overall cancer incidence among men in Nova Scotia reflects rates well above average for lung, colorectal, bladder and kidney cancer, and for melanoma. Mortality rates were significantly high for lung, prostate, and kidney cancer. Despite the

significantly high incidence of colorectal cancer, the mortality rate was significantly low. Leukemia was the only cancer with a significantly low incidence among Nova Scotia men.

Like their male counterparts, Nova Scotia women had elevated incidence and mortality rates for a relatively large number of cancers. Their mortality rates for breast and cervical cancer were among the highest in Canada. Lung cancer mortality was also high. As well, incidence rates for lung, cervical, bladder and kidney cancer were well above the national rate. However, significantly high incidence rates for colorectal cancer and melanoma were accompanied by significantly low mortality rates.

#### *New Brunswick*

Among men in New Brunswick, somewhat higher overall cancer incidence and mortality rates were largely a result of significantly high lung cancer rates and a high incidence rate for prostate cancer. By contrast, the male incidence rate for leukemia and mortality rate for colorectal cancer were low.

Female mortality rates were neither significantly high nor low for any given type of cancer. Only one incidence rate—bladder cancer—was high, while incidence rates for leukemia and for uterine, ovarian, pancreatic and esophageal cancer were significantly low.

#### *Prince Edward Island*

In Prince Edward Island, few incidence and mortality rates differed significantly from national levels. The exceptions among men were the esophageal cancer incidence rate and the prostate cancer mortality rate, which were significantly high, while the incidence rate for bladder cancer and the mortality rate for leukemia were low. Among women, the incidence rate for colorectal cancer was high, and the mortality rate for esophageal cancer was significantly low. However, because of the small number of cases, rates for Prince Edward Island are subject to high variability and should be interpreted with caution.

#### *Newfoundland*

Newfoundland's pattern differed from the general picture of cancer in the eastern provinces. For both

sexes, incidence rates for all sites combined were low, as were rates for many individual sites.

Among men, the overall cancer mortality rate was significantly high, and incidence and mortality rates for stomach and bladder cancer were among the highest in the country. As well, the incidence rate for colorectal cancer was elevated. On the other hand, incidence and mortality rates for leukemia and melanoma were low, as was the incidence of prostate, lung and pancreatic cancer and non-Hodgkin's lymphoma.

Among Newfoundland women, stomach cancer incidence and mortality rates were the highest of any province. Incidence rates for colorectal and cervical cancer were also well above average. By contrast, lung cancer incidence and mortality rates were the lowest in the country, and mortality rates were low for melanoma, non-Hodgkin's lymphoma and pancreatic cancer.

### **Close to national average**

#### *Ontario*

Ontario residents' overall cancer incidence and mortality rates were close to the national average.

The slightly, but significantly, low overall cancer rates among men were largely attributable to low incidence and mortality rates for lung cancer, with smaller contributions from prostate and stomach cancer. Ontario men also had low incidence rates for cancers of the bladder and larynx, and low mortality rates for cancers of the pancreas, kidney and oral cavity. The mortality rate was elevated for non-Hodgkin's lymphoma. As well, both incidence and mortality rates were high for esophageal cancer and melanoma, as was the incidence rate for leukemia.

Ontario women's cancer incidence and mortality rates were significantly high for melanoma and for esophageal, cervical and ovarian cancer, and slightly above average for breast cancer. As well, incidence rates for non-Hodgkin's lymphoma, leukemia and cancer of the oral cavity were elevated. These high rates were counterbalanced by low incidence and mortality rates for lung and stomach cancer. Rates were also low for bladder cancer incidence and colorectal cancer mortality. An above-average

Table 2

Annual age-standardized cancer incidence and mortality rates differing significantly from national rates, by province, sex and site, 1991-1993

		Significantly higher* than national rate		Significantly lower* than national rate	
		Incidence	Mortality	Incidence	Mortality
Newfoundland	Men	colorectal, stomach, bladder	stomach, bladder	prostate, lung, non-Hodgkin's lymphoma, leukemia, pancreas, melanoma	leukemia, melanoma
	Women	colorectal, cervix, stomach	stomach	breast, lung, ovary, non-Hodgkin's lymphoma, leukemia, pancreas, oral cavity	lung, pancreas, non-Hodgkin's lymphoma, melanoma
Prince Edward Island	Men	esophagus	prostate	bladder	leukemia
	Women	colorectal	—	—	esophagus
Nova Scotia	Men	lung, colorectal, bladder, kidney, melanoma	lung, prostate, kidney	leukemia	colorectal
	Women	colorectal, lung, cervix, melanoma, kidney, bladder	lung, breast, cervix	—	colorectal, melanoma
New Brunswick	Men	prostate, lung	lung	leukemia	colorectal
	Women	bladder	—	uterus, ovary, leukemia, pancreas, esophagus	—
Quebec	Men	lung, colorectal, bladder, non-Hodgkin's lymphoma, kidney, stomach, leukemia, oral cavity, pancreas, larynx	lung, colorectal, pancreas, stomach, leukemia, bladder, kidney, oral cavity, larynx	prostate, melanoma	esophagus, melanoma
	Women	colorectal, lung, leukemia, bladder, stomach, larynx	lung, breast, colorectal, leukemia, stomach, uterus, larynx	breast, cervix, melanoma, oral cavity	ovary, cervix, esophagus, melanoma
Ontario	Men	leukemia, melanoma, esophagus	non-Hodgkin's lymphoma, esophagus, melanoma	prostate, lung, bladder, stomach, larynx	lung, prostate, pancreas, stomach, kidney, oral cavity
	Women	breast, uterus, ovary, non-Hodgkin's lymphoma, cervix, melanoma, leukemia, oral cavity, esophagus	breast, ovary, cervix, esophagus, melanoma	lung, bladder, stomach	lung, colorectal, stomach, uterus

Source: National Cancer Incidence Reporting System, Canadian Cancer Registry, Canadian Vital Statistics Data Base

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

— No cancer rates significantly higher (or lower) than national rate

\*  $p < 0.05$

Table 2, continued

**Annual age-standardized cancer incidence and mortality rates differing significantly from national rate, by province, sex and site, 1991-1993**

		Significantly higher* than national rate		Significantly lower* than national rate	
		Incidence	Mortality	Incidence	Mortality
<b>Manitoba</b>	Men	prostate, non-Hodgkin's lymphoma	prostate	lung, leukemia, oral cavity, larynx	lung, larynx
	Women	breast, uterus, non-Hodgkin's lymphoma	—	larynx	breast, melanoma
<b>Saskatchewan</b>	Men	prostate, bladder	—	lung, colorectal, stomach, oral cavity, larynx, esophagus,	lung, colorectal, bladder, esophagus, oral cavity, larynx
	Women	breast	non-Hodgkin's lymphoma	colorectal, lung, stomach, larynx	lung, breast, colorectal, stomach, uterus, bladder, oral cavity
<b>Alberta</b>	Men	—	—	lung, colorectal, bladder, non-Hodgkin's lymphoma, oral cavity, larynx, esophagus	lung, colorectal, bladder, non-Hodgkin's lymphoma, oral cavity, larynx, stomach
	Women	breast	—	colorectal, lung, non-Hodgkin's lymphoma, leukemia, stomach, esophagus, larynx	lung, colorectal, non-Hodgkin's lymphoma, leukemia, esophagus, larynx
<b>British Columbia</b>	Men	prostate, melanoma, esophagus	esophagus	lung, colorectal, bladder, kidney, stomach, pancreas, leukemia, larynx	lung, colorectal, pancreas, stomach, leukemia, bladder, kidney, oral cavity, larynx
	Women	breast, lung, melanoma, oral cavity	lung	colorectal, uterus, non-Hodgkin's lymphoma, cervix, leukemia, kidney, bladder, stomach, larynx	breast, colorectal, leukemia, stomach, uterus
<b>Yukon</b>	Men	—	—	non-Hodgkin's lymphoma, leukemia	colorectal
	Women	—	—	colorectal, uterus	—
<b>Northwest Territories</b>	Men	lung, stomach	lung	prostate, colorectal, non-Hodgkin's lymphoma, leukemia, esophagus	colorectal
	Women	—	lung	breast, uterus, ovary, bladder	non-Hodgkin's lymphoma

**Source:** National Cancer Incidence Reporting System, Canadian Cancer Registry, Canadian Vital Statistics Data Base

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

— No cancer rates significantly higher (or lower) than national rate

\*  $p < 0.05$

incidence rate for uterine cancer was accompanied by a below-average mortality rate.

### *Manitoba*

In Manitoba, the relatively high overall cancer incidence rate among men primarily resulted from their very high incidence of prostate cancer. Prostate cancer mortality was also above average, as was the incidence rate for non-Hodgkin's lymphoma. On the other hand, incidence and mortality rates for cancers of the lung and the larynx were low, as were incidence rates for leukemia and cancer of the oral cavity.

For Manitoba women, the incidence of breast cancer was high, but the mortality rate was low. Incidence rates for uterine cancer and non-Hodgkin's lymphoma were also elevated. By contrast, the incidence rate for cancer of the larynx was low, as was the melanoma mortality rate.

## **Low rates in west**

### *Saskatchewan*

In Saskatchewan, cancer incidence and mortality rates were generally much lower than national averages.

Among men, incidence rates were high only for prostate and bladder cancer, and mortality rates were not significantly high for cancer of any type. In fact, male mortality rates were among the lowest in Canada for cancer of the bladder. As well, both incidence and mortality rates were low for cancer of the lung, larynx, esophagus and oral cavity, and for colorectal cancer. The incidence of stomach cancer was also low.

Saskatchewan women had a high incidence of breast cancer, but a low mortality rate from the disease. Non-Hodgkin's lymphoma was the only cancer with a significantly high mortality rate. Mortality rates for cancers of the lung, uterus, bladder, and oral cavity were among the lowest in Canada. Both incidence and mortality rates for stomach and colorectal cancer were considerably below average.

### *Alberta*

In Alberta, too, incidence and mortality rates for most cancers tended to be well below national rates.

No sites had significantly high mortality rates for either sex. Among women, only breast cancer incidence was slightly above average.

For both men and women, incidence and mortality rates were low for lung, colorectal and larangeal cancer, and non-Hodgkin's lymphoma. Alberta men had among the country's lowest mortality rates for lung, stomach and bladder cancer, and very low incidence and mortality rates for cancer of the oral cavity. Among women, incidence and mortality rates were very low for cancer of the esophagus, as were mortality rates for leukemia and cancer of the larynx.

### *British Columbia*

Low overall rates of cancer in British Columbia reflect significantly low incidence and mortality rates for most sites, with many being well below the national average. Male mortality rates for pancreatic and kidney cancer and female mortality rates for breast and colorectal cancer were among the country's lowest. However, there were some exceptions to this trend toward low rates.

Male incidence and mortality rates were high for esophageal cancer. Their incidence rates for prostate cancer and melanoma were also above average.

Women had high lung cancer incidence and mortality rates. The incidence of melanoma and cancer of the oral cavity and of the breast was high. Breast cancer mortality, however, was significantly low.

## **Mixed pattern in north**

### *Yukon*

For men in the Yukon, no cancer site had incidence or mortality rates significantly above the national level. The colorectal cancer mortality rate was very low, as were the incidence rates for leukemia and non-Hodgkin's lymphoma.

Women had a significantly high mortality rate for all sites combined, but not for any specific cancer. Their incidence rates for colorectal and uterine cancer, in fact, were significantly low.

These rates should be regarded with caution. They are based on a small number of cases and are subject to high variability.



*Northwest Territories*

In the Northwest Territories, lung cancer incidence and mortality rates for both sexes far exceeded the national level.

Among men, the incidence rate was also very high for stomach cancer, and the mortality rate fell just short of statistical significance. On the other hand, incidence and mortality rates were significantly low for colorectal cancer, and incidence rates for prostate cancer, esophageal cancer, non-Hodgkin's lymphoma and leukemia were low.

Women's incidence rates were well below national averages for breast, ovarian, uterine and bladder cancer. Their mortality rate for non-Hodgkin's lymphoma was one of the lowest in the country.

To a considerable degree, many of these rates reflect the distinctive patterns of cancer incidence and mortality among the Inuit,<sup>11</sup> who comprised 32% of the population of the Northwest Territories in 1991.<sup>12</sup>

Again, the small number of cases means that rates for the Northwest Territories are subject to high variability.

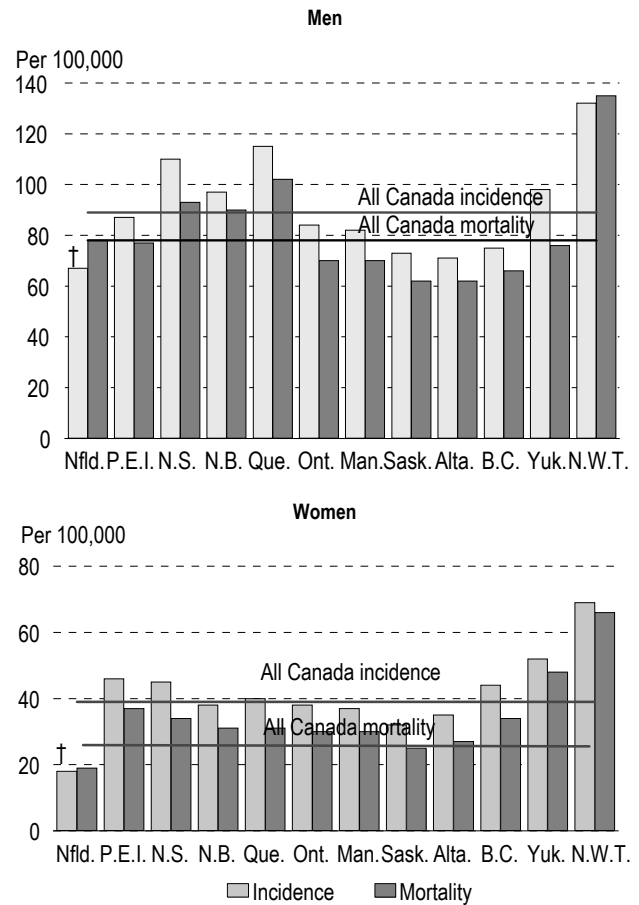
**Effects of smoking**

Much of the geographic variation in overall cancer rates mirrors lung cancer incidence and mortality, which can be largely attributed to patterns of tobacco use.<sup>10</sup> It is estimated that more than 30% of all cancer and 85% of lung cancer, results from cigarette smoking.<sup>3,13</sup>

High smoking prevalence in Quebec and the Maritime provinces<sup>14</sup> coincides with high rates of lung cancer and other smoking-related cancers (Chart 2). And while low rates of lung cancer in Newfoundland reflect a previously low smoking prevalence, this pattern can be expected to change, since a relatively high proportion of the residents of the province currently smoke.<sup>14</sup> Low lung cancer rates among both sexes in Ontario, Manitoba, Saskatchewan and Alberta, and among men in British Columbia, can largely be ascribed to low to average smoking prevalence over the past three decades.<sup>10</sup>

Lung cancer mortality rates in the Northwest Territories were about than twice the Canadian

Chart 2  
Annual age-standardized lung cancer incidence and mortality rates, by sex, Canada, provinces and territories, 1991-1993



**Source:** Canadian Cancer Registry, National Cancer Incidence Reporting System, Canadian Vital Statistics Data Base  
**Note:** Rates are age-standardized to the 1991 Canadian population adjusted for net census undercoverage.  
 † Incidence rates may be lower than mortality rates because of incomplete reporting of new cases.

average, a result of high incidence rates among the Inuit,<sup>11</sup> and a high prevalence of smoking among Aboriginal people in the North.<sup>15</sup>

The relationship between smoking and lung cancer in women is a particular concern. Female lung cancer incidence and mortality rates are rising substantially,<sup>5,16</sup> while reductions in the prevalence of smoking among women lag behind those of men.<sup>14</sup> Moreover, between 1984 and 1993, lung cancer incidence rates rose more rapidly among women in Quebec and the Atlantic provinces than among those in western Canada.<sup>5</sup> Significantly high

rates of lung cancer among Quebec women are a change from previous below-average rates.<sup>1,2</sup> This is associated with their high prevalence of smoking from the mid-1960s to the mid-1980s. As well, the significantly high rates of lung cancer in British Columbia women have been associated with high smoking rates in the 1960s.<sup>10</sup>

## Diet

Diet may also contribute to geographic variations in cancer across Canada, as an estimated 35% of all cancers are linked to dietary factors.<sup>3,13</sup>

High fat consumption has been associated with colorectal cancer risk, while dietary fibre is protective.<sup>13</sup> Quebec residents, who have high colorectal cancer incidence and mortality rates, tend to consume more fat and more total calories than other Canadians,<sup>17</sup> and also have the highest levels of blood cholesterol.<sup>18</sup> In the Atlantic provinces, too, higher colorectal cancer incidence rates may be associated with high fat diets,<sup>17</sup> although mortality rates were low or average (Chart 3).

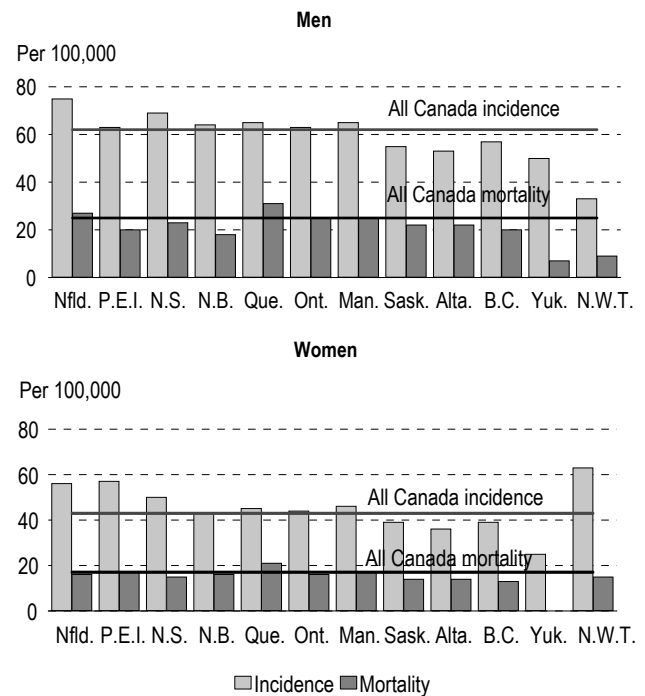
Stomach cancer is associated with diets high in smoked, salted and pickled foods and low in fresh fruit and vegetables.<sup>11</sup> The significantly high rates of stomach cancer in Newfoundland likely reflect such diets, which are deficient in Vitamin C.<sup>1,2</sup> Similar dietary factors could contribute to the high rates for stomach cancer in the Northwest Territories.<sup>19</sup>

## Screening and early detection

Provincial/territorial differences in incidence and mortality rates for some cancer sites likely reflect variations in the establishment of early detection programs.<sup>1,2,20</sup> This is particularly true for breast, cervical and prostate cancer.

Implementation of a screening program can initially result in higher than normal incidence rates, because many cancers are diagnosed earlier than they would otherwise have been. As the program becomes fully operational, incidence rates may fall to pre-screening levels, and eventually, mortality rates may also decline. Thus, well-established screening programs may be contributing to the relatively favourable pattern of cancer mortality in the three

Chart 3  
Annual age-standardized colorectal cancer incidence and mortality rates, by sex, Canada, provinces and territories, 1991-1993



Source: Canadian Cancer Registry, National Cancer Incidence Reporting System, Canadian Vital Statistics Data Base

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

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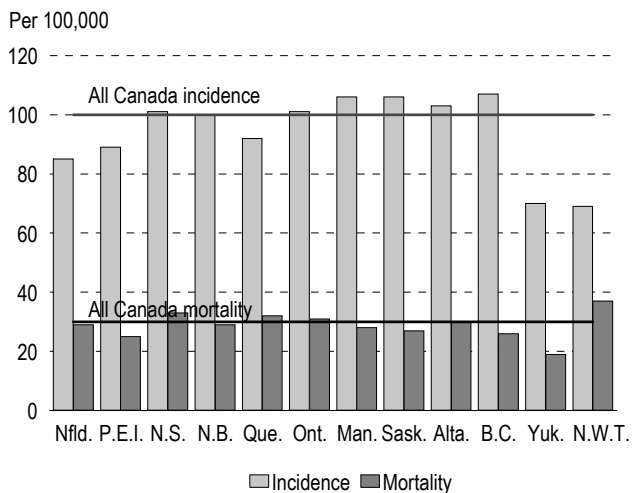
westernmost provinces.

For instance, variations in breast cancer incidence may be due to the availability of screening programs.<sup>21</sup> All provinces with higher incidence rates, except Manitoba, had provincially organized screening mammography programs during the 1991 to 1993 period, while those with lower rates did not. The pattern of high incidence and low mortality rates in British Columbia and Saskatchewan suggests that earlier detection, together with effective treatment guidelines, may be reducing breast cancer mortality (Chart 4).<sup>22</sup>

In addition, comparatively low rates of cervical cancer in British Columbia may be influenced by the well-established Pap test program in that province.<sup>2,23</sup>

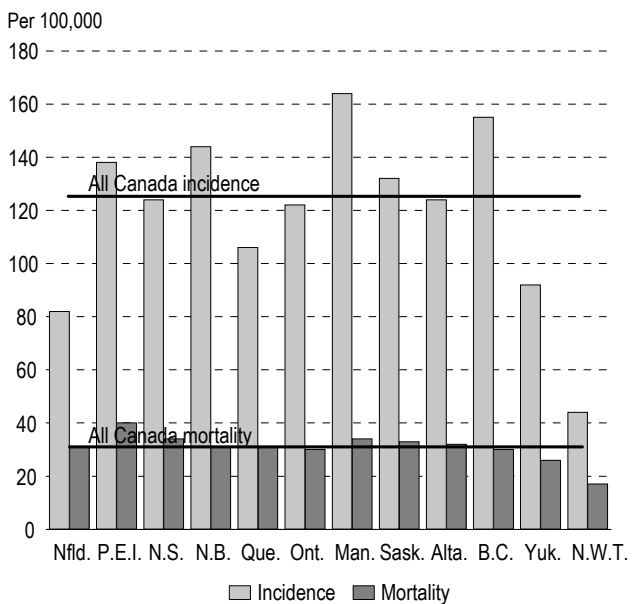
Variations in prostate cancer incidence may reflect differential rates of use of PSA (prostate-specific antigen) screening and other forms of early

**Chart 4**  
**Annual age-standardized breast cancer incidence and mortality rates, women, Canada, provinces and territories, 1991-1993**



**Source:** Canadian Cancer Registry, National Cancer Incidence Reporting System, Canadian Vital Statistics Data Base  
**Note:** Rates are age-standardized to the 1991 Canadian population adjusted for net census undercoverage.

**Chart 5**  
**Annual age-standardized prostate cancer incidence and mortality rates, men, Canada, provinces and territories, 1991-1993**



**Source:** Canadian Cancer Registry, National Cancer Incidence Reporting System, Canadian Vital Statistics Data Base  
**Note:** Rates are age-standardized to the 1991 Canadian population adjusted for net census undercoverage.

detection. That the east-to-west gradient in cancer incidence is less marked than in previous years<sup>1,2</sup> suggests that early detection is now practised more uniformly across Canada. However, mortality rates varied much less than incidence rates, and mortality did not always follow the pattern of incidence (Chart 5). It is too early to determine whether increased early detection of this cancer has resulted in declining mortality rates. This pattern of wide variations in incidence rates, accompanied by a narrower range of mortality rates, has been observed in other countries, indicating that earlier detection of prostate cancer may have little impact on mortality.<sup>24</sup>

**Concluding remarks**

Provincial and territorial cancer incidence and mortality rates vary considerably from national levels. Much of the variation appears to be associated with differences in risk factors such as smoking and diet, and in cancer control practices, such as screening.

**Acknowledgement**

The co-operation of provincial and territorial cancer registries and vital statistics registrars who supply incidence and mortality data to Statistics Canada is gratefully acknowledged.

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## Appendix

Table A

## Annual age-standardized cancer incidence rates, selected sites, men, Canada, provinces and territories, 1991-1993

	All sites		Prostate		Lung		Colorectal	
	Rate	95% confidence interval	Rate	95% confidence interval	Rate	95% confidence interval	Rate	95% confidence interval
<b>Canada</b>	<b>475.6</b>	<b>473.4 - 477.8</b>	<b>124.9</b>	<b>123.7 - 126.1</b>	<b>89.4</b>	<b>88.4 - 90.4</b>	<b>62.0</b>	<b>61.2 - 62.8</b>
Newfoundland	406.6**	391.6 - 421.6	82.0**	75.1 - 88.9	66.9**	60.9 - 72.9	75.0**	68.5 - 81.5
Prince Edward Island	473.7	443.0 - 504.4	138.3	121.7 - 154.9	87.0	73.8 - 100.2	63.4	52.1 - 74.7
Nova Scotia	519.8**	507.3 - 532.3	123.6	117.5 - 129.7	109.6**	103.9 - 115.3	69.0**	64.4 - 73.6
New Brunswick	493.0**	479.4 - 506.6	144.2**	136.8 - 151.6	96.8**	90.8 - 102.8	63.6	58.7 - 68.5
Quebec	501.8**	497.1 - 506.5	105.6**	103.4 - 107.8	115.0**	112.8 - 117.2	65.0**	63.3 - 66.7
Ontario	470.7**	467.1 - 474.3	121.5**	119.6 - 123.4	83.5**	82.0 - 85.0	62.9	61.6 - 64.2
Manitoba	506.3**	495.4 - 517.2	163.6**	157.4 - 169.8	81.9**	77.5 - 86.3	64.6	60.7 - 68.5
Saskatchewan	451.0**	440.5 - 461.5	132.1**	126.5 - 137.7	72.5**	68.3 - 76.7	55.4**	51.7 - 59.1
Alberta	433.8**	426.3 - 441.3	124.3	120.2 - 128.4	71.3**	68.2 - 74.4	53.0**	50.3 - 55.7
British Columbia	460.1**	454.2 - 466.0	155.0**	151.6 - 158.5	74.6**	72.2 - 77.0	57.2**	55.1 - 59.3
Yukon	371.9*	283.9 - 459.9	92.1	47.3 - 136.9	98.0	52.5 - 143.5	50.3	19.0 - 81.6
Northwest Territories	396.5*	322.8 - 470.2	44.0**	16.6 - 71.4	132.2*	90.7 - 173.7	33.2**	12.2 - 54.2
	<b>Bladder</b>		<b>Non-Hodgkin's lymphoma</b>		<b>Kidney</b>		<b>Stomach</b>	
<b>Canada</b>	<b>26.9</b>	<b>26.4 - 27.4</b>	<b>17.8</b>	<b>17.4 - 18.2</b>	<b>14.9</b>	<b>14.5 - 15.3</b>	<b>14.7</b>	<b>14.3 - 15.1</b>
Newfoundland	35.1**	30.6 - 39.6	11.4**	9.0 - 13.8	13.2	10.6 - 15.8	24.0**	20.3 - 27.7
Prince Edward Island	18.3**	12.3 - 24.3	16.7	10.9 - 22.5	15.2	9.7 - 20.7	10.5	5.9 - 15.1
Nova Scotia	33.7**	30.5 - 36.9	17.1	14.9 - 19.3	18.8**	16.4 - 21.2	16.8	14.5 - 19.1
New Brunswick	29.6	26.2 - 33.0	17.3	14.8 - 19.8	15.2	12.8 - 17.6	14.9	12.5 - 17.3
Quebec	35.8**	34.5 - 37.1	18.5**	17.6 - 19.4	15.7*	14.9 - 16.5	17.3**	16.4 - 18.2
Ontario	24.3**	23.5 - 25.1	18.1	17.4 - 18.8	14.6	14.0 - 15.2	13.5**	12.9 - 14.1
Manitoba	25.6	23.1 - 28.1	20.6**	18.4 - 22.8	15.8	13.9 - 17.7	15.2	13.3 - 17.1
Saskatchewan	31.5**	28.8 - 34.2	16.8	14.7 - 18.9	15.7	13.7 - 17.7	11.8**	10.1 - 13.5
Alberta	24.6**	22.8 - 26.4	15.9**	14.5 - 17.3	15.9	14.5 - 17.3	13.9	12.5 - 15.3
British Columbia	15.4**	14.3 - 16.5	17.5	16.4 - 18.6	12.5**	11.5 - 13.5	12.3**	11.3 - 13.3
Yukon	17.8	0.0 - 36.3	5.7 *	0.0 - 16.9	17.5	0.0 - 43.2	6.1	0.0 - 15.3
Northwest Territories	13.5	0.0 - 27.8	5.0**	0.6 - 9.4	18.3	1.3 - 35.3	40.2*	15.6 - 64.8
	<b>Leukemia</b>		<b>Oral cavity</b>		<b>Pancreas</b>		<b>Melanoma</b>	
<b>Canada</b>	<b>13.6</b>	<b>13.2 - 14.0</b>	<b>12.2</b>	<b>11.9 - 12.5</b>	<b>10.9</b>	<b>10.6 - 11.2</b>	<b>9.8</b>	<b>9.5 - 10.1</b>
Newfoundland	5.6**	3.9 - 7.3	10.5	8.1 - 12.9	5.0**	3.4 - 6.6	5.3**	3.7 - 6.9
Prince Edward Island	11.1	6.4 - 15.8	12.1	7.2 - 17.0	13.3	8.2 - 18.4	10.0	5.5 - 14.5
Nova Scotia	11.5*	9.6 - 13.4	13.9	11.9 - 15.9	12.0	10.1 - 13.9	13.8**	11.8 - 15.8
New Brunswick	10.9**	8.9 - 12.9	11.8	9.7 - 13.9	10.0	8.1 - 11.9	11.3	9.3 - 13.3
Quebec	15.3**	14.5 - 16.1	14.1**	13.3 - 14.9	12.4**	11.7 - 13.1	4.9**	4.5 - 5.3
Ontario	15.0**	14.4 - 15.6	12.3	11.7 - 12.9	10.6	10.1 - 11.1	11.5**	11.0 - 12.0
Manitoba	11.4**	9.8 - 13.0	10.0**	8.5 - 11.5	10.7	9.1 - 12.3	10.6	9.0 - 12.2
Saskatchewan	15.1	13.2 - 17.0	7.1**	5.8 - 8.4	11.2	9.5 - 12.9	10.4	8.8 - 12.0
Alberta	12.7	11.4 - 14.0	10.0**	8.9 - 11.1	11.3	10.1 - 12.5	10.5	9.4 - 11.6
British Columbia	10.4**	9.5 - 11.3	12.2	11.3 - 13.1	9.5**	8.6 - 10.4	13.3**	12.3 - 14.3
Yukon	4.7**	0.0 - 11.5	17.0	0.0 - 36.8	10.3	0.0 - 22.2	11.0	0.0 - 29.2
Northwest Territories	3.0**	0.0 - 7.1	17.9	4.6 - 31.2	12.1	0.0 - 26.4	-	...
	<b>Larynx</b>		<b>Esophagus</b>					
<b>Canada</b>	<b>7.9</b>	<b>7.6 - 8.2</b>	<b>5.8</b>	<b>5.6 - 6.0</b>				
Newfoundland	7.8	5.8 - 9.8	6.6	4.7 - 8.5				
Prince Edward Island	8.2	4.2 - 12.2	10.5 *	5.9 - 15.1				
Nova Scotia	7.5	6.0 - 9.0	6.4	5.0 - 7.8				
New Brunswick	9.4	7.5 - 11.3	5.0	3.6 - 6.4				
Quebec	11.6**	10.9 - 12.3	5.7	5.2 - 6.2				
Ontario	7.2**	6.8 - 7.6	6.2**	5.8 - 6.6				
Manitoba	6.0**	4.8 - 7.2	5.3	4.2 - 6.4				
Saskatchewan	4.6**	3.5 - 5.7	4.6 *	3.5 - 5.7				
Alberta	4.9**	4.1 - 5.7	3.9**	3.2 - 4.6				
British Columbia	6.1**	5.4 - 6.8	6.7**	6.0 - 7.4				
Yukon	-	...	10.3	0.0 - 27.6				
Northwest Territories	5.0	0.0 - 12.3	1.7 *	0.0 - 5.1				

Source: National Cancer Incidence Reporting System, Canadian Cancer Registry

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

- Nil or zero

... Not applicable

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

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

Table B

## Annual age-standardized cancer mortality rates, selected sites, men, Canada, provinces and territories, 1991-1993

	All sites		Lung		Prostate		Colorectal	
	Rate	95% confidence interval	Rate	95% confidence interval	Rate	95% confidence interval	Rate	95% confidence interval
<b>Canada</b>	<b>243.1</b>	<b>241.5 - 244.7</b>	<b>77.9</b>	<b>77.0 - 78.8</b>	<b>31.0</b>	<b>30.4 - 31.6</b>	<b>25.2</b>	<b>24.7 - 25.7</b>
Newfoundland	257.8*	245.5 - 270.1	77.8	71.2 - 84.4	30.5	26.0 - 35.0	27.3	23.3 - 31.3
Prince Edward Island	254.3	231.8 - 276.8	77.3	64.9 - 89.7	39.7*	30.8 - 48.6	19.6	13.4 - 25.8
Nova Scotia	275.2**	266.0 - 284.4	92.6**	87.3 - 97.9	34.2*	30.9 - 37.5	22.6*	20.0 - 25.2
New Brunswick	253.8*	243.9 - 263.7	90.3**	84.5 - 96.1	30.9	27.4 - 34.4	18.4**	15.7 - 21.1
Quebec	281.8**	278.2 - 285.4	102.0**	99.9 - 104.1	31.1	29.8 - 32.4	31.3**	30.1 - 32.5
Ontario	234.8**	232.2 - 237.4	70.4**	69.0 - 71.8	30.3*	29.3 - 31.3	25.1	24.2 - 26.0
Manitoba	237.6	230.1 - 245.1	70.1**	66.0 - 74.2	33.7*	30.9 - 36.5	25.2	22.8 - 27.6
Saskatchewan	215.5**	208.3 - 222.7	62.0**	58.1 - 65.9	33.0	30.2 - 35.8	22.4*	20.1 - 24.7
Alberta	217.0**	211.6 - 222.4	61.6**	58.7 - 64.5	32.0	29.8 - 34.2	22.2**	20.5 - 23.9
British Columbia	211.2**	207.1 - 215.3	65.8**	63.6 - 68.0	29.7	28.1 - 31.3	19.6**	18.4 - 20.8
Yukon	242.2	164.6 - 319.8	75.8	38.0 - 113.6	26.1	0.0 - 56.8	7.3**	0.0 - 17.6
Northwest Territories	288.9	223.9 - 353.9	135.3**	92.3 - 178.3	16.5	0.1 - 32.9	9.3**	0.0 - 20.9

	Pancreas		Stomach		Leukemia		Non-Hodgkin's lymphoma	
	Rate	95% confidence interval	Rate	95% confidence interval	Rate	95% confidence interval	Rate	95% confidence interval
<b>Canada</b>	<b>11.0</b>	<b>10.7 - 11.3</b>	<b>10.2</b>	<b>9.9 - 10.5</b>	<b>8.6</b>	<b>8.3 - 8.9</b>	<b>7.9</b>	<b>7.6 - 8.2</b>
Newfoundland	9.9	7.6 - 12.2	21.5**	17.9 - 25.1	5.9**	4.1 - 7.7	6.4	4.6 - 8.2
Prince Edward Island	14.9	9.5 - 20.3	7.9	3.9 - 11.9	4.5**	1.6 - 7.4	7.3	3.5 - 11.1
Nova Scotia	12.6	10.7 - 14.5	10.7	8.9 - 12.5	9.4	7.7 - 11.1	7.5	6.0 - 9.0
New Brunswick	10.8	8.8 - 12.8	11.1	9.0 - 13.2	7.7	6.0 - 9.4	8.9	7.1 - 10.7
Quebec	11.8**	11.1 - 12.5	12.9**	12.1 - 13.7	10.0**	9.3 - 10.7	8.3	7.7 - 8.9
Ontario	10.7*	10.1 - 11.3	8.9**	8.4 - 9.4	8.8	8.3 - 9.3	8.3**	7.8 - 8.8
Manitoba	10.6	9.0 - 12.2	10.8	9.2 - 12.4	9.1	7.6 - 10.6	8.0	6.6 - 9.4
Saskatchewan	10.7	9.1 - 12.3	9.1	7.6 - 10.6	8.6	7.2 - 10.0	8.2	6.8 - 9.6
Alberta	11.7	10.5 - 12.9	8.3**	7.2 - 9.4	8.3	7.2 - 9.4	6.9*	6.0 - 7.8
British Columbia	9.9**	9.0 - 10.8	8.5**	7.7 - 9.3	6.4**	5.7 - 7.1	7.3	6.5 - 8.1
Yukon	7.3	0.0 - 17.6	7.8	0.0 - 17.6	23.9	2.0 - 45.8	3.0	0.0 - 8.9
Northwest Territories	7.5	0.0 - 18.5	26.6	6.6 - 46.6	5.7	0.0 - 15.7	-	...

	Bladder		Esophagus		Kidney		Oral cavity	
	Rate	95% confidence interval	Rate	95% confidence interval	Rate	95% confidence interval	Rate	95% confidence interval
<b>Canada</b>	<b>7.3</b>	<b>7.0 - 7.6</b>	<b>6.2</b>	<b>5.9 - 6.5</b>	<b>5.8</b>	<b>5.6 - 6.0</b>	<b>5.5</b>	<b>5.3 - 5.7</b>
Newfoundland	11.2**	8.6 - 13.8	6.2	4.3 - 8.1	5.6	3.8 - 7.4	3.9	2.4 - 5.4
Prince Edward Island	5.0	1.9 - 8.1	8.3	4.2 - 12.4	9.3	5.0 - 13.6	6.3	2.7 - 9.9
Nova Scotia	7.5	5.9 - 9.1	7.4	5.9 - 8.9	7.2*	5.7 - 8.7	6.3	4.9 - 7.7
New Brunswick	6.9	5.2 - 8.6	6.9	5.3 - 8.5	6.3	4.8 - 7.8	4.7	3.4 - 6.0
Quebec	8.1**	7.5 - 8.7	5.2**	4.7 - 5.7	6.4**	5.9 - 6.9	7.9**	7.3 - 8.5
Ontario	7.3	6.8 - 7.8	6.7**	6.3 - 7.1	5.2**	4.8 - 5.6	5.0**	4.6 - 5.4
Manitoba	7.6	6.3 - 8.9	6.0	4.8 - 7.2	6.7	5.4 - 8.0	4.5	3.5 - 5.5
Saskatchewan	6.0*	4.8 - 7.2	4.5**	3.5 - 5.5	6.2	5.0 - 7.4	3.1**	2.2 - 4.0
Alberta	6.2*	5.3 - 7.1	5.4	4.6 - 6.2	6.0	5.1 - 6.9	3.8**	3.1 - 4.5
British Columbia	6.6*	5.9 - 7.3	7.1**	6.4 - 7.8	5.0*	4.4 - 5.6	4.7*	4.1 - 5.3
Yukon	-	...	20.4	0.0 - 49.0	11.8	0.0 - 34.9	-	...
Northwest Territories	-	...	7.5	0.0 - 18.5	11.2	0.0 - 24.0	6.8	0.0 - 17.3

	Larynx		Melanoma	
	Rate	95% confidence interval	Rate	95% confidence interval
<b>Canada</b>	<b>3.3</b>	<b>3.1 - 3.5</b>	<b>2.5</b>	<b>2.3 - 2.7</b>
Newfoundland	2.4	1.2 - 3.6	1.1**	0.4 - 1.8
Prince Edward Island	3.0	0.6 - 5.4	3.3	0.6 - 6.0
Nova Scotia	3.2	2.2 - 4.2	3.1	2.1 - 4.1
New Brunswick	2.9	1.9 - 3.9	2.7	1.7 - 3.7
Quebec	5.4**	4.9 - 5.9	1.8**	1.5 - 2.1
Ontario	3.1	2.8 - 3.4	3.0**	2.7 - 3.3
Manitoba	1.8**	1.1 - 2.5	2.3	1.6 - 3.0
Saskatchewan	2.5*	1.7 - 3.3	2.4	1.6 - 3.2
Alberta	1.8**	1.3 - 2.3	2.6	2.0 - 3.2
British Columbia	2.1**	1.7 - 2.5	2.7	2.3 - 3.1
Yukon	1.7	0.0 - 5.0	9.1	0.0 - 26.9
Northwest Territories	2.4	0.0 - 7.1	-	...

Source: Canadian Vital Statistics Data Base

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

- Nil or zero

... Not applicable

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

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

Table C

## Annual age-standardized cancer incidence rates, selected sites, women, Canada, provinces and territories, 1991-1993

	All sites		Breast		Colorectal		Lung		Body of uterus	
	Rate	95% confidence interval	Rate	95% confidence interval	Rate	95% confidence interval	Rate	95% confidence interval	Rate	95% confidence interval
<b>Canada</b>	336.5	334.8 - 338.2	99.5	98.6 - 100.4	43.2	42.6 - 43.8	38.8	38.2 - 39.4	19.1	18.7 - 19.5
Newfoundland	288.7**	277.0 - 300.4	84.6**	78.2 - 91.0	55.6**	50.4 - 60.8	18.2**	15.2 - 21.2	16.9	14.0 - 19.8
Prince Edward Island	343.3	318.8 - 367.8	88.5	75.9 - 101.1	57.0**	47.4 - 66.6	45.6	36.5 - 54.7	16.3	11.1 - 21.5
Nova Scotia	360.4**	351.0 - 369.8	100.7	95.7 - 105.7	50.1**	46.7 - 53.5	44.5**	41.2 - 47.8	18.1	15.9 - 20.3
New Brunswick	328.2	318.0 - 338.4	99.9	94.3 - 105.5	43.3	39.7 - 46.9	38.1	34.6 - 41.6	16.3**	14.0 - 18.6
Quebec	330.7**	327.5 - 333.9	91.7**	90.0 - 93.4	45.3**	44.1 - 46.5	39.9**	38.8 - 41.0	18.5	17.7 - 19.3
Ontario	343.7**	341.0 - 346.4	101.0**	99.5 - 102.5	43.5	42.5 - 44.5	38.1**	37.2 - 39.0	20.0**	19.3 - 20.7
Manitoba	348.1**	339.7 - 356.5	106.3**	101.6 - 111.0	45.8	42.8 - 48.8	37.1	34.4 - 39.8	22.8**	20.6 - 25.0
Saskatchewan	324.9*	316.2 - 333.6	106.2**	101.2 - 111.2	39.1**	36.2 - 42.0	32.2**	29.5 - 34.9	18.5	16.4 - 20.6
Alberta	325.7**	319.8 - 331.6	103.3**	100.0 - 106.6	36.1**	34.1 - 38.1	35.0**	33.0 - 37.0	19.2	17.7 - 20.7
British Columbia	335.3	330.6 - 340.0	106.5**	103.8 - 109.2	38.8**	37.2 - 40.4	43.9**	42.2 - 45.6	18.1*	17.0 - 19.2
Yukon	290.7	213.9 - 367.5	70.0	34.5 - 105.5	25.2*	7.3 - 43.1	52.4	17.0 - 87.8	6.5*	0.0 - 16.2
Northwest Territories	333.3	267.3 - 399.3	68.5*	41.8 - 95.2	62.9	30.6 - 95.2	69.2	38.5 - 99.9	5.7**	0.0 - 11.4
	<b>Ovary</b>	<b>Non-Hodgkin's lymphoma</b>	<b>Cervix</b>	<b>Melanoma</b>	<b>Leukemia</b>					
<b>Canada</b>	<b>13.7</b>	<b>13.4 - 14.0</b>	<b>12.5</b>	<b>12.2 - 12.8</b>	<b>9.5</b>	<b>9.2 - 9.8</b>	<b>8.7</b>	<b>8.4 - 9.0</b>	<b>8.4</b>	<b>8.1 - 8.7</b>
Newfoundland	9.3**	7.2 - 11.4	8.3**	6.3 - 10.3	13.8**	11.2 - 16.4	6.8	5.0 - 8.6	5.2**	3.6 - 6.8
Prince Edward Island	11.8	7.1 - 16.5	15.1	9.9 - 20.3	11.2	6.6 - 15.8	11.3	6.8 - 15.8	5.5	2.3 - 8.7
Nova Scotia	13.3	11.5 - 15.1	12.2	10.5 - 13.9	12.7**	10.9 - 14.5	11.5**	9.8 - 13.2	8.2	6.8 - 9.6
New Brunswick	11.8*	9.9 - 13.7	12.1	10.2 - 14.0	8.4	6.7 - 10.1	10.0	8.2 - 11.8	6.0**	4.7 - 7.3
Quebec	13.6	12.9 - 14.3	12.7	12.1 - 13.3	8.4**	7.9 - 8.9	4.5**	4.1 - 4.9	9.0**	8.5 - 9.5
Ontario	14.5**	13.9 - 15.1	12.8*	12.3 - 13.3	10.0**	9.5 - 10.5	9.8**	9.3 - 10.3	9.1**	8.7 - 9.5
Manitoba	12.6	11.0 - 14.2	14.7**	13.0 - 16.4	10.1	8.6 - 11.6	9.0	7.6 - 10.4	7.6	6.4 - 8.8
Saskatchewan	13.5	11.7 - 15.3	12.4	10.7 - 14.1	9.6	8.0 - 11.2	9.6	8.0 - 11.2	9.8	8.3 - 11.3
Alberta	13.5	12.3 - 14.7	11.1**	10.0 - 12.2	10.2	9.2 - 11.2	9.2	8.2 - 10.2	7.5*	6.6 - 8.4
British Columbia	13.3	12.4 - 14.2	11.6*	10.7 - 12.5	8.1**	7.3 - 8.9	12.6**	11.7 - 13.5	6.9**	6.2 - 7.6
Yukon	20.7	0.0 - 42.9	6.0	0.0 - 12.8	4.7	0.0 - 11.3	4.4	0.0 - 10.5	-	...
Northwest Territories	4.5**	0.0 - 11.1	9.3	0.0 - 19.6	13.5	1.4 - 25.6	6.4	0.0 - 15.5	6.7	0.0 - 16.9
	<b>Pancreas</b>	<b>Kidney</b>	<b>Bladder</b>	<b>Stomach</b>	<b>Oral cavity</b>					
<b>Canada</b>	<b>8.2</b>	<b>7.9 - 8.5</b>	<b>7.7</b>	<b>7.4 - 8.0</b>	<b>7.0</b>	<b>6.8 - 7.2</b>	<b>6.4</b>	<b>6.2 - 6.6</b>	<b>4.8</b>	<b>4.6 - 5.0</b>
Newfoundland	4.3**	2.9 - 5.7	6.4	4.6 - 8.2	6.7	4.9 - 8.5	11.7**	9.3 - 14.1	3.0**	1.8 - 4.2
Prince Edward Island	9.7	5.8 - 13.6	6.5	3.1 - 9.9	6.4	3.1 - 9.7	8.1	4.6 - 11.6	5.4	2.3 - 8.5
Nova Scotia	9.2	7.8 - 10.6	9.6**	8.1 - 11.1	9.9**	8.4 - 11.4	6.2	5.0 - 7.4	4.4	3.4 - 5.4
New Brunswick	6.9*	5.5 - 8.3	9.2	7.5 - 10.9	9.8**	8.1 - 11.5	6.6	5.2 - 8.0	3.9	2.8 - 5.0
Quebec	8.5	8.0 - 9.0	8.1	7.6 - 8.6	8.8**	8.3 - 9.3	7.8**	7.3 - 8.3	4.0**	3.6 - 4.4
Ontario	8.3	7.9 - 8.7	7.6	7.2 - 8.0	6.1**	5.7 - 6.5	5.8**	5.5 - 6.1	5.2**	4.9 - 5.5
Manitoba	8.2	7.0 - 9.4	8.4	7.1 - 9.7	7.3	6.1 - 8.5	6.5	5.4 - 7.6	4.6	3.7 - 5.6
Saskatchewan	7.6	6.4 - 8.8	7.8	6.5 - 9.1	8.2	6.9 - 9.5	5.0**	4.0 - 6.0	4.0	3.0 - 5.0
Alberta	8.8	7.8 - 9.8	8.0	7.1 - 8.9	6.4	5.6 - 7.2	5.7*	4.9 - 6.5	4.4	3.7 - 5.1
British Columbia	7.8	7.1 - 8.5	6.4**	5.8 - 7.1	4.4**	3.9 - 4.9	5.4**	4.8 - 6.0	6.1**	5.5 - 6.7
Yukon	-	...	-	...	3.6	0.0 - 10.6	-	...	16.5	0.0 - 37.0
Northwest Territories	7.6	0.9 - 14.3	14.0	0.9 - 27.1	0.9**	0.0 - 2.7	12.0	0.0 - 26.8	10.1	0.0 - 20.4
	<b>Esophagus</b>	<b>Larynx</b>								
<b>Canada</b>	<b>2.0</b>	<b>1.9 - 2.1</b>	<b>1.4</b>	<b>1.3 - 1.5</b>						
Newfoundland	2.0	1.0 - 3.0	1.0	0.3 - 1.7						
Prince Edward Island	2.1	0.2 - 4.0	0.9	0.0 - 2.1						
Nova Scotia	2.3	1.6 - 3.0	1.3	0.7 - 1.9						
New Brunswick	1.1**	0.5 - 1.7	1.1	0.5 - 1.7						
Quebec	1.9	1.7 - 2.1	2.0**	1.7 - 2.3						
Ontario	2.2*	2.0 - 2.4	1.3	1.1 - 1.5						
Manitoba	2.0	1.4 - 2.6	0.9*	0.5 - 1.3						
Saskatchewan	1.6	1.0 - 2.2	0.9*	0.4 - 1.4						
Alberta	1.6*	1.2 - 2.0	1.0**	0.7 - 1.3						
British Columbia	2.1	1.7 - 2.5	1.0**	0.7 - 1.3						
Yukon	-	...	-	...						
Northwest Territories	1.1	0.0 - 3.2	-	...						

**Source:** National Cancer Incidence Reporting System, Canadian Cancer Registry

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

- Nil or zero

... Not applicable

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

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

Table D  
Annual age-standardized cancer mortality rates, selected sites, women, Canada, provinces and territories, 1991-1993

	All sites		Lung		Breast		Colorectal		Pancreas	
	Rate	95% confidence interval	Rate	95% confidence interval	Rate	95% confidence interval	Rate	95% confidence interval	Rate	95% confidence interval
<b>Canada</b>	<b>153.2</b>	<b>152.1 - 154.3</b>	<b>30.3</b>	<b>29.8 - 30.8</b>	<b>29.9</b>	<b>29.4 - 30.4</b>	<b>16.6</b>	<b>16.2 - 17.0</b>	<b>8.1</b>	<b>7.8 - 8.4</b>
Newfoundland	150.3	141.8 - 158.8	19.1**	16.1 - 22.1	29.1	25.4 - 32.8	16.3	13.5 - 19.1	5.9**	4.2 - 7.6
Prince Edward Island	156.3	140.1 - 172.5	37.0	28.9 - 45.1	25.4	18.7 - 32.1	17.0	11.9 - 22.1	9.4	5.7 - 13.1
Nova Scotia	170.0**	163.6 - 176.4	34.4**	31.5 - 37.3	32.9*	30.1 - 35.7	14.5*	12.7 - 16.3	9.3	7.9 - 10.7
New Brunswick	154.5	147.7 - 161.3	30.5	27.4 - 33.6	29.0	26.0 - 32.0	15.8	13.7 - 17.9	7.4	5.9 - 8.9
Quebec	160.7**	158.5 - 162.9	31.1**	30.1 - 32.1	31.6**	30.6 - 32.6	21.4**	20.6 - 22.2	8.2	7.7 - 8.7
Ontario	152.9	151.1 - 154.7	29.6**	28.8 - 30.4	30.5**	29.7 - 31.3	16.0**	15.4 - 16.6	7.9	7.5 - 8.3
Manitoba	151.2	145.8 - 156.6	29.6	27.2 - 32.0	27.5*	25.2 - 29.8	17.2	15.4 - 19.0	8.1	6.9 - 9.3
Saskatchewan	135.7**	130.3 - 141.1	25.1**	22.7 - 27.5	26.9*	24.4 - 29.4	13.8**	12.2 - 15.4	7.6	6.4 - 8.8
Alberta	146.0**	142.0 - 150.0	26.7**	25.0 - 28.4	29.9	28.1 - 31.7	13.5**	12.3 - 14.7	8.5	7.5 - 9.5
British Columbia	145.1**	142.1 - 148.1	34.3**	32.8 - 35.8	26.0**	24.7 - 27.3	12.5**	11.6 - 13.4	8.0	7.3 - 8.7
Yukon	227.9*	154.4 - 301.4	47.9	15.8 - 80.0	18.8	0.7 - 36.9	-	...	22.8	0.0 - 48.8
Northwest Territories	214.5*	156.5 - 272.5	66.0*	34.2 - 97.8	37.0	12.9 - 61.1	14.7	0.0 - 29.8	11.3	0.0 - 23.3
	Ovary		Non-Hodgkin's lymphoma		Leukemia		Stomach		Body of uterus	
<b>Canada</b>	<b>7.9</b>	<b>7.6 - 8.2</b>	<b>5.6</b>	<b>5.4 - 5.8</b>	<b>5.1</b>	<b>4.9 - 5.3</b>	<b>4.7</b>	<b>4.5 - 4.9</b>	<b>3.4</b>	<b>3.2 - 3.6</b>
Newfoundland	7.6	5.7 - 9.5	3.4**	2.1 - 4.7	4.3	2.9 - 5.7	11.2**	8.9 - 13.5	3.5	2.2 - 4.8
Prince Edward Island	5.6	2.4 - 8.8	4.6	1.8 - 7.4	4.1	1.6 - 6.6	6.6	3.5 - 9.7	3.9	1.4 - 6.4
Nova Scotia	6.8	5.5 - 8.1	6.2	5.0 - 7.4	5.4	4.3 - 6.5	5.5	4.4 - 6.6	3.0	2.2 - 3.8
New Brunswick	7.1	5.6 - 8.6	5.6	4.3 - 6.9	4.3	3.2 - 5.4	4.5	3.4 - 5.6	3.6	2.6 - 4.6
Quebec	7.4*	6.9 - 7.9	5.7	5.3 - 6.1	5.8**	5.4 - 6.2	5.7**	5.3 - 6.1	4.3**	3.9 - 4.7
Ontario	8.3*	7.9 - 8.7	5.7	5.4 - 6.0	5.1	4.8 - 5.4	4.1**	3.8 - 4.4	3.2*	2.9 - 3.5
Manitoba	7.5	6.3 - 8.7	6.5	5.4 - 7.6	4.5	3.6 - 5.4	5.2	4.2 - 6.2	3.3	2.5 - 4.1
Saskatchewan	7.0	5.8 - 8.3	6.7*	5.5 - 7.9	5.0	4.0 - 6.0	3.6**	2.7 - 4.5	2.4**	1.7 - 3.1
Alberta	8.1	7.2 - 9.0	4.7*	4.0 - 5.4	4.2**	3.5 - 4.9	4.8	4.1 - 5.5	3.7	3.1 - 4.3
British Columbia	8.5	7.8 - 9.2	5.1	4.5 - 5.7	4.6*	4.1 - 5.1	3.6**	3.1 - 4.1	2.7**	2.3 - 3.1
Yukon	20.3	0.0 - 43.5	10.3	0.0 - 26.8	5.5	0.0 - 13.5	-	...	-	...
Northwest Territories	-	...	1.2**	0.0 - 3.5	5.1	0.0 - 15.1	12.8	0.0 - 29.3	-	...
	Kidney		Cervix		Bladder		Esophagus		Oral cavity	
<b>Canada</b>	<b>2.7</b>	<b>2.6 - 2.8</b>	<b>2.6</b>	<b>2.5 - 2.7</b>	<b>2.1</b>	<b>2.0 - 2.2</b>	<b>1.9</b>	<b>1.8 - 2.0</b>	<b>1.7</b>	<b>1.6 - 1.8</b>
Newfoundland	3.2	2.0 - 4.4	3.4	2.1 - 4.7	1.9	0.9 - 2.9	1.6	0.8 - 2.4	1.6	0.7 - 2.5
Prince Edward Island	2.8	0.6 - 5.0	4.9	1.8 - 8.0	1.7	0.1 - 3.3	0.3**	0.0 - 0.9	2.0	0.1 - 3.9
Nova Scotia	3.1	2.3 - 3.9	4.0**	3.0 - 5.0	2.1	1.4 - 2.8	2.0	1.3 - 2.7	1.5	0.9 - 2.1
New Brunswick	3.3	2.3 - 4.3	2.1	1.3 - 2.9	2.1	1.3 - 2.9	1.5	0.8 - 2.2	1.3	0.7 - 1.9
Quebec	2.8	2.5 - 3.1	2.1**	1.8 - 2.4	2.2	1.9 - 2.5	1.7*	1.5 - 1.9	1.7	1.5 - 1.9
Ontario	2.5	2.3 - 2.7	2.8**	2.6 - 3.1	2.1	1.9 - 2.3	2.1*	1.9 - 2.3	1.8	1.6 - 2.0
Manitoba	3.0	2.2 - 3.8	3.2	2.4 - 4.0	2.2	1.6 - 2.8	2.5	1.8 - 3.2	1.7	1.1 - 2.3
Saskatchewan	2.7	1.9 - 3.5	2.9	2.0 - 3.8	1.5*	1.0 - 2.0	1.6	1.0 - 2.2	1.2*	0.8 - 1.7
Alberta	2.9	2.3 - 3.5	2.7	2.2 - 3.2	2.0	1.5 - 2.5	1.4*	1.0 - 1.8	1.9	1.5 - 2.3
British Columbia	2.6	2.2 - 3.0	2.3	1.9 - 2.7	2.0	1.7 - 2.3	2.1	1.7 - 2.5	1.8	1.5 - 2.1
Yukon	12.3	0.0 - 29.4	2.8	0.0 - 8.4	-	...	8.6	0.0 - 25.4	-	...
Northwest Territories	5.3	0.0 - 15.8	5.1	0.0 - 15.1	-	...	7.7	0.0 - 18.3	1.2	0.0 - 3.5
	Melanoma		Larynx							
<b>Canada</b>	<b>1.5</b>	<b>1.4 - 1.6</b>	<b>0.5</b>	<b>0.4 - 0.6</b>						
Newfoundland	0.2**	0.0 - 0.5	0.5	0.0 - 1.0						
Prince Edward Island	0.9	0.0 - 2.2	-	...						
Nova Scotia	0.7**	0.3 - 1.1	0.4	0.1 - 0.7						
New Brunswick	1.0	0.5 - 1.5	0.6	0.2 - 1.0						
Quebec	1.2**	1.0 - 1.4	0.8**	0.6 - 1.0						
Ontario	1.8**	1.6 - 2.0	0.5	0.4 - 0.6						
Manitoba	0.9*	0.5 - 1.3	0.4	0.1 - 0.7						
Saskatchewan	1.3	0.7 - 1.9	0.4	0.1 - 0.7						
Alberta	1.6	1.2 - 2.0	0.3*	0.1 - 0.5						
British Columbia	1.7	1.4 - 2.0	0.4	0.2 - 0.6						
Yukon	-	...	8.2	0.0 - 24.2						
Northwest Territories	-	...	-	...						

Source: Canadian Vital Statistics Data Base

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

- Nil or zero

... Not applicable

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

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