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# Nova Scotia Cancer Incidence and Survival Statistics Update

A FOCUS ON 2011-15

REPORT RELEASE: SEPTEMBER 2018



## Citation

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## About this report

The report focuses on cancer incidence counts and rates in Nova Scotia for the years 2011-15<sup>1</sup>. It also presents time trends in cancer incidence rates since 1985 for common cancer sites such as colorectal, lung and prostate along with female breast. Finally, the report provides an in-depth look at cancer survival in relation to the patient's age at the time of diagnosis; the stage of the cancer diagnosed and; the time since diagnosis. All cancer data for this publication has been obtained from the Nova Scotia Cancer Registry, operated by the Nova Scotia Cancer Care Program of the Nova Scotia Health Authority.

Classifications of cancer site are consistent with Canadian Cancer Statistics reporting [1]. While the primary focus of this report is on invasive cancers, all statistics referring to bladder cancer combine invasive and *in situ* cases. This is also consistent with current statistical reporting of cancer in Canada.

## New standard population

The incidence rates in this publication were standardized to the age distribution of the 2011 Canadian population. Previous statistics reported from the Nova Scotia Cancer Registry were based on the 1991 Canadian population structure. Compared to 1991, the 2011 Canadian population has a higher proportion of people in older age groups, in which cancer is more common, resulting in rates that are generally higher than those standardized to the 1991 population. It is crucial to recognize that these differences are methodological artifacts and do not represent actual differences in cancer rates. The incidence rates in this report should not be directly compared to those reported using the 1991 Canadian population.

## Questions

Should questions regarding methodology or content arise in the reading of this report, please contact the Registry & Analytics team of the Nova Scotia Cancer Care Program at 902-473-5172.

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<sup>1</sup> At the time of this report was prepared (June 2018), the most recent complete year of available data was 2015.

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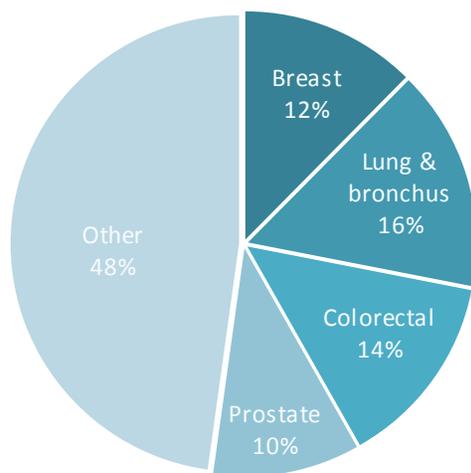
## Highlights

- ❖ In 2015, eighteen Nova Scotians were diagnosed daily with some form of invasive cancer.
- ❖ Breast, lung and colorectal cancers accounted for 57% of all cancers diagnosed in females between 2011 and 2015. A similar proportion (51%) was accounted for by prostate, lung and colorectal cancers in males.
- ❖ The proportion of common cancers by health zones was comparable, though rates (i.e. ‘all cancers combined’) varied significantly, with those in the Eastern Zone above and those in the Western Zone below the Nova Scotia average.
- ❖ Based on county-level statistics, for both sexes— Queens and Cape Breton counties show elevated rates (i.e. ‘all cancers combined’) compared to the provincial average and; Lunenburg and Antigonish had lower rates.
- ❖ Trend analyses showed significant increases in the rate of melanomas of the skin, liver, thyroid and kidney cancers and lower rates of stomach—in both women and men since 2006. The rate of Non-Hodgkin lymphoma rose in males; the rates of ovarian and uterine cancers rose in females. Overall, cancer rates in men have declined about 2% annually since 2006, a trend driven by prostate cancer.
- ❖ Five-year *relative* survival was highest in patients diagnosed with thyroid (96%), prostate (93%), melanoma of the skin (90%) cancers and for women with breast cancer (87%).
- ❖ Regardless of the type of measure used to report cancer survival, *survival* was always lowest in high fatality cancers such as those of the pancreas and lung.
- ❖ Patient age and stage of disease at time of diagnosis are important predictors of prognosis.
- ❖ *Relative* survival at one- three- and five-years post diagnosis was considerably and consistently better in patients diagnosed with earlier disease stage.
- ❖ *Observed* survival at one- three- and five-year post diagnosis was consistently better in younger age-groups, with the exception of women aged 18-44 years diagnosed with breast cancer for whom survival was comparable to that of women aged up to 64 years.
- ❖ Surviving the first few years after diagnosis is another important predictor of long-term survival, especially for high fatality cancers. For example, five-year observed survival is less than 4% on average in men diagnosed with pancreatic cancer but the value increases steeply to 33%, 60% and 72% in those living beyond three-, four- and five-years post diagnosis.
- ❖ Typically, the probability of dying from cancer or other causes increases with age. However, for more fatal cancers, cancer as a cause of death contributes proportionally more to the probability of dying at any age and any time after diagnosis.

## Cancer incidence

In the five year period from 2011 to 2015, over 31,000 Nova Scotians were diagnosed with invasive cancer. The four most common cancer sites (prostate, female breast, lung and colorectal cancer), accounted for more than half of these newly diagnosed cases (**Figure 1**).

The age-standardized incidence rates (ASIR) of cancer among males were generally higher than those of females, with the exception of thyroid cancer for which the 2015 rate was almost twice as high in females than males (15.4 per 100,000 vs 8.9 per 100,000, respectively; **Tables 1-2**). For all cancers combined, the higher ASIR observed in males compared to females, was largely driven by a higher rate of lung, colorectal, bladder, kidney and oral cancer (**Figure 2**).



**Figure 1** Percent distribution of common cancers, Nova Scotia 2011-15

## Reference guide

**Invasive cancer** refers to the uncontrolled growth of normal cells resulting in the formation of a malignant tumor that invades underlying tissues.

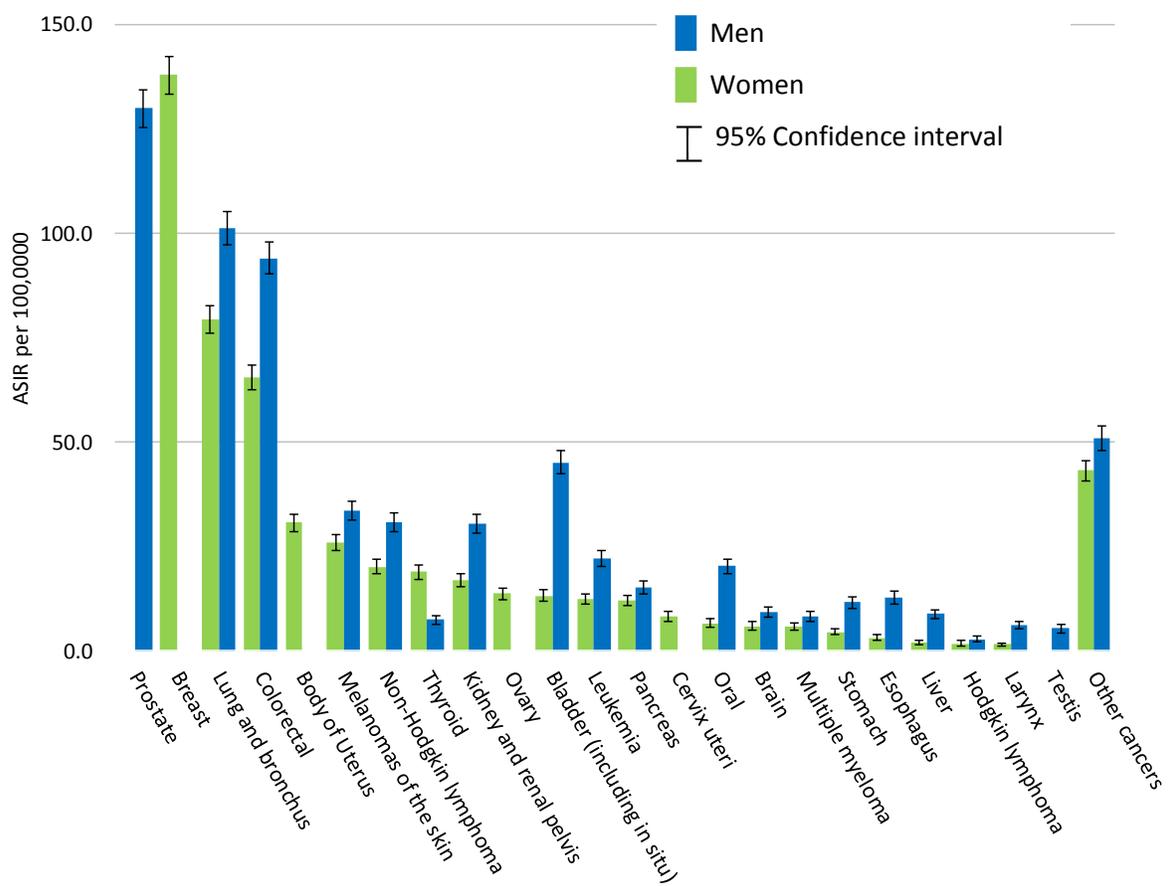
**In situ cancer** is a malignant tumor confined to the top layer of tissues (epithelium).

**Cancer incidence** is the number of newly diagnosed cancer cases in a given time period for a defined population.

**Cancer incidence rate** refers to the number of new cancer cases per 100,000 individuals in a population.

**Age-standardized incidence rate (ASIR)** here the rate of cancer was standardized to the age structure of the 2011 Canadian population. ASIR accounts for differences in the age structure of the populations being compared. This is important when comparing cancer rates between geographical areas or over time. For example, as cancer is typically more common in older people, a population with a large proportion of older people will have a higher rate than one composed of younger individuals.

**Confidence interval (CI)** a numerical range within which a value is expected to fall with a given probability (expressed as a percentage; e.g. 95% CI).



**Figure 2** Age-standardized incidence rates (ASIR) of selected cancers, Nova Scotia 2011-15

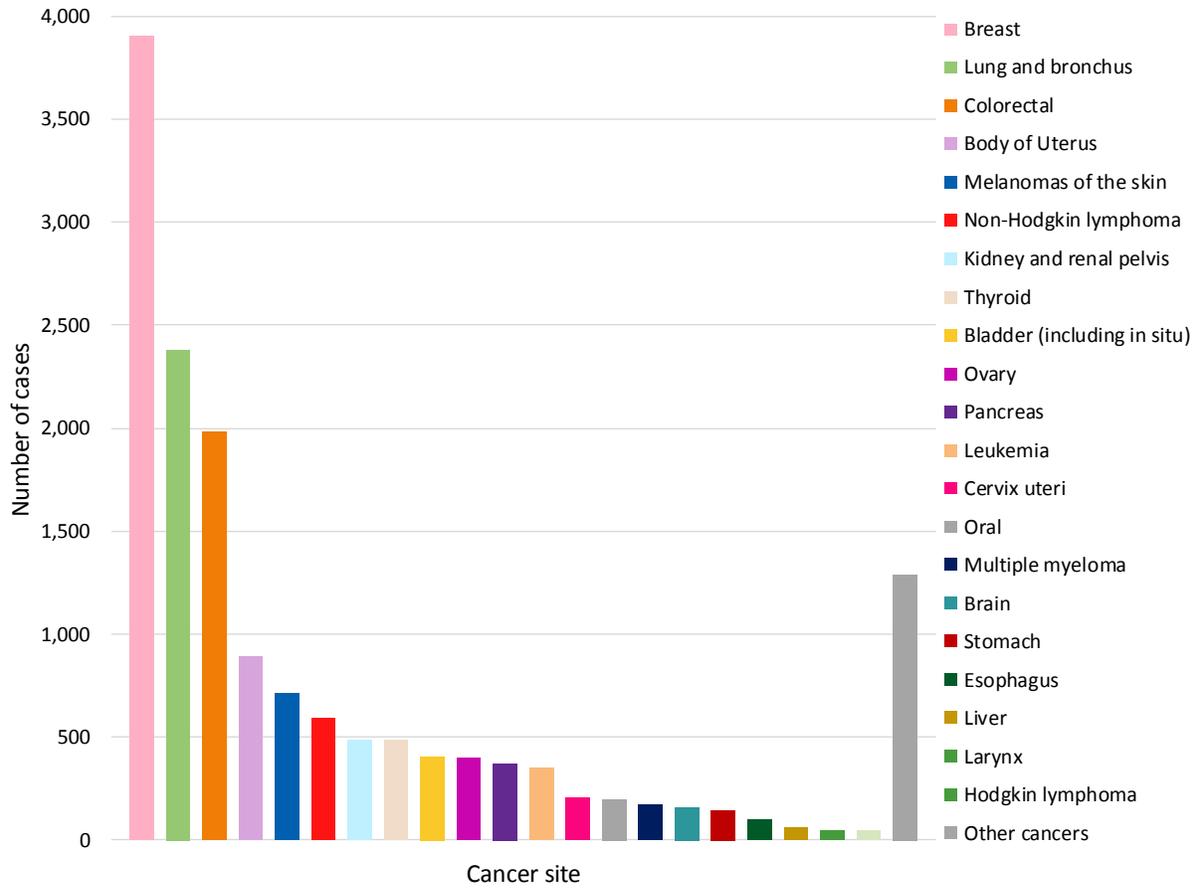
## Cancer incidence in women

Incident cases and ASIR for selected cancers among females are presented in Table 1 and **Figure 3**. Breast cancer is the most frequently diagnosed cancer in females, accounting for just over 25% (3,904 cases over the 5 year-period) of all cases (Table 1; **Figure 4**). Other common cancers include lung and colorectal, accounting for 15.5% and 12.9%, respectively, of all cancer diagnosed in Nova Scotia women between 2011 and 2015 (Table 1; Figure 4).

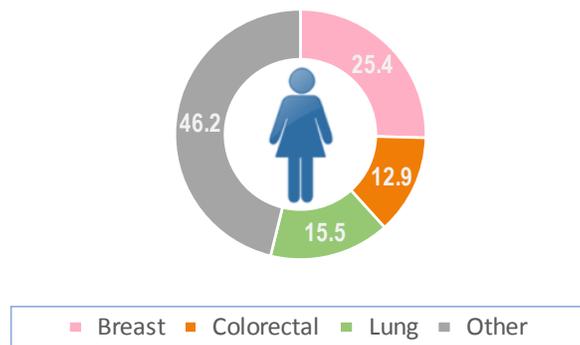
**Table 1** New cases and rates of invasive cancer among females, Nova Scotia 2011-15

Females	2011-15									2015		
	Age at diagnosis <sup>1</sup>						Cases	ASIR <sup>2</sup>	95% CI <sup>3</sup>	Cases	ASIR <sup>2</sup>	95% CI <sup>3</sup>
	0-29	30-49	50-59	60-69	70-79	80+						
Breast	15	585	835	1,160	785	525	3,904	137.9	[133.6 - 142.3]	851	146.6	[136.6 - 156.6]
Lung and bronchus	0	50	375	720	760	470	2,380	79.5	[76.3 - 82.7]	504	79.9	[72.9 - 86.9]
Colorectal	5	110	265	465	550	580	1,979	65.7	[62.7 - 68.6]	390	63.2	[56.8 - 69.5]
Body of uterus	0	70	220	340	170	80	888	30.7	[28.7 - 32.8]	190	31.3	[26.8 - 35.8]
Melanoma of the skin	25	150	150	170	120	95	710	25.9	[24.0 - 27.9]	165	29.0	[24.5 - 33.5]
Non-Hodgkin lymphoma	5	45	110	155	170	100	590	20.2	[18.5 - 21.8]	127	21.3	[17.5 - 25.1]
Thyroid	10	55	90	145	105	75	483	16.9	[15.4 - 18.4]	91	15.4	[12.2 - 18.6]
Kidney and renal pelvis	35	170	105	105	50	15	483	18.9	[17.2 - 20.6]	92	17.7	[14.0 - 21.3]
Bladder (including in situ)	0	15	55	110	120	100	401	13.3	[12.0 - 14.6]	66	10.3	[7.8 - 12.8]
Ovary	5	40	75	105	100	70	399	13.7	[12.4 - 15.1]	86	14.0	[11.0 - 17.0]
Pancreas	0	15	40	85	115	120	370	12.1	[10.8 - 13.3]	72	11.2	[8.6 - 13.9]
Leukemia	30	35	40	80	80	85	352	12.4	[11.1 - 13.7]	80	13.3	[10.3 - 16.3]
Cervix uteri	20	95	45	30	10	10	205	8.3	[7.2 - 9.5]	33	6.8	[4.5 - 9.2]
Oral	0	15	50	45	50	40	196	6.7	[5.8 - 7.6]	42	7.1	[4.9 - 9.3]
Multiple myeloma	0	10	20	45	50	50	172	5.7	[4.9 - 6.6]	31	5.1	[3.3 - 7.0]
Brain <sup>4</sup>	15	35	25	30	30	25	160	6.0	[5.1 - 7.0]	35	6.8	[4.5 - 9.1]
Stomach	0	0	15	25	40	55	142	4.6	[3.8 - 5.4]	35	5.4	[3.6 - 7.2]
Esophagus	0	0	15	20	25	35	99	3.2	[2.6 - 3.8]	22	3.3	[1.9 - 4.6]
Hodgkin lymphoma	0	0	10	15	15	20	61	2.1	[1.5 - 2.6]	24	4.0	[2.4 - 5.7]
Liver	0	0	5	15	15	10	45	1.5	[1.1 - 2.0]	11	1.8	[0.7 - 2.8]
Larynx	15	15	0	0	5	0	43	1.9	[1.3 - 2.4]	10	2.1	[0.8 - 3.4]
Other cancers	30	90	185	265	315	405	1,289	43.2	[40.8 - 45.6]	269	43.8	[38.5 - 49.1]
<b>All cancers</b>	<b>220</b>	<b>1,605</b>	<b>2,735</b>	<b>4,125</b>	<b>3,685</b>	<b>2,980</b>	<b>15,351</b>	<b>530.5</b>	<b>[522.0 - 539.0]</b>	<b>3,226</b>	<b>539.4</b>	<b>[520.5 - 558.3]</b>

<sup>1</sup> Cell counts for age categories are rounded to respect confidentiality, thus, total case counts over all ages may not be a result of the age group summation <sup>2</sup>Age-standardized incidence rate per 100,000 people, standardized to the 2011 Canadian population; <sup>3</sup> Confidence interval; <sup>4</sup> Central nervous system not included (see Appendix II for case counts/rates).



**Figure 3** Number of new cases of invasive cancer among females by cancer site, Nova Scotia 2011-15



**Figure 4** Percent distribution of common cancers among females, Nova Scotia, 2011-15

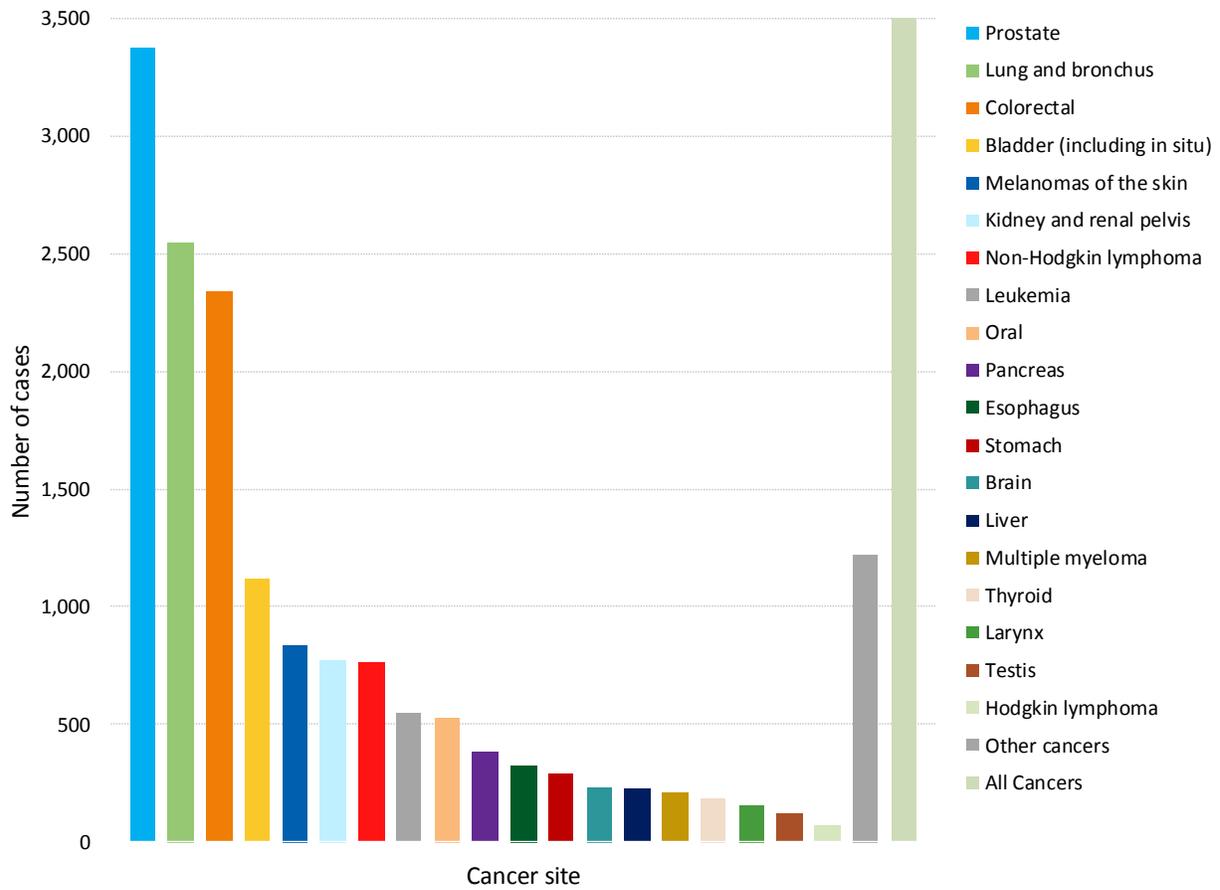
## Cancer incidence in men

Incident cases and ASIR for selected cancers among males are presented in Table 2 and **Figure 5**. Prostate cancer is the most frequently diagnosed cancer in males, accounting for 20.8% (3,372 cases over the 5-year period) of all cases (Table 2; **Figure 6**). Other common cancers include lung and colorectal, accounting for 15.7% and 14.4%, respectively, of all cancers diagnosed in Nova Scotia males between 2011 and 2015 (Table 2; Figure 6).

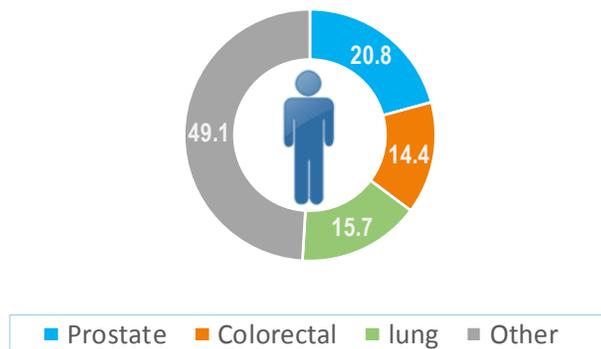
**Table 2** New cases and rates of invasive cancer among males, Nova Scotia 2011-15

Males	2011-15								2015			
	Age at diagnosis <sup>1</sup>						Cases	ASIR <sup>2</sup>	95% CI <sup>3</sup>	Cases	ASIR <sup>2</sup>	95% CI <sup>3</sup>
	0-29	30-49	50-59	60-69	70-79	80+						
Prostate	0	70	595	1,330	960	415	3,372	130.0	[125.5 - 134.4]	550	101.1	[92.5 - 109.7]
Lung and bronchus	0	40	280	785	935	505	2,550	101.4	[97.4 - 105.4]	525	99.0	[90.4 - 107.6]
Colorectal	10	100	340	735	685	470	2,341	94.1	[90.2 - 98.0]	495	95.0	[86.5 - 103.5]
Bladder (including in situ)	0	15	120	310	415	250	1,114	45.2	[42.5 - 47.9]	226	43.1	[37.4 - 48.8]
Melanomas of the skin	10	115	150	245	205	115	834	33.6	[31.3 - 35.9]	209	40.3	[34.8 - 45.9]
Kidney and renal pelvis	0	80	145	260	200	85	774	30.5	[28.4 - 32.7]	167	32.2	[27.2 - 37.2]
Non-Hodgkin lymphoma	25	85	115	215	200	125	760	30.9	[28.6 - 33.1]	164	32.1	[27.1 - 37.1]
Leukemia	45	40	80	125	160	100	544	22.3	[20.4 - 24.2]	100	19.2	[15.4 - 23.1]
Oral	0	35	160	200	90	40	527	20.4	[18.6 - 22.1]	107	19.5	[15.8 - 23.2]
Pancreas	0	20	55	130	115	70	383	15.3	[13.8 - 16.9]	91	17.2	[13.6 - 20.8]
Esophagus	0	20	65	100	95	40	323	12.8	[11.4 - 14.2]	75	14.0	[10.8 - 17.3]
Stomach	0	15	50	75	90	60	287	11.7	[10.3 - 13.1]	55	10.7	[7.8 - 13.6]
Brain <sup>4</sup>	30	40	55	45	50	15	230	9.5	[8.2 - 10.7]	53	11.0	[8.0 - 14.0]
Liver	5	10	50	85	45	30	226	8.9	[7.7 - 10.0]	50	9.6	[6.9 - 12.3]
Multiple myeloma	0	10	30	75	55	40	208	8.3	[7.1 - 9.4]	60	10.8	[8.1 - 13.6]
Thyroid	5	55	40	40	30	10	182	7.5	[6.4 - 8.6]	42	8.9	[6.2 - 11.6]
Larynx	0	5	25	50	50	25	157	6.2	[5.2 - 7.2]	28	5.3	[3.3 - 7.3]
Testis	40	55	15	0	0	0	120	5.4	[4.4 - 6.4]	20	4.6	[2.6 - 6.7]
Hodgkin lymphoma	15	20	10	5	10	0	66	2.8	[2.1 - 3.5]	22	4.6	[2.7 - 6.5]
Other cancers	40	75	145	305	355	295	1,220	50.9	[48.0 - 53.8]	247	49.5	[43.2 - 55.8]
<b>All cancers</b>	<b>230</b>	<b>910</b>	<b>2,520</b>	<b>5,120</b>	<b>4,740</b>	<b>2,690</b>	<b>16,218</b>	<b>647.6</b>	<b>[637.5 - 657.7]</b>	<b>3,286</b>	<b>627.9</b>	<b>[606.0 - 649.8]</b>

<sup>1</sup> Cell counts for age categories are rounded to respect confidentiality, thus, total case counts over all ages may not be a result of the age group summation <sup>2</sup> Age-standardized incidence rate per 100,000 people, standardized to the 2011 Canadian population; <sup>3</sup> Confidence interval; <sup>4</sup> Central nervous system not included (see Appendix II for case counts/rates).



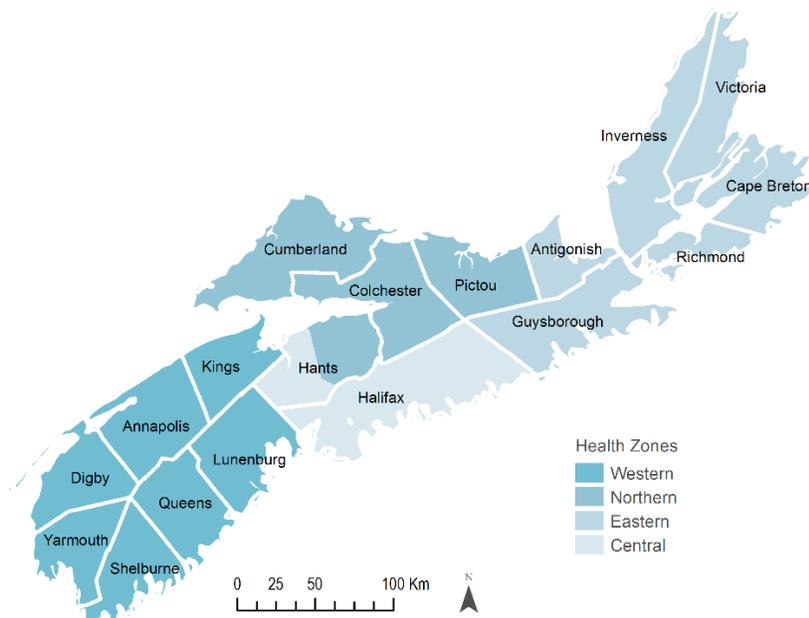
**Figure 5** Number of new cases of invasive cancer among males by cancer site, Nova Scotia 2011-15



**Figure 6** Percent distribution of common cancers among males, Nova Scotia 2011-15

## Cancer incidence by geography

Nova Scotia (NS) is a relatively small province with approximately 943,000 people. The province is divided into four health zones and 18 counties as shown in **Figure 7**.



**Figure 7** Nova Scotia Health Zones and Counties, 2015

The percent distribution of common cancers is largely comparable between health zones, although Central Zone does show a slightly higher percentage of breast (27.4% vs 24.2%, 23.4%, 24.6% in Western, Northern and Eastern regions, respectively) and prostate cancers (22.2% vs 21.9%, 17.6%, 19.3% in Western, Northern and Eastern regions, respectively) and a lower percentage of lung and colorectal cancer compared to other areas (see details in **Figure 8**). However, rates do vary between zones. For example, looking at 'All cancers', rates are significantly lower in the Western Zone and higher in the Eastern Zone relative to NS as a whole. In the Northern Zone, rates are higher in females and lower in males. See **Appendix II** for tabulation of counts and rates by cancer site, sex and health zones.

Regional variation in the incidence rate of cancer becomes more apparent when comparing county-level rates to those of the provincial average (**Figure 9**). For example, a higher cancer rate (i.e. all cancers combined) is being observed among males living in Kings, Hants and Cape Breton counties, whereas a lower rate is seen in Cumberland, Pictou and Antigonish. Much of the excess risk observed in Kings

## Reference guide

**Health Zones**— Four health zones have been created in NS to deliver programs and services and support provincial planning. These are:

*Western Zone*— comprised of Yarmouth, Shelburne, Digby, Queens, Annapolis, Lunenburg and Kings counties. It serves 21% of the NS population

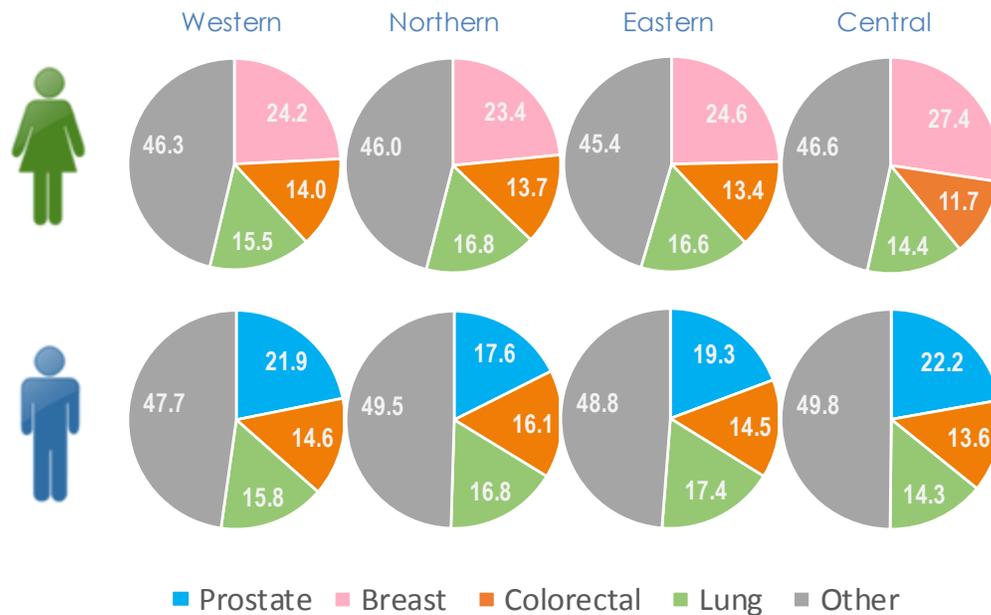
*Northern Zone*— comprised of Colchester, Cumberland and Pictou counties as well as the eastern portion of Hants County. It covers 16% of the NS population.

*Eastern Zone*— comprised of Guysborough, Antigonish, Richmond, Inverness, Victoria and Cape Breton counties. It serves 17% of the NS population.

*Central Zone*— comprised of Halifax County and the western portion of Hants County. It covers 46% of the NS population.

**Comparative Incidence Figure (CIF)** The ratio of the age-standardized incidence rate of a given cancer site (e.g. lung) in a specific area (e.g. county) relative to that of the whole of NS. A CIF < 1 indicates a rate that is lower than the NS average, while a CIF > 1 indicates a rate that is higher than the NS average.

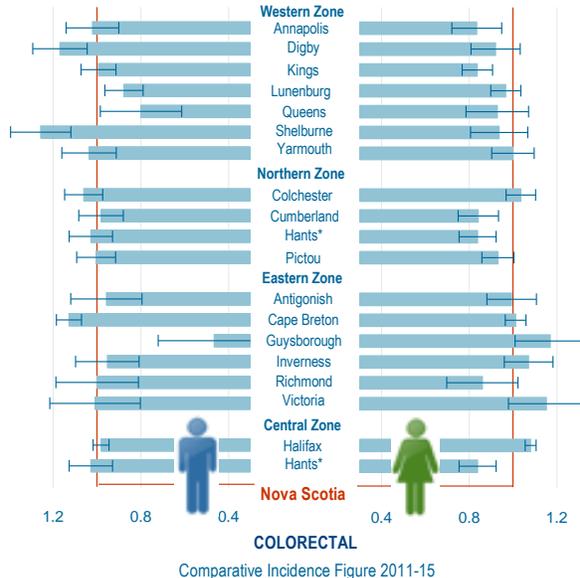
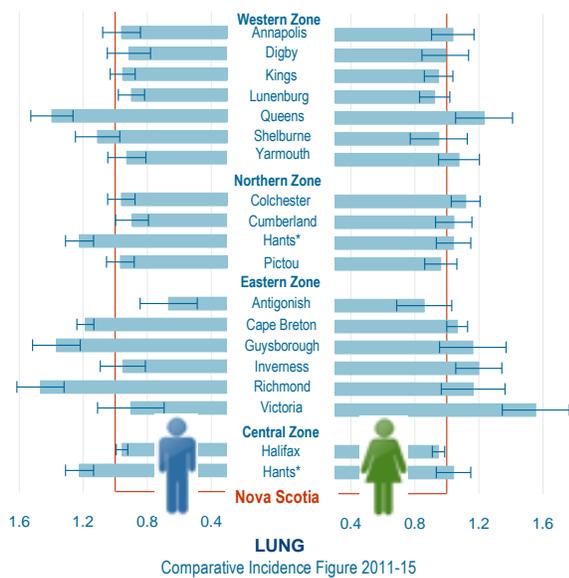
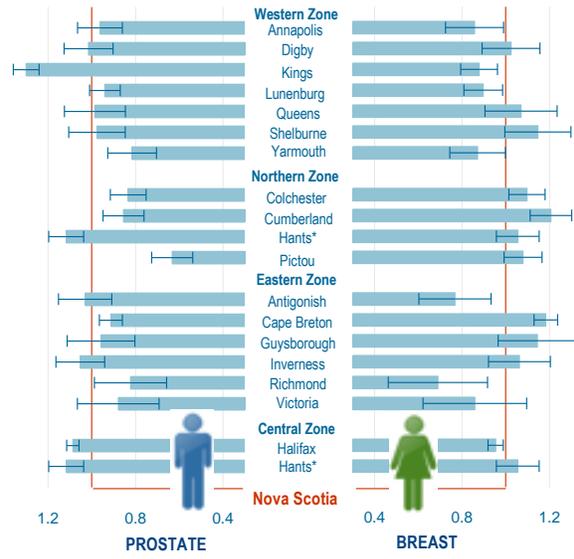
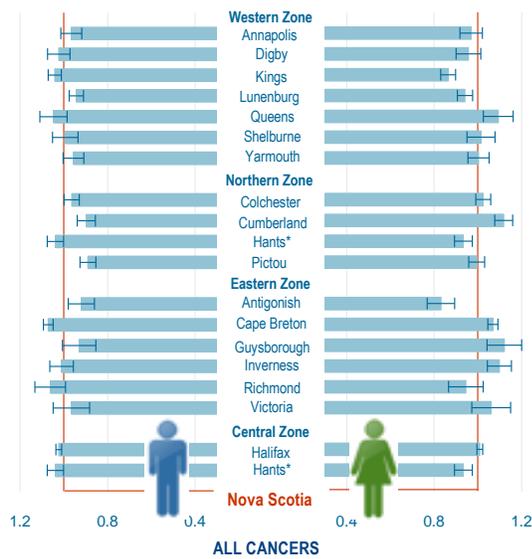
County is driven by prostate cancer which exceeds the provincial average by 30%. The prostate cancer rate also surpasses the NS average in Hants County by 12% and the rate of lung cancer is also elevated at 22% over the NS average. The high cancer rate in Cape Breton County is largely associated with lung and colorectal cancer which exceed the NS average by 19% and 13%, respectively. In contrast, *lower rates* in both Cumberland and Pictou counties are due to the significantly low rate of prostate cancer (15% and 37% below the NS average, respectively); that of Antigonish reflects the low incidence rate of lung cancer in the area, a pattern previously reported in men diagnosed between 2000-04 [2].



**Figure 8** Percent distribution of common cancers by Health Zones and sex, Nova Scotia 2011-15

Among females, the cancer rate (i.e. all cancers combined) is higher than the NS average in Cumberland, Cape Breton, Queens, Inverness and Guysborough and; lower than the NS average in Antigonish, Kings, Hants and Lunenburg counties (Figure 9). Much of the observed excess risk is due to rates higher than the NS average for breast cancer (Cumberland by 21%; Cape Breton by 19%) and lung cancer (Queens by 23%; Inverness by 20%; Guysborough by 16%). The rate of colorectal cancer among women in Guysborough was also amongst the highest in the province, exceeding that of NS by 17%. In contrast, the lower cancer rates (i.e. all cancers combined) in Antigonish, Kings and Lunenburg reflects the lower rates of breast cancer in these counties (23%, 12% and 10% lower than NS average, respectively). In Hants County, the colorectal cancer rate is 16% lower than the NS average.

For both sexes, Queens and Cape Breton counties show an elevated cancer rate compared to the provincial average, while Lunenburg and Antigonish show a lower rate.



**Figure 9** Comparative incidence figures (CIF) for the most common cancers, comparing county and provincial level estimates, by cancer sites and sex 2011-2015. The age-standardized incidence rate of cancer in a given county varies significantly from that of the province if the 95% confidence intervals ( — ) of the CIF value (solid bars) does not cross the red reference line (i.e. Nova Scotia estimate). \* Please note that Hants County contributes to Northern and Central Zones.

## Cancer trends

**Common cancer sites** For *males*, the most pronounced variation in incidence rates was seen in prostate cancer, for which the rate doubled between 1985 and 2007 (from 104 to 213 per 100,000; **Figure 10**) and since, has declined 6.8% annually and is now at to the lowest rate reported since 1985 in Nova Scotia (100 per 100, 000; **Table 3**). Much of this trend results from variations in the adoption of early detection procedures (especially for the period of 1991-94) based upon the determination of prostate-specific antigen levels. The use of this test has been declining since the mid-2000s. Lung cancer has also declined continually since 1992 at an annual rate of 1.6%, reflecting a reduction in male tobacco consumption since the mid-1960s (**Figure 10**; Table 3). Colorectal cancer has also followed a downward trajectory since 2003, declining 0.9% annually. Declines for Canada have been more pronounced (1.6% annually) and attributed to the adoption of colorectal cancer screening which can identify treatable precancerous polyps and reduce cancer incidence [3, 4].

**Table 3** Annual percent change (APC) in the age-standardized incidence rates for common cancers among males, Nova Scotia, 1985-2015

Males	APC <sup>1</sup>	Time period <sup>1</sup>
Prostate	7.75*	1985-1993
	0.82	1993-2007
	-6.77*	2007-2014
Lung	0.96	1985-1992
	-1.60*	1992-2015
Colorectal	0.69*	1985-2003
	-0.94*	2003-2015

<sup>1</sup> Each APC and time period refers to the fitted line segment (see figure 10), where the end of the time period represents a year of significant change or the end of the study period; \* Indicates statistical significance for  $\alpha = 0.05$  based on Joinpoint regression.

## Reference guide

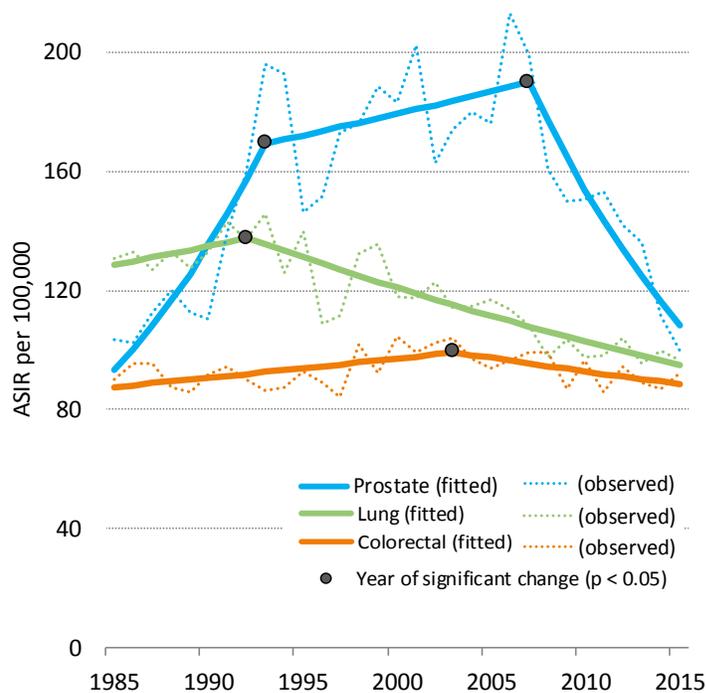
**Trends** are used to monitor changes in cancer patterns over time. They can provide information on the potential causes of cancer and the success (or lack thereof) of prevention and intervention efforts.

The interpretation of trends is complex as a large number of factors can influence the onset of cancer including: exposure to risk factors (e.g. physical inactivity, diet, smoking, ionizing or solar radiation, alcohol, drugs, parasites, viruses, environmental and/or occupational factors), time lags in the manifestation of the disease, varying degrees of effort in detecting the disease, variation in age structure, lifestyle changes and education.

**Annual percent change (APC)** The rate of change in the cancer age-standardized rate from one year to the next. The APC is reported as a percentage [1].

**Average annual percent change (AAPC)** The estimated rate of change in the cancer age-standardized rate, averaged over a specific time period and expressed as a percent increase or decrease.

**Changepoint** The year corresponding to a significant change in trend of age-standardized rates [3, 4].



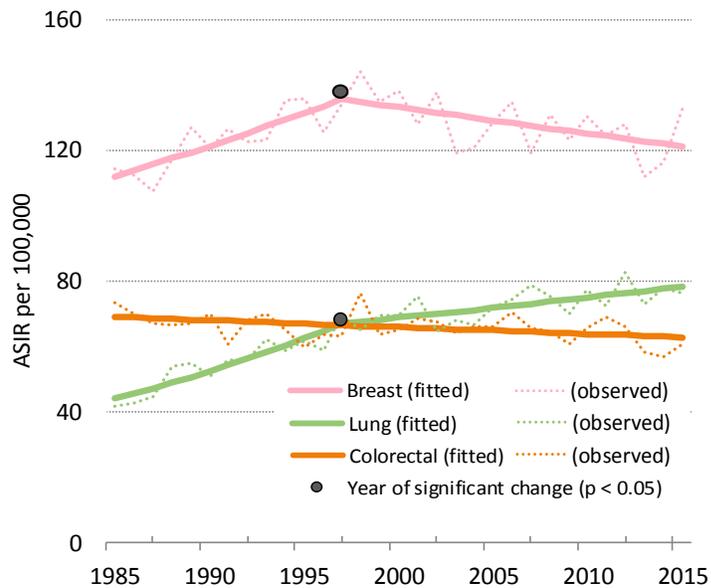
**Figure 10** Trends in the age-standardized incidence rate (ASIR) for common cancers in males, Nova Scotia 1985-2015. 2015 [Fitted lines indicate general tendencies and the asterisk (\*) indicates a year of significant change in trend based on Joinpoint analysis [3,4]]

For *females*, the rate of colorectal cancer has decreased gradually since 1985 at an annual rate of 0.3% whereas, that of lung cancer increased significantly since 1985 (3.6% annually 1995-97), although at a slower annual rate of 0.82%, since 1997. Breast cancer has decreased at an annual rate of 0.62% since 1997 in this province (**Figure 11; Table 4**).

**Table 4** Annual percent change (APC) in the age-standardized incidence rates for common cancers among females, Nova Scotia 1985-2015

Females	APC <sup>1</sup>	Time period <sup>1</sup>
Breast	1.60*	1985-1997
	-0.62*	1997-2015
Lung	3.57*	1985-1997
	0.82*	1997-2015
Colorectal	-0.32*	1985-2015

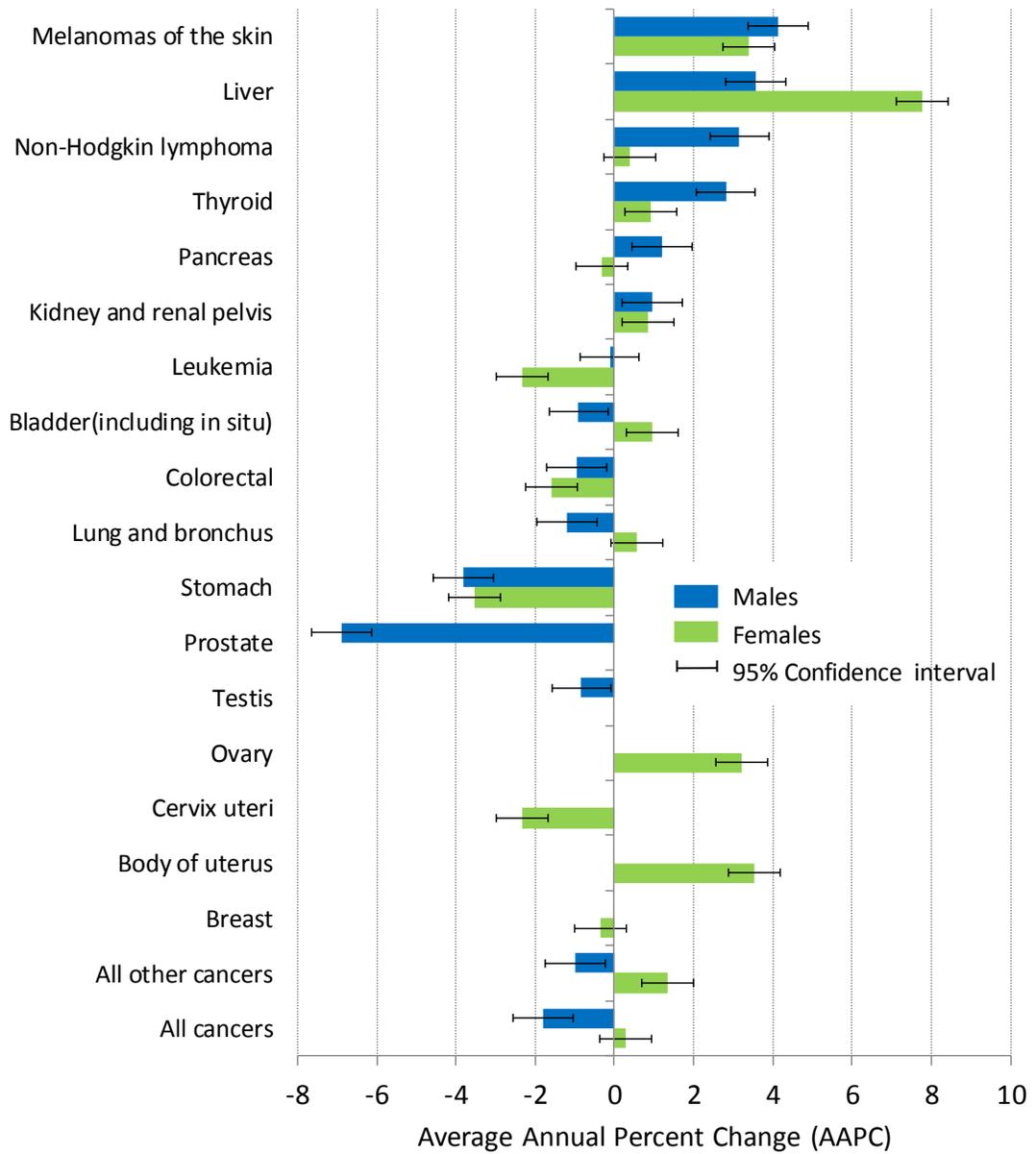
<sup>1</sup> Each APC and time period refers to the fitted line segment (see figure 10), where the end of the time period represents a year of significant change or the end of the study period; \* Indicates statistical significance for  $\alpha = 0.05$  based on Joinpoint regression.



**Figure 11** Trends in the age-standardized incidence rate (ASIR) for common cancers in females, Nova Scotia 1985-2015 [Fitted lines indicate general tendencies and the asterisk (\*) indicates a year of significant change in trend based on Joinpoint analysis [3-4]]

**Selected cancer sites** The average annual percent change (AAPC) in the age-standardized incidence rate (ASIR) over a 10-year period (2006-15) for selected cancers is displayed in **Figure 12**. This figure shows that among males, rates have decreased significantly at an average annual rate of 6.9%, 1.2%, 0.90%, 0.97% and 1.8% for prostate, lung, bladder, all other cancers and all cancers combined, respectively. Among females, rates of leukemia and cervical cancers have shown an annual average decrease of 2.3% and 1.6%, respectively. Stomach (males 3.8%; females 3.5%) and colorectal (males 1.0%; females 31.6%) cancer rates have decreased significantly in both sexes over the period 2006-15.

Statistically significant increases are observed for melanomas of the skin (males 4.1%; females 3.1%), liver (males 3.6%; females 7.8%), thyroid (males 2.8%; females 0.93%) and kidney/renal pelvis (males 0.96%; females 0.84%) in both sexes (Figure 12). Similar increases have been reported for Canada as a whole, although of lower magnitude with regards to melanoma of the skin. Sex-specific increases have also been observed for Non-Hodgkin lymphoma (3.2%) among males and bladder cancer (1%) among females. Comparatively, national figures report a 0.3% average annual increase in Non-Hodgkin lymphoma in males and a 0.2% decrease in female bladder cancer.



**Figure 12** Average annual percent change (AAPC) in the age-standardized incidence rate for selected cancer, Nova Scotia 2006-2015

## Cancer survival

Survival is the amount of time between first diagnosis and death of a cancer patient. It is influenced by many factors including the type/location of cancer, the nature of the disease (e.g. rate of tumor development), the age of the patient, the stage of the disease at diagnosis, the availability and effectiveness of treatment, variation in diagnostic techniques and prior health. This section describes the survival experience of Nova Scotians diagnosed with common (prostate, breast, lung or colorectal cancers) or selected cancers (other common cancers for which there were sufficient data to compute stable estimates). To contribute to the estimates, patients had to be diagnosed between 2006 and 2015 and alive in 2013. Estimates for lung and pancreatic cancer are derived from the experience of all patients diagnosed between 2006 and 2015 (see sidebar for details).[5, 6]

This report describes the survival experience at multiple time points, ranging one to ten years post diagnosis. A number of different measures are presented in order to meet the needs of patients and health care providers. For example, statistics reporting net measures of mortality such as relative survival allow for comparisons over time and/or between jurisdictions, which can be useful to planners and managers of the health care system. On the other hand, observed survival measures may be of greater interest to health care providers and their patients, as surviving a cancer diagnosis will vary depending on the risk of dying from a full spectrum of other causes of deaths, and may help answer a question such as *'how long do I have to live?'*.

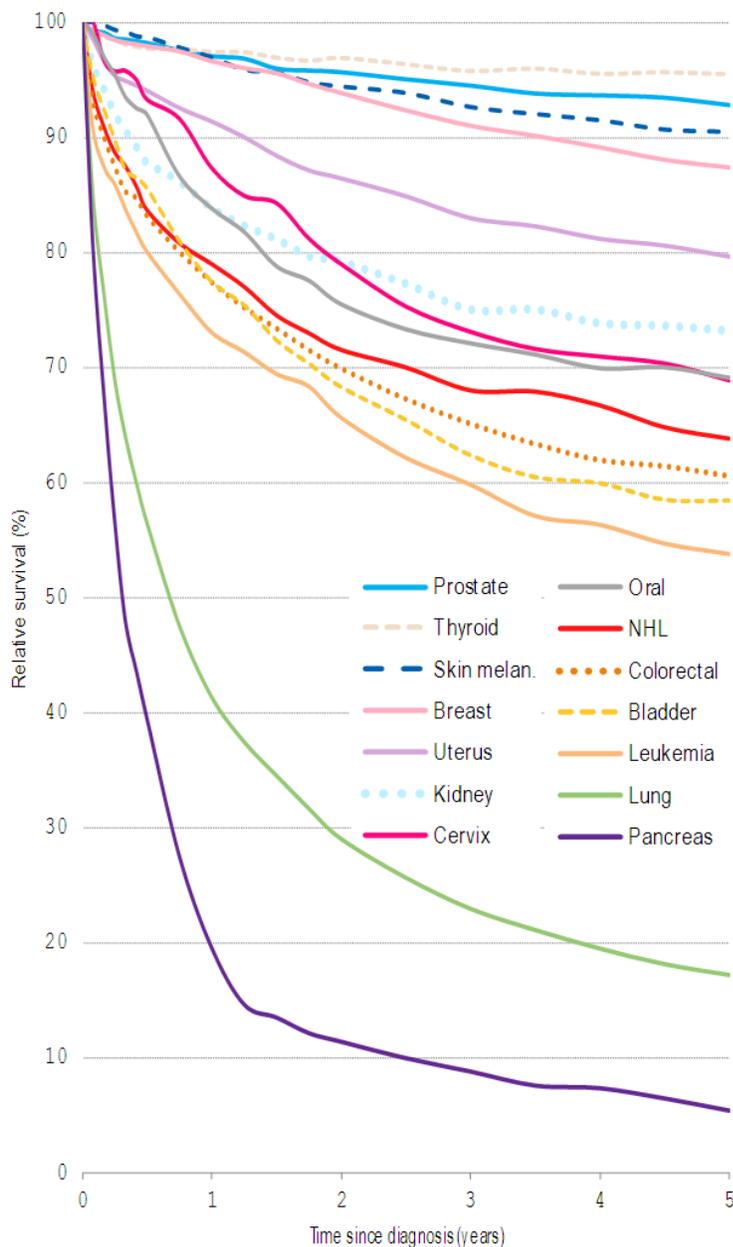
**Relative survival (RS)** Figure 13 shows relative survival up to five years post diagnosis for selected cancers and both sexes combined. Five-year survival estimates are highest for thyroid (96%), prostate (93%), melanoma of the skin (90%) and female breast cancer (87%) and; lowest for pancreatic (5%) and lung (17%) cancer (Figure 13).

## Reference guide

**Observed survival (OS)** is the proportion of people diagnosed with cancer who are still alive after a given time period, commonly 1, 3, 5 or 10 years after initial diagnosis. It is also referred as *'crude survival'* and is expressed as a percentage.

**Relative survival (RS)** is a net measure of survival. It is the probability of surviving a cancer diagnosis in the hypothetical world, where the cancer being analysed is the only possible cause of death. It is expressed as a percentage and estimated here by the ratio of the OS for a group of cancer patients to the survival that would have been expected for members of the general population, assumed to be cancer-free and who have similar characteristics such as age, sex, and province of residence, as the cancer patients [5]. Expected survival was derived for each age up to 99 years of age from gender-specific Statistics Canada life tables. RS was calculated by the Ederer II method [6]. Typically, RS rates are greater than OS rates which do not account for increases in mortality with age.

**Age-standardized relative survival (ASRS)** is the net survival that would have occurred if the age distribution at diagnosis of the group of people with the cancer of interest had been the same as that of a standard population. This report used the Canadian Cancer Survival Standards from Statistics Canada to allow comparisons with ASRS from other provinces using the same standard.



**Figure 13** Relative survival for selected cancers— both sexes combined, ages 18-99 years, Nova Scotia 2013-15

### Reference guide (cont'd)

**Conditional survival (CS)** is the probability of surviving an additional number of years (here 5 years), given that a fixed number of years have already been survived. In this report, CS is based on *observed rates* and so accounts for the probability of dying from any causes post diagnosis [6].

**Crude probability of death** is the probability of death in the real world where the probability of dying from cancer can vary depending on the risk of dying from other causes.

**All survival estimates** were derived using the period method except for lung and pancreatic cancers which were calculated using the complete method due to sparse data. The period method analyzed the survival experience of patients diagnosed in 2013-15, plus that of patients diagnosed in 2006 – 2012, provided they had not died before 2013. The period method allows for the estimation of 10 year survival, without waiting for all recent patients to be followed for the requisite number of years. This analytic method has been recognized [10] as producing survival estimates that are good predictions of the future survival experience of patients diagnosed recently. The complete method was used to analyze the experience of patients diagnosed in 2006 - 15 and followed to the end of 2015 [5-10]. One should note that population-based estimates of survival represent an ‘average’ measure of survival as they are derived from the experience of a group of patient rather than that of a specific individual.

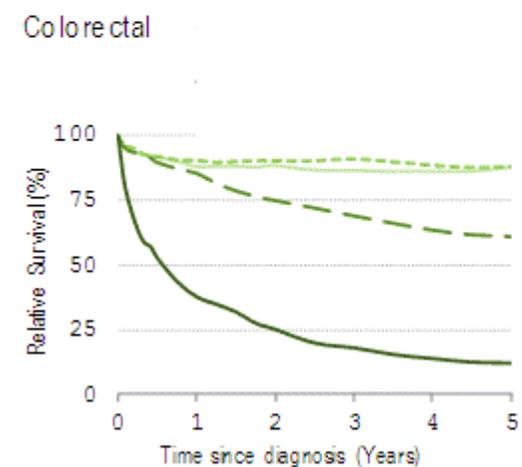
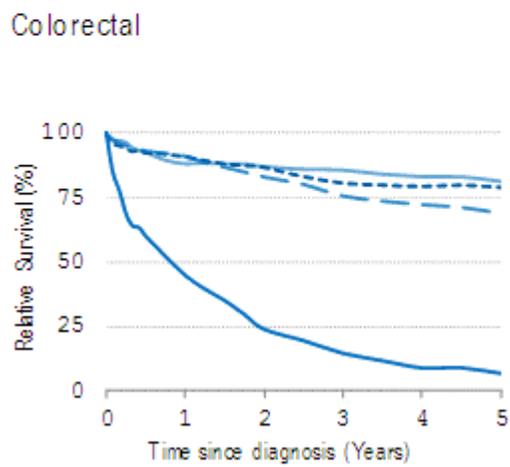
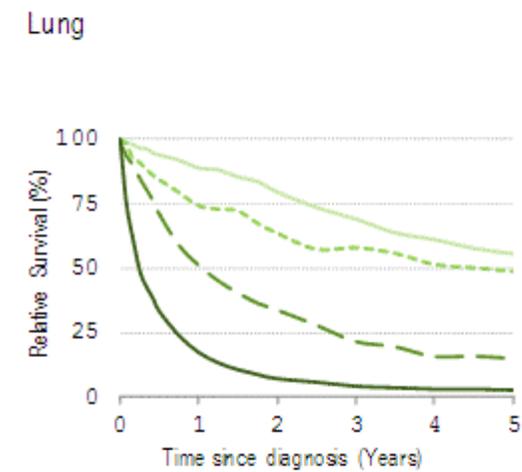
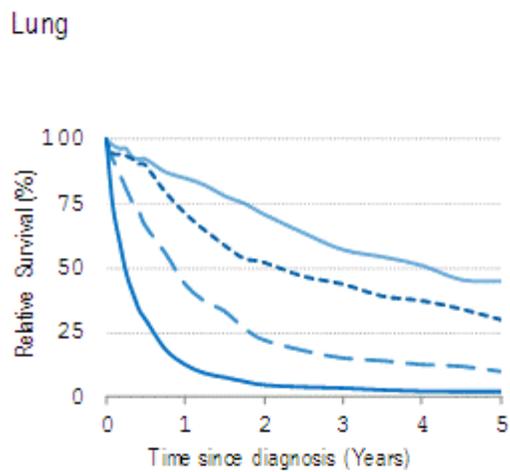
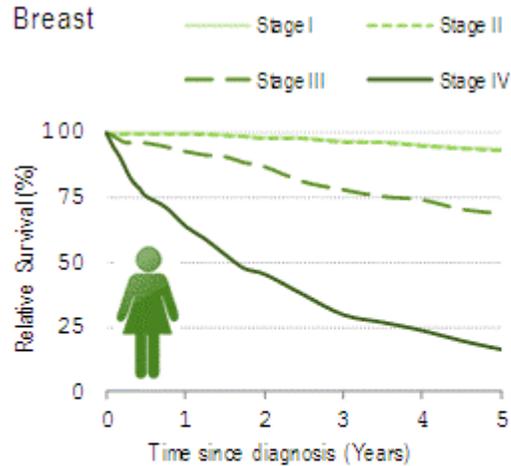
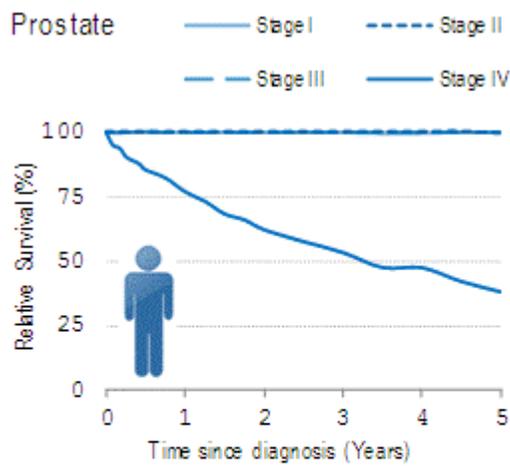
Stage-specific RS rates for common cancers are presented in **Table 5** and **Figure 14** for males and females, separately. The stage of a disease at time of diagnosis is an important and consistent predictor of survival for most cancers. With perhaps, the exception of prostate cancer, survival ratios are consistently higher for patients diagnosed with early disease stage (Table 5; Figure 14).

For example, men diagnosed with early stage (stage I) lung cancer experience a RS rate of 85% at 1-year post diagnosis, whereas those diagnosed with late stage disease (stage IV) experience, on average, a RS rate of 9%. Comparable (although slightly higher) figures are observed for women diagnosed with early (88%) versus late (13%) stage lung cancer. RS for non-metastatic prostate cancer (stage I-III) all hover around 100% up to five years post diagnosis but drop to an average of 38% in those with stage IV disease.

**Table 5** Relative survival for common cancers by sex and stage of disease at diagnosis, ages 18-99 years, Nova Scotia 2013-15

Males	Stage at diagnosis	Relative survival (%) <sup>1-3</sup>		
		1 year	3 year	5 year
Prostate	Stage I	99.9 [98.1 - 100.0]	100.0 [97.9 - 100.0]	100.0 [96.0 - 100.0]
	Stage II	100.0 [99.6 - 100.0]	100.0 [98.0 - 100.0]	99.5 [96.9 - 100.0]
	Stage III	100.0 [99.1 - 100.0]	100.0 [100.0 - 100.0]	100.0 [98.0 - 100.0]
	Stage IV	76.8 [70.4 - 82.2]	53.4 [45.8 - 60.6]	37.6 [29.5 - 46.0]
	Stage unknown	80.3 [66.2 - 89.9]	74.4 [60.0 - 85.8]	72.5 [58.0 - 84.8]
Lung	Stage I	84.8 [79.8 - 88.9]	57.2 [50.4 - 63.7]	45.0 [37.9 - 52.1]
	Stage II	72.5 [63.7 - 79.8]	44.1 [34.4 - 53.7]	30.2 [20.8 - 40.4]
	Stage III	44.6 [38.5 - 50.5]	15.7 [11.6 - 20.4]	10.5 [7.1 - 14.9]
	Stage IV	9.1 [7.5 - 10.9]	2.5 [1.7 - 3.6]	1.6 [1.0 - 2.5]
	Stage unknown	11.0 [1.9 - 29.3]	3.6 [0.2 - 18.6]	1.8 [0.1 - 11.7]
Colorectal	Stage I	88.0 [83.3 - 91.6]	85.5 [79.9 - 90.2]	81.2 [74.5 - 87.1]
	Stage II	90.6 [86.1 - 94.1]	80.2 [74.2 - 85.4]	78.5 [71.8 - 84.4]
	Stage III	91.3 [87.4 - 94.2]	75.8 [70.2 - 80.7]	69.1 [62.8 - 74.8]
	Stage IV	41.1 [35.4 - 46.7]	14.0 [10.2 - 18.3]	6.9 [4.2 - 10.3]
	Stage unknown	32.2 [16.5 - 49.4]	17.4 [6.8 - 32.5]	16.6 [6.4 - 31.7]
<b>Females</b>				
Breast	Stage I	100.0 [99.3 - 100.0]	100.0 [98.5 - 100.0]	99.4 [97.2 - 100.0]
	Stage II	100.0 [98.6 - 100.0]	96.5 [93.9 - 98.6]	93.4 [90.2 - 96.2]
	Stage III	93.0 [88.5 - 96.0]	78.0 [71.6 - 83.3]	68.7 [61.6 - 75.0]
	Stage IV	63.2 [54.2 - 71.1]	29.3 [21.8 - 37.4]	16.2 [10.5 - 23.1]
	Stage unknown	75.9 [55.4 - 89.4]	60.8 [41.2 - 77.9]	53.8 [35.1 - 71.7]
Lung	Stage I	88.8 [84.4 - 92.2]	69.1 [63.1 - 74.4]	55.4 [49.0 - 61.6]
	Stage II	74.2 [64.7 - 81.8]	57.6 [46.5 - 67.5]	48.6 [36.6 - 60.0]
	Stage III	51.4 [44.8 - 57.7]	21.6 [16.5 - 27.2]	15.3 [10.8 - 20.4]
	Stage IV	12.7 [10.6 - 15.0]	3.1 [2.1 - 4.4]	2.0 [1.2 - 3.3]
	Stage unknown	10.2 [2.9 - 23.3]	6.1 [0.7 - 21.3]	3.9 [0.4 - 15.4]
Colorectal	Stage I	87.6 [82.1 - 91.7]	86.3 [80.1 - 91.3]	87.4 [80.4 - 93.2]
	Stage II	90.3 [85.3 - 94.0]	90.8 [85.0 - 95.4]	87.9 [81.2 - 93.5]
	Stage III	85.7 [80.8 - 89.6]	69.0 [62.9 - 74.6]	61.0 [54.3 - 67.2]
	Stage IV	33.7 [27.4 - 40.2]	16.0 [11.7 - 21.0]	10.8 [7.2 - 15.1]
	Stage unknown	33.5 [18.2 - 49.9]	17.9 [7.1 - 33.2]	16.6 [6.2 - 32.2]

<sup>1</sup> Analyses were conducted using period method except for lung cancer for which the complete method was used; <sup>2</sup> relative survival was computed for all ages combined; <sup>3</sup> [#-#] represents 95% confidence interval



**Figure 14** Relative survival for common cancers in males (blue) and females (green), by stage at diagnosis, ages 18-99 years, Nova Scotia 2013-15

**Tables 6 and 7** show age-standardized RS (ASRS) up to ten years post diagnosis for selected cancers and by sex. Data presented in these tables differ slightly from those presented in Figure 13 in that, they represent the RS ratios that would be reported for Nova Scotia if the group of patients contributing to the NS cancer-specific survival estimates had the same sex and age distribution at diagnosis as the group of patients diagnosed with comparable cancers in Canada as a whole between 2010 and 2014. Therefore, these RS ratios allow for comparison with published Canadian cancer survival statistics[1]. Overall, these ASRS ratios closely mirror the non-age-standardized RS estimates presented in Figure 13. Five-year ASRS are similar to those reported for Canada with the exceptions of male colorectal cancer for which the ASRS is significantly lower in NS compared to Canada (57% [54 – 60] vs 63% [62 – 64], respectively). One can also note that the five-year ASRS ratio for pancreatic cancer in NS is about half of that reported nationally (i.e. 4% vs 8%). However, when excluding the province of Ontario, the national estimate falls to 4.5%, a figure comparable to that of NS [1].

**Table 6** Age-standardized relative survival for selected cancers in males aged 18-99 years, Nova Scotia 2013-15

Males	Age-standardized <b>relative</b> survival (%) <sup>1-4</sup>			
	1 year	3 year	5 year	10 year
Thyroid	98.2 [88.2 - 99.7]	96.4 [87.1 - 99.0]	95.4 [83.4 - 98.8]	87.9 [75.9 - 94.2]
Prostate	96.9 [95.6 - 97.8]	94.0 [92.2 - 95.4]	92.2 [89.9 - 94.0]	88.8 [85.5 - 91.3]
Melanomas of the skin	96.0 [92.8 - 97.8]	89.8 [84.9 - 93.1]	87.2 [81.3 - 91.4]	82.4 [72.6 - 88.9]
Kidney and renal pelvis	83.9 [80.1 - 87.0]	74.6 [69.7 - 78.9]	72.8 [67.1 - 77.6]	57.4 [50.0 - 64.1]
Oral	82.5 [77.0 - 86.8]	71.7 [64.9 - 77.3]	70.5 [62.3 - 77.2]	59.3 [47.8 - 69.1]
Bladder (including in situ)	79.3 [74.5 - 83.2]	63.0 [57.2 - 68.3]	58.9 [52.5 - 64.8]	52.8 [45.3 - 59.8]
Non-Hodgkin lymphoma	77.6 [73.1 - 81.4]	65.4 [60.3 - 70.0]	61.6 [56.1 - 66.6]	51.9 [44.4 - 58.9]
Colorectal	76.9 [74.3 - 79.3]	62.2 [59.1 - 65.2]	57.1 [53.7 - 60.4]	52.5 [48.2 - 56.7]
Leukemia	72.3 [66.0 - 77.7]	55.2 [48.7 - 61.1]	47.6 [41.1 - 53.8]	37.4 [30.7 - 44.0]
Lung and bronchus	34.7 [33.6 - 35.8]	17.3 [16.4 - 18.3]	12.4 [11.5 - 13.3]	7.6 [6.6 - 8.6]
Pancreas	15.9 [13.8 - 18.2]	5.4 [4.1 - 7.1]	3.6 [2.4 - 5.2]	.

<sup>1</sup> Based on Canadian standards of cancer-specific age distribution (2010-2014, Statistics Canada); <sup>2</sup> analyses were conducted using period method except for lung and pancreas for which the cohort analysis method was used; <sup>3</sup> ‘.’ insufficient data to compute estimates; <sup>4</sup> [#-#] represents 95% confidence interval

**Table 7** Age-standardized relative survival for selected cancers in females aged 18-99 years, Nova Scotia 2013-15

Females	Age-standardized relative survival (%) <sup>1-4</sup>			
	1 year	3 year	5 year	10 year
Melanomas of the skin	97.5 [93.8 - 99.0]	94.2 [88.5 - 97.1]	92.1 [85.1 - 95.9]	92.1 [80.1 - 97.0]
Thyroid	97.0 [94.1 - 98.5]	95.8 [92.1 - 97.7]	95.6 [91.1 - 97.9]	95.2 [88.3 - 98.1]
Breast	96.6 [95.5 - 97.5]	91. [89.3 - 92.5]	87.3 [85.2 - 89.1]	79.3 [76.5 - 81.8]
Body of uterus	88.8 [84.6 - 91.9]	77.9 [72.6 - 82.3]	74.5 [68.4 - 79.7]	68.4 [61.0 - 74.7]
Cervix uteri	87.1 [79.1 - 92.2]	72.5 [63.5 - 79.6]	68.7 [59.7 - 76.1]	66.1 [55.9 - 74.4]
Oral	85.4 [78.2 - 90.4]	76.1 [67.4 - 82.8]	74.3 [64.9 - 81.6]	71.1 [56.7 - 81.4]
Kidney and renal pelvis	83.5 [78.6 - 87.4]	75.4 [69.8 - 80.1]	73.9 [67.7 - 79.1]	64.4 [56.8 - 71.1]
Non-Hodgkin lymphoma	78.7 [73.6 - 82.9]	70.2 [64.5 - 75.1]	65.3 [59.2 - 70.7]	56. [49.0 - 62.4]
Colorectal	76.3 [73.6 - 78.8]	66.2 [63.0 - 69.2]	62.1 [58.5 - 65.4]	55.4 [51.1 - 59.4]
Bladder (including in situ)	71.4 [62.1 - 78.7]	60.1 [50.1 - 68.8]	57.9 [47.1 - 67.3]	.
Leukemia	70.6 [63.3 - 76.8]	61.8 [53.9 - 68.8]	57.6 [49.5 - 64.9]	50.1 [42.1 - 57.6]
Lung and bronchus	41.2 [39.9 - 42.4]	22.6 [21.5 - 23.8]	17.6 [16.5 - 18.7]	12.4 [11.2 - 13.7]
Pancreas	17.7 [15.4 - 20.1]	6.7 [5.1 - 8.6]	3.8 [2.5 - 5.5]	.

<sup>1</sup> Based on Canadian standards of cancer-specific age distribution (2010-14, Statistics Canada); <sup>2</sup> analyses were conducted using period method except for lung and pancreas for which the complete analysis method was used; <sup>3</sup> '.' insufficient data to compute estimates; <sup>4</sup> [#-#] represents 95% confidence interval

**Observed survival (OS)** Tables 8 and 9 show the age-specific OS proportion (expressed as percentage) for selected cancers and for males (Table 8) and females (Table 9) up to ten-years post diagnosis. OS estimates take into account the probability of dying from any cause of death and thus, are typically lower than RS ratios — a difference which of course increases with increasing age at diagnosis. Older patients also tend to present with more co-morbidities (other existing health conditions) that may affect the provision of more aggressive treatment which in turn, can further increase the probability of dying from their cancer diagnosis [1]. However, regardless of age, OS ratios associated with high fatality cancers such as those of the pancreas and lung undergo rapid decline within the first 3 years post-diagnosis.

**Table 10** shows five-year *conditional* OS for people who have already survived one- to five-years post-diagnosis. This measure may help both clinicians and patients understand mid- and long-term prognosis beyond the first few years of a cancer diagnosis, when the chance of dying from the disease is often greatest. Again, this is particularly important for cancer types with low initial five-year survival such as lung, pancreas and other cancer types including cancers of the brain, liver, stomach and esophagus—statistics for these sites while not presented in this report due to sparse data, are available for Canada [1]. Despite this limitation, this report shows that the average five-year OS increased by an order of magnitude, from 3% to 31% in those diagnosed with pancreatic cancer and who have survived the first two years and further increase to 72% conditional of surviving an additional three years. Among lung cancer patients who have survived two years from their initial diagnosis, the estimated five-year OS is about 3.5 times greater than that estimated at the time of diagnosis.

**Table 8** Observed survival for selected cancers among males, Nova Scotia 2013-15

Males	Age	Observed survival (%) <sup>1-3</sup>				
		1 year	3 year	5 year	10 year	
Prostate	18-54	99.4 [95.5 - 99.9]	97.7 [93.9 - 99.1]	94.4 [89.9 - 97.0]	89.8 [84.6 - 93.3]	
	55-64	94.9 [92.9 - 96.3]	91.3 [88.9 - 93.2]	91.3 [88.9 - 93.2]	83.0 [80.0 - 85.6]	
	65-74	96.3 [94.7 - 97.5]	90.4 [88.0 - 92.2]	84.7 [82.0 - 87.0]	68.0 [64.7 - 71.0]	
	75-84	89.9 [86.4 - 92.5]	76.6 [72.1 - 80.6]	63.3 [58.3 - 67.9]	34.4 [30.0 - 38.9]	
	85-99	64.6 [53.8 - 73.5]	36.6 [27.3 - 46.0]	23.4 [16.1 - 31.5]	5.8 [2.9 - 10.1]	
	All ages	94.4 [93.3 - 95.4]	87.0 [85.5 - 88.4]	80.4 [78.7 - 82.1]	64.6 [62.6 - 66.5]	
Lung	18-44	40.2 [27.8 - 52.2]	27.7 [16.9 - 39.5]	22.7 [12.5 - 34.8]	19.8 [10.0 - 32.0]	
	45-54	45.0 [40.5 - 49.4]	24.7 [20.9 - 28.8]	19.7 [16.1 - 23.5]	13.2 [9.9 - 17.0]	
	55-64	40.2 [37.8 - 42.7]	21.6 [19.5 - 23.8]	15.8 [13.8 - 17.8]	9.4 [7.7 - 11.3]	
	65-74	37.3 [35.5 - 39.2]	17.5 [16.0 - 19.1]	11.6 [10.3 - 13.0]	5.3 [4.2 - 6.5]	
	75-99	28.2 [26.4 - 30.0]	10.8 [9.5 - 12.1]	5.9 [4.9 - 6.9]	2.0 [1.3 - 2.8]	
	All ages	35.3 [34.2 - 36.4]	16.6 [15.7 - 17.5]	11.2 [10.4 - 12.0]	5.8 [5.1 - 6.5]	
Colorectal	18-44	82.6 [65.4 - 91.8]	68.1 [48.4 - 81.6]	61.6 [42.0 - 76.2]	61.6 [42.0 - 76.2]	
	45-54	82.1 [73.6 - 88.1]	66.2 [56.5 - 74.3]	57.8 [48.0 - 66.5]	52.7 [42.9 - 61.5]	
	55-64	85.4 [80.8 - 89.0]	70.8 [65.3 - 75.6]	65.6 [60.0 - 70.6]	54.5 [48.6 - 60.1]	
	65-74	80.1 [76.0 - 83.5]	63.3 [58.6 - 67.6]	55.0 [50.1 - 59.7]	40.7 [35.7 - 45.7]	
	75-99	63.0 [58.3 - 67.4]	41.0 [36.2 - 45.7]	31.0 [26.6 - 35.4]	16.3 [12.9 - 20.0]	
	All ages	75.9 [73.5 - 78.2]	58.3 [55.6 - 60.9]	50.2 [47.5 - 52.9]	37.6 [34.8 - 40.3]	
Thyroid	All ages	97.1 [91.4 - 99.1]	91.1 [83.7 - 95.3]	87.5 [79.0 - 92.8]	73.3 [62.2 - 81.5]	
Melanomas of the skin	All ages	93.8 [91.2 - 95.7]	83.9 [80.0 - 87.1]	77.1 [72.6 - 80.9]	66.7 [61.7 - 71.3]	
Kidney and renal pelvis	All ages	82.0 [78.1 - 85.2]	69.8 [65.2 - 73.9]	64.5 [59.6 - 68.9]	45.0 [39.8 - 50.1]	
Oral	All ages	82.6 [77.9 - 86.4]	68.7 [63.0 - 73.7]	63.4 [57.4 - 68.8]	47.6 [41.0 - 53.9]	
Bladder (including in situ)	All ages	75.6 [70.9 - 79.6]	55.1 [49.8 - 60.0]	47.0 [41.8 - 52.0]	33.8 [29.4 - 38.2]	
Non-Hodgkin lymphoma	All ages	76.2 [71.9 - 80.0]	61.0 [56.1 - 65.5]	54.8 [49.8 - 59.6]	41.4 [36.3 - 46.4]	
Leukemia	All ages	71.5 [65.6 - 76.6]	53.6 [47.6 - 59.2]	44.7 [38.8 - 50.4]	30.9 [25.7 - 36.3]	
Pancreas	All ages	17.1 [14.8 - 19.5]	5.7 [4.3 - 7.4]	3.9 [2.7 - 5.5]	2.8 [1.7 - 4.4]	

<sup>1</sup> Analyses were conducted using period method except for lung and pancreatic cancers for which the complete method was used; <sup>2</sup> observed survival was computed for 'All ages' only where data were insufficient; <sup>3</sup> [#-#] represents 95% confidence interval

**Table 9** Observed survival for selected cancers among females, Nova Scotia, 2013-15

Females	Age	Observed survival (%) <sup>1-3</sup>			
		1 year	3 year	5 year	10 year
Breast	18-44	98.8 [95.1 - 99.7]	90.8 [85.6 - 94.2]	87.2 [81.5 - 91.2]	82.2 [75.9 - 87.0]
	45-54	97.7 [95.5 - 98.9]	94.0 [91.0 - 96.0]	90.2 [86.7 - 92.8]	81.8 [77.6 - 85.4]
	55-64	97.4 [95.7 - 98.5]	91.8 [89.1 - 93.8]	87.5 [84.4 - 90.1]	78.8 [74.9 - 82.1]
	65-74	95.8 [93.7 - 97.2]	86.8 [83.6 - 89.4]	80.3 [76.5 - 83.5]	64.4 [60.0 - 68.6]
	75-99	86.6 [82.8 - 89.6]	69.4 [64.7 - 73.7]	55.8 [50.9 - 60.4]	26.6 [22.7 - 30.7]
	All ages	95.0 [93.9 - 95.8]	86.3 [84.7 - 87.7]	79.6 [77.8 - 81.3]	64.5 [62.3 - 66.5]
Lung	18-44	48.6 [37.8 - 58.6]	31.5 [21.9 - 41.5]	20.5 [12.4 - 30.0]	17.4 [9.9 - 26.7]
	45-54	48.9 [44.7 - 53.]	29.5 [25.7 - 33.4]	23.9 [20.3 - 27.7]	19.3 [15.7 - 23.2]
	55-64	49.1 [46.4 - 51.8]	29.3 [26.8 - 31.9]	22.8 [20.3 - 25.3]	16.4 [13.9 - 19.0]
	65-74	44.9 [42.6 - 47.1]	25.2 [23.2 - 27.2]	19.4 [17.5 - 21.4]	12.1 [10.3 - 14.1]
	75-99	33.1 [31.1 - 35.2]	13.3 [11.8 - 14.9]	8.3 [7.1 - 9.7]	3.1 [2.1 - 4.4]
	All ages	42.2 [40.9 - 43.4]	22.5 [21.4 - 23.6]	16.7 [15.7 - 17.8]	10.8 [9.8 - 11.8]
Colorectal	18-44	93.1 [75.1 - 98.2]	74.1 [54.9 - 86.1]	65.9 [47.1 - 79.4]	55.8 [38. - 70.4]
	45-54	90.6 [82.8 - 95.]	74.1 [64.1 - 81.7]	69.3 [59.2 - 77.4]	63.0 [52.3 - 71.9]
	55-64	86.4 [80.8 - 90.5]	75.0 [68.4 - 80.4]	67.4 [60.3 - 73.5]	59.2 [51.7 - 65.9]
	65-74	80.2 [75.1 - 84.3]	69.9 [64.3 - 74.8]	62.8 [57.1 - 67.9]	50.2 [44.1 - 55.9]
	75-99	58.7 [53.8 - 63.3]	44.2 [39.5 - 48.8]	36.6 [32.1 - 41.1]	18.3 [14.9 - 21.9]
	All ages	74.0 [71.2 - 76.6]	61.0 [58.0 - 63.8]	53.8 [50.7 - 56.7]	39.0 [36.0 - 42.0]
Melanomas of the skin	All ages	96.1 [93.7 - 97.6]	90.3 [86.8 - 92.9]	85.6 [81.6 - 88.8]	77.1 [72.3 - 81.3]
Thyroid	All ages	96.3 [93.4 - 97.9]	93.5 [90.1 - 95.8]	91.9 [88.0 - 94.6]	86.7 [81.9 - 90.3]
Body of uterus	All ages	90.0 [87.1 - 92.2]	79.3 [75.6 - 82.5]	73.7 [69.6 - 77.4]	63.2 [58.5 - 67.5]
Cervix uteri	All ages	86.8 [79.0 - 91.8]	71.7 [62.8 - 78.9]	66.7 [57.5 - 74.3]	61.0 [51.9 - 69.0]
Oral	All ages	81.6 [73.4 - 87.5]	67.2 [57.5 - 75.1]	61.1 [51.2 - 69.6]	52.4 [41.7 - 62.1]
Kidney and renal pelvis	All ages	82.2 [77.2 - 86.2]	71.3 [65.6 - 76.2]	67.0 [61.1 - 72.2]	51.0 [44.5 - 57.2]
Non-Hodgkin lymphoma	All ages	78.0 [73.0 - 82.2]	66.3 [60.6 - 71.3]	58.8 [53.0 - 64.1]	44.6 [38.9 - 50.1]
Bladder (including in situ)	All ages	71.7 [63.1 - 78.6]	57.4 [48.4 - 65.4]	52.1 [43.1 - 60.3]	44.2 [36.0 - 52.1]
Leukemia	All ages	70.4 [63.2 - 76.6]	58.7 [51.1 - 65.6]	52.2 [44.5 - 59.3]	38.8 [32.0 - 45.6]
Pancreas	All ages	17.1 [14.8 - 19.5]	5.9 [4.5 - 7.6]	3.2 [2.1 - 4.6]	2.3 [1.3 - 3.7]

<sup>1</sup> Analyses were conducted using period method except for lung and pancreatic cancers for which the complete method was used; <sup>2</sup> observed survival was computed for 'All ages' only where data were insufficient; <sup>3</sup> [#-#] represents 95% confidence interval

**Table 10** Five-year observed survival for selected cancers **conditional** on having survived the specified number of years post diagnosis, ages 18-99 years, Nova Scotia 2013-15

Males	Five-year <b>observed</b> survival (%) <sup>1-2</sup>					
	5-year OS at diagnosis	1 Year post diagnosis	2 Year post diagnosis	3 Year post diagnosis	4 Year post diagnosis	5Year post diagnosis
Thyroid	87.5 [78.9 - 92.7]	87.6 [78.7 - 93.0]	85.7 [76.1 - 91.6]	85.5 [75.3 - 91.7]	86.0 [75.6 - 92.3]	83.7 [72.4 - 90.7]
Prostate	80.4 [78.7 - 82.1]	81.3 [79.6 - 82.9]	81.9 [80.2 - 83.5]	81.5 [79.8 - 83.1]	81.3 [79.5 - 82.9]	80.3 [78.4 - 82.0]
Melanomas of the skin	77.0 [72.5 - 80.8]	77.9 [73.2 - 81.9]	79.9 [75.0 - 83.8]	81.6 [76.7 - 85.5]	84.1 [79.2 - 87.9]	86.6 [81.7 - 90.2]
Kidney and renal pelvis	64.4 [59.5 - 68.8]	73.9 [68.6 - 78.4]	75.8 [70.2 - 80.6]	74.7 [68.6 - 79.8]	72.9 [66.5 - 78.3]	69.9 [63.2 - 75.7]
Oral	63.4 [57.4 - 68.8]	73.6 [67.1 - 79.1]	76.6 [69.3 - 82.4]	75.4 [67.3 - 81.7]	75.4 [67.0 - 82.0]	75.0 [66.3 - 81.8]
Non-Hodgkin lymphoma	54.6 [49.6 - 59.3]	69.7 [64.1 - 74.6]	74.6 [68.7 - 79.6]	77.8 [71.6 - 82.8]	74.4 [67.7 - 80.0]	75.4 [68.4 - 81.1]
Colorectal	49.9 [47.2 - 52.6]	61.8 [58.7 - 64.8]	66.6 [63.2 - 69.7]	71.7 [68.2 - 74.9]	73.0 [69.3 - 76.3]	74.8 [71.0 - 78.2]
Bladder (including in situ)	46.9 [41.7 - 51.9]	58.8 [52.7 - 64.3]	64.7 [58.5 - 70.2]	70.2 [64.2 - 75.5]	71.4 [65.6 - 76.4]	71.7 [66.1 - 76.5]
Leukemia	44.5 [38.6 - 50.3]	60.5 [53.4 - 66.8]	63.5 [55.8 - 70.1]	67.4 [59.4 - 74.2]	69.8 [61.6 - 76.6]	69.2 [60.7 - 76.2]
Lung and bronchus	10.7 [9.9 - 11.5]	28.5 [26.6 - 30.6]	39.5 [36.6 - 42.4]	46.6 [42.9 - 50.2]	50.2 [45.7 - 54.4]	51.9 [46.7 - 56.8]
Pancreas	3.6 [2.5 - 5.0]	19.0 [12.4 - 26.7]	33.1 [20.1 - 46.7]	49.0 [29.8 - 65.6]	60.3 [36.9 - 77.4]	71.6 [44.2 - 87.2]

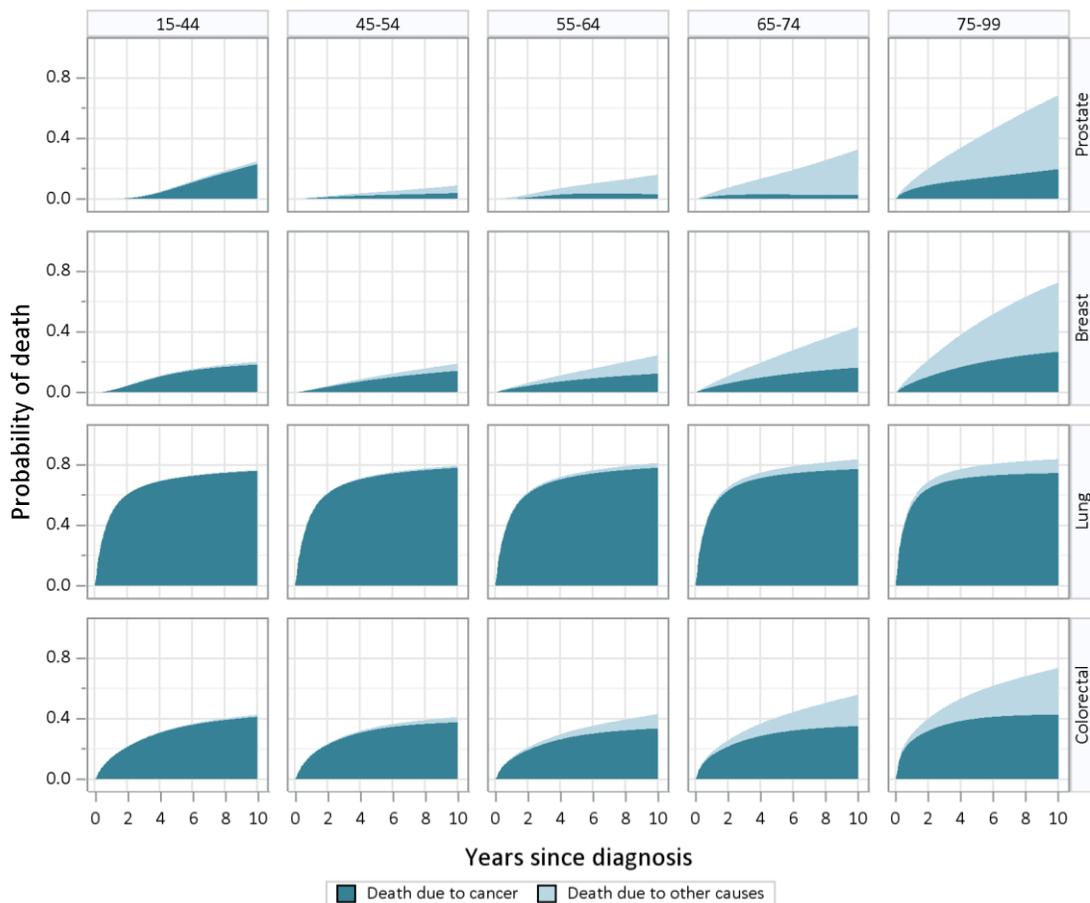
Females						
Thyroid	91.9 [88.0 - 94.5]	93.7 [89.9 - 96.1]	94.2 [90.3 - 96.5]	93.8 [89.8 - 96.3]	94.1 [90.0 - 96.5]	94.3 [90.1 - 96.7]
Melanomas of the skin	85.6 [81.5 - 88.8]	87.9 [83.9 - 90.9]	88.3 [84.3 - 91.4]	89.9 [86.0 - 92.8]	90.8 [86.9 - 93.6]	90.1 [85.8 - 93.2]
Breast	79.6 [77.8 - 81.3]	80.7 [78.9 - 82.4]	80.3 [78.4 - 82.0]	80.7 [78.7 - 82.5]	80.2 [78.2 - 82.0]	81.0 [78.9 - 82.8]
Body of uterus	73.6 [69.5 - 77.3]	78.3 [73.9 - 82.0]	81.0 [76.5 - 84.8]	83.3 [78.6 - 87.0]	85.1 [80.4 - 88.7]	85.7 [80.9 - 89.3]
Kidney and renal pelvis	66.9 [61.1 - 72.1]	78.3 [72.3 - 83.2]	82.8 [76.8 - 87.4]	84.4 [78.0 - 89.0]	80.9 [73.8 - 86.3]	75.9 [67.8 - 82.2]
Cervix uteri	66.7 [57.5 - 74.3]	76.0 [66.8 - 83.0]	81.6 [72.4 - 88.0]	88.7 [80.1 - 93.8]	90.0 [81.7 - 94.7]	91.5 [83.7 - 95.7]
Oral	61.0 [51.1 - 69.5]	73.6 [62.7 - 81.8]	80.1 [68.0 - 88.0]	80.7 [67.3 - 89.0]	83.0 [68.3 - 91.3]	85.7 [70.5 - 93.4]
Non-Hodgkin lymphoma	58.4 [52.6 - 63.8]	72.2 [65.9 - 77.6]	76.5 [70.0 - 81.8]	74.9 [68.2 - 80.4]	71.5 [64.6 - 77.4]	75.8 [68.8 - 81.4]
Colorectal	53.4 [50.4 - 56.4]	68.4 [65.1 - 71.5]	71.8 [68.3 - 75.0]	73.3 [69.6 - 76.6]	74.4 [70.6 - 77.8]	72.7 [68.7 - 76.3]
Bladder (including in situ)	51.8 [42.9 - 60.0]	71.7 [61.3 - 79.8]	77.1 [66.8 - 84.6]	84.2 [74.6 - 90.4]	85.8 [76.9 - 91.4]	85.0 [76.9 - 90.4]
Leukemia	51.7 [44.0 - 58.8]	68.5 [59.5 - 75.9]	70.5 [61.4 - 77.8]	71.8 [62.9 - 79.0]	70.7 [61.8 - 77.9]	74.2 [65.3 - 81.1]
Lung and bronchus	16.2 [15.2 - 17.2]	35.7 [33.5 - 37.9]	47.0 [44.0 - 49.8]	56.1 [52.5 - 59.5]	61.6 [57.5 - 65.5]	64.4 [59.7 - 68.7]
Pancreas	2.9 [1.9 - 4.2]	18.6 [12.4 - 25.7]	31.3 [19.9 - 43.4]	38.3 [21.6 - 54.8]	51.1 [28.8 - 69.6]	70.6 [39.0 - 88.0]

<sup>1</sup> Analyses were conducted using period method except for lung and pancreatic cancers for which the complete method was used; <sup>2</sup> [#-#] represents 95% confidence interval

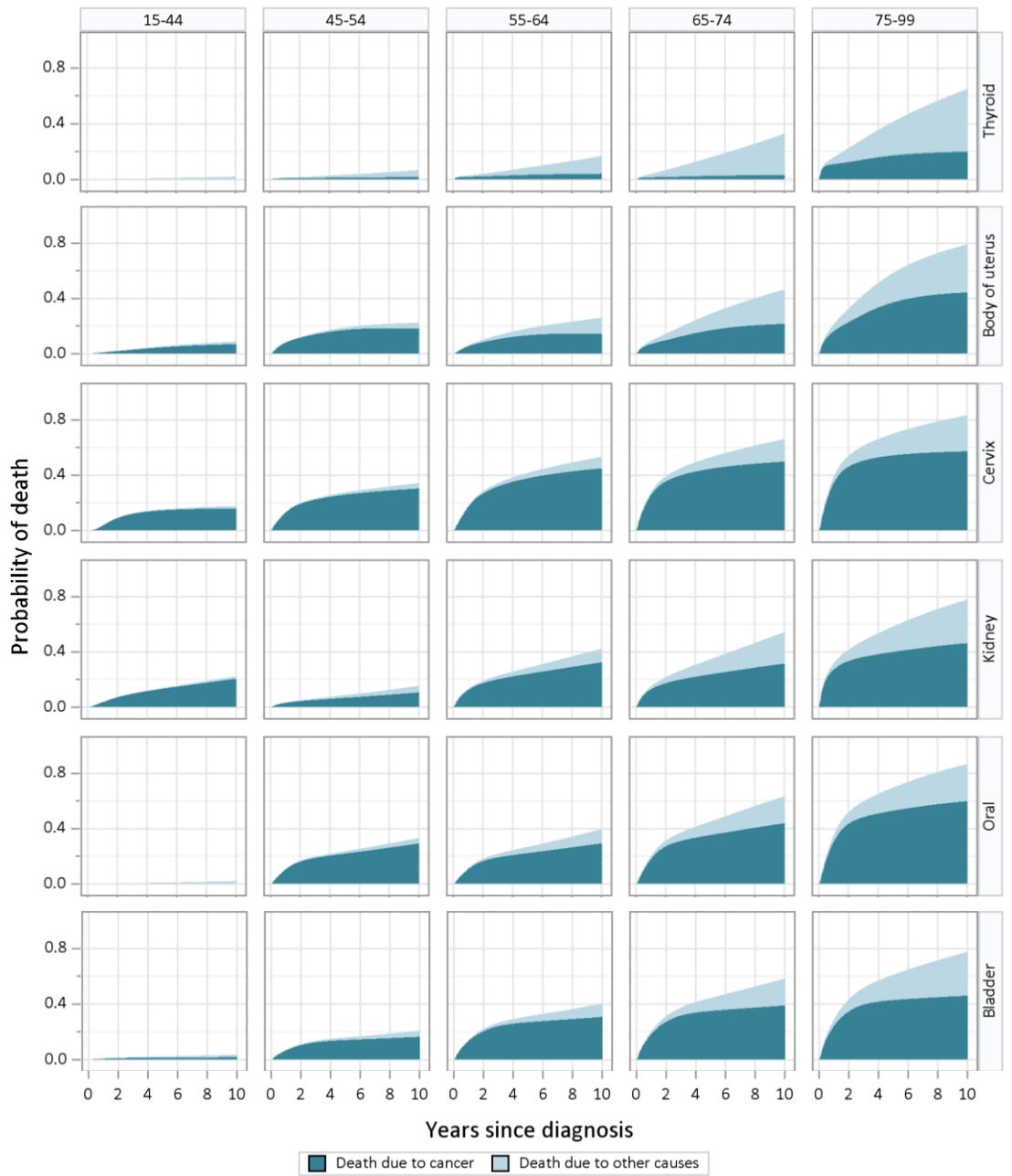
Finally, another way to understand a patient survival experience, is to look at the *crude probability of death (CPD)*. This measure is not commonly reported but could be helpful for the treating clinician and the patient. It is particularly useful when making decisions about treatments with potentially severe side effects or for the planning of future health-care services[7, 8].

The sum of the crude probability of death due to cancer (Cancer-CPD) and the crude probability of death due to other causes (Other-CPD) provides the total probability of death (Total-PD). **Figure 15** presents plots of how these probabilities change up to 10 years post diagnosis for patients of different ages. Typically, the probability of dying from both cancer and from other causes increases with age. For more fatal cancers, *cancer as a cause of death* (C-CPD) contributes proportionally more to the probability of dying (T-PD) at any age and any time post-diagnosis. For example, patients aged 55-64 years diagnosed with prostate cancer have a 20% probability of dying from their diagnosis within 10 years. By comparison, those diagnosed with colorectal cancer, a more fatal type of diagnosis, have an 80% probability of dying from their diagnosis within 10 years. Those aged 75-99 years have a 35% and a 65% probability of dying from cancer had they been diagnosed with prostate or colorectal cancer, respectively.

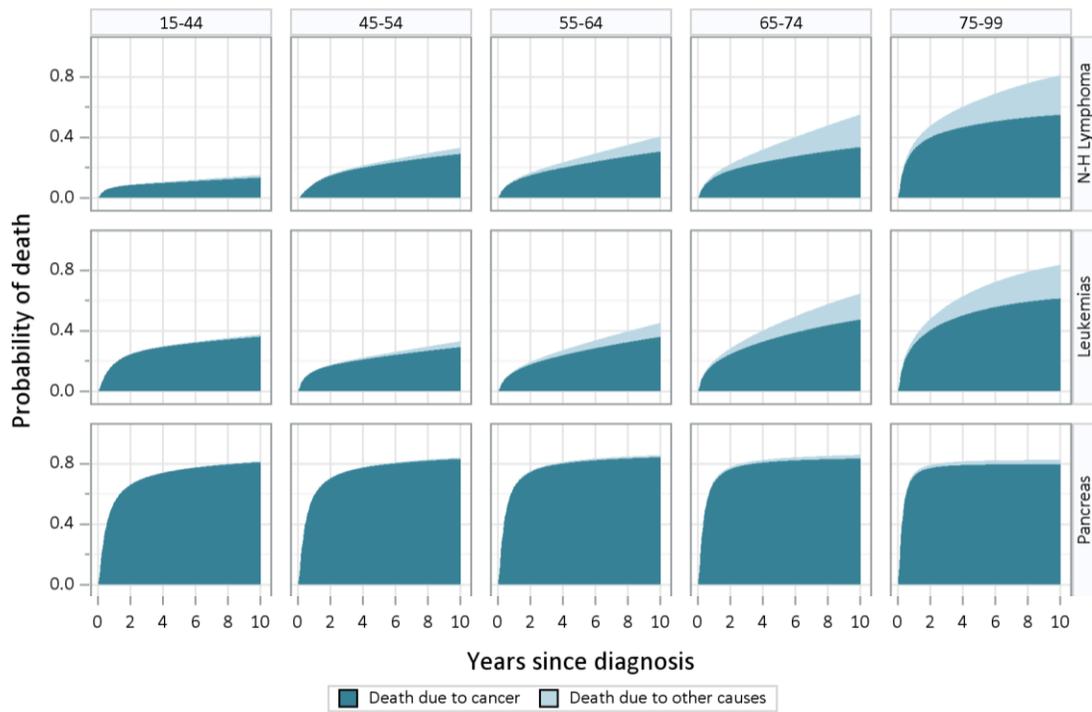
A. Common cancers



B. Other cancers



B. Other cancers



**Figure 15** Modeled crude probability of death due to cancer (A. common cancers; B. Other cancers) vs other causes for different age groups, Nova Scotia 2013-15 [Note: all analyzes were conducted using period method except for pancreas, lung, thyroid, melanoma and cervix for which the complete method was used]

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## Appendix I

Canadian Cancer Statistics, cancer definitions, 2016 (**Canadian Cancer Society's Advisory Committee on Cancer Statistics, 2016**)

Cancer type	International classification of diseases for oncology, Third Edition (ICD-O-3) site/type (incidence)	International statistical classification of diseases and related health problems, tenth revision (ICD-10) (mortality)
Oral	C00-C14	C00-C14
Esophagus	C15	C15
Stomach	C16	C16
Colorectal	C18-C20, C26.0	C18-C20, C26.0
Liver	C22.0	C22.0, C22.2-C22.7
Pancreas	C25	C25
Larynx	C32	C32
Lung and bronchus	C34	C34
Melanoma	C44 (Type 8720-8790)	C43
Breast	C50	C50
Cervix	C53	C53
Body of uterus	C54-C55	C54-C55
Ovary	C56.9	C56
Prostate	C61.9	C61
Testis	C62	C62
Bladder (including in situ)	C67	C67
Kidney and renal pelvis	C64.9, C65.9	C64-C65
Brain & Central Nervous System	C70-C72	C70-C72
Thyroid	C73.9	C73
Hodgkin lymphoma	Type 9650-9667	Type 9650-9667
Non-Hodgkin lymphoma	Type 9590-9597, 9670-9719, 9724-9729, 9735, 9737, 9738	C82-C85, C96.3
Multiple myeloma	Type 9731, 9732, 9734	C90.0, C90.2
Leukemia	Type 9733, 9742, 9800-9801, 9805-9809, 9820, 9826, 9831-9836, 9840, 9860-9861, 9863, 9865-9867, 9869-9876, 9891, 9895-9898, 9910, 9911, 9920, 9930-9931, 9940, 9945-9946, 9948, 9963-9964	C91-C95, C90.1
All Other cancers	All sites C00-C80, C97 not listed above	All sites C00-C80, C97 not listed above
All Cancers	All invasive sites	All invasive sites

## Appendix II

Age-specific cases and the age-standardized incidence rates (ASIR), Nova Scotia Health Zones— 2015 and 2011-15

### Nova Scotia – All Health Zones

Nova Scotia - All Health Zones		2011 - 2015							2015		
Sex	Cancer site	Age at diagnosis <sup>1</sup>				All cases	ASIR <sup>2</sup>	95% CI <sup>3-4</sup>	All cases	ASIR <sup>2</sup>	95% CI <sup>3-4</sup>
		0-44	45-64	65-74	75+						
Females	Breast	310	1,695	1,045	855	3,904	137.9	[133.6-142.3]	851	146.6	[144.6-148.6]
	Lung and bronchus	15	715	815	835	2,380	79.5	[76.3 - 82.7]	504	79.9	[78.5 - 81.3]
	Colorectal	55	530	555	835	1,979	65.7	[62.7 - 68.6]	390	63.2	[61.9 - 64.5]
	Body of uterus	35	430	280	145	888	30.7	[28.7 - 32.8]	190	31.3	[30.4 - 32.2]
	Melanomas of the skin	115	305	145	140	710	25.9	[24.0 - 27.9]	165	29.0	[28.1 - 29.9]
	Non-Hodgkin lymphoma	25	205	175	180	590	20.2	[18.5 - 21.8]	127	21.3	[20.6 - 22.1]
	Kidney and renal pelvis	30	190	135	130	483	16.9	[15.4 - 18.4]	91	15.4	[14.7 - 16.0]
	Thyroid	150	215	85	35	483	18.9	[17.2 - 20.6]	92	17.7	[16.9 - 18.4]
	Bladder (including in situ)	5	115	110	175	401	13.3	[12.0 - 14.6]	66	10.3	[9.8 - 10.8]
	Ovary	25	150	110	115	399	13.7	[12.4 - 15.1]	86	14.0	[13.4 - 14.6]
	Pancreas	5	85	105	175	370	12.1	[10.8 - 13.3]	72	11.2	[10.7 - 11.8]
	Leukemia	50	95	80	130	352	12.4	[11.1 - 13.7]	80	13.3	[12.7 - 13.9]
	Brain and central nervous system	55	125	65	80	324	11.9	[10.6 - 13.3]	66	12.1	[11.5 - 12.6]
	Cervix uteri	90	80	20	15	205	8.3	[7.2 - 9.5]	33	6.8	[6.4 - 7.3]
	Oral	10	75	55	60	196	6.7	[5.8 - 7.6]	42	7.1	[6.7 - 7.5]
	Multiple myeloma	5	40	45	80	172	5.7	[4.9 - 6.6]	31	5.1	[4.8 - 5.5]
	Stomach	5	30	35	75	142	4.6	[3.8 - 5.4]	35	5.4	[5.1 - 5.8]
	Esophagus	0	20	30	50	99	3.2	[2.6 - 3.8]	22	3.3	[3.0 - 3.5]
	Liver	5	20	15	20	61	2.1	[1.5 - 2.6]	24	4.0	[3.7 - 4.4]
	Larynx	0	15	15	15	45	1.5	[1.1 - 2.0]	11	1.8	[1.5 - 2.0]
Hodgkin lymphoma	25	10	5	5	43	1.9	[1.3 - 2.4]	10	2.1	[1.8 - 2.3]	
All other cancers	70	365	265	590	1,289	43.2	[40.8 - 45.6]	269	43.8	[42.7 - 44.9]	
<b>All cancers</b>		<b>1,085</b>	<b>5,510</b>	<b>4,185</b>	<b>4,735</b>	<b>15,515</b>	<b>536.5</b>	<b>[527.9-545.0]</b>	<b>3,257</b>	<b>544.7</b>	<b>[540.9-548.5]</b>
Males	Prostate	15	1,245	1,305	805	3,372	130.0	[125.5-134.4]	550	101.1	[99.4 - 102.9]
	Lung and bronchus	15	625	960	950	2,550	101.4	[97.4 - 105.4]	525	99.0	[97.3 - 100.7]
	Colorectal	50	730	785	770	2,341	94.1	[90.2 - 98.0]	495	95.0	[93.3 - 96.7]
	Bladder (including in situ)	10	260	375	470	1,114	45.2	[42.5 - 47.9]	226	43.1	[42.0 - 44.2]
	Melanomas of the skin	70	320	245	200	834	33.6	[31.3 - 35.9]	209	40.3	[39.2 - 41.5]
	Kidney and renal pelvis	40	325	245	165	774	30.5	[28.4 - 32.7]	167	32.2	[31.2 - 33.2]
	Non-Hodgkin lymphoma	75	250	225	215	760	30.9	[28.6 - 33.1]	164	32.1	[31.1 - 33.1]
	Leukemia	65	155	155	170	544	22.3	[20.4 - 24.2]	100	19.2	[18.5 - 20.0]
	Oral	15	300	145	70	527	20.4	[18.6 - 22.1]	107	19.5	[18.7 - 20.2]
	Pancreas	10	120	130	125	383	15.3	[13.8 - 16.9]	91	17.2	[16.4 - 17.9]
	Brain and central nervous system	75	135	60	55	327	13.4	[12.0 - 14.9]	76	15.4	[14.7 - 16.2]
	Esophagus	5	135	105	75	323	12.8	[11.4 - 14.2]	75	14.0	[13.4 - 14.7]
	Stomach	5	95	85	100	287	11.7	[10.3 - 13.1]	55	10.7	[10.2 - 11.3]
	Liver	15	100	70	45	226	8.9	[7.7 - 10.0]	50	9.6	[9.1 - 10.1]
	Multiple myeloma	5	65	75	65	208	8.3	[7.1 - 9.4]	60	10.8	[10.3 - 11.4]
	Thyroid	45	80	35	25	182	7.5	[6.4 - 8.6]	42	8.9	[8.4 - 9.5]
	Larynx	0	55	55	45	157	6.2	[5.2 - 7.2]	28	5.3	[4.9 - 5.7]
	Testis	80	30	5	5	120	5.4	[4.4 - 6.4]	20	4.6	[4.2 - 5.0]
	Hodgkin lymphoma	30	20	10	10	66	2.8	[2.1 - 3.5]	22	4.6	[4.2 - 5.0]
	All other cancers	75	315	345	485	1,220	50.9	[48.0 - 53.8]	247	49.5	[48.2 - 50.8]
<b>All cancers</b>		<b>695</b>	<b>5,360</b>	<b>5,415</b>	<b>4,840</b>	<b>16,315</b>	<b>651.6</b>	<b>[641.4-661.7]</b>	<b>3,309</b>	<b>632.3</b>	<b>[628.0-636.7]</b>

<sup>1</sup> Where only age-specific counts are rounded to nearest '0 or '5' values; <sup>2</sup> Age-standardized incidence rate per 100,000 people, standardized to the 2011 Canadian population; <sup>3</sup> Confidence interval.

## Western Zone

Western Zone		2011 - 2015							2015		
Sex	Cancer site	Age at diagnosis <sup>1</sup>				All cases	ASIR <sup>2</sup>	95% CI <sup>3-4</sup>	All cases	ASIR <sup>2</sup>	95% CI <sup>3-4</sup>
		0-44	45-64	65-74	75 +						
Females	Breast	55	340	260	190	844	125.8	[117.0-134.5]	190	135.4	[131.4-139.4]
	Lung and bronchus	5	145	195	195	541	73.5	[67.2 - 79.7]	127	83.6	[80.6 - 86.6]
	Colorectal	5	115	155	215	486	65.0	[59.1 - 70.9]	90	59.1	[56.6 - 61.6]
	Body of uterus	5	105	65	40	218	31.8	[27.5 - 36.1]	42	29.4	[27.6 - 31.3]
	Non-Hodgkin lymphoma	5	45	50	50	153	21.6	[18.1 - 25.2]	33	21.9	[20.3 - 23.4]
	Kidney and renal pelvis	5	55	30	30	117	17.3	[14.1 - 20.5]	22	17.0	[15.5 - 18.4]
	Melanomas of the skin	15	55	25	25	117	18.9	[15.3 - 22.5]	26	19.4	[17.8 - 21.0]
	Bladder (including in situ)	0	30	30	50	109	14.8	[12.0 - 17.6]	17	10.4	[9.4 - 11.5]
	Thyroid	30	45	20	10	100	18.0	[14.3 - 21.6]	17	15.9	[14.3 - 17.5]
	Leukemia	10	20	25	40	99	14.7	[11.6 - 17.7]	20	12.2	[11.1 - 13.4]
	Ovary	0	40	30	25	97	14.1	[11.2 - 17.0]	16	12.3	[11.0 - 13.5]
	Pancreas	5	15	25	45	85	11.5	[9.0 - 14.0]	11	7.1	[6.2 - 7.9]
	Brain and central nervous system	20	25	15	10	70	12.3	[9.3 - 15.3]	13	11.9	[10.6 - 13.3]
	Multiple myeloma	0	10	15	20	50	6.8	[4.9 - 8.7]	13	9.0	[8.0 - 10.0]
	Oral	0	15	10	15	41	5.4	[3.7 - 7.1]	9	6.5	.
	Stomach	0	5	10	20	35	4.4	[2.9 - 5.9]	11	7.2	[6.4 - 8.1]
	Cervix uteri	10	5	5	5	23	4.6	[2.6 - 6.5]	5	5.2	.
	Esophagus	0	5	5	10	22	2.9	[1.6 - 4.1]	4	2.7	.
	Liver	0	5	5	0	12	1.7	[0.7 - 2.7]	5	3.5	.
	Hodgkin lymphoma	5	0	0	0	10	2.2	[0.8 - 3.6]	<5	3.2	.
Larynx	0	0	0	0	6	0.9	.	1	0.6	.	
All other cancers	10	85	65	125	283	39.1	[34.4 - 43.8]	50	33.7	[31.8 - 35.6]	
<b>All cancers</b>		<b>185</b>	<b>1,170</b>	<b>1,040</b>	<b>1,125</b>	<b>3,518</b>	<b>507.2</b>	<b>[489.9-524.5]</b>	<b>725</b>	<b>507.4</b>	<b>[499.7-515.1]</b>
Males	Prostate	0	300	330	245	880	135.3	[126.3-144.4]	158	116.1	[112.5-119.8]
	Lung and bronchus	0	150	245	240	637	98.8	[91.0 -106.5]	112	83.9	[80.8 - 87.1]
	Colorectal	10	180	200	200	587	93.4	[85.7 -101.0]	113	86.8	[83.5 - 90.1]
	Bladder (including in situ)	0	75	95	135	311	49.1	[43.6 - 54.6]	58	42.8	[40.6 - 45.1]
	Non-Hodgkin lymphoma	20	60	60	65	206	34.2	[29.4 - 39.0]	45	37.4	[35.2 - 39.7]
	Kidney and renal pelvis	10	70	65	55	201	32.4	[27.8 - 37.0]	39	28.3	[26.4 - 30.1]
	Melanomas of the skin	15	70	55	50	190	31.4	[26.8 - 35.9]	47	36.5	[34.4 - 38.7]
	Leukemia	15	40	45	45	145	24.0	[20.0 - 28.0]	23	17.5	[16.1 - 19.0]
	Oral	0	55	25	10	92	15.1	[12.0 - 18.3]	17	12.8	[11.5 - 14.0]
	Pancreas	0	20	30	35	86	13.3	[10.5 - 16.2]	25	17.4	[16.0 - 18.7]
	Brain and central nervous system	10	35	10	20	75	13.6	[10.4 - 16.7]	18	16.5	[14.9 - 18.1]
	Esophagus	0	20	30	25	74	11.8	[9.0 - 14.5]	20	14.7	[13.4 - 16.0]
	Stomach	0	20	20	20	60	9.5	[7.1 - 12.0]	14	10.9	[9.8 - 12.1]
	Multiple myeloma	0	20	15	15	47	7.6	[5.4 - 9.8]	17	13.3	[12.0 - 14.6]
	Thyroid	5	20	15	5	47	8.1	[5.7 - 10.5]	8	7.9	.
	Larynx	0	10	15	15	39	6.0	[4.1 - 7.9]	6	4.0	.
	Liver	0	15	10	5	33	5.4	[3.6 - 7.3]	7	5.4	.
	Testis	15	5	5	0	24	5.5	[3.3 - 7.8]	1	1.3	.
	Hodgkin lymphoma	10	5	5	0	15	3.1	[1.5 - 4.8]	4	4.3	.
	All other cancers	20	75	90	120	304	50.2	[44.4 - 56.0]	48	38.5	[36.2 - 40.7]
<b>All cancers</b>		<b>135</b>	<b>1,240</b>	<b>1,365</b>	<b>1,315</b>	<b>4,053</b>	<b>647.9</b>	<b>[627.7-668.2]</b>	<b>780</b>	<b>596.5</b>	<b>[587.9-605.1]</b>

<sup>1</sup> Where only age-specific counts are rounded to nearest '0 or 5'; <sup>2</sup> Age-standardized incidence rate per 100,000 people, standardized to the 2011 Canadian population; <sup>3</sup> Confidence interval; <sup>4</sup> Where missing values were generated as a result of insufficient case counts.

## Northern Zone

Northern Zone		2011 - 2015						2015			
Sex	Cancer site	Age at diagnosis <sup>1</sup>				All cases	ASIR <sup>2</sup>	95% CI <sup>3-4</sup>	All cases	ASIR <sup>2</sup>	95% CI <sup>3-4</sup>
		0-44	45-64	65-74	75+						
Female	Breast	40	265	170	150	628	133.1	[122.5-143.7]	140	141.8	[137.0-146.6]
	Lung and bronchus	5	135	165	145	451	89.6	[81.2 - 97.9]	101	93.0	[89.4 - 96.7]
	Colorectal	5	90	105	170	368	71.1	[63.7 - 78.5]	73	69.2	[66.0 - 72.5]
	Melanomas of the skin	25	65	25	35	150	33.6	[28.0 - 39.1]	37	38.7	[36.1 - 41.3]
	Body of uterus	5	65	45	25	142	29.9	[24.9 - 34.8]	30	29.1	[27.0 - 31.3]
	Kidney and renal pelvis	10	35	25	20	87	18.7	[14.7 - 22.7]	18	18.5	[16.7 - 20.2]
	Non-Hodgkin lymphoma	0	30	25	30	87	17.7	[13.9 - 21.5]	21	22.1	[20.2 - 24.1]
	Thyroid	15	35	25	5	77	17.7	[13.6 - 21.8]	10	10.1	[8.8 - 11.4]
	Ovary	5	25	20	25	70	14.1	[10.7 - 17.5]	18	17.1	[15.4 - 18.7]
	Pancreas	0	15	20	30	67	13.1	[9.9 - 16.3]	12	11.3	[10.0 - 12.5]
	Leukemia	15	15	15	20	64	14.3	[10.6 - 17.9]	16	15.9	[14.3 - 17.5]
	Bladder (including in situ)	0	20	15	25	62	12.0	[9.0 - 15.1]	14	13.0	[11.7 - 14.4]
	Brain and central nervous system	10	20	10	15	53	12.3	[8.9 - 15.6]	11	13.5	[11.8 - 15.1]
	Cervix uteri	20	15	0	0	40	11.2	[7.6 - 14.7]	8	11.5	.
	Oral	0	15	15	10	39	7.9	[5.4 - 10.4]	8	7.2	.
	Stomach	0	5	5	15	26	4.7	[2.9 - 6.6]	7	5.9	.
	Multiple myeloma	0	5	5	10	18	3.5	[1.9 - 5.1]	0	0.0	.
	Esophagus	0	5	0	10	16	2.9	[1.4 - 4.3]	<5	1.3	.
	Larynx	0	5	5	5	14	2.8	[1.3 - 4.3]	6	5.4	.
	Hodgkin lymphoma	5	0	0	0	9	2.5	.	<5	3.5	.
Liver	0	0	5	0	6	1.1	.	<5	3.8	.	
All Other Cancers	15	60	40	115	232	46.1	[40.0 - 52.2]	47	43.7	[41.1 - 46.3]	
<b>All cancers</b>	<b>180</b>	<b>925</b>	<b>740</b>	<b>865</b>	<b>2,706</b>	<b>559.8</b>	<b>[538.3-581.4]</b>	<b>586</b>	<b>575.8</b>	<b>[566.2-585.4]</b>	
Male	Prostate	0	150	185	120	456	103.0	[93.4 - 112.6]	81	86.0	[82.2 - 89.8]
	Lung and bronchus	0	105	165	165	434	99.4	[89.9 - 108.8]	92	98.5	[94.4 - 102.6]
	Colorectal	5	125	140	145	416	97.0	[87.5 - 106.5]	94	105.9	[101.5 - 110.2]
	Bladder (including in situ)	5	45	50	70	172	40.5	[34.3 - 46.7]	35	37.8	[35.2 - 40.4]
	Melanomas of the skin	10	60	50	35	152	35.3	[29.6 - 41.0]	40	41.4	[38.8 - 44.0]
	Non-Hodgkin lymphoma	15	50	35	30	132	31.9	[26.4 - 37.4]	25	29.2	[26.8 - 31.5]
	Kidney and renal pelvis	5	40	35	25	110	25.3	[20.5 - 30.1]	28	33.5	[30.9 - 36.0]
	Oral	0	60	40	10	110	24.4	[19.8 - 29.0]	20	20.8	[18.9 - 22.6]
	Leukemia	10	30	20	20	84	20.2	[15.8 - 24.6]	26	27.0	[24.8 - 29.1]
	Pancreas	0	25	15	15	59	13.7	[10.2 - 17.3]	18	21.3	[19.3 - 23.3]
	Brain and central nervous system	10	25	10	5	55	13.4	[9.8 - 17.0]	11	13.0	[11.4 - 14.6]
	Esophagus	0	20	15	10	47	10.8	[7.7 - 14.0]	9	10.1	.
	Stomach	5	15	15	10	44	10.4	[7.3 - 13.5]	9	10.1	.
	Multiple myeloma	0	5	15	15	35	7.8	[5.2 - 10.5]	9	8.7	.
	Liver	0	10	15	5	27	5.9	[3.6 - 8.1]	3	3.2	.
	Larynx	0	10	5	10	21	4.9	[2.8 - 7.0]	<5	4.8	.
	Thyroid	0	15	0	5	21	5.1	[2.9 - 7.3]	6	7.0	.
	Testis	10	5	0	0	16	4.6	[2.3 - 6.8]	<5	3.7	.
	Hodgkin lymphoma	5	5	5	0	12	2.9	[1.2 - 4.6]	<5	3.5	.
	All Other Cancers	10	50	55	80	197	47.9	[41.1 - 54.8]	38	44.2	[41.3 - 47.1]
<b>All cancers</b>	<b>95</b>	<b>850</b>	<b>875</b>	<b>780</b>	<b>2,600</b>	<b>604.4</b>	<b>[580.8-628.0]</b>	<b>554</b>	<b>609.6</b>	<b>[599.2-620.0]</b>	

<sup>1</sup> Where only age-specific counts are rounded to nearest '0 or 5'; <sup>2</sup> Age-standardized incidence rate per 100,000 people, standardized to the 2011 Canadian population; <sup>3</sup> Confidence interval; <sup>4</sup> Where missing values were generated as a result of insufficient case counts.

## Eastern Zone

Eastern Zone		2011 - 2015							2015		
Sex	Cancer site	Age at diagnosis <sup>1</sup>				All cases	ASIR <sup>2</sup>	95% CI <sup>3-4</sup>	All cases	ASIR <sup>2</sup>	95% CI <sup>3-4</sup>
		0-44	45-64	65-74	75 +						
Female	Breast	45	320	210	185	764	140.5	[130.2-150.7]	157	145.0	[140.3-149.7]
	Lung and bronchus	5	155	170	185	514	86.3	[78.8 - 93.9]	120	98.5	[94.9 -102.1]
	Colorectal	15	110	105	185	415	70.7	[63.7 - 77.6]	91	77.1	[73.8 - 80.4]
	Body of uterus	5	85	50	40	184	32.9	[28.0 - 37.8]	35	30.0	[28.0 - 32.1]
	Non-Hodgkin lymphoma	5	45	40	30	117	20.9	[17.0 - 24.7]	24	21.6	[19.8 - 23.4]
	Melanomas of the skin	20	45	25	25	112	22.0	[17.8 - 26.3]	27	26.3	[24.2 - 28.4]
	Kidney and renal pelvis	5	45	30	30	111	20.1	[16.2 - 23.9]	14	12.5	[11.2 - 13.9]
	Thyroid	15	55	15	5	92	19.4	[15.3 - 23.6]	18	18.8	[17.0 - 20.7]
	Bladder (including in situ)	0	15	25	35	80	13.4	[10.4 - 16.4]	9	6.6	.
	Ovary	0	25	25	25	74	12.6	[9.6 - 15.5]	16	12.9	[11.6 - 14.2]
	Pancreas	0	15	20	35	72	11.6	[8.9 - 14.3]	12	10.4	[9.1 - 11.6]
	Brain and central nervous system	5	25	15	20	67	12.6	[9.5 - 15.7]	9	7.6	.
	Cervix uteri	20	25	10	5	64	14.7	[11.0 - 18.5]	8	10.0	.
	Leukemia	10	15	15	20	54	10.0	[7.2 - 12.8]	8	7.9	.
	Oral	0	15	10	15	39	7.0	[4.7 - 9.2]	8	6.9	.
	Multiple myeloma	0	10	10	15	32	5.2	[3.4 - 7.0]	<5	2.5	.
	Stomach	0	5	10	15	32	5.2	[3.4 - 7.1]	11	8.8	[7.7 - 9.8]
	Esophagus	0	5	10	10	24	3.8	[2.3 - 5.4]	7	5.2	.
	Larynx	0	5	5	5	12	2.1	[0.9 - 3.3]	<5	0.9	.
	Liver	0	5	5	5	11	1.9	[0.7 - 3.1]	7	6.3	.
Hodgkin lymphoma	0	5	0	0	6	1.6	.	<5	0.9	.	
All Other Cancers	10	80	55	120	264	45.5	[39.9 - 51.1]	54	44.8	[42.4 - 47.3]	
<b>All cancers</b>		<b>165</b>	<b>1,110</b>	<b>850</b>	<b>1,015</b>	<b>3,140</b>	<b>559.9</b>	<b>[539.8-580.1]</b>	<b>640</b>	<b>561.7</b>	<b>[552.6-570.7]</b>
Male	Prostate	0	200	285	150	641	121.5	[112.0-131.1]	104	93.7	[90.1 - 97.4]
	Lung and bronchus	5	145	225	205	578	113.5	[104.0-122.9]	126	120.0	[115.7-124.3]
	Colorectal	10	145	175	155	481	97.2	[88.3 -106.1]	112	106.8	[102.7-110.8]
	Bladder (including in situ)	0	50	85	95	232	46.6	[40.4 - 52.7]	53	52.0	[49.1 - 54.8]
	Kidney and renal pelvis	0	65	50	30	145	28.8	[24.0 - 33.6]	39	37.4	[35.0 - 39.7]
	Melanomas of the skin	5	50	45	45	144	29.8	[24.8 - 34.8]	34	33.4	[31.1 - 35.7]
	Non-Hodgkin lymphoma	10	30	45	40	127	26.7	[21.9 - 31.5]	26	25.7	[23.7 - 27.8]
	Oral	5	60	35	15	114	22.3	[18.2 - 26.5]	25	25.3	[23.2 - 27.3]
	Leukemia	15	25	40	25	108	23.2	[18.7 - 27.7]	13	14.3	[12.7 - 16.0]
	Pancreas	0	30	30	30	94	19.1	[15.1 - 23.0]	21	20.6	[18.8 - 22.4]
	Stomach	0	30	20	40	91	18.7	[14.8 - 22.6]	16	15.7	[14.1 - 17.3]
	Esophagus	0	40	25	10	75	14.9	[11.4 - 18.3]	15	14.2	[12.7 - 15.7]
	Brain and central nervous system	10	25	15	15	62	13.6	[10.1 - 17.0]	16	17.8	[16.0 - 19.6]
	Liver	5	15	20	10	52	10.2	[7.4 - 13.0]	11	9.9	[8.7 - 11.1]
	Larynx	0	10	20	10	40	7.7	[5.3 - 10.2]	6	5.8	.
	Multiple myeloma	0	5	15	10	36	6.9	[4.6 - 9.2]	8	6.6	.
	Thyroid	5	15	5	5	30	7.0	[4.4 - 9.6]	7	9.1	.
	Testis	15	5	0	0	19	5.7	[3.1 - 8.2]	<5	4.8	.
	Hodgkin lymphoma	5	0	0	0	8	2.1	.	<5	5.7	.
	All Other Cancers	15	60	80	95	253	54.1	[47.2 - 60.9]	44	45.7	[42.9 - 48.5]
<b>All cancers</b>		<b>110</b>	<b>1,005</b>	<b>1,225</b>	<b>990</b>	<b>3,330</b>	<b>669.5</b>	<b>[646.2-692.8]</b>	<b>683</b>	<b>664.6</b>	<b>[654.3-674.8]</b>

<sup>1</sup> Where only age-specific counts are rounded to nearest '0 or 5'; <sup>2</sup> Age-standardized incidence rate per 100,000 people, standardized to the 2011 Canadian population; <sup>3</sup> Confidence interval; <sup>4</sup> Where missing values were generated as a result of insufficient case counts.

## Central Zone

Central Zone		2011 - 2015						2015			
Sex	Cancer site	Age at diagnosis <sup>1</sup>				All cases	ASIR <sup>2</sup>	95% CI <sup>3-4</sup>	All cases	ASIR <sup>2</sup>	95% CI <sup>3-4</sup>
		0-44	45-64	65-74	75 +						
Females	Breast	165	770	400	330	1,668	145.6	[138.6-152.6]	364	154.5	[151.3-157.7]
	Lung and bronchus	5	280	280	310	874	75.9	[70.8 - 80.9]	156	63.2	[61.2 - 65.2]
	Colorectal	25	220	195	270	710	61.2	[56.7 - 65.8]	136	56.4	[54.4 - 58.3]
	Body of uterus	15	175	115	45	344	29.7	[26.6 - 32.9]	83	34.0	[32.5 - 35.4]
	Melanomas of the skin	55	145	75	55	331	28.9	[25.8 - 32.0]	75	31.4	[30.0 - 32.9]
	Non-Hodgkin lymphoma	15	85	60	75	232	20.2	[17.6 - 22.8]	49	20.6	[19.4 - 21.7]
	Thyroid	95	80	25	10	213	18.8	[16.3 - 21.3]	47	20.2	[19.0 - 21.4]
	Kidney and renal pelvis	15	55	50	50	168	14.6	[12.4 - 16.8]	37	14.9	[14.0 - 15.9]
	Ovary	15	60	40	40	158	13.8	[11.6 - 15.9]	36	14.9	[13.9 - 15.8]
	Bladder (including in situ)	0	45	40	60	150	13.0	[10.9 - 15.1]	26	10.8	[9.9 - 11.6]
	Pancreas	0	40	40	65	146	12.3	[10.3 - 14.3]	37	14.6	[13.7 - 15.6]
	Leukemia	20	45	25	50	135	11.9	[9.8 - 13.9]	36	15.3	[14.3 - 16.3]
	Brain and central nervous system	20	50	30	30	134	11.7	[9.7 - 13.7]	33	14.0	[13.1 - 15.0]
	Cervix uteri	40	30	5	5	78	6.8	[5.3 - 8.3]	12	5.3	[4.7 - 5.9]
	Oral	5	30	20	20	77	6.7	[5.2 - 8.2]	17	7.1	[6.4 - 7.8]
	Multiple myeloma	5	15	20	35	72	6.2	[4.8 - 7.6]	15	6.4	[5.8 - 7.1]
	Stomach	5	15	10	20	49	4.2	[3.0 - 5.4]	6	2.4	.
	Esophagus	0	10	15	15	37	3.2	[2.2 - 4.2]	9	3.5	.
	Liver	0	10	5	15	32	2.8	[1.8 - 3.8]	8	3.5	.
	Hodgkin lymphoma	15	0	0	0	18	1.6	[0.9 - 2.4]	< 5	1.4	.
Larynx	0	5	5	0	13	1.1	[0.5 - 1.7]	< 5	1.3	.	
All Other Cancers	35	140	105	230	510	43.6	[39.7 - 47.4]	118	48.9	[47.1 - 50.7]	
<b>All cancers</b>	<b>555</b>	<b>2,310</b>	<b>1,555</b>	<b>1,730</b>	<b>6,149</b>	<b>533.9</b>	<b>[520.5-547.3]</b>	<b>1,306</b>	<b>544.6</b>	<b>[538.7-550.6]</b>	
Males	Prostate	10	590	505	290	1,395	142.0	[134.4-149.5]	207	102.2	[99.3 -105.0]
	Lung and bronchus	10	230	325	335	901	98.2	[91.6 -104.7]	195	98.8	[96.0 -101.6]
	Colorectal	25	285	275	275	857	92.2	[85.9 - 98.5]	176	88.2	[85.6 - 90.9]
	Bladder (including in situ)	5	90	140	165	399	44.5	[40.0 - 48.9]	80	41.5	[39.6 - 43.3]
	Melanomas of the skin	40	140	95	70	348	35.9	[32.0 - 39.7]	88	45.5	[43.6 - 47.5]
	Kidney and renal pelvis	20	150	90	55	318	32.3	[28.7 - 35.9]	61	30.7	[29.1 - 32.3]
	Non-Hodgkin lymphoma	30	110	80	80	295	30.8	[27.2 - 34.4]	68	34.0	[32.3 - 35.6]
	Oral	10	125	45	30	211	20.8	[18.0 - 23.7]	45	20.7	[19.5 - 22.0]
	Leukemia	25	60	50	75	207	22.4	[19.3 - 25.5]	38	19.2	[18.0 - 20.5]
	Pancreas	5	40	50	45	144	15.2	[12.7 - 17.8]	27	13.7	[12.7 - 14.8]
	Brain and central nervous system	40	50	25	20	135	13.3	[11.0 - 15.5]	31	14.7	[13.7 - 15.8]
	Esophagus	0	55	35	35	126	13.2	[10.9 - 15.6]	30	14.5	[13.4 - 15.5]
	Liver	10	55	30	25	114	11.8	[9.5 - 14.0]	29	15.1	[14.0 - 16.3]
	Stomach	0	35	25	30	92	10.1	[8.0 - 12.3]	16	9.5	[8.5 - 10.4]
	Multiple myeloma	0	30	30	25	90	9.6	[7.6 - 11.6]	26	12.6	[11.6 - 13.6]
	Thyroid	30	30	15	10	84	8.1	[6.3 - 9.8]	21	9.5	[8.7 - 10.3]
	Testis	45	15	0	5	61	5.6	[4.1 - 7.0]	13	5.8	[5.2 - 6.5]
	Larynx	0	25	15	15	57	6.0	[4.4 - 7.6]	12	5.9	[5.2 - 6.5]
	Hodgkin lymphoma	15	10	0	5	31	3.1	[2.0 - 4.2]	11	5.2	[4.6 - 5.8]
	All Other Cancers	30	135	115	185	466	51.9	[47.1 - 56.7]	117	63.4	[61.1 - 65.8]
<b>All cancers</b>	<b>355</b>	<b>2,265</b>	<b>1,950</b>	<b>1,760</b>	<b>6,331</b>	<b>666.8</b>	<b>[650.0-683.6]</b>	<b>1,291</b>	<b>650.6</b>	<b>[643.4-657.9]</b>	

<sup>1</sup> Where only age-specific counts are rounded to nearest '0 or 5'; <sup>2</sup> Age-standardized incidence rate per 100,000 people, standardized to the 2011 Canadian population; <sup>3</sup> Confidence interval; <sup>4</sup> Where missing values were generated as a result of insufficient case counts.

