Section 8 » Incidence, Mortality, Survival and Prevalence

8.1. Description of Statistics Reported

This section focuses on the regional distribution of cancer with data derived from the BC Cancer Registry which is maintained by the BCCA. Both current and projected statistical data, by health authority region, for all cancers and for select cancer types is provided as follows:

Incidence

Cancer incidence is related to numerous aspects, many of which are described in our previous sections such as; the growth and aging of a population (Section 2), ethno-cultural and social characteristics (Section 3), underlying risk factors (Section 4), screening uptake (Section 5) and genetics (Section 5.4.). This section provides information on the number of cancer diagnoses (incidence count), the projected number of new cases and also on the incidence rate.

- *Number of cancer diagnoses (incidence count)*

    This is the number of new cases of a given type of cancer that were diagnosed within the specified year in people living in the specified health authority at the time of diagnosis. They are provided by gender.

    This provides a measure of the overall burden of cancer in that region

Section 8 » Incidence, Mortality, Survival and Prevalence (cont.)
8.1. Description of Statistics Reported (cont.)

- *Projections of New Cases*

 This is the estimated number of new cases of the given type of cancer that are projected to be diagnosed in the specified years in the future, within each health region.

- *Age standardized incidence rate per 100,000 population*

 This is the number of new cases of a given type of cancer that are diagnosed within the specified year in people living in the specified health authority at the time of diagnosis divided by the total number of people living in that region.

 To remove the influence of variations in the distribution of age and gender between regions, the rate is standardized to the Canadian 1991 Population.

 The Figures for the age-standardized incidence rate per 100,000 provide the estimated rate for each health region as well as the 95% confidence interval for the estimated rates, represented by the bars around the estimate. The vertical dotted line represents the estimated provincial rate for BC. The size of the 95% confidence interval bar provides a measure of how certain or uncertain the point estimates are.

Mortality

The number of deaths from cancer (mortality), the projected number of deaths in future years and the mortality rate are provided. Mortality is affected both by incidence and the likelihood of dying from cancer. The different elements described in the different sections of this report all effect mortality to some degree.

- *Number of cancer deaths (mortality)*

 This is the number of deaths that occurred in the specified year that were attributed to the specified type of cancer, by gender, in people that were living in the respective health regions at the time of their death. For example, someone who was diagnosed when they were residing in FH but died in VCH in the specified year would contribute to the mortality for VCH.

 This provides a measure of the overall burden of cancer in that region

- *Projections of Deaths*

 This is the estimated number of deaths from the given type of cancer that are projected to occur in the specified years in the future, within each health region.

Section 8 » Incidence, Mortality, Survival and Prevalence (cont.)
8.1. Description of Statistics Reported (cont.)

- *Age standardized mortality rate per 100,000 population*

This is the number of deaths that occurred in the specified year that were attributed to the specified type of cancer, in people that were living in the respective health regions at the time of their death divided by the total number of people living in that region

To remove the influence of variations in the distribution of age and gender between regions, the rate is standardized to the Canadian 1991 Population.

The Figures for the age-standardized mortality rate per 100,000 provide the estimated rate for each health region as well as the 95% confidence interval for the estimated rates, represented by the bars around the estimate. The vertical dotted line represents the estimated provincial rate for BC. The size of the 95% confidence interval bar provides a measure of how certain or uncertain the point estimates are.

Survival

Survival is a key measurement of the overall effectiveness of healthcare in the management of cancer patients. The survival estimates provided are based on deaths from all types of cancer. For example, survival rates for breast cancer will be based on patients diagnosed with breast cancer who died from any type of cancer, not just breast cancer. Survival prognosis is traditionally assessed for cohorts of patients defined by calendar year. This approach often calculates survival on patients that are diagnosed far enough back in time for there to be enough follow-up information to provide the survival estimates. For example, to obtain 5-year survival it will require the use of information on patients going back to a diagnosis year that is at least 5 years in the past and follows their survival experience. If recent changes have occurred (e.g. new therapies etc) any benefits will not be picked up because it will only be seen in those patients diagnosed more recently - the cohort approach would not include these more recently diagnosed patients. This report utilizes an alternative approach known as the 'period approach' [15]. This approach looks at the survival experience of patients during a recent time period and looks back to utilize their information. So it monitors survival by periods of follow-up rather than diagnosis years and therefore incorporates more up-to-date data with the aim to enhance the timeliness in the detection of changes in patient survival. Detailed information on this analysis is provided by Brenner et al. 2003 [16] and by Paul Dickman 2004, Example 6.3 [17].

- *1-Year All Cancer Cause Death Survival*

One-year survival is an important measure since lower than average one-year survival rates can suggest people are being diagnosed at a later stage of their disease, when treatment is often less effective.

One year survival is the likelihood a cancer patient will not succumb to cancer within 12 months of their diagnosis.

Section 8 » Incidence, Mortality, Survival and Prevalence (cont.)

8.1. Description of Statistics Reported (cont.)

- *5-Year All Cancer Cause Death Survival Rates, Having Already Survived 1 Year*

  The 5-year survival rate having already survived 1-year is influenced by the success of primary treatment of cancer.

  This statistic is the likelihood a cancer patient will survive 5 years after their diagnosis given they survived their first year after diagnosis.

The figures for both types of survival rates provide the estimated rate along with the 95% confidence interval shown as a bar, similar to the age-standardized incidence and mortality rate plots. In addition, a p-value is provided to indicate if there are any statistical significance differences in survival between the health authorities. These p-values have been adjusted (using the Holm-Sidak step-down method) to account for the multiple comparisons that have been performed for all the different disease sites. The period for which the survival rates apply to is specified. For the rarer types of cancer a longer period is used in order to get stable estimates.

Prevalence

Prevalence represents people alive at a given time who were previously diagnosed with the specified cancer.

- *5-year Prevalence*

We have provided 5-year prevalence which includes people who are alive and diagnosed with the specified cancer within 5 years of the specified year. This provides a closer assessment of cancer prevalence for patients in more intensive cancer care compared to complete prevalence which would include all patients alive diagnosed with cancer regardless of how long ago they were diagnosed.

8.2. Summary of Findings

This section provides an overview of findings from the cancer incidence, mortality, survival and prevalence statistics from a health regions perspective. It does not go into detail for each cancer disease type.

Interior Health (IH)

Incidence, mortality and survival rates in the IH are similar to that of the province as a whole. Consequently new cases and deaths from cancer, in relation to the rest of the province, are determined by the relative size and age of the population. The next decade has a projected increase of 27% in the number of new diagnoses of cancer and a 23% increase in deaths.

Section 8 » Incidence, Mortality, Survival and Prevalence (cont.)
8.2. Summary of Findings (cont.)

Fraser Health (FH)

Fraser Health Region has the largest population and the greatest influence on the overall provincial rates. It is therefore not surprising that the incidence, mortality and survival rates for the region are close to the provincial average. As the largest region Fraser has the most new cases of cancer and cancer deaths. The projected rapid population growth of the region mean that FH will see a projected 43% increase in the number of new cancer diagnoses and 33% increase in the number of cancer deaths. Forty-five per cent of the increase in new cancer cases in the province will occur in FH.

Vancouver Coastal (VCH)

Although results for each cancer type vary somewhat VCH tends to have lower incidence and mortality rates and higher survival rates than the provincial average. Consequently VCH has the lowest incidence and mortality rates and highest survival rates for all cancers combined. A notable exception is for liver cancer where VCH has higher incidence and mortality rates: this is likely related to migrants from areas where exposure to hepatitis, a recognized liver carcinogen, is more common. VCH will see comparatively slow rates of growth in the number of new cancers (22%) and cancer deaths (17%) in the next decade.

Vancouver Island Health (VIHA)

Incidence rates for different cancers vary with some being elevated compared to the province. For all cancers combined 1-year survival rates are higher than the provincial average with the net effect that the mortality rate seems similar to the provincial average. Rates of growth in the number of new cases of cancer (22%) and cancer deaths (18%) over the next decade are similar to those anticipated in VCH. One-year survival for leukemia and ovarian cancers in VIHA tends to be lower compared to the other HAs.

Northern Health (NH)

Being the smallest, NH will have the largest statistical uncertainty in its incidence, mortality and survival rates. Also, it has the least influence on the overall provincial rate so that it is "easier" for its rate to differ from that of the province as a whole. Incidence rates do not seem to vary from the provincial average except for lung cancer where there is indication of higher rates which coincides with NH have the highest smoking rates. However survival rates do tend to be lower for most cancer types in NH with both 1-year and 5 year rates usually below or at the provincial average but seldom above. As a result survival for all cancers combined is below the provincial average at both 1 and 5 years. The predicted growth in new cases of cancer (34%) will be close to the provincial average in the next decade. The predicted growth in cancer deaths in the same period is 44%. On the basis of existing trends the NH is the only region for which the relative growth in cancer deaths will exceed the relative growth in cancer cases in the next decade.

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8.2. Summary of Findings (cont.)

1-Year Survival Statistics Summary

As mentioned earlier, lower than average 1-year survival rates can suggest patients are presenting and being diagnosed at a later stage of disease when treatment is often less effective. Table 8-1 shows the range of the 1-year survival estimates between the lowest and highest HAs in order to try and gain an understanding of the differences between the HAs in early/late diagnosis.   The appropriateness of this measure will vary by cancer site and early/late presentation is not the only possible reason for any observed differences.

◆ = statistical significance and range > 5%
● = no statistical significance or statistical significance and range ≤ 5%

Table 8-1: Range Between HAs in 1-year Survival Estimates, by Cancer Type

Cancer Type	1-year survival (%) Range (lowest – highest HA)	Cancer Type	1-year survival (%) Range (lowest – highest HA)
All Cancers	● 73.4 - 78.0	Lung	◆ 38.4 - 46.9
Bladder	● 87.2 - 89.8	Melanoma (Skin)	● 97.5 - 98.4
Body of Uterus	● 92.1 - 93.8	Multiple Myeloma	● 72.2 - 77.9
Brain	◆ 38.3 - 49.0	Non-Hodgkin Lymphoma	● 80.7 - 83.3
Breast	● 97.0 - 97.5	Oral	◆ 78.7 - 85.4
Cervix	● 88.4 - 92.6	Ovary	◆ 72.1 - 77.5
Colorectal	● 81.0 - 84.3	Pancreas	● 19.4 - 26.3
Esophagus	● 35.3 - 44.6	Prostate	● 97.0 - 97.7
Hodgkin Lymphoma	● 91.7 - 94.8	Stomach	◆ 43.7 - 51.7
Kidney	◆ 74.3 - 79.9	Testis	● 98.2 - 99.1
Larynx	● 84.7 - 86.3	Thyroid	● 96.8 - 97.4
Leukemia	◆ 69.7 - 77.6	All other cancers	◆ 49.7 - 59.1
Liver	◆ 40.0 - 50.2		