



BC Cancer Agency

CARE & RESEARCH

An agency of the Provincial Health Services Authority

Survival Statistics 2007



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Introduction

When referring to disease, survival is the length of time between a person's diagnosis and death. Recording the survival of cancer patients is important for many reasons. For example, survival is a key measure in clinical trials designed to test the value of therapy. At the population level, survival can be used to indicate the net effects of therapy - although it is also affected by factors unrelated to treatment.

Survival is usually reported as the proportion of patients surviving a specified time after diagnosis. It is most often expressed as a percentage, probability or proportion, although it is usually referred to as a "survival rate". Changes in the survival rate may be used to monitor changes in the impact of cancer on the population.

This report presents relative survival rates to indicate the risk of dying from a disease, if other causes of death were eliminated, without relying on cause of death information (see glossary). Relative survival rates are the most common way to present population-based survival rates.



Description of Material

This report provides the following survival statistics on British Columbia cancer patients:

- 1, 3 & 5 year relative survival rates by cancer type for BC adults diagnosed in 2006, 2004 and 2002 respectively
- trends in 1, 3 & 5 year relative survival rates by cancer type for BC adults diagnosed between 1982 and 2007 (*estimates are smoothed to reduce the effect of random year-to-year fluctuations*)
- 1, 3 & 5 year relative survival rates by cancer type for patients referred to the BC Cancer Agency in 2006, 2004 and 2002 respectively (*cases referred to the BC Cancer Agency in 2007 are included as a guide to number of subjects included*)
- age and sex adjusted 5 year disease-specific survival for breast, colorectal, lung and prostate cancer by health authority region for BC adults diagnosed between 2002 and 2007

Cancer Cases Used In This Report Satisfied The Following Criteria (*unless otherwise specified*)

The data used in this report was obtained from the BC Cancer Registry and the BC Vital Statistics Agency.

- classified according to the *International Classification of Diseases for Oncology - Third Edition (ICDO-3)*
- includes BC residents at time of diagnosis
- includes adult cases only (*age at time of diagnosis between 20 and 99 years*)
- includes invasive/malignant cancer cases (*excludes in-situ (except bladder) and benign neoplasms*)
- excludes non-melanoma skin cancers
- excludes autopsy only cases
- excludes death certificate only (DCO) cases *refer to 'Technical Notes' section of report for further details*

Methodology

Survival rates were calculated using the method of relative survival (an estimate of the likelihood of dying of cancer over time, after adjustment for other causes of death).

Smoothed Graphs

In order to examine the long-term trends in relative survival, curves were fit to the yearly 1, 3 and 5 year results and these were smoothed to reduce the effect of year-to-year random fluctuation. The type of smoother used was smoothing splines with 4 degrees of freedom.



Interpretation of Survival Rates

The survival rates presented are based on groups of patients and provide one measurement of the impact of each type of cancer within the population. They cannot be used to indicate what would happen to an individual since prognosis varies.

Survival rates are influenced by the method used to calculate them. This report calculates relative survival using a method developed by Hakulinen. Other methods, even applied to the same data, would not give identical results. Typically, differences in the results from the various methods of calculating relative survival are small; however, other types of survival such as disease-specific survival, can lead to substantially different values. Therefore, caution must be exercised in comparing results from different reports.

Survival rates are considerably affected by the makeup of the patient group under consideration. For example comparison of 1-year survival from pancreatic cancer for the province (page 4) with those referred to a BC Cancer Agency facility (page 18) we see that a higher percentage survived among the referred. It is tempting to interpret this as a beneficial effect of treatment received at the BC Cancer Agency. However, we can also see from the same table that slightly more than half of all patients were referred to the BC Cancer Agency. Those who were referred were selected because the characteristics of their disease indicated that they might benefit from treatment obtainable at the BC Cancer Agency. An alternate interpretation is that those referred had a less severe form of the disease and this will influence their survival. There is probably truth in both explanations that patients selected for referral do benefit from the treatment they receive but you cannot compare them with those not referred since these are "apples and oranges".

Another consideration when examining survival rates is their statistical reliability, which is principally determined by the number of cases (deaths) included. Some annual survival rates will be higher than others due to the inherent variability in the outcomes of individual patients. The number of cases in a year dictates the likely magnitude of this variability. When calculations are based on 500 or more patients variations of +/- 2% in survival rates are to be expected. For patient numbers in the 100-500 range +/- 4% are not unusual and for less than 100 patients +/- 10%. In this report, (the tables, not the graphs), survival rates based on less than 100 patients are indicated.



1, 3 & 5 Year Relative Survival Rates by Cancer Type for BC Adults Diagnosed in 2006, 2004 and 2002 Respectively

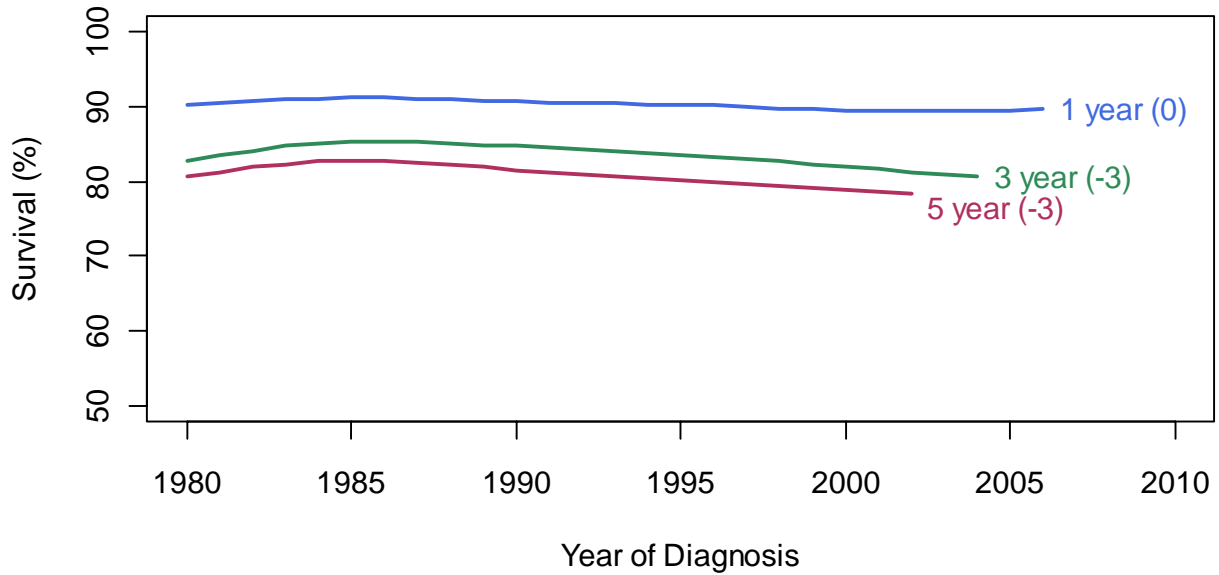
Cancer Type	Diagnosis Year = 2006		Diagnosis Year = 2004		Diagnosis Year = 2002	
	Cases	1 yr survival (%)	Cases	3 yr survival (%)	Cases	5 yr survival (%)
Bladder (incl: in-situ cases)	802	90	715	81	751	78
Body of Uterus	484	94	423	88	399	87
Brain	210	43	241	27	237	23
Breast	2447	97	2300	93	2324	89
Cervix	145	91	136	80	165	77
Colon	1361	82	1302	69	1237	61
Esophagus	190	36	186	17	161	13
Hodgkin Lymphoma	<i>78</i>	<i>94</i>	<i>85</i>	<i>93</i>	<i>98</i>	<i>96</i>
Kidney	346	81	302	67	341	62
Larynx	<i>85</i>	<i>87</i>	<i>96</i>	<i>69</i>	101	63
Leukemia	510	72	423	62	369	57
Liver	175	39	175	14	152	23
Lung	2135	37	2187	19	2056	15
Melanoma	612	100	606	92	587	93
Multiple Myeloma	171	71	176	50	182	32
Non-Hodgkin Lymphoma	778	81	701	75	686	66
Oral	323	84	350	67	330	58
Ovary	261	78	243	55	234	43
Pancreas	420	20	396	9	368	4
Prostate	2794	99	2336	97	2620	98
Rectum	775	88	778	74	727	68
Stomach	299	42	307	28	288	24
Testis	<i>98</i>	<i>100</i>	<i>97</i>	<i>95</i>	101	97
Thyroid	235	98	212	99	202	<i>94</i>
All Other Cancers	1286	52	1345	40	1373	39
All Cancers	17020	77	16118	66	16089	64

Note: Rates based on less than 100 cases are liable to statistical fluctuation and are indicated by gray italic type.

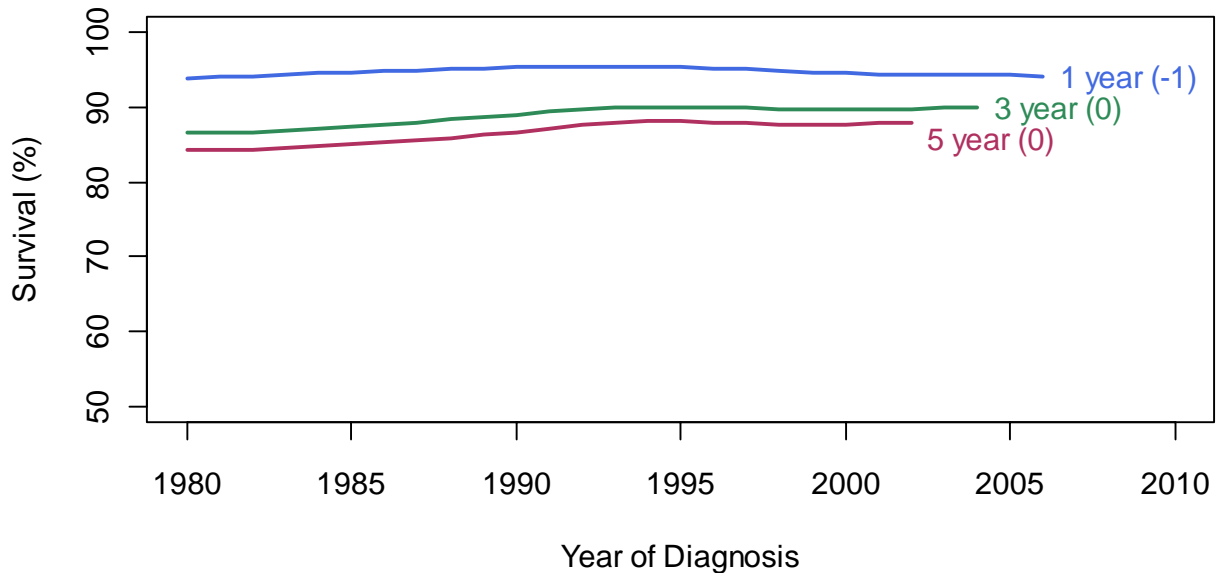


Trends in 1, 3 & 5 Year Relative Survival Rates by Cancer Type for BC Adults Diagnosed between 1980 and 2007 (percentage point change over last 10 years) *[®]

Bladder (including in-situ cases)



Body of Uterus



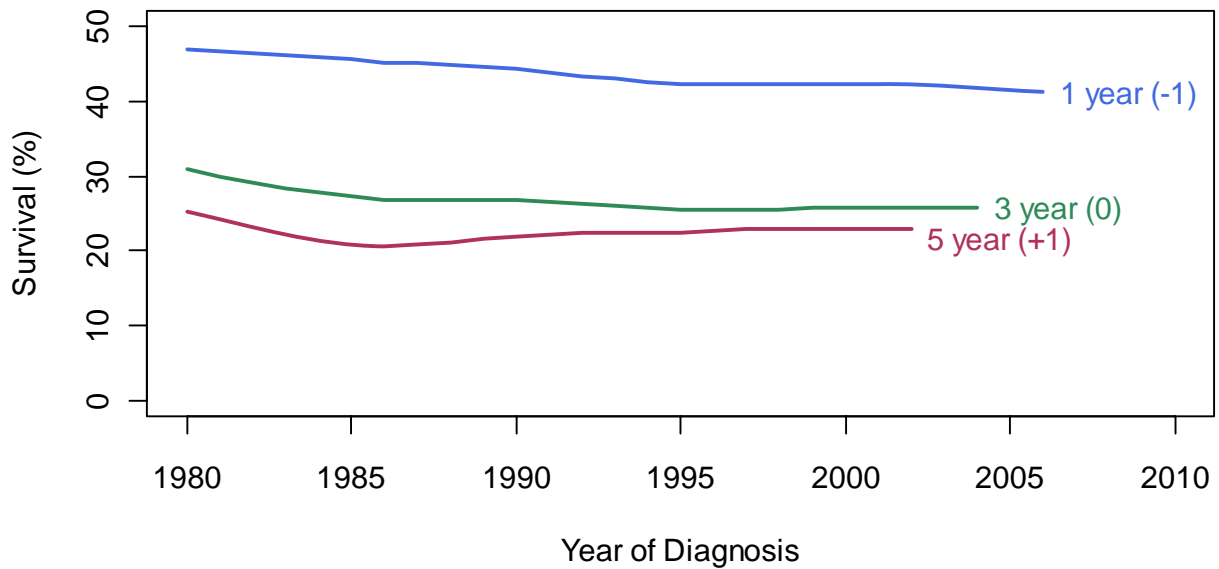
* Scales vary by cancer type

[®] The number in parentheses shows the percentage-point change for the last 10 years of each curve.

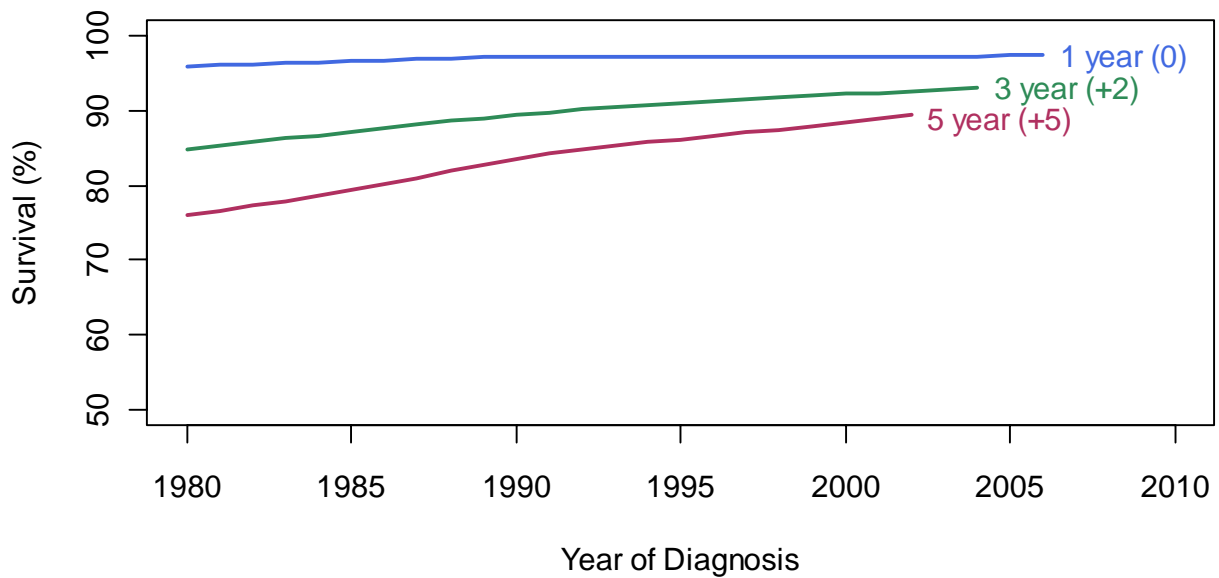


Trends in 1, 3 & 5 Year Relative Survival Rates by Cancer Type for BC Adults Diagnosed between 1980 and 2007 (percentage point change over last 10 years)*@
 (cont.)

Brain



Breast



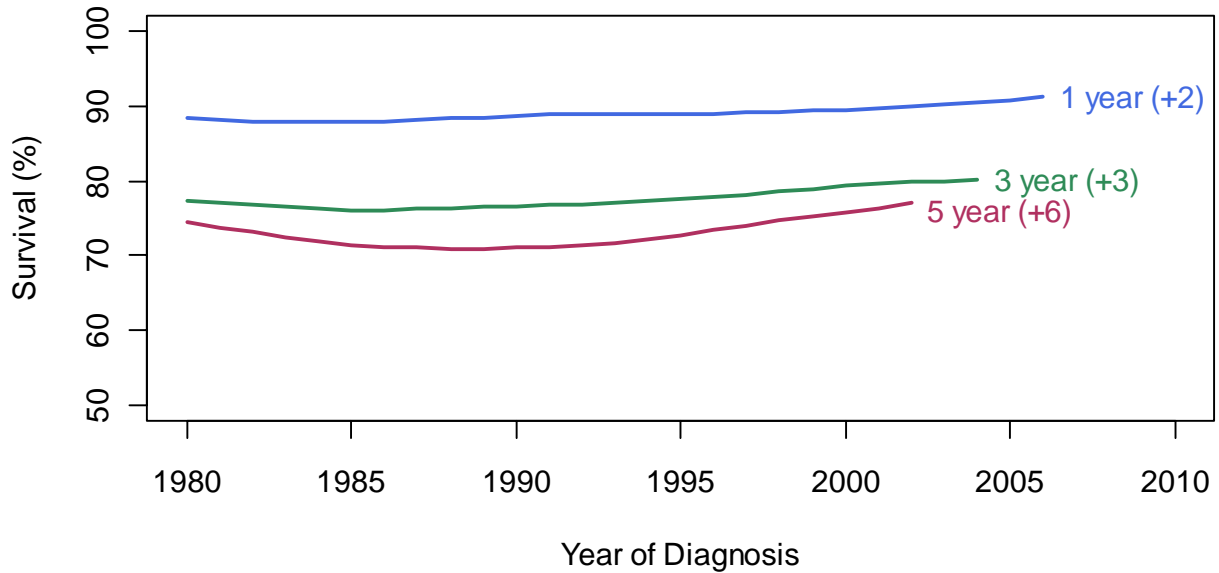
* Scales vary by cancer type

@ The number in parentheses shows the percentage-point change for the last 10 years of each curve.

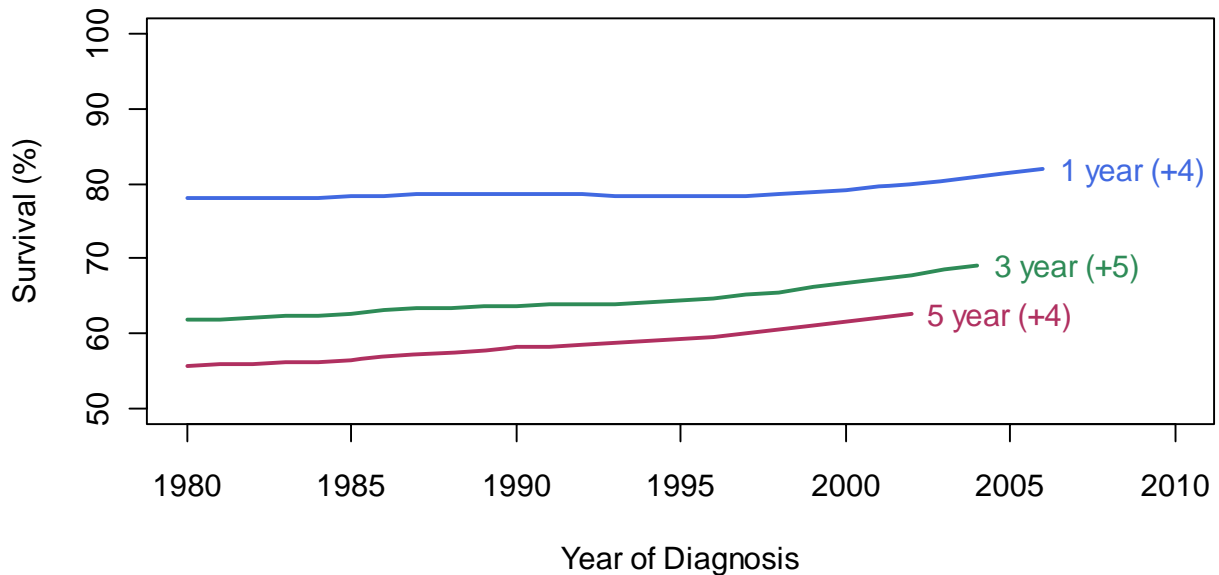


Trends in 1, 3 & 5 Year Relative Survival Rates by Cancer Type for BC Adults Diagnosed between 1980 and 2007 (percentage point change over last 10 years)*[@] # (cont.)

Cervix



Colon



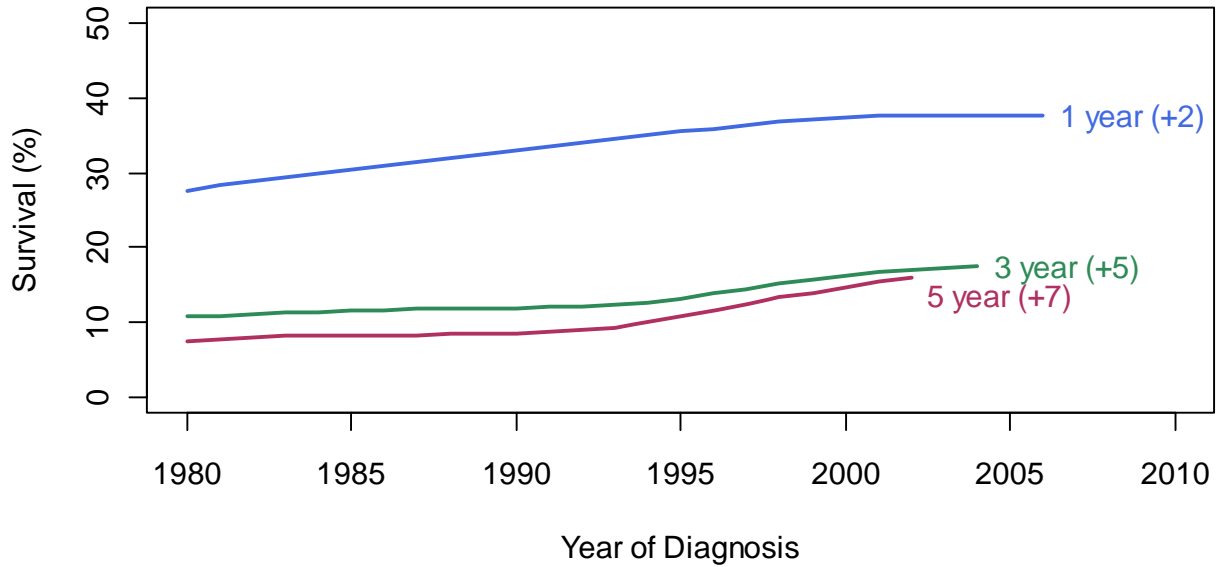
* Scales vary by cancer type

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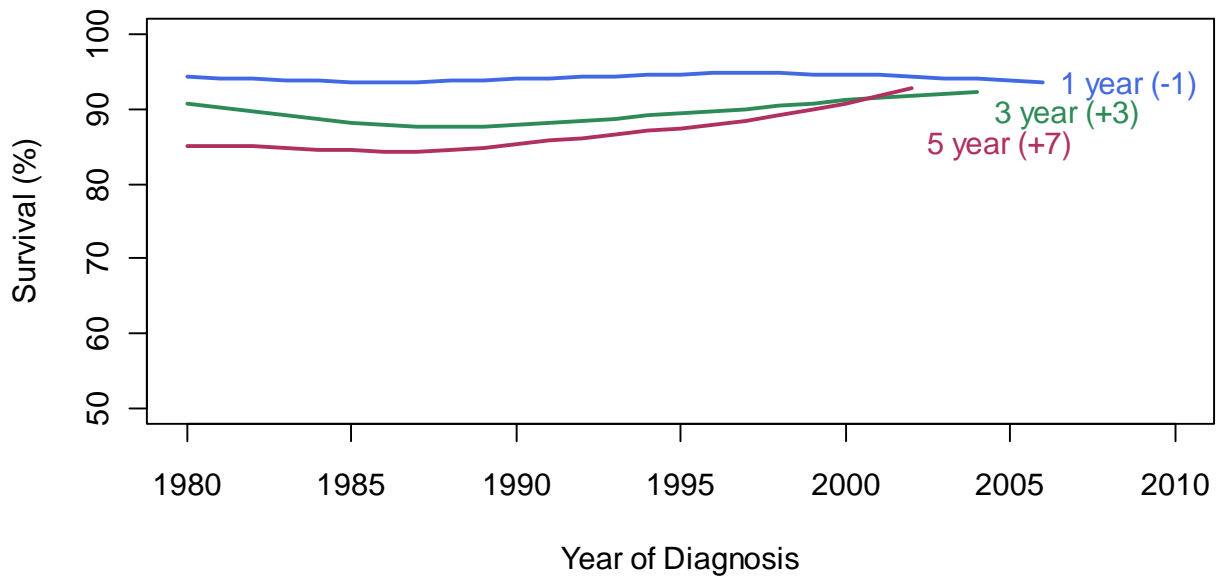


Trends in 1, 3 & 5 Year Relative Survival Rates by Cancer Type for BC Adults Diagnosed between 1980 and 2007 (percentage point change over last 10 years)*[@]
(cont.)

Esophagus



Hodgkin Lymphoma



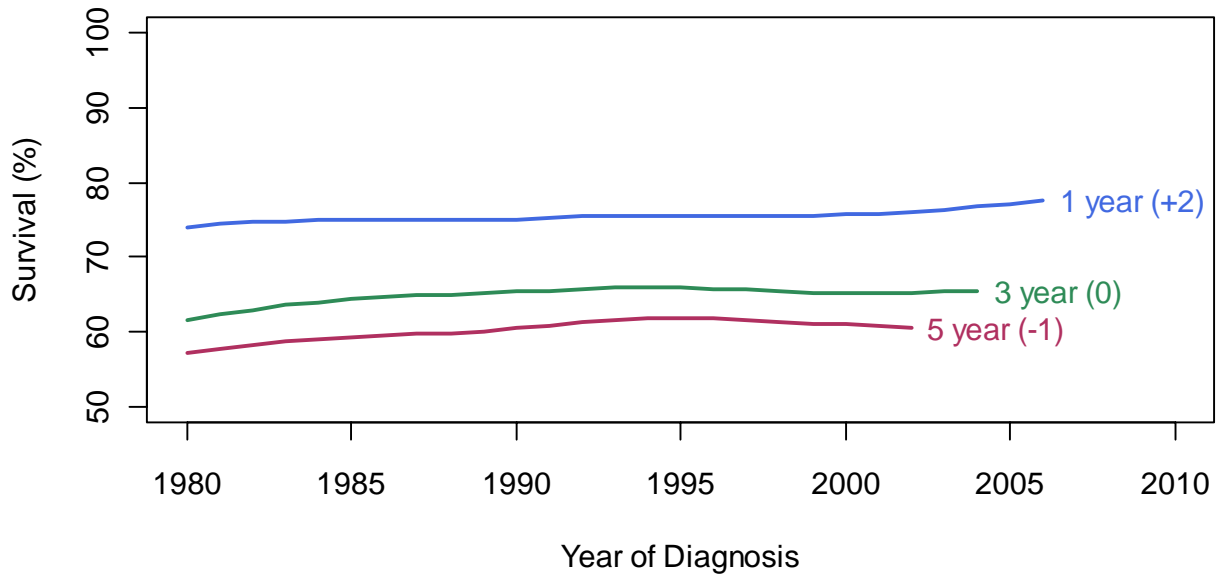
* Scales vary by cancer type

[@] The number in parentheses shows the percentage-point change for the last 10 years of each curve.

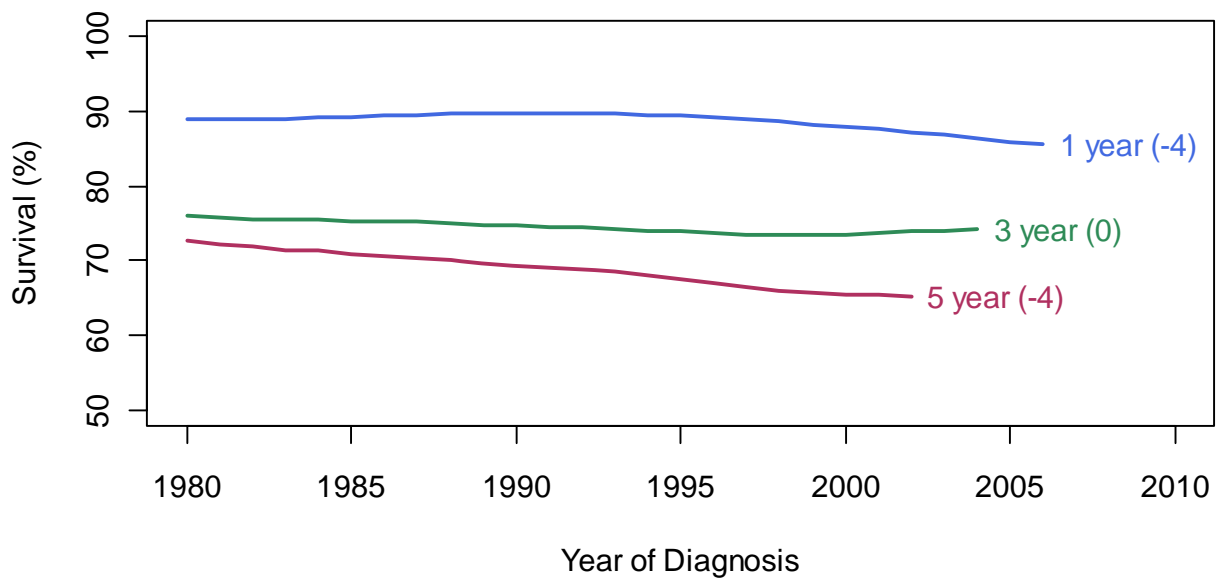


Trends in 1, 3 & 5 Year Relative Survival Rates by Cancer Type for BC Adults Diagnosed between 1980 and 2007 (percentage point change over last 10 years)*[@]
(cont.)

Kidney



Larynx



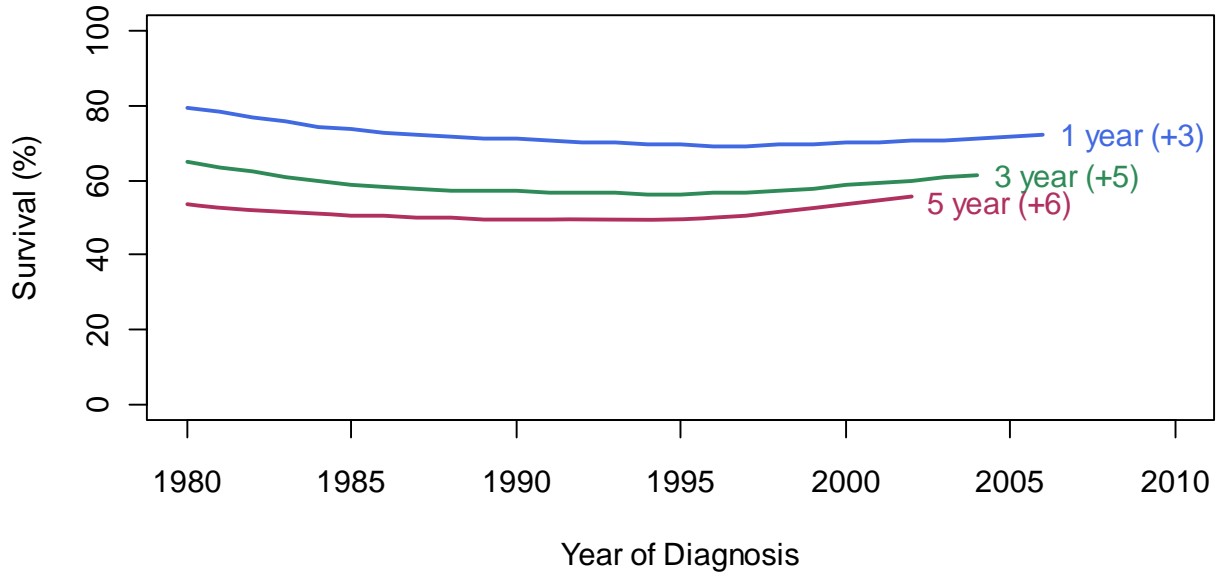
* Scales vary by cancer type

[@] The number in parentheses shows the percentage-point change for the last 10 years of each curve.

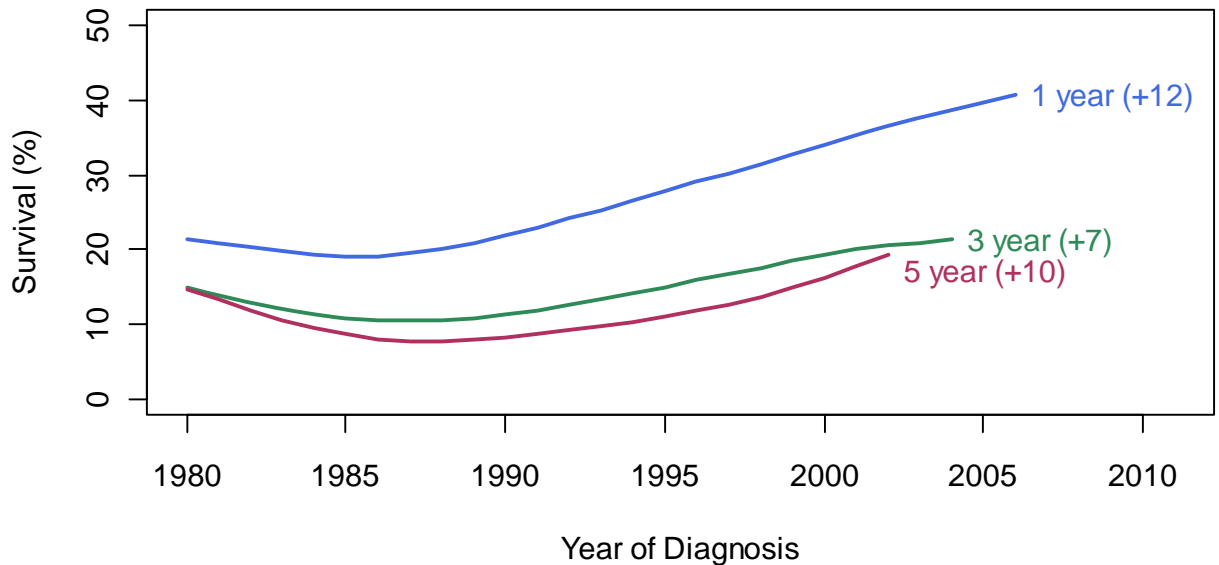


Trends in 1, 3 & 5 Year Relative Survival Rates by Cancer Type for BC Adults Diagnosed between 1980 and 2007 (percentage point change over last 10 years)*[®] (cont.)

Leukemia



Liver



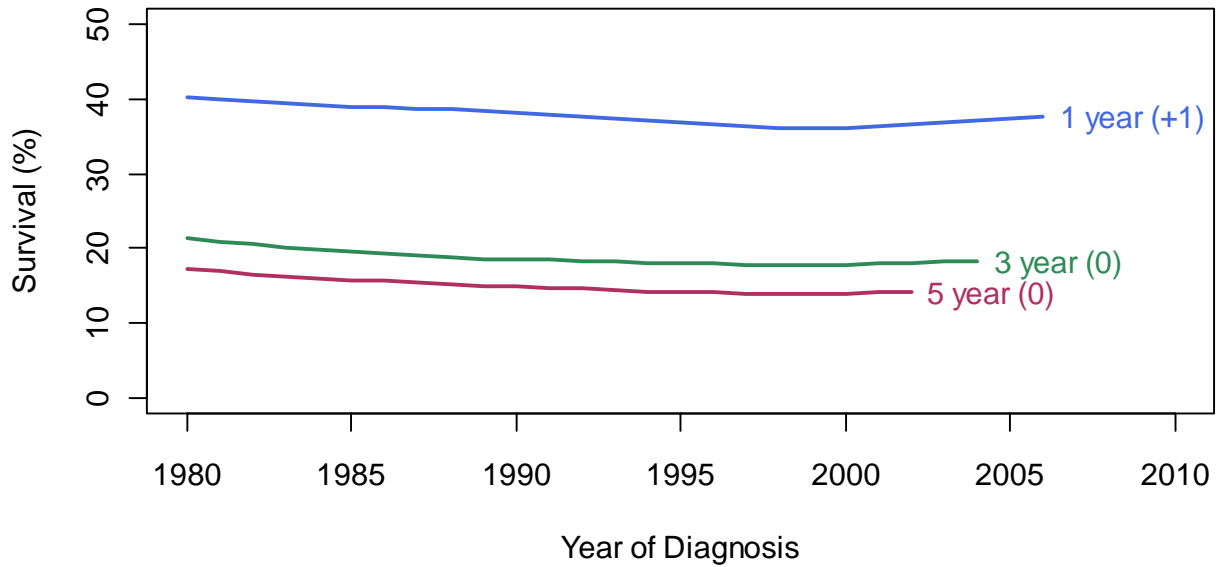
* Scales vary by cancer type

[®] The number in parentheses shows the percentage-point change for the last 10 years of each curve.



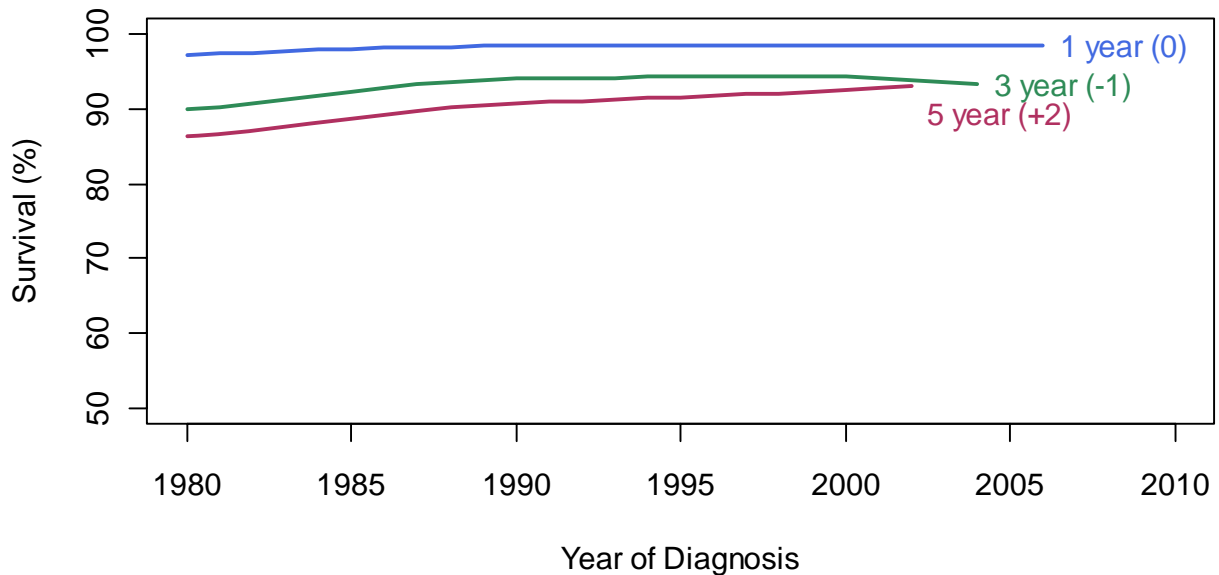
Trends in 1, 3 & 5 Year Relative Survival Rates by Cancer Type for BC Adults Diagnosed between 1980 and 2007 (percentage point change over last 10 years)*[®] (cont.)

Lung



The apparent drop in relative survival for lung cancers is affected by the decrease in the rate of DCO cancers from 13% in the 1980's to less than 2% after 2000. If late-stage cancers are more likely to be detected in recent years, this would result in the appearance that survival times are decreasing (since DCO-cancers are not included in survival statistics).

Melanoma



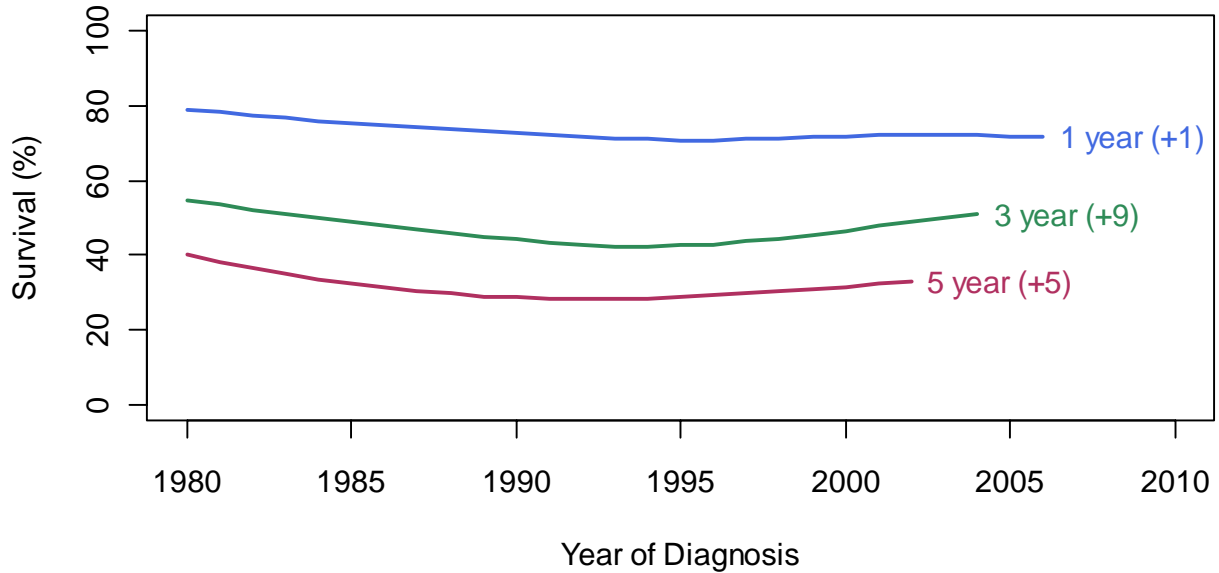
*Scales vary by cancer type

[®] The number in parentheses shows the percentage-point change for the last 10 years of each curve.

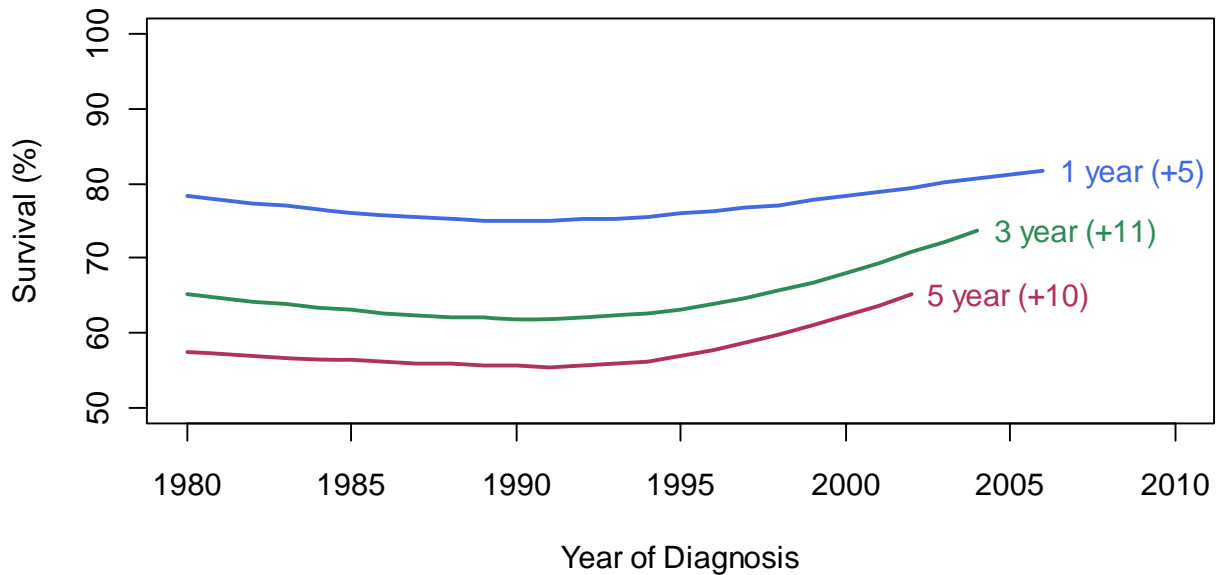


Trends in 1, 3 & 5 Year Relative Survival Rates by Cancer Type for BC Adults Diagnosed between 1980 and 2007 (percentage point change over last 10 years)*[@]
(cont.)

Multiple Myeloma



Non-Hodgkin Lymphoma



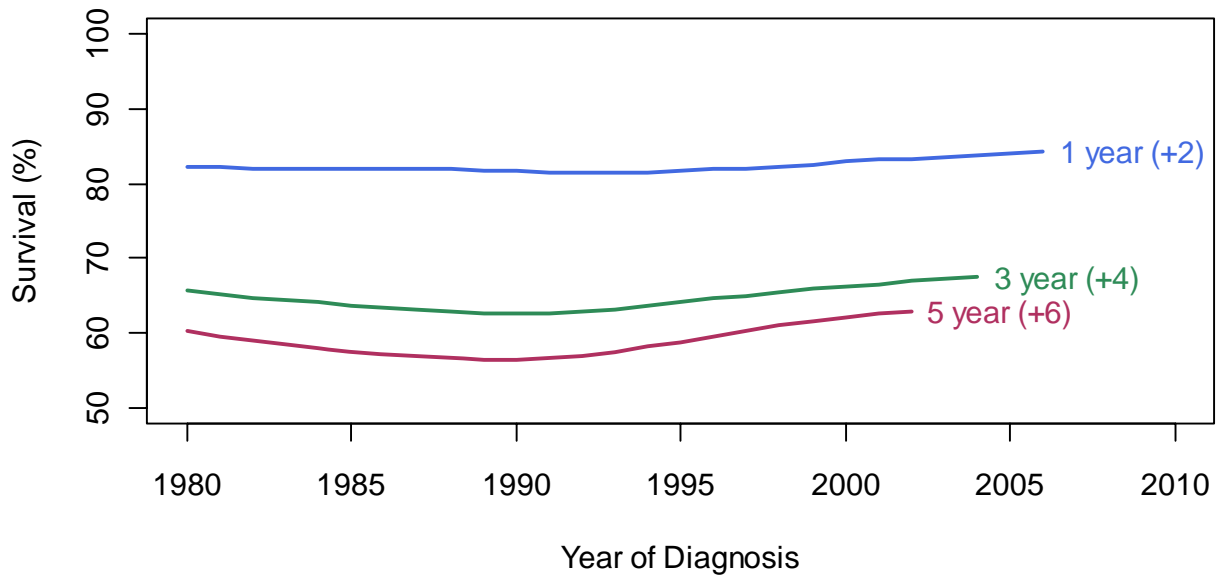
*Scales vary by cancer type

[@] The number in parentheses shows the percentage-point change for the last 10 years of each curve.

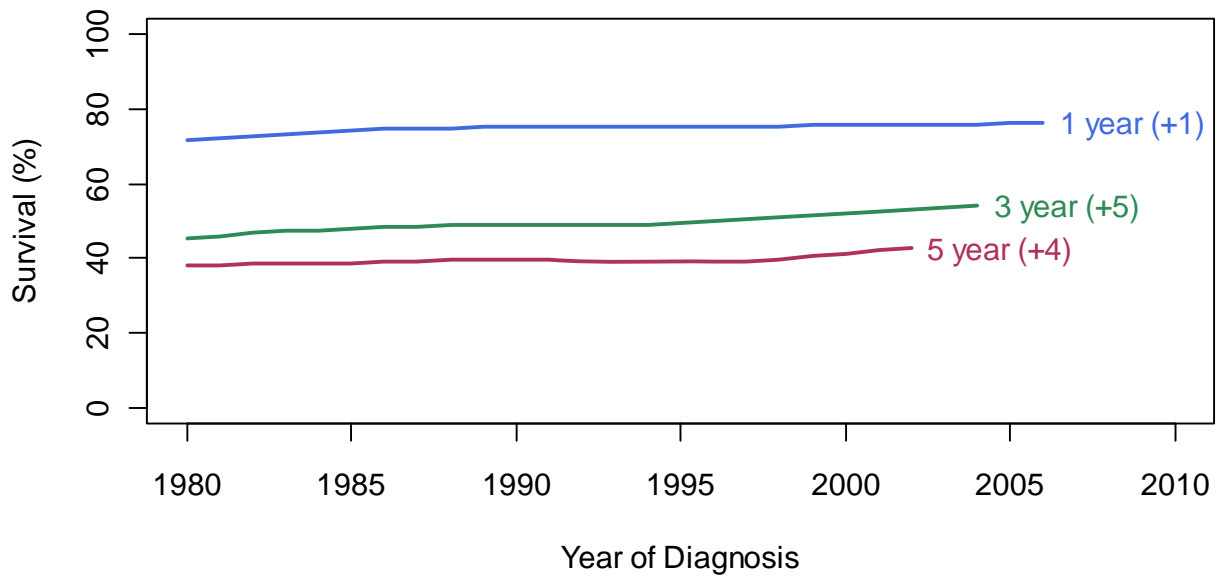


Trends in 1, 3 & 5 Year Relative Survival Rates by Cancer Type for BC Adults Diagnosed between 1980 and 2007 (percentage point change over last 10 years)*[®]
 (cont.)

Oral



Ovary



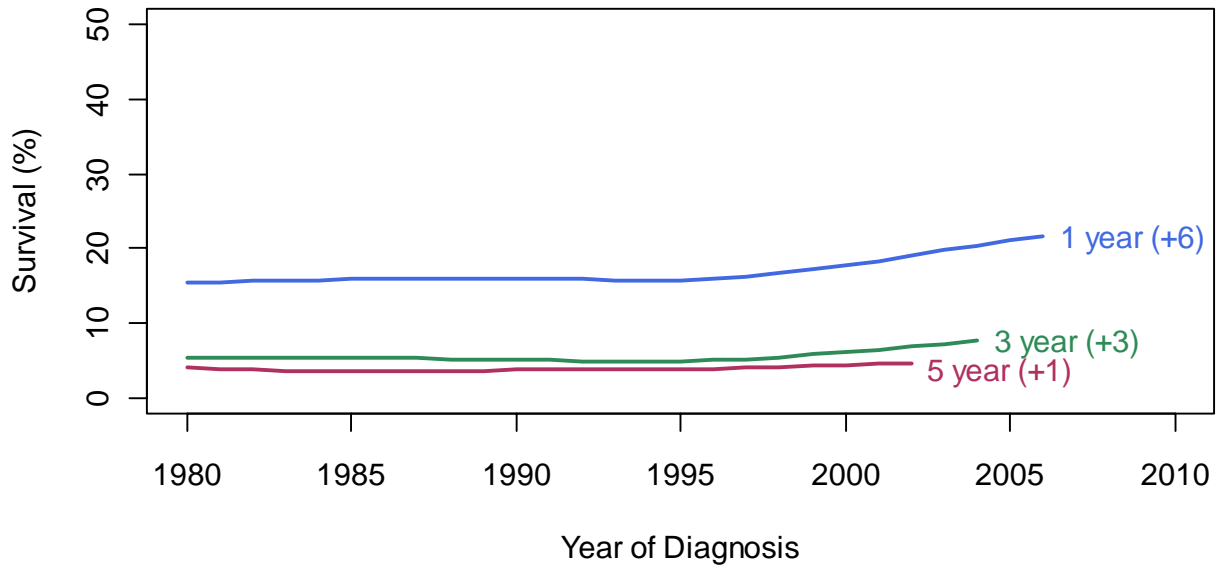
* Scales vary by cancer type

[®] The number in parentheses shows the percentage-point change for the last 10 years of each curve.

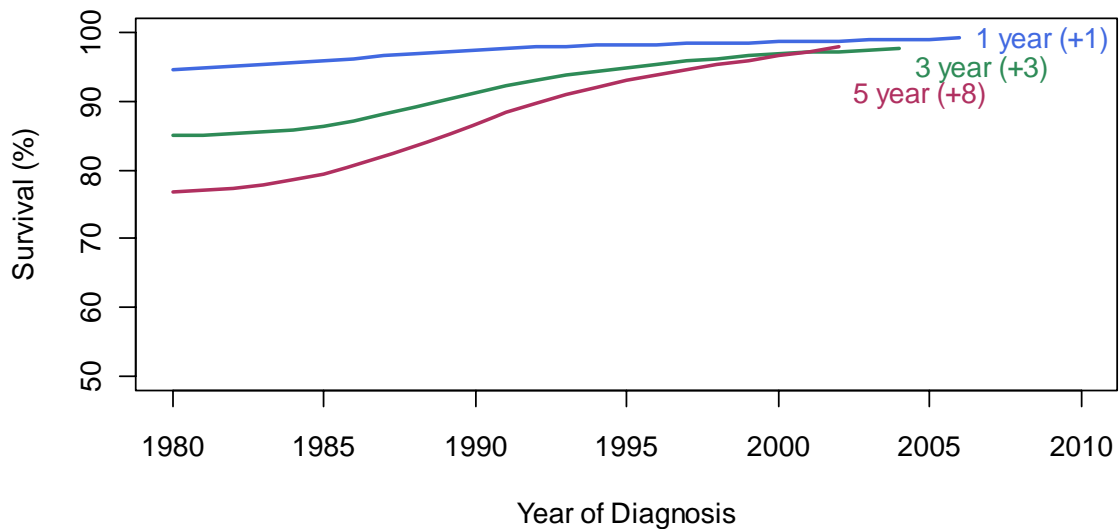


Trends in 1, 3 & 5 Year Relative Survival Rates by Cancer Type for BC Adults Diagnosed between 1980 and 2007 (percentage point change over last 10 years)*[@]
 (cont.)

Pancreas



Prostate



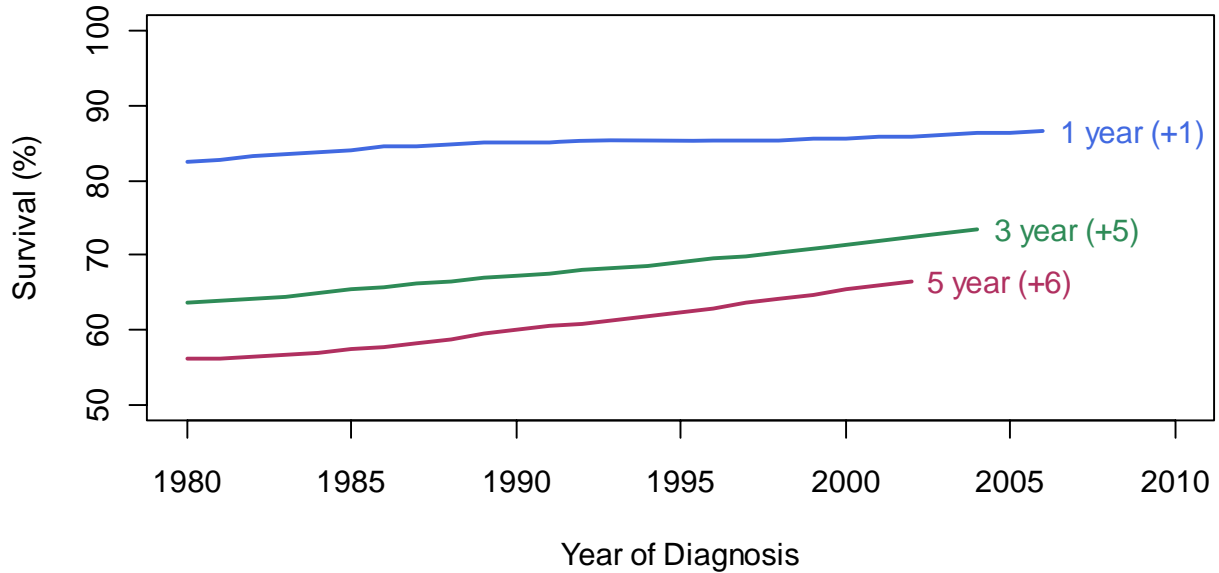
* Scales vary by cancer type

[@] The number in parentheses shows the percentage-point change for the last 10 years of each curve.

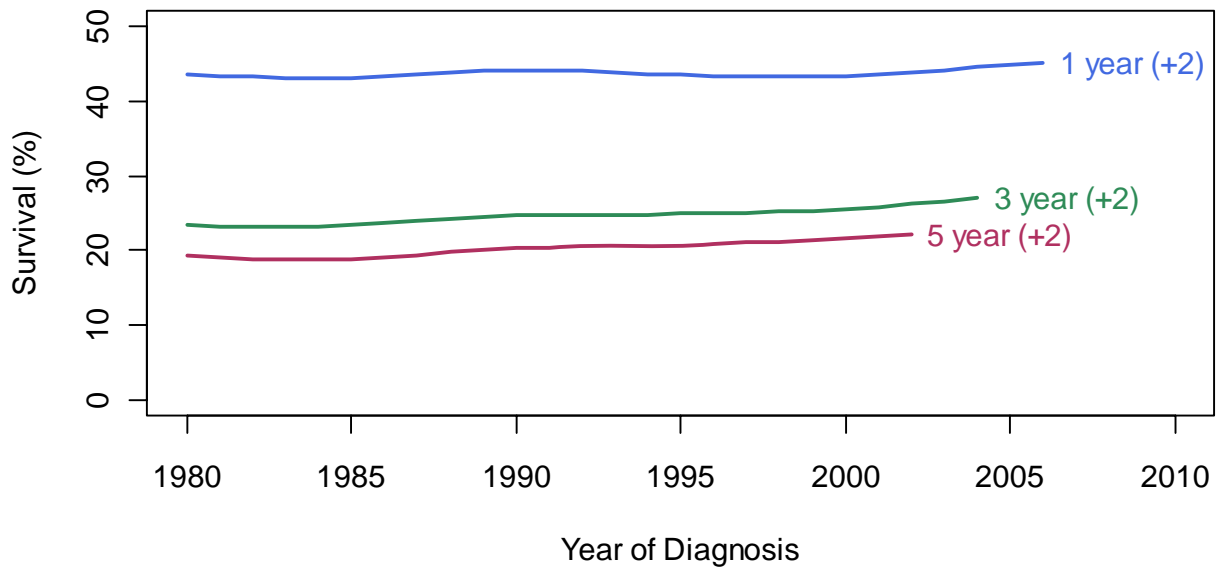


Trends in 1, 3 & 5 Year Relative Survival Rates by Cancer Type for BC Adults Diagnosed between 1980 and 2007 (percentage point change over last 10 years)*[@]
 (cont.)

Rectum



Stomach



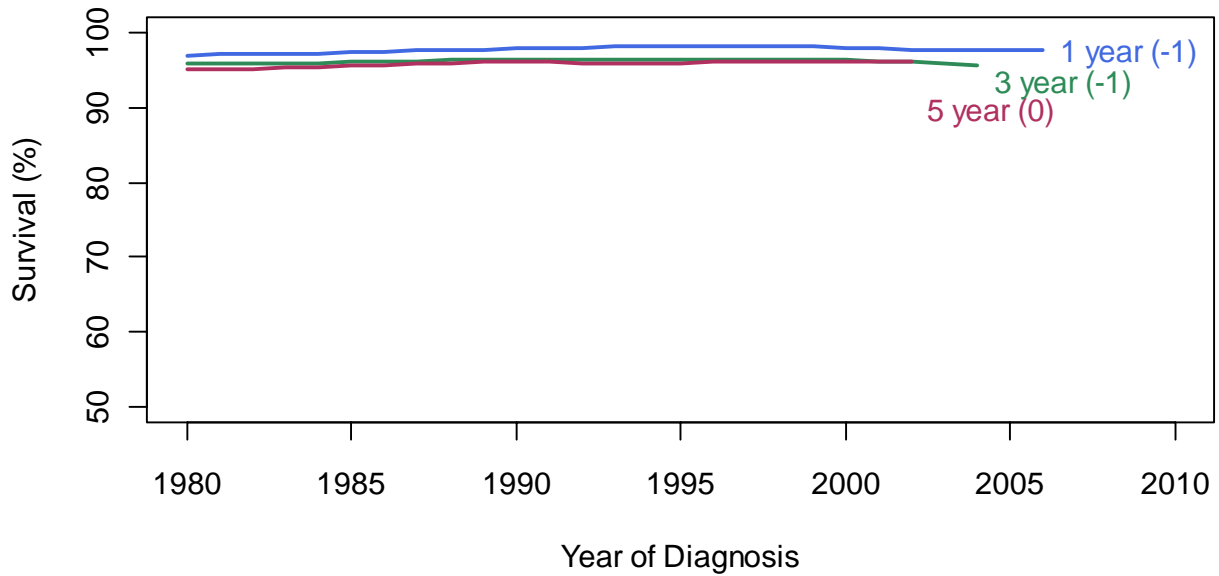
* Scales vary by cancer type

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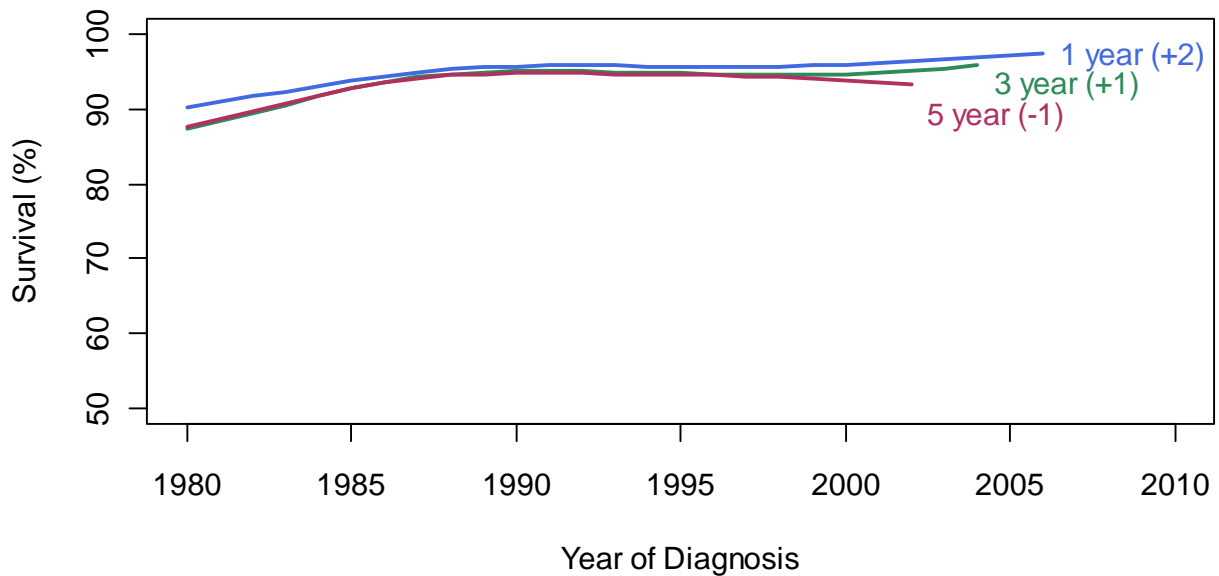


Trends in 1, 3 & 5 Year Relative Survival Rates by Cancer Type for BC Adults Diagnosed between 1980 and 2007 (percentage point change over last 10 years)*[@]
(cont.)

Testis



Thyroid



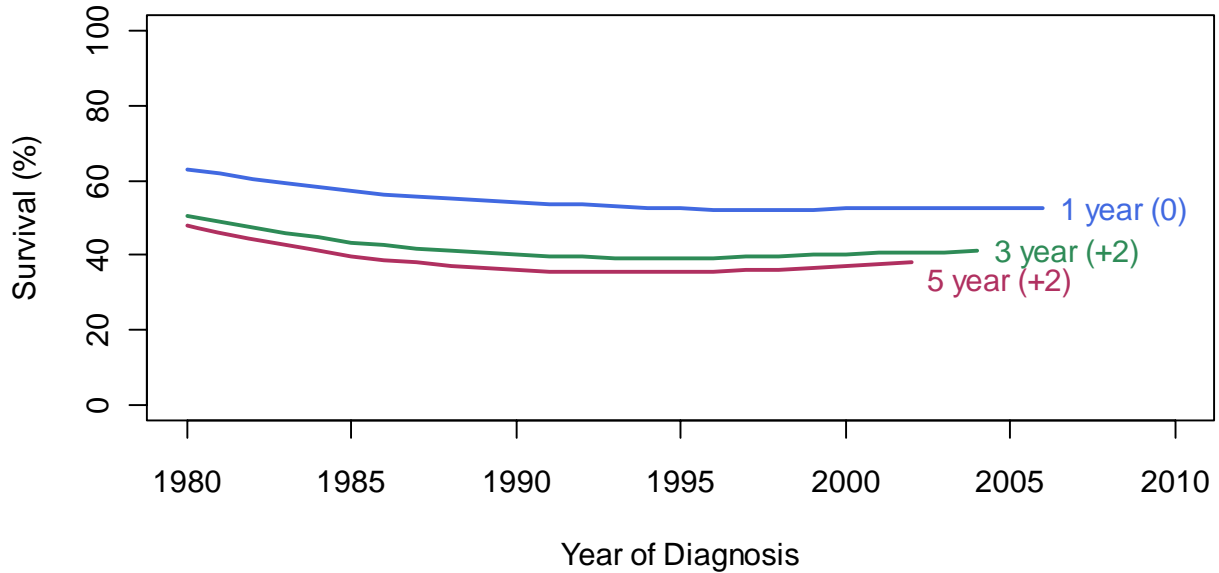
* Scales vary by cancer type

[@] The number in parentheses shows the percentage-point change for the last 10 years of each curve.

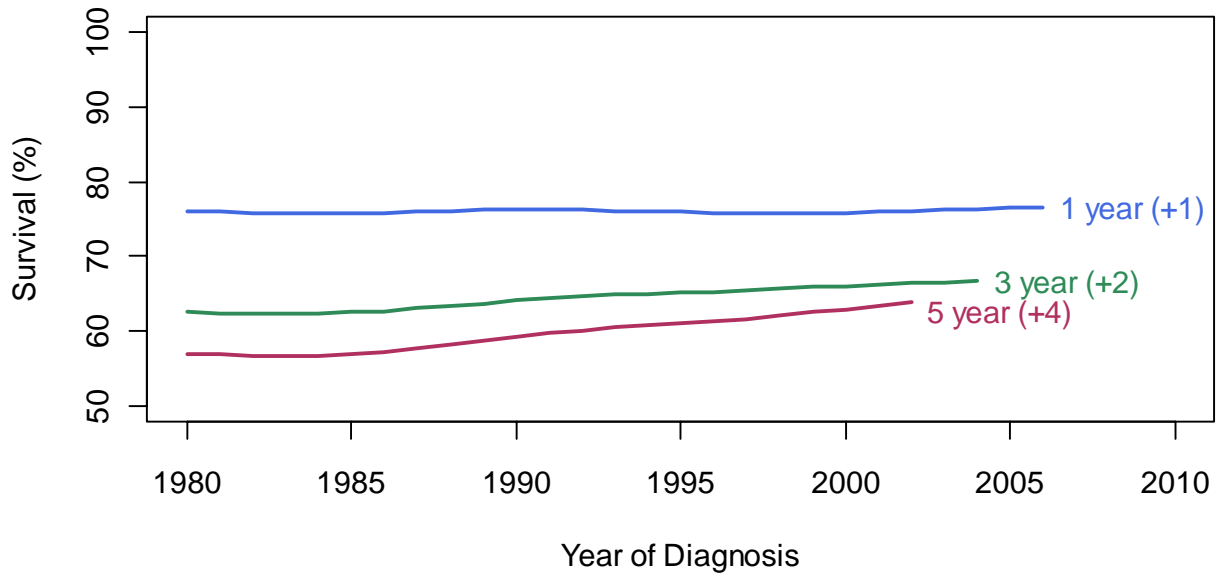


Trends in 1, 3 & 5 Year Relative Survival Rates by Cancer Type for BC Adults Diagnosed between 1980 and 2007 (percentage point change over last 10 years)*[®] (cont.)

All Other Cancers



All Cancers



* Scales vary by cancer type

[®] The number in parentheses shows the percentage-point change for the last 10 years of each curve.



1, 3 & 5 Year Relative Survival Rates by Cancer Type for Patients *Referred to the BC Cancer Agency in 2006, 2004 and 2002 Respectively

Cancer Type	New Referrals 2007	Diagnosis Year = 2006	Diagnosis Year = 2004	Diagnosis Year =2002
		1 Year Relative Survival (%)	3 Year Relative Survival (%)	5 Year Relative Survival (%)
Bladder (incl. in-situ cases)	163	62	40	25
Body of Uterus	319	94	84	81
Brain	212	48	30	24
Breast	2349	99	95	91
Cervix	123	89	80	73
Colon	758	88	68	62
Esophagus	144	33	15	14
Hodgkin Lymphoma	54	96	98	95
Kidney	91	59	32	19
Larynx	101	88	71	64
Leukemia	122	86	68	67
Liver	98	48	14	26
Lung	1770	40	18	11
Melanoma	281	100	88	89
Multiple Myeloma	138	69	49	38
Non-Hodgkin Lymphoma	585	85	81	68
Oral	372	83	63	53
Ovary	179	89	66	50
Pancreas	204	31	14	6
Prostate	1583	100	99	99
Rectum	640	93	75	64
Stomach	244	47	25	19
Testis	82	100	98	97
Thyroid	145	97	99	93
All Other Cancers	754	59	42	33
All Cancers	11511	80	67	64

**Referred: Patients referred to the BC Cancer Agency within 6 months of diagnosis.*



Age and Sex Adjusted 5 Year Disease-Specific Survival for Breast, Colorectal, Lung and Prostate Cancer by Health Authority Region for BC Adults Diagnosed between 2002 and 2007

Cancer Type	BC Health Authority Regions									
	Interior		Fraser		Vancouver Coastal		Vancouver Island		Northern	
	# Cases	Survival (%)	# Cases	Survival (%)	# Cases	Survival (%)	# Cases	Survival (%)	# Cases	Survival (%)
Breast (female)	2650	90	4457	89	3454	92	2888	88	755	86
Colorectal	2500	68	3778	66	2841	68	2683	66	691	60
Lung	2907	18	3861	18	2512	19	2677	17	794	13
Prostate	2915	91	5124	94	3265	94	3331	94	903	94

Excludes: age <20 and 80+, dco and autopsy only's, second primaries, cases with a blank/unknown postal code a follows; breast 0.6%, colorectal 0.9%, lung 0.8%, prostate 1.2%.



Technical Notes

*Death Certificate Only (DCO)/Autopsy Only Rates by Cancer Type for Diagnosis Years 2006, 2004 and 2002 Respectively

Cancer Type	Diagnosis Year / DCO and Autopsy Only Combined Rate		
	2006	2004	2002
	Rate (%)	Rate (%)	Rate (%)
Bladder (incl: in-situ cases)	0.9	0.5	0.4
Body of Uterus	0.7	1	1.3
Brain	2.3	1.7	1.4
Breast	0.5	0.6	0.3
Cervix	0	2	0
Colon	2	1.6	0.6
Esophagus	1.3	1.3	0.5
Hodgkin Lymphoma	0	0	0.8
Kidney	4.2	2.6	1.2
Larynx	1	0.9	0
Leukemia	3.4	2.9	3.1
Liver	6.7	4.1	3.9
Lung	2.2	2.9	2.2
Melanoma	0.1	0.3	0
Multiple Myeloma	2	1.5	0.9
Non-Hodgkin Lymphoma	0.6	0.6	1
Oral	0.8	0	0
Ovary	3.6	0	1.8
Pancreas	6.2	5.7	4.4
Prostate	0.6	0.9	0.6
Rectum	0.6	0.7	0.6
Stomach	2.5	1.7	0.9
Testis	0	0	0.9
Thyroid	0.4	0	0.9
All Other Cancers	5.9	4.9	3.4

***Death Certificate Only Cases:** *Cases diagnosed on the basis of death certificate information.*

Note: *DCO rates for pancreas and leukemia are high because of low rates of histopathology diagnosis.*



References

The lifetable used to calculate relative survival for this report was based on British Columbia mortality rates, published by Statistics Canada.

Relevant References

- Edderer F, Axtell LM, Cutler SJ. The Relative Survival Rate: A Statistical Methodology. In: End Results and Mortality Trends in Cancer. National Cancer Institute Monograph #6, Washington DC, US Government Printing Office, 1961, p101-21.
- Hakulinen T. On Long-Term Survival Rates. *Journal of Chronic Disease*, 1977, 30:431-43.
- Esteve J, Benhamou E, Croasdale M, Raymond L. Relative Survival and the Estimation of Net Survival; Elements for Further Discussion. *Statistics in Medicine*, 1990, 9:529-38.



Glossary

Autopsy Only

Cases diagnosed on the basis of autopsy information.

Communities Oncology Network

Network of cancer clinics, affiliated with the BC Cancer Agency, that provide cancer care in the communities.

Death Certificate Only (DCO)

Cases diagnosed on the basis of death certificate information.

Diagnosis Date

The earliest diagnosis date of class IV/V Cytology, positive Pathology, Autopsy Report or in the absence of the former, clinical diagnosis.

Disease Specific Survival Rate

Survival probability over time under the assumption that causes of death, other than the cancer under consideration, have been eliminated.

Number of Deaths (Mortality)

The number of deaths attributed to a particular type of cancer in a given year. Included are deaths of patients diagnosed in earlier years, persons with a new diagnosis during the year, and patients for whom a diagnosis of cancer is made only after death.

Number of New Cases (Incidence)

The number of new cases of a given type of cancer diagnosed.

The basic unit of reporting is a new case of cancer rather than an individual patient.

Overall Survival Rate

Survival rate in which deaths from any cause are counted.

Referred

Cases receiving some level of service at a BC Cancer Agency Cancer Centre or Communities Oncology Clinic.

Relative Survival Rate

Overall survival rate, which is statistically adjusted to remove the effects of deaths from causes other than the disease. Relative survival is used to estimate disease-specific survival when cause of death information is unavailable, incomplete or unreliable.

Survival Rate

Proportion of people alive at a given time after diagnosis (eg. 5-year survival rate).

Survival Time

Elapsed time between diagnosis and death.



BC Cancer Agency

CARE & RESEARCH

An agency of the Provincial Health Services Authority

BC Cancer Agency's Mission

- to reduce the incidence of cancer;
- to reduce the mortality rate of people with cancer;
- to improve the quality of life of people living with cancer.

BC Cancer Agency

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(p) 604-877-6000

(f) 604-877-6278

BC Cancer Foundation

200-601 West Broadway

Vancouver, BC

Canada V5Z 4C2

(p) 604-877-6040

(f) 604-877-6161

BC Cancer Research Centre

2-111, 675 West 10th Avenue

Vancouver, BC

Canada V5Z 1L3

(p) 604-675-8051

(f) 604-675-8180

BC Cancer Agency – Centre for the Southern Interior

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(f) 250-712-3911

BC Cancer Agency – Fraser Valley Centre

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Surrey, BC

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(f) 604-930-4049

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BC Cancer Agency – Website

www.bccancer.bc.ca