Cancer in New Brunswick 2002-2006

New Nouveau Brunswick

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Message from the New Brunswick Cancer Network (NBCN) Co-CEOs

The New Brunswick Cancer Network is pleased to provide the Provincial Cancer Report 2002-2006. This is the third New Brunswick cancer report and the very first report produced by the NBCN, which was established in the fall of 2005 as the provincial organization responsible for the development and implementation of provincial cancer strategies for all elements of cancer care. The purpose of this report is to provide updated information on cancer statistics in an effort to further our understanding of the burden of cancer in New Brunswick. This information will be useful for the public, health professionals, educational institutions and governments.

We recognize the importance of population-based cancer surveillance statistics in providing valuable evidence for program evaluation and policy development. This report furthers our understanding of the impact of population-based cancer control and surveillance activities, particularly in the area of breast cancer where a screening program has been well-established in the province since 1995. In this regard, we initiated a special topic focused on Breast Cancer and Breast cancer screening. We are also pleased to present more comprehensive statistics on pediatric cancers, an integral part of the mandate of NBCN.

Historically, data have been collected on all diagnosed cancers in New Brunswick since 1952. Thanks to the efforts of NBCN's Provincial Cancer Registry and Epidemiological Teams, we are able to collect, analyze and report on cancer incidence, mortality, survival, trends over time and future cancer projections to understand the disease and its impact. This information enables us to be in a better position to develop policies and programs across the cancer continuum, from prevention to palliation, which may affect clinical practice, system development and patient outcomes.

This report has shown improvements in cancer mortality in New Brunswick. We hope to see further progress from advances in cancer treatments as well as the development and implementation of cervical and colorectal cancer screening programs to complement our breast cancer screening program. NBCN will utilize information in this report to plan for continuing improvements in the quality of cancer care and ultimately reduce the burden of cancer in New Brunswick.

Message from the New Brunswick Cancer Network (NBCN) Co-CEOs

We extend our thanks to our epidemiologist, Dr. Bin Zhang, for his leadership in preparing this report. We would welcome any comments or recommendations you may have for improvement of this report. An evaluation form is included for feedback.

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Cancer Incidence and Mortality Profiles

Cancer Incidence

- In 2006, approximately 0.6% of New Brunswickers were diagnosed with some form of invasive cancer, with about 3,912 new invasive cases diagnosed yearly between 2002 and 2006.

- The age-standardized incidence rates (*ASIR*) for all cancers combined were stable during the past decade (males: 501.6 cases in 1997-2001[1] to 499.9 cases per 100,000 population in 2002-2006; females: 353.9 to 357.8 cases per 100,000 population; Tables 1-2). The total number of new cancer cases in males increased from 9,460 in 1997-2001 to 10,495 cases in 2002-2006 and for females from 8,186 to 9,063 cases. For both genders combined 10.7 new cancer cases were diagnosed per day for the period 2002-2006 in New Brunswick compared to 9.7 new cancer cases per day between 1997 and 2001.

- The leading four cancers in New Brunswick were lung, colorectal, prostate and breast cancer. Prostate cancer continued to be the leading site for males and breast cancer for females.

- In males, prostate, lung and colorectal cancers accounted for 58.2% of all cancers diagnosed between 2002 and 2006. For females, a similar proportion (54.9%) was attributed to breast, colorectal and lung cancers in this period.

Cancer Mortality

- The age-standardized mortality rates (*ASMR*) declined for all cancers combined in both males and females. For males, the *ASMR* declined from 247.4 deaths in 1997-2001 to 229.2 deaths per 100,000 population in 2002-2006, and for females from 148.9 to 148.4 deaths per 100,000 population (Tables 3-4). An improvement in mortality rates was observed in cancers such as stomach, colon and rectum, lung, prostate and non-Hodgkin's lymphoma in males; colon and rectum, breast and cervix uteri in females.

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- Lung cancer was the leading cause of cancer-related deaths (29.6%) in both males and females, accounting for 33.3% and 25.3% of cancer deaths, respectively. Approximately one out of three cancer deaths in males and one out of four in females was due to lung cancer alone.

Age and Sex Distribution of Cancer

- In males, 74.6% (7,831/10,495) of new cases and 84.5% (4,013/4,750) of deaths due to cancer occurred among those who were 60 years or older. In females, 64.3% (5,826/9,063) of new cases and 82.2% (3,357/4,083) of cancer deaths occurred amongst those 60 years and older.

- Leukemia (31.7%), brain (25.6%) and soft tissue (8.5%) cancers were major cancer sites for children less than 14 years of age. These cancer sites accounted for approximately 64.1% (25/39) of all cancers diagnosed in males and 67.4% (29/43) in females.

- Hodgkin's disease (19.3%), thyroid (15.6%), melanoma of the skin (9.6%) and testis (9.2%) were major cancer sites for adolescents and young adults from 15 to 29 years of age. These cancer sites consisted of 53.2% (50/94) of all cancers diagnosed in male and 54.0% (67/124) in female adolescents and young adults.

- Lung (16.5%), prostate (15.1%), breast (13.0%) and colorectal (12.8%) were major cancer sites for adults who were 30 years or older. In total, these cancer sites constituted 59.1% (6,124/10,362) of all cancers diagnosed in males and 55.8% (4,963/8,896) in females, respectively.

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Geographic Distribution of Cancer

The geographic boundaries of New Brunswick's seven health zones are illustrated on Page 25.

Leading cancers

- The distribution of leading cancers (prostate, breast, lung and colorectal) by health zone (HZ) is presented in Figures i-iv. In all health zones, the leading cancer diagnosed in males was prostate and in females was breast. Lung cancer was the leading cause of cancer-related deaths in males and females, and was responsible for more deaths than prostate, breast and colorectal cancers combined.

Prostate cancer

- HZ6 had the highest incidence rate for prostate cancer of 178.1 cases per 100,000 population, while the lowest rate occurred in HZ4 (107.6 cases). Incidence rates in HZ2 (158.4 cases) and HZ6 (178.1 cases) were significantly higher than the provincial rate (139.3 cases).
- Mortality rates across the seven health zones were similar to the provincial rate (24.7 deaths per 100,000 population).

Breast cancer

- HZ7 had the highest incidence rate for breast cancer of 103.6 cases, while the lowest rate was found in HZ4 (83.0 cases), compared with the provincial rate of 98.3 cases.
- Mortality rates across the seven health zones were comparable to the provincial rate (22.2 deaths).

Lung cancer

- In males, HZ5 had the highest incidence (105.9 cases) and mortality (90.2 deaths) rates for lung cancer. There were no significant differences in incidence and mortality rates between other health zones and the province (incidence: 89.7 cases; mortality: 76.5 deaths).
- In females, the highest rates for incidence (62.8 cases) and mortality (48.7 deaths) occurred in HZ2. These rates were significantly higher than the provincial rates (incidence: 52.5 cases; mortality: 39.7 deaths).

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Colorectal cancer

- In males, HZ4 had the highest incidence rate for colorectal cancer of 67.2 cases, while the highest mortality rate occurred in HZ7 (31.0 deaths). There were no significant differences in both rates between other health zones and the province (incidence: 62.5 cases; mortality: 25.5 deaths).
- In females, the highest incidence and mortality rates were found in HZ4 (52.1 cases) and HZ7 (20.3 deaths), respectively. The incidence rate in HZ5 (28.4 cases) was significantly lower than the provincial rate (42.0 cases).

Cancer Incidence and Mortality Trends 1989-2006

- The *ASIRs* for all cancer sites combined in New Brunswick showed a slight increase with an average annual percentage change (AAPC) of +0.1% for males and +0.6% for females. These increases were largely due to the influence of prostate cancer in males as well as lung cancer in females. The *ASMRs* for all cancer sites combined decreased significantly for both genders (AAPC for males: -0.7%; -0.4% for females).

- The *ASIRs* and *ASMRs* for lung cancer in males have significantly decreased since 1989 (AAPC for incidence: -1.1%; -1.1% for mortality). However, an increasing trend was observed for both rates in females (incidence: +2.6%; mortality: +2.5%).

- The *ASIR* for non-Hodgkin's lymphoma (NHL) in males significantly increased by +1.9% per year; an increasing trend was also observed in females by +1.2% per year.

- The *ASIR* of thyroid cancer for males and females increased significantly with an average annual increase of +7.9% and +18.0%, respectively. Thyroid cancer is the most rapidly increasing form of cancer in Canada. This finding was similar to the national trend and this upward increase in the incidence rate may be related to changes in diagnostic practices and imaging techniques, resulting in improved detection of earlier stage, asymptomatic cancers.[2]

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- Overall, decreasing trends were observed for both genders in cancer incidence rates: colorectal (males: -0.2%; females: -0.8%); leukemia (males: -0.3%); stomach (males: -2.1%) and melanoma of the skin (females: -1.7%). Similarly, decreasing trends in mortality rates were also noted: colorectal (males: -1.1%; females: -2.5%); bladder (males: -0.4%); leukemia (males: -0.4%; females: -1.3%) and stomach (-3.8% for males and -3.7% for females).

Relative Cancer Survival Ratio

- Five-year relative survival ratios were highest for patients diagnosed with prostate cancer (97.3%), followed by breast cancer (86.0%), colorectal cancer (males: 59.7%; females: 63.7%), and lung cancer (males: 16.0%; females: 15.5%). Relative survival ratio for lung cancer was significantly lower than for other major cancers (i.e., prostate, breast and colorectal), and survival decreased with increasing age.

- Five-year relative survival ratios were consistently higher for breast cancer patients diagnosed in the early stages (Stage I: 96.1%; Stage II: 89.0%; Stage III: 67.6% and Stage IV: 57.5%).

- Five-year relative survival ratios for males and females diagnosed with thyroid cancer were 79.7% and 100.0%*. Thyroid cancer for females had the highest estimated five-year relative survival ratio and this finding was consistent with the national observation.[3]

- Five-year survival ratio for testicular cancer was 94.8%.

- Five-year survival ratios for ovarian and cervical cancers were 36.2% and 75.7%, respectively.

* The relative survival ratio for females with thyroid cancer was truncated from 100.7 to 100.0%.

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Projections for Cancer Incidence and Mortality

- Based on the continuation of past and current trends, males will have an estimated five year total of 12,343 new cases (i.e., 6.8 new cases per day) of cancer and 5,290 deaths (2.9 deaths per day) from cancer for the period 2011 to 2015. This represents a 17.6% increase in incidence and 11.4% increase in mortality compared to the actual counts in 2002-2006. For females, the estimated new cancer cases and deaths are expected to be 10,725 (5.9 new cases per day; 18.3% increase) and 4,453 (2.4 deaths per day; 9.1% increase), respectively.

- Three types of cancer are expected to account for the majority of new cases in each gender between 2011 and 2015: prostate, lung and colorectal in males and breast, lung and colorectal in females. Lung and colorectal cancers will remain the first and second leading cause of cancer death for both genders.

Table 1: Age-Standardized Cancer Incidence Rates* for Males by Site, New Brunswick, 2002-2006

Cancer Site	Total Incidence		Crude Rate (95% CI)			Age-Standardized Rate (95% CI)		
	2002-2006	2006	2002-2006		2006	2002-2006		2006
All Sites	**10,495**	**2,272**	**565.3**	**(554.5-576.1)**	**614.9**	**499.9**	**(490.3-509.4)**	**519.7**
Buccal Cavity and Pharynx	**283**	**56**	**15.2**	**(13.5-17.0)**	**15.2**	**13.1**	**(11.6-14.7)**	**12.6**
Lip	49	15	2.6	(1.9-3.4)	4.1	2.4	(1.8-3.1)	3.6
Tongue	49	9	2.6	(1.9-3.4)	2.4	2.2	(1.6-2.8)	2.2
Major Salivary Gland	33	8	1.8	(1.2-2.4)	2.2	1.7	(1.1-2.2)	1.8
Floor of the Mouth	16	<5	0.9	(0.4-1.3)	0.8	0.8	(0.4-1.2)	0.8
Gum and Other Mouth	30	<5	1.6	(1.0-2.2)	0.8	1.5	(0.9-2.0)	0.7
Nasopharynx	23	6	1.2	(0.7-1.7)	1.6	1.0	(0.6-1.4)	1.2
Oropharynx	6	<5	0.3	(0.1-0.6)	0.0	0.3	(0.1-0.5)	0.0
Hypopharynx	19	<5	1.0	(0.6-1.5)	0.3	0.9	(0.5-1.3)	0.2
Other Buccal Cavity and Pharynx	58	11	3.1	(2.3-3.9)	3.0	2.5	(1.8-3.1)	2.1
Digestive System	**2,187**	**460**	**117.8**	**(112.9-122.7)**	**124.5**	**103.5**	**(99.2-107.9)**	**104.5**
Esophagus	149	27	8.0	(6.7-9.3)	7.3	6.9	(5.8-8.0)	6.0
Stomach	261	54	14.1	(12.4-15.8)	14.6	12.5	(11.0-14.0)	12.6
Small Intestine	33	8	1.8	(1.2-2.4)	2.2	1.6	(1.0-2.1)	2.0
Colorectal	**1,327**	**288**	**71.5**	**(67.6-75.3)**	**77.9**	**62.5**	**(59.1-65.8)**	**64.3**
Colon Excluding Rectum	754	157	40.6	(37.7-43.5)	42.5	35.9	(33.4-38.5)	35.8
Rectum and Rectosigmoid	550	126	29.6	(27.2-32.1)	34.1	25.5	(23.3-27.6)	27.5
Anus	23	5	1.2	(0.7-1.7)	1.4	1.1	(0.6-1.5)	1.0
Liver	57	19	3.1	(2.3-3.9)	5.1	2.7	(2.0-3.4)	4.2
Gall Bladder	13	<5	0.7	(0.3-1.1)	0.8	0.7	(0.3-1.0)	0.8
Pancreas	278	50	15.0	(13.2-16.7)	13.5	13.5	(11.9-15.0)	12.0
Other Digestive System	69	11	3.7	(2.8-4.6)	3.0	3.3	(2.5-4.1)	2.6
Respiratory System	**2,019**	**395**	**108.8**	**(104.0-113.5)**	**106.9**	**96.9**	**(92.7-101.2)**	**91.5**
Larynx	135	22	7.3	(6.0-8.5)	6.0	6.3	(5.2-7.4)	5.1
Lung	1,865	368	100.5	(95.9-105.0)	99.6	89.7	(85.7-93.8)	85.3
Other Respiratory System	19	5	1.0	(0.6-1.5)	1.4	0.9	(0.5-1.3)	1.2
Bones and Joints	**20**	**<5**	**1.1**	**(0.6-1.5)**	**1.1**	**1.0**	**(0.6-1.5)**	**1.2**
Soft Tissue (Including Heart)	**77**	**17**	**4.1**	**(3.2-5.1)**	**4.6**	**3.7**	**(2.8-4.5)**	**4.0**
Breast	**18**	**<5**	**1.0**	**(0.5-1.4)**	**0.8**	**0.9**	**(0.5-1.3)**	**0.7**
Male Genital System	**3,023**	**735**	**162.8**	**(157.0-168.6)**	**198.9**	**145.0**	**(139.8-150.2)**	**167.6**
Prostate	2,919	719	157.2	(151.5-162.9)	194.6	139.3	(134.3-144.4)	163.3
Testis	69	12	3.7	(2.8-4.6)	3.2	4.0	(3.1-5.0)	3.3
Penis	31	<5	1.7	(1.1-2.3)	1.1	1.5	(1.0-2.0)	1.0
Other Male Genital System	<5	<5	0.2	(0.0-0.4)	0.0	0.2	(0.0-0.3)	0.0
Urinary System	**1,104**	**226**	**59.5**	**(56.0-63.0)**	**61.2**	**51.7**	**(48.6-54.7)**	**51.3**
Bladder (Excluding In Situ)	689	146	37.1	(34.3-39.9)	39.5	32.9	(30.4-35.3)	33.4
Kidney and Renal Pelvis	395	78	21.3	(19.2-23.4)	21.1	17.9	(16.1-19.7)	17.5
Ureter	18	<5	1.0	(0.5-1.4)	0.5	0.8	(0.4-1.2)	0.5
Other Urinary System	<5	<5	0.1	(0.0-0.3)	0.0	0.1	(0.0-0.2)	0.0
Eye	**10**	**5**	**0.5**	**(0.2-0.9)**	**1.4**	**0.5**	**(0.2-0.8)**	**1.1**
Brain and Other Nervous System	**174**	**31**	**9.4**	**(8.0-10.8)**	**8.4**	**8.2**	**(7.0-9.5)**	**7.0**
Brain	167	31	9.0	(7.6-10.4)	8.4	7.9	(6.7-9.2)	7.0
Other Nervous System	7	<5	0.4	(0.1-0.7)	0.0	0.3	(0.1-0.5)	0.0
Endocrine	**102**	**32**	**5.5**	**(4.4-6.6)**	**8.7**	**4.7**	**(3.8-5.6)**	**7.4**
Thyroid	94	31	5.1	(4.0-6.1)	8.4	4.3	(3.5-5.2)	7.2
Other Endocrine	8	<5	0.4	(0.1-0.7)	0.3	0.4	(0.1-0.6)	0.2
Skin (Excluding Basal and Squamous)	**364**	**75**	**19.6**	**(17.6-21.6)**	**20.3**	**17.1**	**(15.3-18.9)**	**17.1**
Melanomas of the Skin	323	67	17.4	(15.5-19.3)	18.1	15.0	(13.4-16.7)	15.1
Skin, Non-Epithelial	41	8	2.2	(1.5-2.9)	2.2	2.1	(1.4-2.7)	1.9
Lymphoma	**516**	**106**	**27.8**	**(25.4-30.2)**	**28.7**	**24.7**	**(22.5-26.8)**	**24.4**
Hodgkin's Lymphoma	57	10	3.1	(2.3-3.9)	2.7	3.1	(2.3-3.9)	2.6
Non-Hodgkin's Lymphoma	459	96	24.7	(22.5-27.0)	26.0	21.6	(19.6-23.5)	21.8
Multiple Myeloma	**124**	**25**	**6.7**	**(5.5-7.9)**	**6.8**	**5.9**	**(4.9-6.9)**	**5.8**
Leukemia	**236**	**46**	**12.7**	**(11.1-14.3)**	**12.4**	**11.5**	**(10.0-13.0)**	**10.7**
Other, Ill-Defined, and Unknown	**238**	**56**	**12.8**	**(11.2-14.4)**	**15.2**	**11.3**	**(9.8-12.7)**	**12.9**

** Rates are per 100,000 population and are age-standardized to the 1991 Canadian population estimates. Counts are suppressed when fewer than five cases were reported for the specific cancer. The suppressed cases however, are included in the counts and rates for 'all sites' combined.*

Table 2: Age-Standardized Cancer Incidence Rates* for Females by Site, New Brunswick, 2002-2006

Cancer Site	Total Incidence		Crude Rate (95% CI)			Age-Standardized Rate (95% CI)		
	2002-2006	2006	2002-2006		2006	2002-2006		2006
All Sites	**9,063**	**1,903**	**476.0**	**(466.2-485.8)**	**501.2**	**357.8**	**(350.4-365.1)**	**364.9**
Buccal Cavity and Pharynx	**104**	**26**	**5.5**	**(4.4-6.5)**	**6.8**	**4.2**	**(3.4-5.0)**	**5.0**
Lip	7	<5	0.4	(0.1-0.6)	0.8	0.2	(0.1-0.4)	0.5
Tongue	22	5	1.2	(0.7-1.6)	1.3	0.9	(0.5-1.3)	0.9
Major Salivary Gland	19	<5	1.0	(0.5-1.4)	0.8	0.7	(0.4-1.0)	0.7
Floor of the Mouth	10	<5	0.5	(0.2-0.9)	0.5	0.4	(0.2-0.7)	0.4
Gum and Other Mouth	23	6	1.2	(0.7-1.7)	1.6	0.9	(0.5-1.3)	1.2
Nasopharynx	7	<5	0.4	(0.1-0.6)	0.0	0.3	(0.1-0.5)	0.0
Oropharynx	<5	<5	0.1	(0.0-0.2)	0.0	0.1	(0.0-0.1)	0.0
Hypopharynx	<5	<5	0.0	(0.0-0.0)	0.0	0.0	(0.0-0.0)	0.0
Other Buccal Cavity and Pharynx	15	7	0.8	(0.4-1.2)	1.8	0.6	(0.3-0.9)	1.3
Digestive System	**1,776**	**337**	**93.3**	**(88.9-97.6)**	**88.8**	**65.1**	**(62.1-68.2)**	**59.9**
Esophagus	50	6	2.6	(1.9-3.4)	1.6	1.8	(1.3-2.3)	1.0
Stomach	139	35	7.3	(6.1-8.5)	9.2	5.3	(4.4-6.1)	6.7
Small Intestine	27	6	1.4	(0.9-2.0)	1.6	1.0	(0.6-1.4)	1.0
Colorectal	**1,143**	**213**	**60.0**	**(56.6-63.5)**	**56.1**	**42.0**	**(39.6-44.5)**	**38.1**
Colon Excluding Rectum	778	140	40.9	(38.0-43.7)	36.9	28.1	(26.2-30.1)	24.3
Rectum and Rectosigmoid	336	66	17.6	(15.8-19.5)	17.4	12.7	(11.4-14.1)	12.6
Anus	29	7	1.5	(1.0-2.1)	1.8	1.2	(0.7-1.6)	1.1
Liver	15	<5	0.8	(0.4-1.2)	0.5	0.6	(0.3-0.9)	0.4
Gall Bladder	25	5	1.3	(0.8-1.8)	1.3	0.9	(0.6-1.3)	0.9
Pancreas	272	52	14.3	(12.6-16.0)	13.7	9.7	(8.6-10.9)	8.7
Other Digestive System	105	18	5.5	(4.5-6.6)	4.7	3.8	(3.0-4.5)	3.2
Respiratory System	**1,360**	**304**	**71.4**	**(67.6-75.2)**	**80.1**	**53.7**	**(50.8-56.5)**	**57.4**
Larynx	22	<5	1.2	(0.7-1.6)	0.3	0.8	(0.5-1.2)	0.2
Lung	1,330	301	69.9	(66.1-73.6)	79.3	52.5	(49.7-55.3)	56.9
Other Respiratory System	8	<5	0.4	(0.1-0.7)	0.5	0.3	(0.1-0.6)	0.4
Bones and Joints	**11**	**<5**	**0.6**	**(0.2-0.9)**	**0.5**	**0.6**	**(0.2-0.9)**	**0.4**
Soft Tissue (Including Heart)	**39**	**8**	**2.0**	**(1.4-2.7)**	**2.1**	**1.7**	**(1.2-2.3)**	**1.6**
Breast	**2,500**	**508**	**131.3**	**(126.2-136.5)**	**133.8**	**98.3**	**(94.4-102.1)**	**96.2**
Female Genital System	**1,007**	**213**	**52.9**	**(49.6-56.2)**	**56.1**	**40.7**	**(38.2-43.2)**	**40.5**
Cervix Uteri	177	28	9.3	(7.9-10.7)	7.4	8.1	(6.9-9.3)	6.0
Corpus Uteri	437	116	23.0	(20.8-25.1)	30.5	17.3	(15.7-19.0)	21.5
Uterus, Not Otherwise Specified	<5	<5	0.2	(0.0-0.4)	0.3	0.2	(0.0-0.3)	0.2
Ovary	304	55	16.0	(14.2-17.8)	14.5	11.8	(10.5-13.1)	10.4
Other Female Genital System	85	13	4.5	(3.5-5.4)	3.4	3.3	(2.6-4.0)	2.5
Urinary System	**500**	**100**	**26.3**	**(24.0-28.6)**	**26.3**	**19.5**	**(17.8-21.2)**	**19.1**
Bladder (Excluding In Situ)	237	46	12.4	(10.9-14.0)	12.1	9.0	(7.8-10.1)	8.6
Kidney and Renal Pelvis	249	52	13.1	(11.5-14.7)	13.7	10.0	(8.8-11.3)	10.1
Ureter	11	<5	0.6	(0.2-0.9)	0.3	0.4	(0.1-0.6)	0.1
Other Urinary System	<5	<5	0.2	(0.0-0.3)	0.3	0.1	(0.0-0.2)	0.2
Eye	**9**	**<5**	**0.5**	**(0.2-0.8)**	**0.3**	**0.3**	**(0.1-0.6)**	**0.2**
Brain and Other Nervous System	**138**	**36**	**7.3**	**(6.0-8.5)**	**9.5**	**6.1**	**(5.1-7.2)**	**8.4**
Brain	128	34	6.7	(5.6-7.9)	9.0	5.7	(4.7-6.7)	8.0
Other Nervous System	10	<5	0.5	(0.2-0.9)	0.5	0.5	(0.2-0.7)	0.4
Endocrine	**354**	**88**	**18.6**	**(16.7-20.5)**	**23.2**	**16.7**	**(15.0-18.5)**	**21.8**
Thyroid	344	87	18.1	(16.2-20.0)	22.9	16.2	(14.5-17.9)	21.4
Other Endocrine	10	<5	0.5	(0.2-0.9)	0.3	0.5	(0.2-0.8)	0.4
Skin (Excluding Basal and Squamous)	**322**	**81**	**16.9**	**(15.1-18.8)**	**21.3**	**13.7**	**(12.2-15.2)**	**16.3**
Melanomas of the Skin	288	72	15.1	(13.4-16.9)	19.0	12.4	(11.0-13.9)	14.6
Skin, Non-Epithelial	34	9	1.8	(1.2-2.4)	2.4	1.2	(0.8-1.7)	1.7
Lymphoma	**424**	**93**	**22.3**	**(20.2-24.4)**	**24.5**	**17.2**	**(15.6-18.9)**	**18.6**
Hodgkin's Lymphoma	52	13	2.7	(2.0-3.5)	3.4	2.8	(2.1-3.6)	3.3
Non-Hodgkin's Lymphoma	372	80	19.5	(17.6-21.5)	21.1	14.4	(12.9-15.9)	15.4
Multiple Myeloma	**111**	**21**	**5.8**	**(4.7-6.9)**	**5.5**	**4.3**	**(3.5-5.1)**	**3.8**
Leukemia	**194**	**30**	**10.2**	**(8.8-11.6)**	**7.9**	**8.1**	**(7.0-9.3)**	**5.9**
Other, Ill-Defined, and Unknown	**214**	**55**	**11.2**	**(9.7-12.7)**	**14.5**	**7.4**	**(6.4-8.4)**	**9.9**

** Rates are per 100,000 population and are age-standardized to the 1991 Canadian population estimates. Counts are suppressed when fewer than five cases were reported for the specific cancer. The suppressed cases however, are included in the counts and rates for 'all sites' combined.*

Table 3: Age-Standardized Cancer Mortality Rates* for Males by Site, New Brunswick, 2002-2006

Cancer Site	Total Mortality		Crude Rate (95% CI)			Age-Standardized Rate (95% CI)		
	2002-2006	2006	2002-2006		2006	2002-2006		2006
All Sites	**4,750**	**901**	**255.9**	**(248.6-263.1)**	**243.8**	**229.2**	**(222.6-235.7)**	**209.1**
Buccal Cavity and Pharynx	**84**	**15**	**4.5**	**(3.6-5.5)**	**4.1**	**3.9**	**(3.1-4.8)**	**3.5**
Digestive System	**1,192**	**253**	**64.2**	**(60.6-67.9)**	**68.5**	**57.2**	**(54.0-60.5)**	**58.5**
Esophagus	150	39	8.1	(6.8-9.4)	10.6	6.9	(5.8-8.0)	8.4
Stomach	156	28	8.4	(7.1-9.7)	7.6	7.5	(6.4-8.7)	6.7
Small Intestine	6	<5	0.3	(0.1-0.6)	0.8	0.3	(0.1-0.6)	0.8
Colon and Rectum	529	110	28.5	(26.1-30.9)	29.8	25.5	(23.3-27.7)	25.2
Liver	50	12	2.7	(1.9-3.4)	3.2	2.4	(1.7-3.0)	2.8
Pancreas	243	44	13.1	(11.4-14.7)	11.9	11.7	(10.3-13.2)	10.6
Other Digestive System	58	17	3.1	(2.3-3.9)	4.6	2.8	(2.1-3.6)	4.0
Respiratory System	**1,645**	**303**	**88.6**	**(84.3-92.9)**	**82.0**	**79.6**	**(75.7-83.4)**	**70.0**
Larynx	58	9	3.1	(2.3-3.9)	2.4	2.8	(2.1-3.5)	2.2
Lung	1,581	293	85.2	(81.0-89.4)	79.3	76.5	(72.7-80.3)	67.6
Other Respiratory System	6	<5	0.3	(0.1-0.6)	0.3	0.3	(0.1-0.5)	0.3
Skin	**66**	**11**	**3.6**	**(2.7-4.4)**	**3.0**	**3.2**	**(2.4-3.9)**	**2.5**
Melanoma of the Skin	45	5	2.4	(1.7-3.1)	1.4	2.2	(1.5-2.8)	1.1
Other Skin	21	6	1.1	(0.6-1.6)	1.6	1.0	(0.6-1.5)	1.4
Breast	**7**	**<5**	**0.4**	**(0.1-0.7)**	**0.8**	**0.3**	**(0.1-0.6)**	**0.7**
Male Genital System	**515**	**82**	**27.7**	**(25.3-30.1)**	**22.2**	**25.3**	**(23.1-27.5)**	**19.3**
Prostate	504	79	27.1	(24.8-29.5)	21.4	24.7	(22.6-26.9)	18.6
Testis	<5	<5	0.2	(0.0-0.4)	0.3	0.2	(0.0-0.4)	0.2
Other Male Genital System	7	<5	0.4	(0.1-0.7)	0.5	0.4	(0.1-0.6)	0.5
Urinary System	**300**	**60**	**16.2**	**(14.3-18.0)**	**16.2**	**14.2**	**(12.6-15.8)**	**13.6**
Bladder	144	28	7.8	(6.5-9.0)	7.6	7.0	(5.9-8.2)	6.5
Kidney and Renal Pelvis	148	29	8.0	(6.7-9.3)	7.8	6.8	(5.7-7.9)	6.4
Other Urinary System	8	<5	0.4	(0.1-0.7)	0.8	0.4	(0.1-0.6)	0.7
Brain and Other Nervous System	**121**	**23**	**6.5**	**(5.4-7.7)**	**6.2**	**5.6**	**(4.6-6.6)**	**5.1**
Endocrine	**14**	**5**	**0.8**	**(0.4-1.1)**	**1.4**	**0.7**	**(0.3-1.0)**	**1.2**
Thyroid	8	<5	0.4	(0.1-0.7)	0.8	0.4	(0.1-0.6)	0.7
Other Endocrine System	6	<5	0.3	(0.1-0.6)	0.5	0.3	(0.1-0.5)	0.5
Lymphoma	**183**	**29**	**9.9**	**(8.4-11.3)**	**7.8**	**8.8**	**(7.5-10.0)**	**7.0**
Hodgkin's Lymphoma	<5	<5	0.2	(0.0-0.3)	0.0	0.1	(0.0-0.3)	0.0
Non-Hodgkin's Lymphoma	180	29	9.7	(8.3-11.1)	7.8	8.6	(7.4-9.9)	7.0
Multiple Myeloma	**83**	**13**	**4.5**	**(3.5-5.4)**	**3.5**	**4.0**	**(3.2-4.9)**	**3.0**
Leukemia	**137**	**29**	**7.4**	**(6.1-8.6)**	**7.8**	**6.8**	**(5.7-7.9)**	**7.0**
Other, Ill-Defined, and Unknown	**403**	**75**	**21.7**	**(19.6-23.8)**	**20.3**	**19.5**	**(17.6-21.4)**	**17.6**

** Rates are per 100,000 population and are age-standardized to the 1991 Canadian population estimates. Counts are suppressed when fewer than five cases were reported for the specific cancer. The suppressed cases however, are included in the counts and rates for 'all sites' combined.*

Table 4: Age-Standardized Cancer Mortality Rates* for Females by Site, New Brunswick, 2002-2006

Cancer Site	Total Mortality		Crude Rate (95% CI)			Age-Standardized Rate (95% CI)		
	2002-2006	2006	2002-2006		2006	2002-2006		2006
All Sites	**4,083**	**836**	**214.5**	**(207.9-221.0)**	**219.8**	**148.4**	**(143.9-153.0)**	**154.5**
Buccal Cavity and Pharynx	**31**	**<5**	**1.6**	**(1.1-2.2)**	**1.1**	**1.1**	**(0.7-1.5)**	**0.5**
Digestive System	**995**	**188**	**51.7**	**(48.5-55.0)**	**49.5**	**33.9**	**(31.8-36.1)**	**31.7**
Esophagus	54	9	2.8	(2.1-3.6)	2.4	1.9	(1.4-2.4)	1.4
Stomach	94	21	4.9	(3.9-5.9)	5.5	3.2	(2.5-3.8)	3.8
Small Intestine	7	<5	0.4	(0.1-0.6)	0.3	0.2	(0.1-0.4)	0.1
Colon and Rectum	460	81	24.2	(22.0-26.4)	21.3	15.5	(14.1-16.9)	13.3
Liver	33	<5	1.7	(1.1-2.3)	0.3	1.1	(0.7-1.5)	0.2
Pancreas	248	52	13.0	(11.4-14.6)	13.7	8.8	(7.7-9.9)	8.6
Other Digestive System	89	23	4.7	(3.7-5.6)	6.1	3.2	(2.5-3.8)	4.4
Respiratory System	**1,046**	**248**	**54.9**	**(51.6-58.3)**	**65.3**	**40.2**	**(37.7-42.6)**	**45.7**
Larynx	7	<5	0.4	(0.1-0.6)	0.0	0.3	(0.1-0.5)	0.0
Lung	1,034	248	54.3	(51.0-57.6)	65.3	39.7	(37.3-42.1)	45.7
Other Respiratory System	5	<5	0.3	(0.0-0.5)	0.0	0.2	(0.0-0.3)	0.0
Skin	**64**	**12**	**3.4**	**(2.5-4.2)**	**3.2**	**2.4**	**(1.8-3.0)**	**2.1**
Melanoma of the Skin	46	7	2.4	(1.7-3.1)	1.8	1.9	(1.3-2.4)	1.3
Other Skin	18	5	0.9	(0.5-1.4)	1.3	0.6	(0.3-0.8)	0.8
Breast	**617**	**124**	**32.4**	**(29.8-35.0)**	**32.7**	**22.2**	**(20.4-23.9)**	**21.9**
Female Genital System	**370**	**76**	**19.4**	**(17.5-21.4)**	**20.0**	**13.9**	**(12.5-15.3)**	**13.5**
Cervix Uteri	49	8	2.6	(1.9-3.3)	2.1	1.9	(1.4-2.5)	1.5
Corpus and Uterus, NOS	91	19	4.8	(3.8-5.8)	5.0	3.2	(2.6-3.9)	3.1
Ovary	200	40	10.5	(9.0-12.0)	10.5	7.7	(6.6-8.7)	7.3
Other Female Genital Organs	30	9	1.6	(1.0-2.1)	2.4	1.1	(0.7-1.4)	1.6
Urinary System	**162**	**29**	**8.5**	**(7.2-9.8)**	**7.6**	**5.4**	**(4.5-6.2)**	**4.8**
Bladder	60	8	3.2	(2.4-3.9)	2.1	1.9	(1.4-2.4)	1.4
Kidney and Renal Pelvis	92	20	4.8	(3.8-5.8)	5.3	3.2	(2.5-3.8)	3.3
Other Urinary System	10	<5	0.5	(0.2-0.9)	0.3	0.3	(0.1-0.5)	0.1
Brain and Other Nervous System	**75**	**13**	**3.9**	**(3.0-4.8)**	**3.4**	**3.0**	**(2.3-3.7)**	**2.5**
Endocrine	**21**	**<5**	**1.1**	**(0.6-1.6)**	**1.1**	**0.8**	**(0.5-1.2)**	**0.7**
Thyroid	10	<5	0.5	(0.2-0.9)	0.5	0.3	(0.1-0.5)	0.2
Other Endocrine System	11	<5	0.6	(0.2-0.9)	0.5	0.5	(0.2-0.8)	0.4
Lymphoma	**154**	**36**	**8.1**	**(6.8-9.4)**	**9.5**	**5.5**	**(4.6-6.3)**	**6.3**
Hodgkin's Lymphoma	10	<5	0.5	(0.2-0.9)	0.8	0.4	(0.2-0.7)	0.6
Non-Hodgkin's Lymphoma	144	33	7.6	(6.3-8.8)	8.7	5.1	(4.2-5.9)	5.7
Multiple Myeloma	**74**	**9**	**3.9**	**(3.0-4.8)**	**2.4**	**2.6**	**(2.0-3.3)**	**1.6**
Leukemia	**123**	**27**	**6.5**	**(5.3-7.6)**	**7.1**	**4.5**	**(3.7-5.3)**	**4.9**
Other, Ill-Defined, and Unknown	**361**	**66**	**19.0**	**(17.0-20.9)**	**17.4**	**13.0**	**(11.7-14.4)**	**11.0**

** Rates are per 100,000 population and are age-standardized to the 1991 Canadian population estimates. Counts are suppressed when fewer than five cases were reported for the specific cancer. The suppressed cases however, are included in the counts and rates for 'all sites' combined.*

Figure i: Age-Standardized Incidence Rates* in Males for Prostate, Lung and Colorectal Cancers by Health Zone (HZ) and New Brunswick (NB), 2002-2006

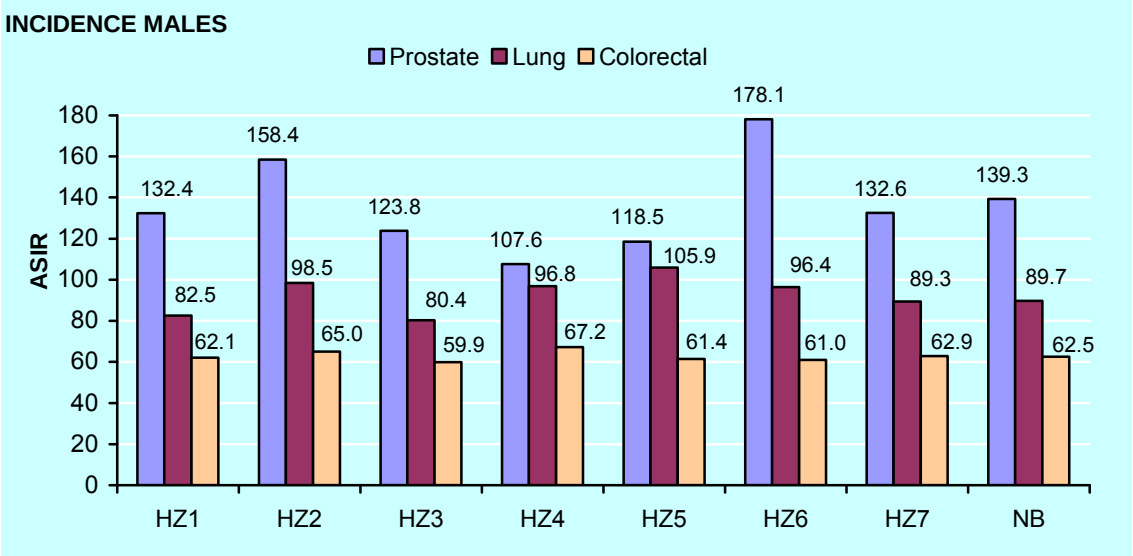
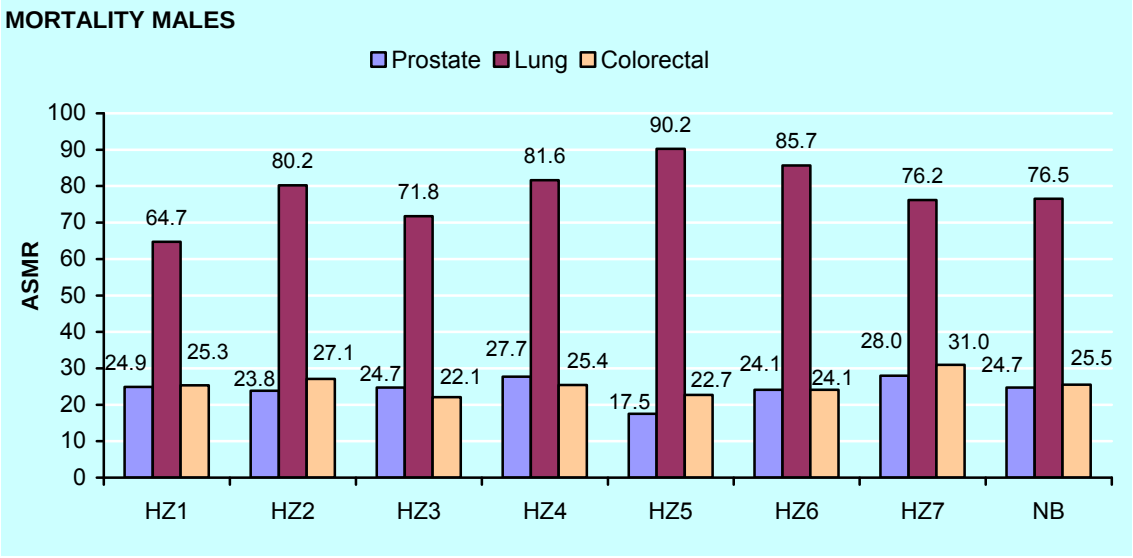


Figure ii: Age-Standardized Mortality Rates* in Males for Prostate, Lung and Colorectal Cancers by Health Zone (HZ) and New Brunswick (NB), 2002-2006



** Rates are per 100,000 population and are age-standardized to the 1991 Canadian population estimates.*

Figure iii: Age-Standardized Incidence Rates* in Females for Breast, Lung and Colorectal Cancers by Health Zone (HZ) and New Brunswick (NB), 2002-2006

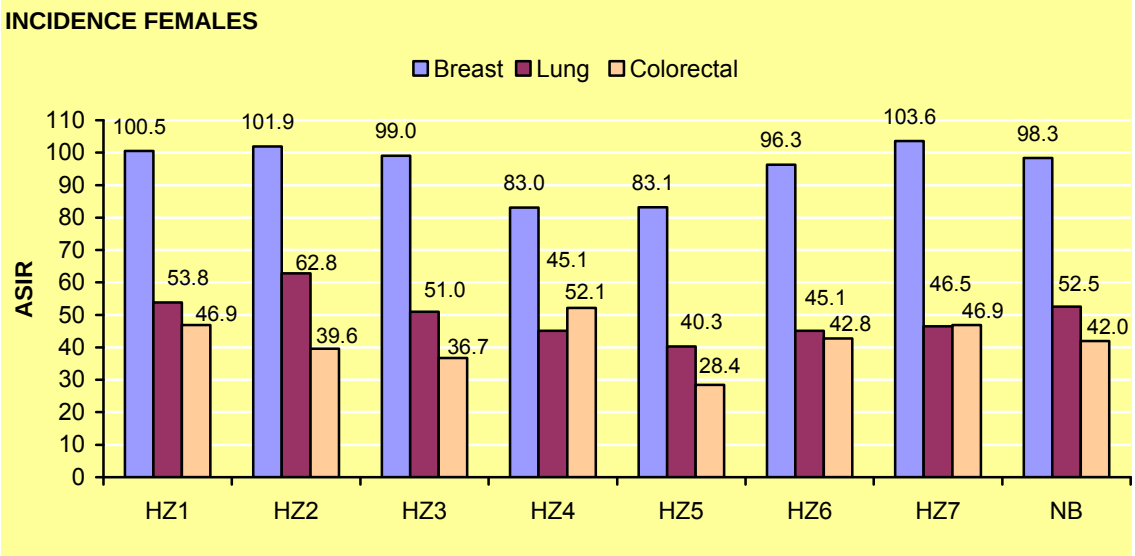
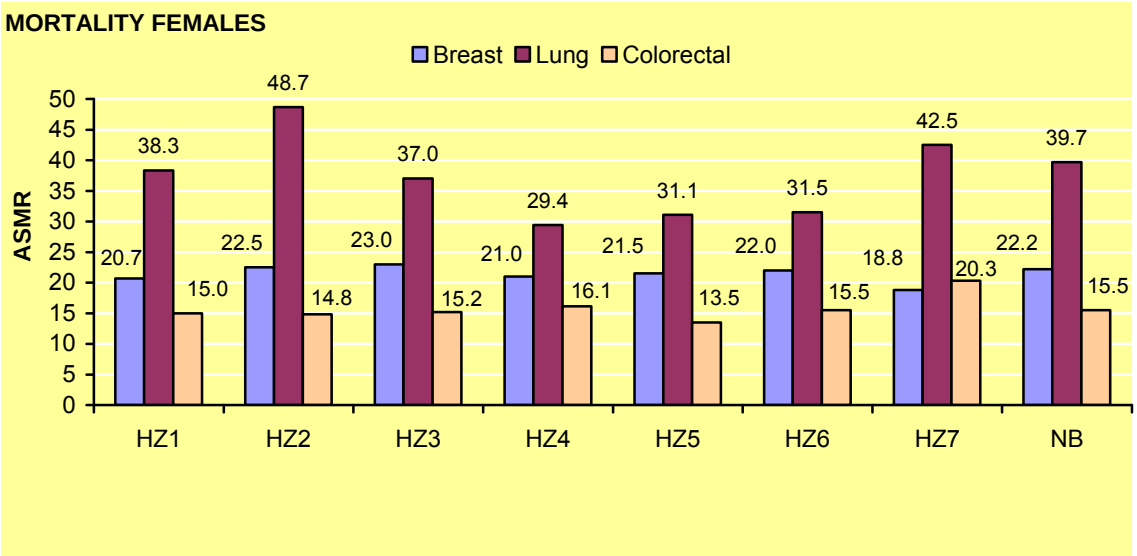


Figure iv: Age-Standardized Mortality Rates* in Females for Breast, Lung and Colorectal Cancers by Health Zone (HZ) and New Brunswick (NB), 2002-2006



** Rates are per 100,000 population and are age-standardized to the 1991 Canadian population estimates.*

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Chapter 1 Introduction

Cancer is a widespread disease which will likely impact every family in New Brunswick in the course of their lifetime. New Brunswick operates a comprehensive cancer surveillance network and reports many different types of cancer which can manifest in men, women and children. Cancer is the only chronic disease that has a legislated reporting system to a central registry in New Brunswick.

Surveillance is a continuous and systematic process of collection, analysis, interpretation and dissemination of descriptive information for monitoring health problems.[4] Specifically, cancer surveillance may include tracking and reporting of different types of new cancer cases or cancer-related deaths by age, sex and community. It may also include measuring the effectiveness of programs aimed at reducing cancer such as screening and many other aspects.

This report provides quality-assured benchmark information for comparison of cancer rates and trends to those in other provinces and to Canada as a whole. Cancer surveillance guides our efforts to reduce the burden of cancer in New Brunswick. This report also provides the scientific-based evidence for guidance in policy decisions, identifies potential cancer research needs and provides information that may be used by various stakeholders for cancer prevention and control strategies.

1.1 New Brunswick Provincial Cancer Registry

The history of the *New Brunswick Provincial Cancer Registry* (hereafter referred to as the Registry) can be traced back to 1952 when records on cancer patients in New Brunswick began to be collected. The information contained in the Registry consists of patient demographic data and specific tumour information for cancers that are considered reportable by the Canadian Cancer Registry (CCR). The system allows for the reporting of multiple primary tumours per person.[5]

The Registry was originally housed in and operated by the Saint John General Hospital. It was later moved to the new Saint John Regional Hospital when it opened in July 1982. In April 1992, the day-to-day responsibilities were transferred to and financed by the Department of Health and Community Services. In 1992, the Department of Health, in partnership with the Government of

Canada, initiated a program to upgrade and automate the Registry. Since 2008, the Registry has been under the leadership of the New Brunswick Cancer Network, a division of the Department of Health.

A computerized registration system was introduced in 1989. Today, the Regional Health Authority laboratories provide the Registry with patient and tumour specific information. Sources of data include: reports from laboratories, radiation oncology clinics, autopsy reports, death registrations and reports from other provincial cancer registries.

1.2 Purpose of Report

The purpose of this report is to provide valuable information on cancer in New Brunswick to the public, health-care professionals, researchers, administrators and policy-makers.

The objectives of this report are to:

- Provide an assessment of cancer in New Brunswick and its' Health Zones;
- Provide cancer information on children less than 14 years of age and on adolescents and young adults from 15 to 29 years of age;
- Examine cancer *incidence* and *mortality* distributions across the seven health zones;
- Provide information on trends in cancer incidence and mortality for the period 1989 to 2006;
- Provide relative survival estimates for lung, colorectal, thyroid, prostate, testicular, breast and ovarian cancers;
- Provide future projections on cancer incidence and mortality in 2015, 2020 and 2025; and,
- Report on the effectiveness of the New Brunswick breast cancer screening program through the linkage between the breast cancer screening and the Registry databases.

Chapter 2 Methods

2.1 Data Sources

The cancer incidence and mortality data used in this report were provided by the following sources:

1. New Brunswick Provincial Cancer Registry;*
2. New Brunswick *Vital Statistics*;† and,
3. Statistics Canada (population estimates for age standardization).

2.2 Data Quality

The Canadian Cancer Registry (CCR) provides Data Quality Reports for feedback on the quality of data submitted each year through the CCR core edit system (Appendix A). Data are also forwarded to the North American Association of Central Cancer Registries (NAACCR) for the purpose of information sharing. NAACCR, an organization established to enhance data quality and promote the use of cancer registry data, has awarded gold certification to the *New Brunswick Cancer Registry* in 2002, 2003, 2004, 2005 and 2006. This certification is awarded based on data quality, completeness and timeliness.

2.3 Grouping Criteria

Similar to New Brunswick's first and second cancer reports[1, 6], this report focuses on primary malignant or *invasive cancer* sites, which do not include basal and squamous cell carcinomas of the skin. "Basal cell carcinomas are the most common cancer type in humans, and are four to five times more common than squamous cell carcinomas of the skin. In general, non-melanomatous skin cancers have a good prognosis and can always be treated with curative intent."[7] There were approximately 5,116 basal cell carcinomas and 1,807 squamous cell carcinomas registered between 2002 and 2006. The Registry only allows one basal cell carcinoma and one squamous cell carcinoma of the skin to be registered per person per lifetime.

* The registry database is dynamic, constantly being updated as new information is received. Incidence rates and figures may change slightly as a result. The data used in this report were current as of April 1, 2008.
† Vital Statistics New Brunswick updates their database for out-of-province deaths, as the information is received. When data were requested for this report, the majority of these updates had been completed up to the year 2006.

Incidence and mortality were grouped according to the *Surveillance, Epidemiology, and End Results (SEER)* tables (Appendices B and C).[8] These tables provide a reliable methodology of grouping, as there have been some major changes in the morphology coding system (used for cancer incidence) in the conversion from *ICD-O-2* to *ICD-O-3* and in the diagnosis coding system (used for cancer mortality) in the conversion from *ICD-9* to *ICD-10*.

2.4 Age-Standardized Incidence and Mortality

Cancer incidence and mortality rates were reported as *crude* and *age-standardized rates*. The 1991 Canadian post-censal population estimate (July 1, 1991) was used for the age standardization. Age-standardized cancer rates provide more meaningful comparisons over time and among different geographic health zones. Variance of the rate was calculated assuming that the number of new cases or deaths were random Poisson events, and the corresponding 95% *confidence interval* was used to indicate the accuracy of the observed rate.

Although the time frame for this report was 2002 to 2006, ten-year data (1997-2006) were used to calculate the age-standardized incidence for *children* (ages 0-14) and *adolescents and young adults* (ages 15-29; Figure 11 A-D) to achieve statistical stability. In addition, incidence and mortality rates were compared by sex as well as health zones for the five leading cancers (Tables 9-12).

2.5 Average Annual Percent Change (AAPC) for Cancer Trend

A joinpoint statistical model[9], developed by the *National Cancer Institute* (NCI), was used to determine when and how often the change(s) occurred in the *Annual Percentage Change* (APC) and the *Average Annual Percentage Change* (AAPC) over time. The APC was expressed as a percentage increase or decrease in the age-standardized rates of cancer incidence or mortality over a pre-specified fixed period, where the change in rates was assumed constant. However, it is not always reasonable to expect that a single APC can accurately characterize the trend over an entire series of data. As mentioned above, the joinpoint model can produce a summary measure (i.e., AAPC) which best fits the data and allows us to determine how long the APC remained constant, and when it changed over a period of multiple years. In this report, the AAPCs for the ten leading cancers were computed using the age-standardized incidence or mortality rates over the 1989-2006 period to achieve statistical stability.

2.6 Five-Year Relative Survival Ratio

Relative survival ratio analyses based on the Period Analysis Method[10] were applied to patients diagnosed with invasive primary cancer between 2002 and 2006. This method provided more up-to-date estimates of long-term patient survival compared to traditional methods.[11] Due to the small population of New Brunswick, a five-year period was used to produce stable and reliable survival estimates, and the analyses were focused on the common cancer sites which included lung, colorectal, prostate, testicular, thyroid, ovarian, cervical and female breast cancers. Records were excluded from the analyses when (1) the year of birth or death was unknown; (2) diagnosis was established either through autopsy or death certificate only, and (3) diagnosis made prior to 2002. In addition, if a patient was diagnosed with more than one invasive tumour, only the record with the earliest date of diagnosis was utilized in the data analysis.[12]

The relative survival ratio is a ratio between the observed survival rate of a group of cancer patients and the expected survival rate of the general population who have the same characteristics but without cancer.[12] Expected survival time for individuals of the general population was estimated from the sex-specific provincial life tables published by Statistics Canada. In particular, Dickman et al.[13] and Ederer II[14] methods were used to estimate the expected survival time and the associated variance. The observed survival time for cancer patients was calculated as the difference in days between the date of diagnosis and the date of last observation. The width of the confidence interval reflects the degree of accuracy of the estimated rates. A narrower confidence interval indicates that the estimated rates have higher precision and vice versa. In general, a small number of cases often results in a wide confidence interval for the estimated survival rate.

In this report, a further investigation was done on breast cancer by staging information. The objective was to provide valuable information for improving treatments and evaluating the importance of early detection to ultimately reduce breast cancer morbidity and mortality. The Registry used the American Joint Cancer Committee (AJCC) Cancer Staging Manual (Sixth Edition) to assign the tumour (T), lymph node (N) and metastasis (M) classification to cancers. This classification system describes the extent of disease at the time of diagnosis. Data are primarily obtained from pathology reports from the laboratory confirming the diagnosis. Information on tumour size and lymph node status was readily available in all cases. Information on distant

metastasis (M), however, was not routinely available for many cases, and therefore the (M) component was left as unknown.

The information is classified as pathological (pTNM), which applies to invasive, micro-invasive and *in situ carcinomas*. In this report, three different relative survival ratios (i.e., one, three and five-year) were reported as a function of tumour type, age, gender and *stage* (female breast cancer only) at the time of diagnosis.*

2.7 Age-Period Cohort Method for Cancer Projection

The age-period-cohort method, developed by the Norway Cancer Registry, was used to project the number of new cases and deaths in 2015, 2020 and 2025. This method makes no assumption about changes in exposure or other risk factors. Rather, the projection process entirely relies on the extrapolation of past incidence and mortality rates, when taking age, period, and birth-cohort effects into consideration. Two different link functions (i.e., Power and Poisson link functions) were implemented in the calculation process. The Power link function provided more stable estimates compared with the Poisson link function, especially for those cancer sites with a significantly increasing or decreasing AAPC over time. To achieve statistical stability, data from 1989-2005 were utilized to project the number of new cancer cases and deaths.

* Date of death or December 31, 2006, whichever was earlier, was used for the calculation.

Chapter 3 Results

3.1 Provincial Cancer Incidence Profile

The 2008 Canadian Cancer Statistics showed that New Brunswick had the fourth highest age-standardized incidence rates in the country for *all cancer sites combined* for males and the sixth highest for females.[15] A total of 19,558 people in New Brunswick were diagnosed with some form of invasive cancer during the period of 2002 to 2006 (Figure 1), which was approximately 10.8% higher than the previous five-year period (1997-2001). Further, the number of new cases of all cancer sites combined was higher for males (10,495 cases) than for females (9,063 cases). Even when the sex-specific sites (female and male genital systems and breast) were excluded, males still had a relatively higher incidence count than females (7,454 vs. 5,556 cases). This is primarily due to the fact that males had substantially higher counts across all different cancers with the exception of endocrine, where female counts were higher (354 females vs. 102 males).

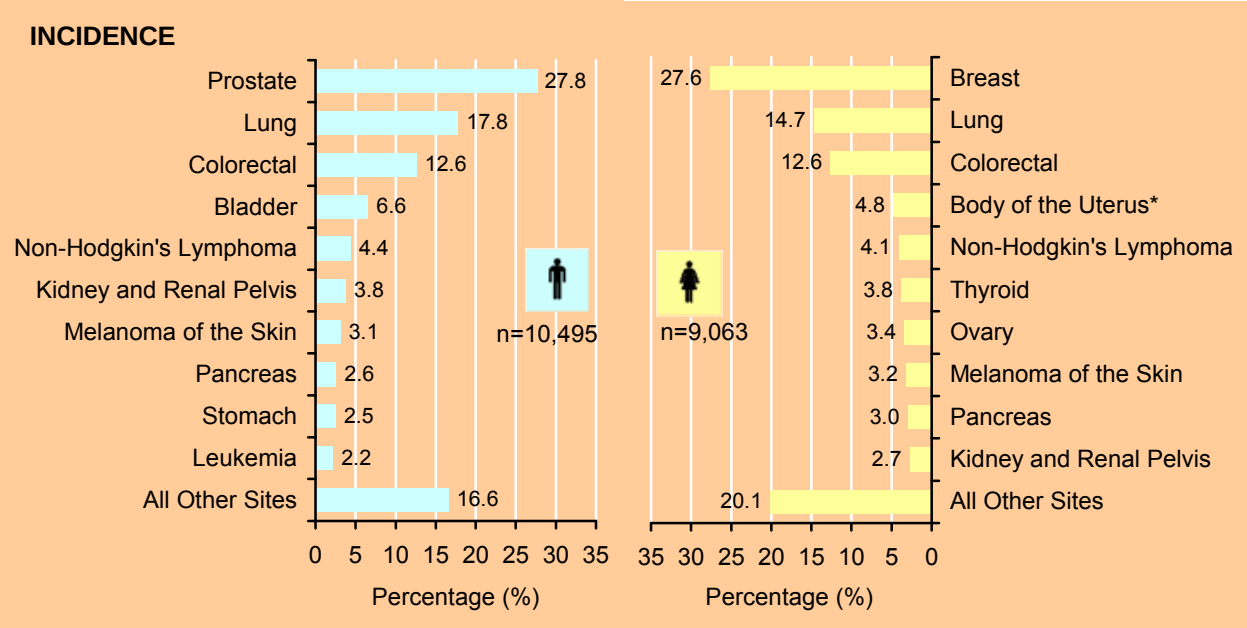
In comparison to the previous provincial cancer report[1], the six leading cancers by percentage distribution of cancer incidence in males remained the same. In descending order, they were: *prostate* (27.8%), *lung* (17.8%), *colorectal* (12.6%), *bladder* (6.6%) *cancers, non-Hodgkin's lymphoma* (4.4%) and cancer of *the kidney and renal pelvis* (3.8%, Figure 1). Of these, prostate, lung and colorectal cancers accounted for 58.2% of all male new cancer cases in 2002-2006.

Prostate continued to be the leading cancer for males, accounting for 2,919 cases or 27.8% of all cancers with approximately 584 newly diagnosed cases each year between 2002 and 2006. *Melanoma of the skin* (3.1%) was the seventh leading cancer for males, followed by *pancreas* (2.6%), *stomach* (2.5%) and *leukemia* (2.2%) in this period.

In comparison to the previous provincial cancer report[1], the five leading cancers by percentage distribution of cancer incidence in females remained the same. In descending order, they were: *breast* (27.6%), *lung* (14.7%), *colorectal* (12.6%) cancers, cancer of *the body of the uterus* (4.8%) and *non-Hodgkin's lymphoma* (4.1%, Figure 1). However, colorectal cancer (14.2%) in the previous report was the second leading cancer diagnosed in females, while lung (13.1%) was in third place. In 2002-2006, breast, lung and colorectal cancers accounted for 54.9% of all female new cancer cases.

Female breast cancer (27.6%) alone accounted for 2,500 cases for the period 2002 to 2006 with about 500 newly diagnosed cases each year between 2002 and 2006. *Thyroid* cancer (3.8%) is now the sixth most common type of cancer diagnosed in females in New Brunswick. This represents a significant increase from the 1997-2001 report where thyroid cancer (1.9%) was the twelfth most common cancer. *Ovarian* cancer (3.4%) remains the seventh most common. *Melanoma of the skin* (3.2%) decreased from sixth to eighth. Cancer of *the kidney and renal pelvis* moved from eighth to tenth, while cancer of the *pancreas* remains the ninth most common cancer.[1]

Figure 1: Percentage Distribution of Cancer Incidence for the Ten Leading Cancers by Sex, New Brunswick, 2002-2006



* Includes Corpus Uteri and Uterus, Not Otherwise Specified.

3.2 Provincial Cancer Mortality Profile

The 2008 Canadian Cancer Statistics also reported that New Brunswick had the fourth highest age-standardized mortality rates in the country for all cancer sites combined for males and the sixth highest for females.[15] Between 2002 and 2006, a total of 8,833 deaths in New Brunswick were attributed to cancer (Figure 2), which was approximately 6.0% higher than the previous five-year period (1997-2001).

The number of deaths was higher for males (4,750 deaths) than for females (4,083 deaths). As in 1997-2001, when the sex-specific sites (male and female genital organs and breast) were excluded, the number of cancer deaths in 2002-2006 was still higher in males (4,228 males vs. 3,096 females). Similar to cancer incidence, males had substantially higher mortality counts across all cancers with the exception of endocrine, where female counts were slightly higher (21 females vs. 14 males).

The four leading cancers for male mortality by percentage distribution in 2002-2006 were similar to those in 1997-2001: *lung* (33.3%), *colorectal* (11.1%), *prostate* (10.6%) cancers and cancer of *the pancreas* (5.1%, Figure 2). These cancers accounted for 60.1% of all male cancer deaths between 2002 and 2006.

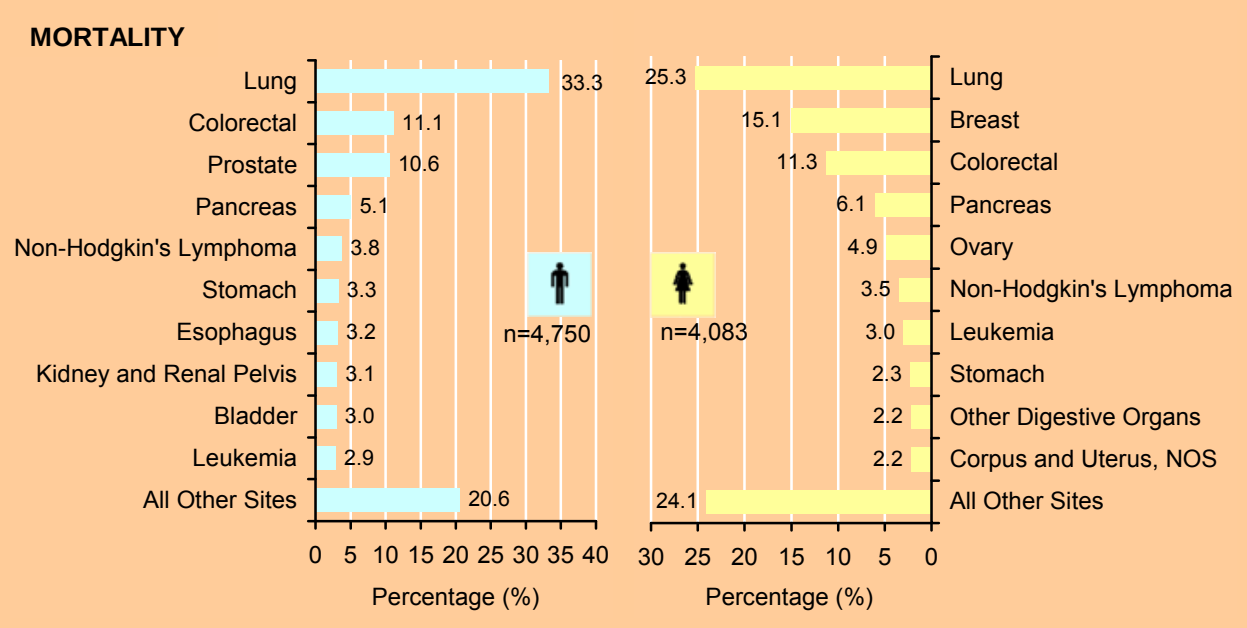
Similar to the previous provincial cancer report[1], *non-Hodgkin's lymphoma* (3.8%) and *stomach* (3.3%) cancer placed as the fifth and sixth most common causes of cancer death respectively. *Bladder* (3.0%) cancer moved from eighth to ninth, while *leukemia* (2.9%) fell to tenth place from seventh. Cancer of *the esophagus* (3.2%) moved from ninth to seventh place while cancer of *the kidney and renal pelvis* (3.1%) moved from the tenth to eighth most common cause of cancer death.

The six leading cancers for female mortality by percentage distribution remained the same in 2002-2006 as in 1997-2001: *lung* (25.3%), *breast* (15.1%) and *colorectal* (11.3%) cancers, cancer of *the pancreas* (6.1%), cancer of *the ovary* (4.9%) and *non-Hodgkin's lymphoma* (3.5%, Figure 2). Of these, lung, breast and colorectal cancers accounted for 51.7% of all female cancer deaths. Cancers of the pancreas, ovary and non-Hodgkin's lymphoma constituted another 14.5% of all female cancer deaths.

As shown in Figure 2, lung cancer was the leading cause of cancer death for both males and females during the period of 2002-2006. This cancer alone accounted for 33.3% of all cancer deaths for males and 25.3% for females.

Pancreatic cancer continued be the fourth leading cause of cancer death for both sexes (5.1% for males and 6.1% for females, Figure 2) unchanged from the 1997-2001 report. *Leukemia* (3.0%) in females remained seventh as it appeared in the previous report[1].

Figure 2: Percentage Distribution of Cancer Mortality for the Ten Leading Cancers by Sex, New Brunswick, 2002-2006



3.3 Age and Sex Distribution of Cancer

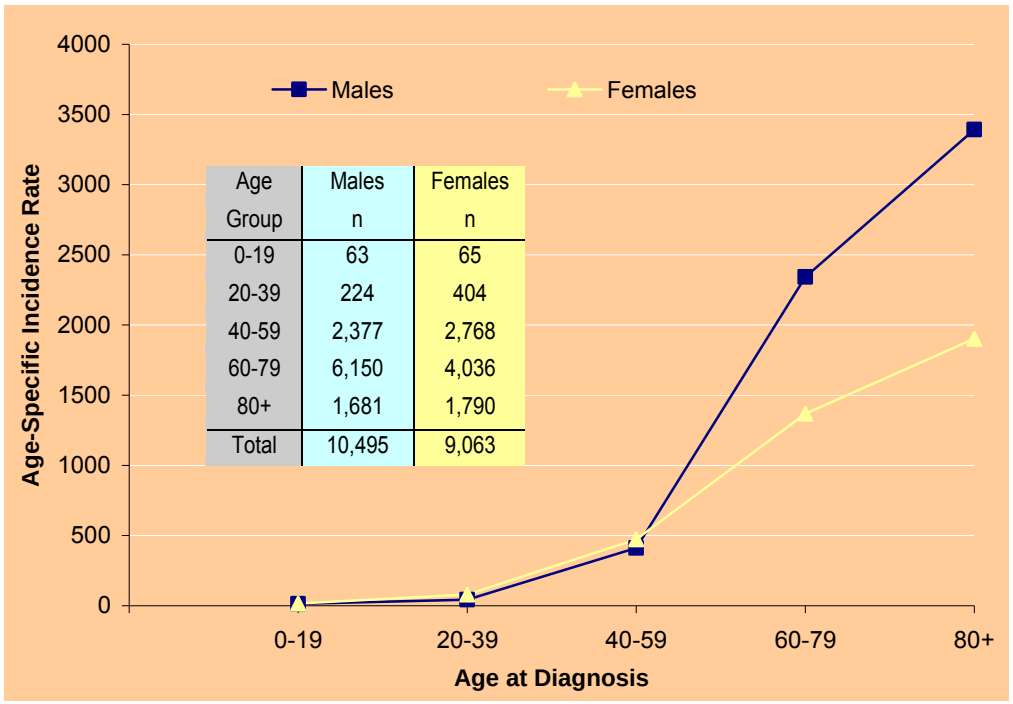
3.3.1 Age-Specific Incidence and Mortality Rates for All Cancer Sites Combined

As shown in Figures 3 and 4, cancer incidence and mortality rates for all cancer sites combined increased with age in both sexes. In males, 74.6% (7,831/10,495) of new cancer cases and 84.5% (4,013/4,750) of cancer deaths occurred among those who were at least sixty years old between 2002 and 2006. Within the same time period, 64.3% (5,826/9,063) of new cancer cases and 82.2% (3,357/4,083) of cancer deaths occurred in females who were sixty years or older. In addition, the relative increase in incidence rates with age was more pronounced for males than for females (Figure 3). For example, when compared to the 20-39 year age group, males in the 60-79 year age group had approximately 54 times the risk of developing cancer of any type, while the corresponding relative risk in females was about 17 times.

Males experienced lower incidence rates than females in all age groups with the exception of the 60-79 and 80+ year age groups. These increases in incidence rates in the elderly age groups were primarily due to the large numbers of prostate cancer, where 2,356 out of 2,919 new cases were diagnosed between 2002 and 2006.

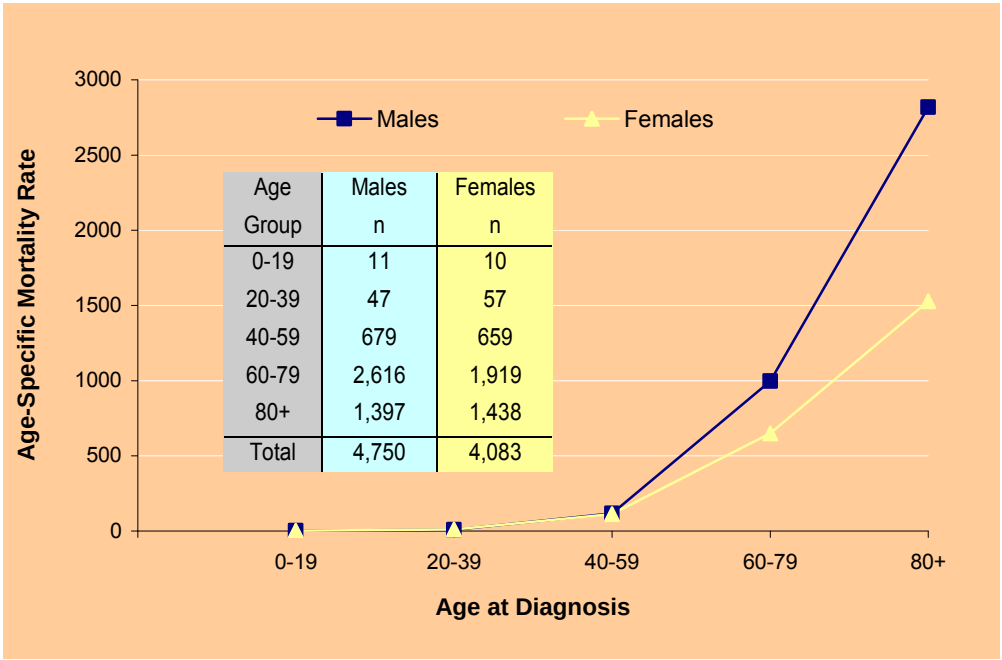
Mortality rates for all cancer sites combined were comparable between males and females in the younger age groups (0-19, 20-39 and 40-59, Figure 4). However, the relative increase in mortality rates was more pronounced in the elderly male group. For example, the relative risks, in comparison to the 20-39 year age group, were roughly 110 times and 311 times higher in males for those who were 60-79 and 80+ years of age. The corresponding relative risks in females were 58 and 136 times.

Figure 3: Age-Specific Incidence Rates (per 100,000 population) for All Cancer Sites Combined by Sex, New Brunswick, 2002-2006



Age Group	Males n	Females n
0-19	63	65
20-39	224	404
40-59	2,377	2,768
60-79	6,150	4,036
80+	1,681	1,790
Total	10,495	9,063

Figure 4: Age-Specific Mortality Rates (per 100,000 population) for All Cancer Sites Combined by Sex, New Brunswick, 2002-2006



Age Group	Males n	Females n
0-19	11	10
20-39	47	57
40-59	679	659
60-79	2,616	1,919
80+	1,397	1,438
Total	4,750	4,083

3.3.2 Age-Specific Incidence Rates in the Three Leading Cancers by Sex

In males, the three leading cancers (*prostate*, *lung* and *colorectal*) accounted for 58.2% of all new cancers between 2002 and 2006. In females, the three leading cancers (*breast*, *lung* and *colorectal*) constituted 54.9% of all new cancers in this period. The incidence patterns of these leading cancers are further examined across different age groups (0-19, 20-39, 40-59, 60-79 and 80+) in Figures 5 and 6.

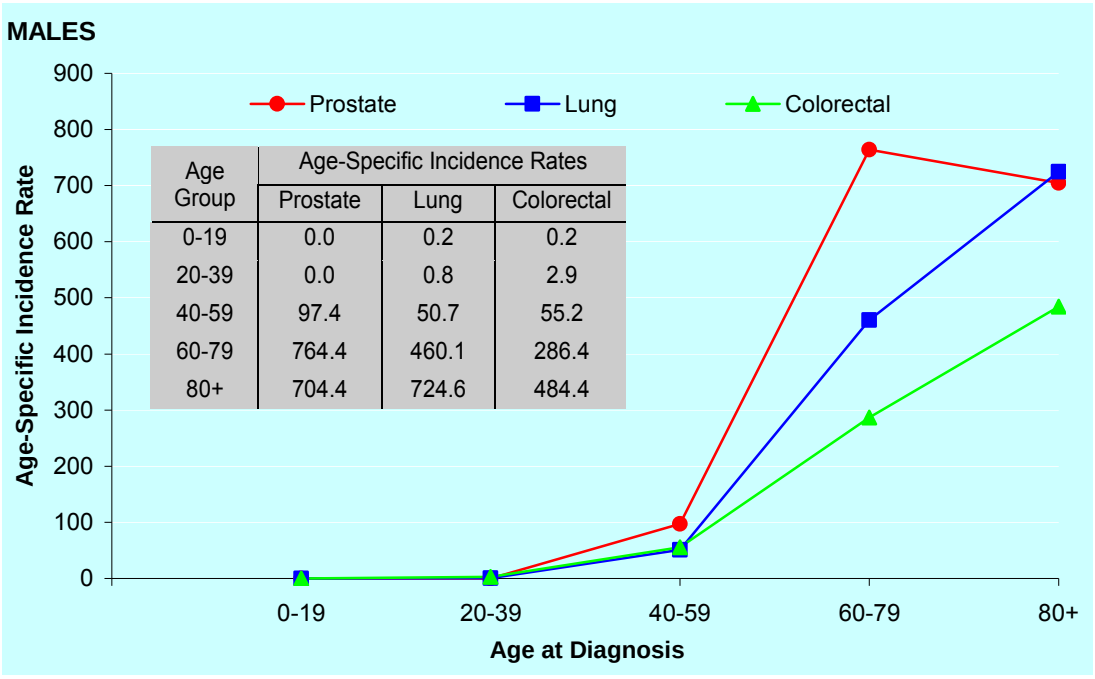
For males, the *age-specific incidence rates* of prostate, lung and colorectal cancers increased substantially after the 40-59 year age group. A similar pattern was observed in females in the age-specific incidence rates of breast, lung and colorectal cancers after age 40-59. However, the relative increase in lung cancer incidence rates with age was slightly more pronounced for males than for females between 2002 and 2006. For example, when compared to the 40-59 year age group, males in the 60-79 year age group had roughly 9 times higher risk of developing lung cancer. Similarly, those in the over 80 year age group had 14 times the risk. The corresponding relative risks in females were about 6 and 5 times, respectively.

The pattern of the age-specific incidence rates of colorectal cancer for males was similar to that of females. For example, when compared to the 40-59 year age group, males and females in the 60-79 year age group had roughly 5 times greater risk of developing colorectal cancer, and in the over 80 age group the risk increased to 9 times for males and 10 times for females.

The relative risk of developing prostate cancer, as shown in Figure 5, increased with age. However, the age-specific incidence rate for those who were 80 years or older appeared to be lower when compared to the 60-79 year age group during the period of 2002-2006.

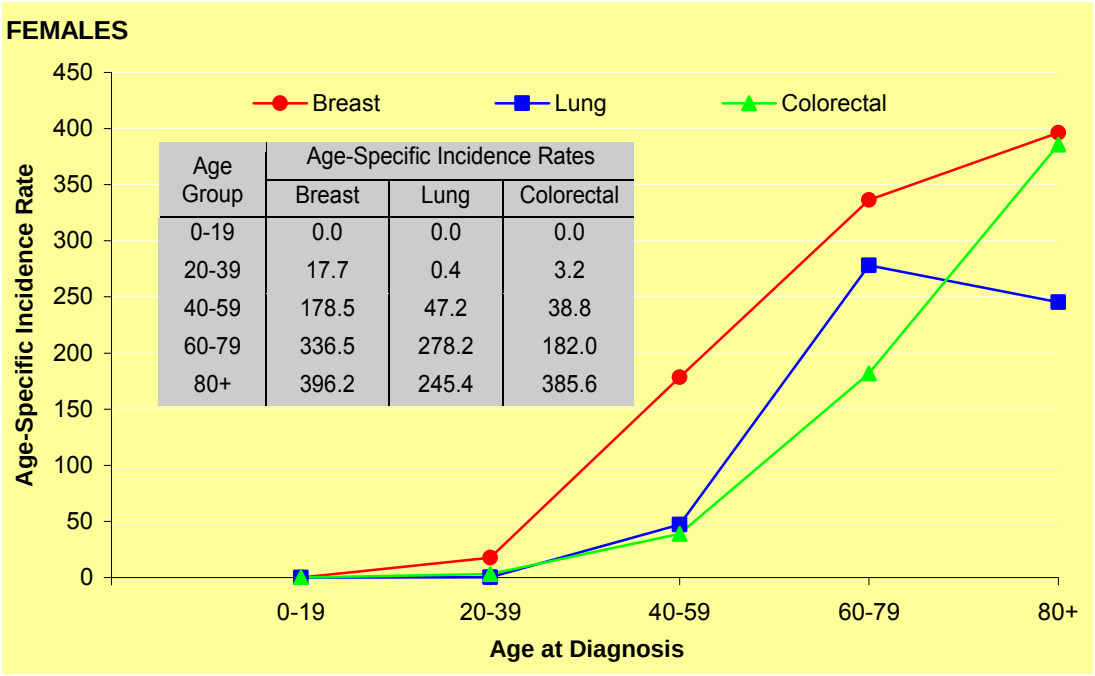
In comparison to the 40-59 year age group, the relative risks of developing breast cancer continued to increase in both the 60-79 and the over 80 year age groups (Figure 6). The risk in these age groups is roughly twice that of the 40-59 year age group. Moreover, females in the 80+ year age group had an approximate 17.8% increase in incidence rate over those in the 60-79 year age group.

Figure 5: Age-Specific Incidence Rates (per 100,000 population) for the Three Leading Cancers, Males, New Brunswick, 2002-2006



Age Group	Age-Specific Incidence Rates		
	Prostate	Lung	Colorectal
0-19	0.0	0.2	0.2
20-39	0.0	0.8	2.9
40-59	97.4	50.7	55.2
60-79	764.4	460.1	286.4
80+	704.4	724.6	484.4

Figure 6: Age-Specific Incidence Rates (per 100,000 population) for the Three Leading Cancers, Females, New Brunswick, 2002-2006



Age Group	Age-Specific Incidence Rates		
	Breast	Lung	Colorectal
0-19	0.0	0.0	0.0
20-39	17.7	0.4	3.2
40-59	178.5	47.2	38.8
60-79	336.5	278.2	182.0
80+	396.2	245.4	385.6

3.3.3 Age-Specific Mortality Rates in the Three Leading Cancers by Sex

Between 2002 and 2006, *prostate*, *lung* and *colorectal* cancers combined accounted for 55.0% of all cancer-related deaths in males. In females, 51.7% of all cancer-related deaths were attributed to *breast*, *lung* and *colorectal* cancers combined. The mortality patterns of these leading cancers across different age groups (0-19, 20-39, 40-59, 60-79 and 80+) are further examined in Figures 7 and 8.

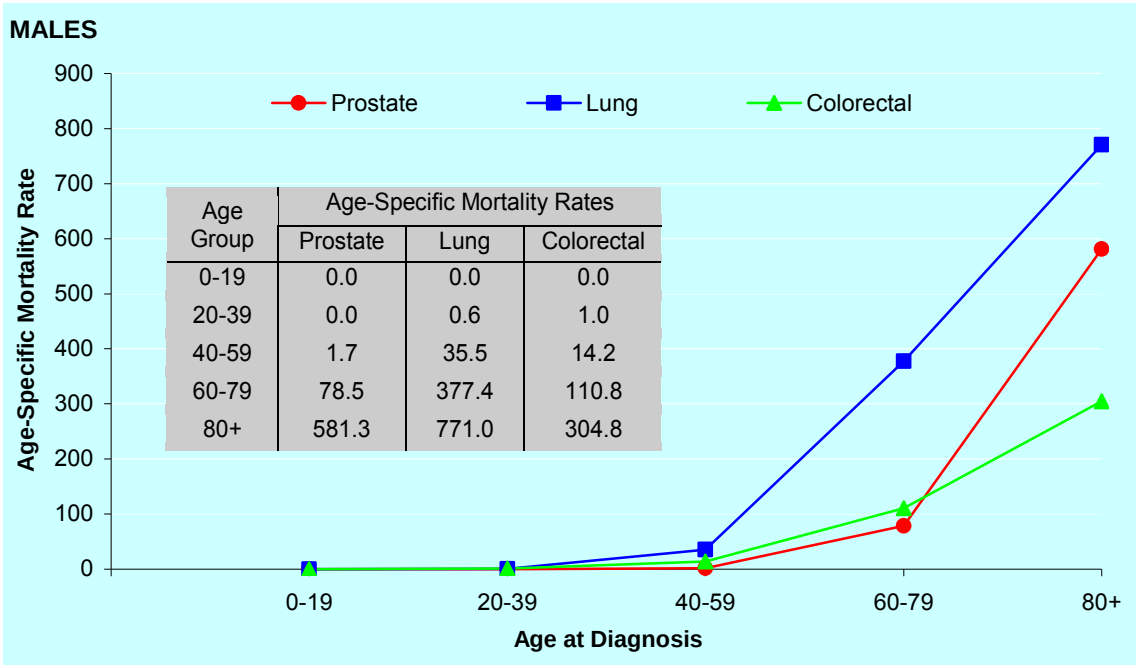
Similar to the previous provincial cancer report[1], the age-specific mortality rates between 2002 and 2006 for lung, colorectal, female breast and prostate cancers significantly increased with age after the 40-59 year age group. The relative increase in lung cancer mortality rates with age was more pronounced for males than for females. For example, when compared to the 40-59 year age group, males in the 60-79 year age group had approximately 11 times greater risk of dying from lung cancer and 22 times greater risk in the over 80 year age group. The corresponding risks for females were 7 and 8 times, respectively.

The relative risk of death due to colorectal cancer increased with age for both sexes. For example, when compared to the 40-59 year age group, males in the 60-79 year age group had an approximate 8 times greater risk of dying from colorectal cancer and 21 times greater risk in the over 80 year age group; the corresponding risks for females were 9 and 35 times.

The risk of death due to prostate cancer increases rapidly between the 60-79 and the over 80 year age groups. Compared to the 40-59 year age group, males in the 60-79 year age group had 45 times greater risk of dying, whereas males over 80 had a risk of 336 times (Figure 7).

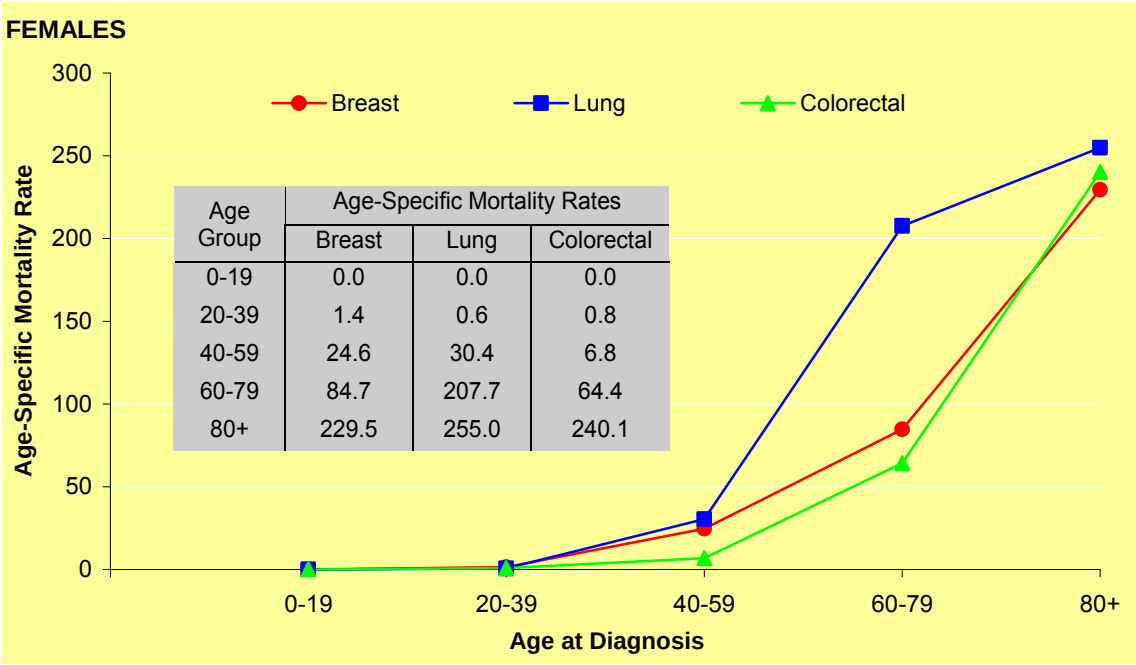
Compared to the 40-59 year age group, the relative risks of death due to breast cancer were 3 times higher for the 60-79 year age group and 9 times for the over 80 year age group (Figure 8).

Figure 7: Age-Specific Mortality Rates (per 100,000 population) for the Three Leading Cancers, Males, New Brunswick, 2002-2006



Age Group	Age-Specific Mortality Rates		
	Prostate	Lung	Colorectal
0-19	0.0	0.0	0.0
20-39	0.0	0.6	1.0
40-59	1.7	35.5	14.2
60-79	78.5	377.4	110.8
80+	581.3	771.0	304.8

Figure 8: Age-Specific Mortality Rates (per 100,000 population) for the Three Leading Cancers, Females, New Brunswick, 2002-2006



Age Group	Age-Specific Mortality Rates		
	Breast	Lung	Colorectal
0-19	0.0	0.0	0.0
20-39	1.4	0.6	0.8
40-59	24.6	30.4	6.8
60-79	84.7	207.7	64.4
80+	229.5	255.0	240.1

3.3.4 Childhood and Adolescent and Young Adults Cancers

Between 1997 and 2006, a total of 678 new cancer cases were diagnosed in children (ages 0-14 years; 182 cases) and adolescents and young adults (ages 15-29 years; 496 cases) in New Brunswick (Figure 9-A and 9-B). During the period of 2002-2006, 82 new cancer cases occurred among children less than 14 years of age and 218 among adolescents and young adults from 15 to 29 years of age. In particular, leukemia*, brain cancer†, soft tissue and non-Hodgkin's lymphoma consisted of 76.9% (30/39) of all new cancer cases diagnosed for males and 69.8% (30/43) for females from 0 to 14 years old (Figure 9-C). Within the same time period, Hodgkin's lymphoma‡, thyroid, melanoma of the skin and testicular cancers constituted 53.2% (50/94) of male cancers from 15 to 29 years of age (Figure 9-D). Hodgkin's lymphoma, thyroid and melanoma of the skin accounted for 54.0% (67/124) of female new cases in this age group (Figure 9-D).

The age-specific incidence rates of all cancer sites combined for children less than 5 years old appeared to be higher than those from 5 to 14 years of age (Figure 10). This finding was similar to the 1995-2000 Health Canada report on childhood cancer.[16] The age-standardized incidence rates for the ten leading cancers were also calculated in this report (Figure 11-A to D). Between 1997 and 2006, the age-standardized incidence rates of leukemia were highest for children less than 14 years old (males: 1.18 cases; females: 0.98 cases per 100,000 population). Thyroid (1.73 cases) and testicular (1.45 cases) cancers had the highest incidence rate for female and male adolescents and young adults (ages: 15-29), respectively.

The frequencies of cancer-related deaths for children (ages 0-14 years) and adolescents and young adults (ages 15-29 years) are also provided in Figure 12.

* The predominant morphology for leukemia in males and females in the 0-14 year age group was "acute lymphoblastic leukemia" for 1997 to 2006.

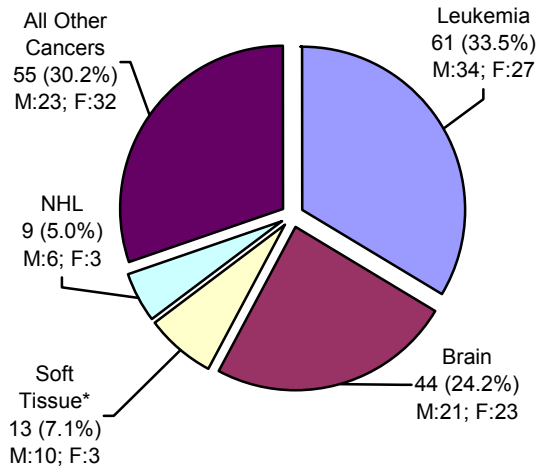
† The predominant morphology for brain cancers in males and females in the 0-14 year age group was "primitive neuroectodermal tumours" and "gliomas, not otherwise specified" and "juvenile astrocytoma or pilocytic astrocytoma" for 1997 to 2006.

‡ The predominant morphology for Hodgkin's lymphoma in the adolescent and young adult age group (15-29) was "nodular sclerosis, not otherwise specified" for 1997 to 2006.

Figure 9: Percentage Distribution of Cancer Incidence in Children (Ages 0-14) and Adolescents and Young Adults (Ages 15-29), New Brunswick, 1997-2006 and 2002-2006

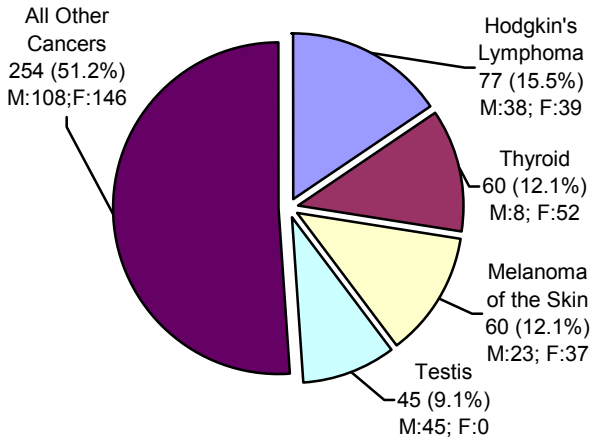
A): Time Period: 1997-2006
Age: 0-14
n=182

M: 94; F: 88



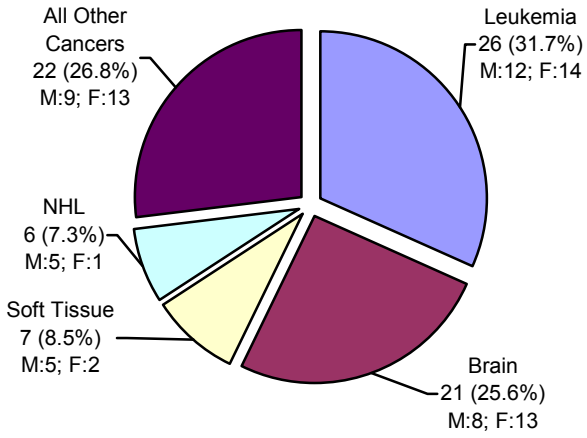
B): Time Period: 1997-2006
Age: 15-29
n=496

M: 222; F: 274



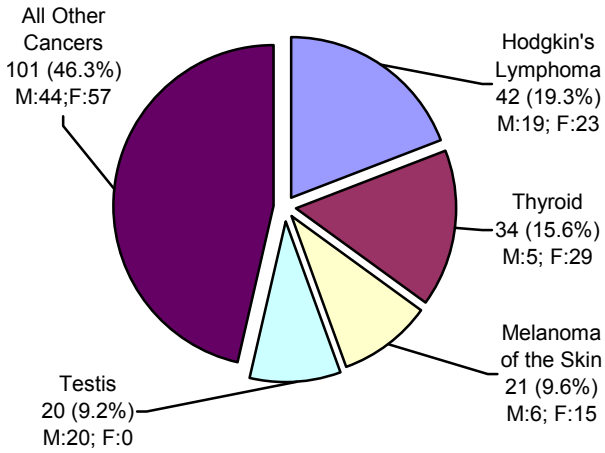
C): Time Period: 2002-2006
Age: 0-14
n=82

M: 39; F: 43



D): Time Period: 2002-2006
Age: 15-29
n=218

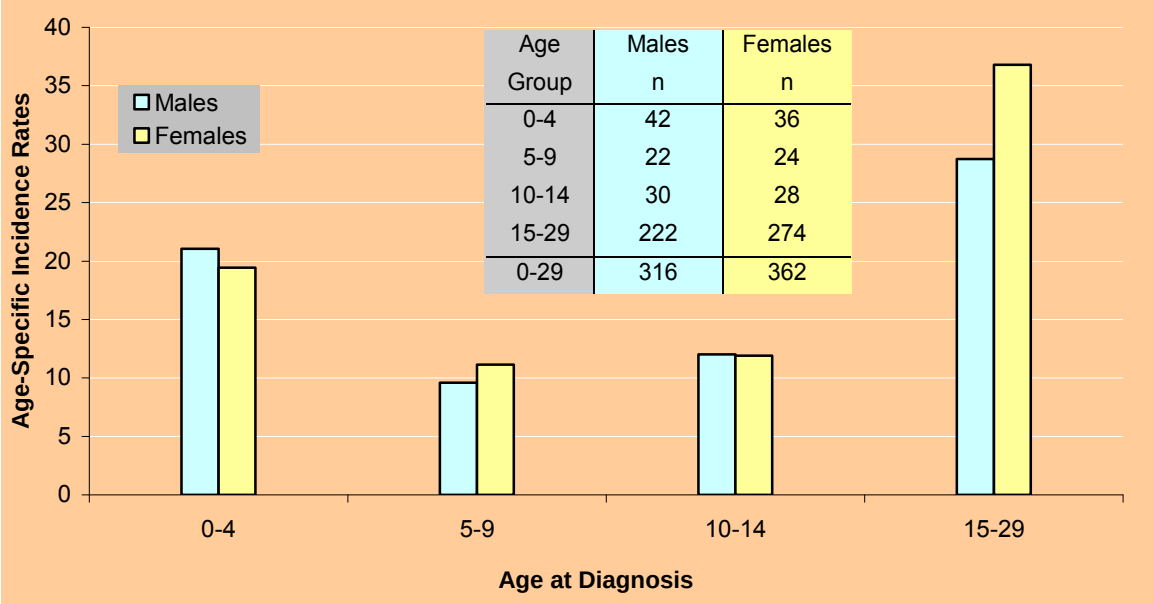
M: 94; F: 124



* Soft tissue (including heart).

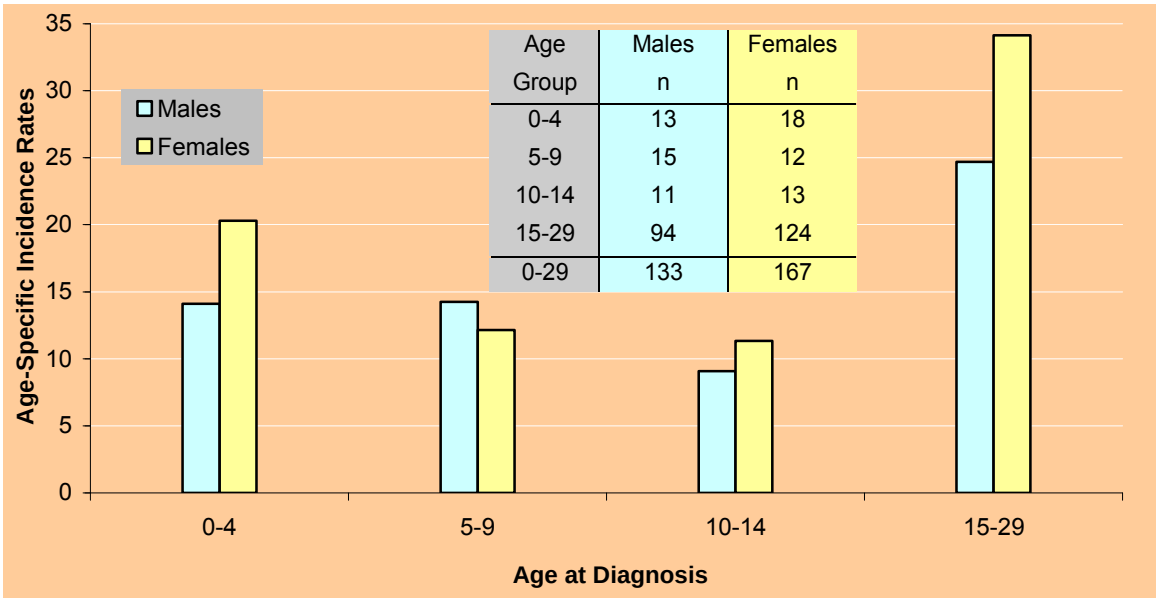
Figure 10: Age-Specific Incidence Rates (per 100,000 population) for All Cancer Sites Combined among Children (Ages 0-14) and Adolescents and Young Adults (Ages 15-29) by Sex, New Brunswick, 1997-2006 and 2002-2006

A) Time Period: 1997-2006



Age Group	Males n	Females n
0-4	42	36
5-9	22	24
10-14	30	28
15-29	222	274
0-29	316	362

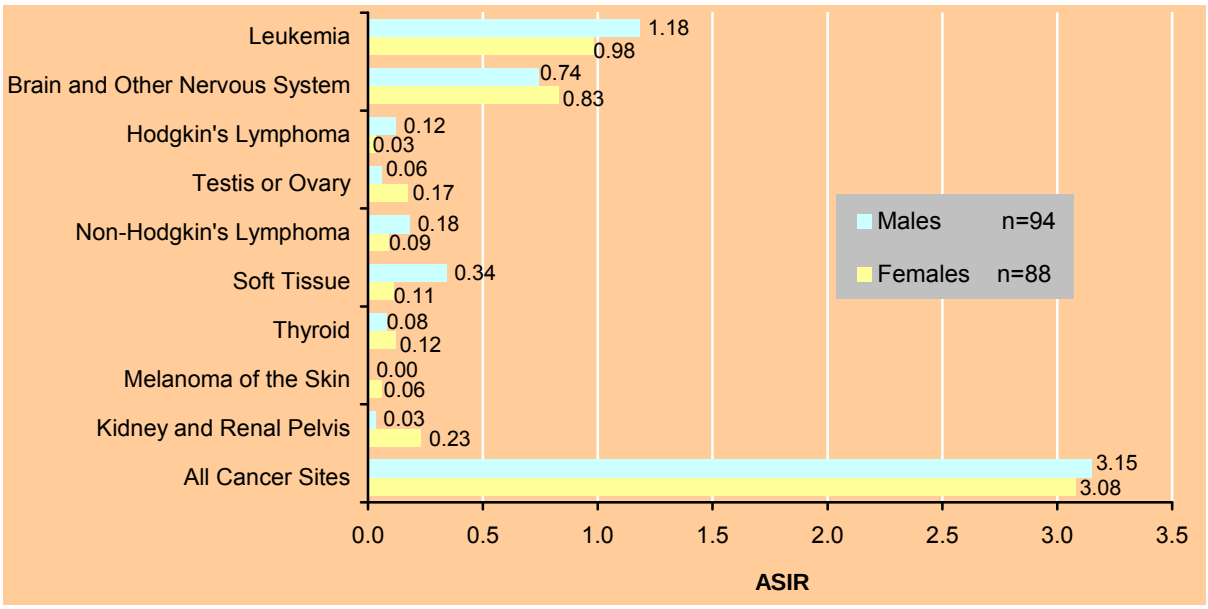
B) Time Period: 2002-2006



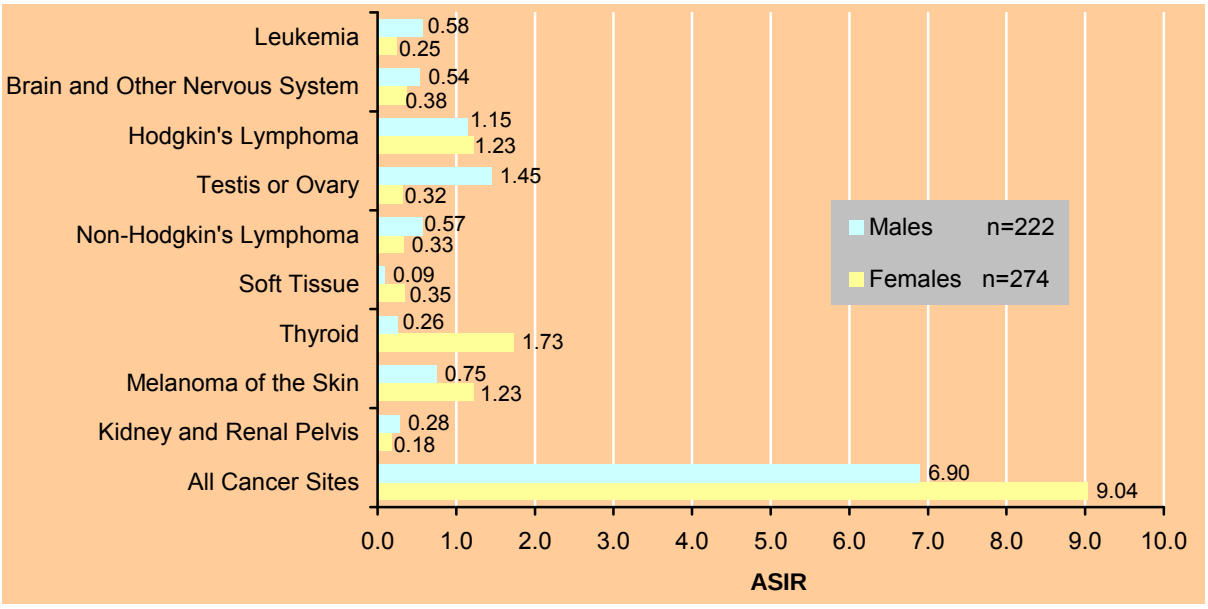
Age Group	Males n	Females n
0-4	13	18
5-9	15	12
10-14	11	13
15-29	94	124
0-29	133	167

Figure 11: Age-Standardized Incidence Rates (ASIR)* for Selected Cancers among Children (Ages 0-14) and Adolescents and Young Adults (Ages 15-29) by Sex, New Brunswick, 1997-2006 and 2002-2006

A) Time Period: 1997-2006; Ages: 0-14

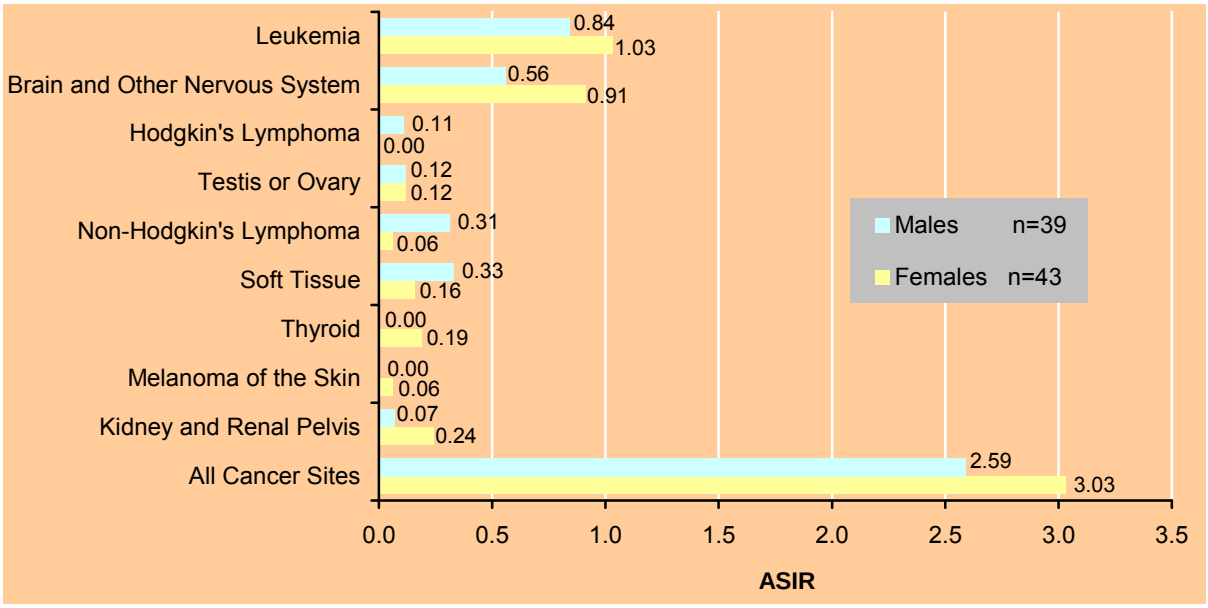


B) Time Period: 1997-2006; Ages: 15-29



* Age-standardized to the 1991 Canadian population estimates.

C) Time Period: 2002-2006; Ages: 0-14



D) Time Period: 2002-2006; Ages: 15-29

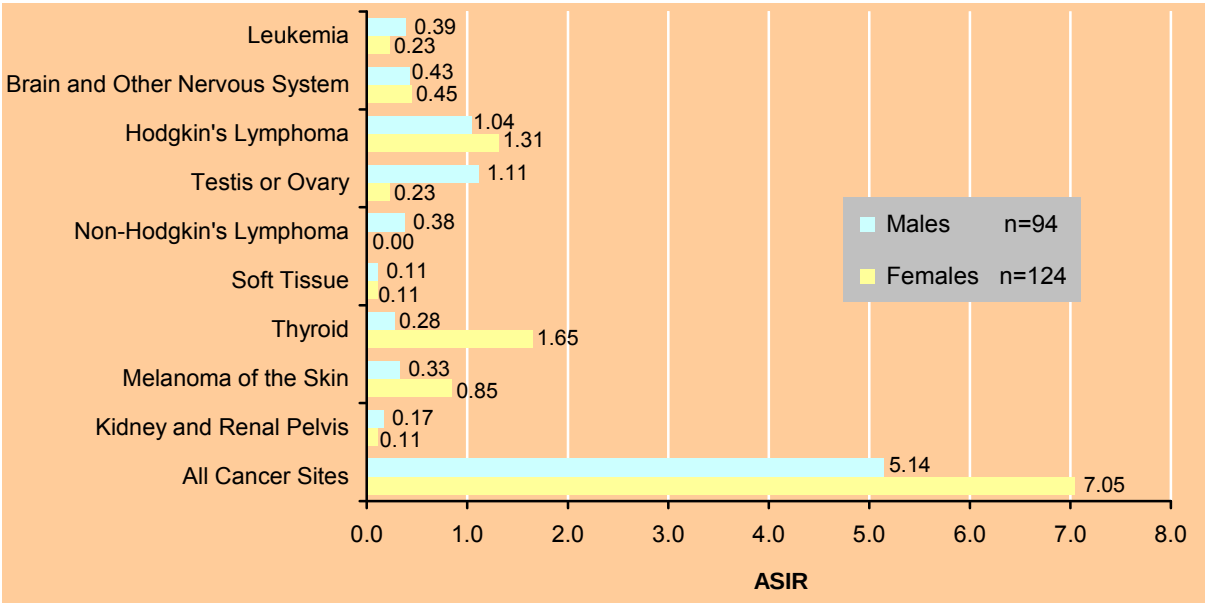
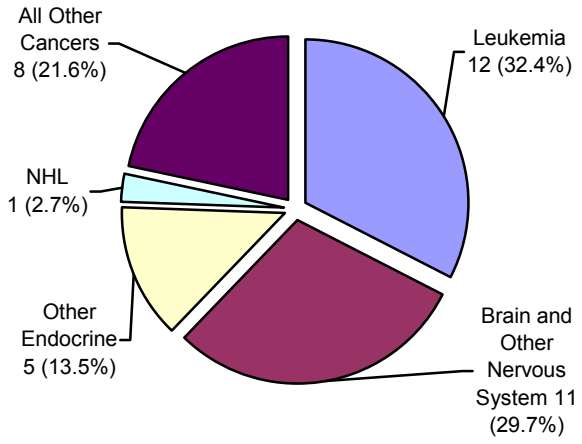


Figure 12: Percentage Distribution of Cancer Mortality in Children (Ages 0-14) and Adolescents and Young Adults (Ages 15-29), New Brunswick, 1997-2006 and 2002-2006

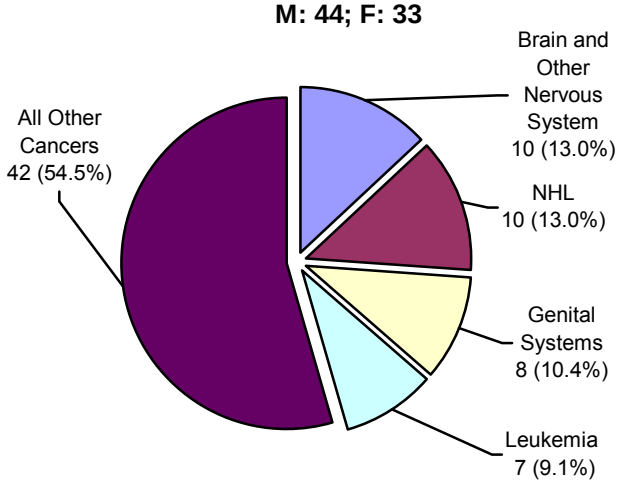
A): Time Period: 1997-2006
Age: 0-14
n=37

M: 20; F: 17



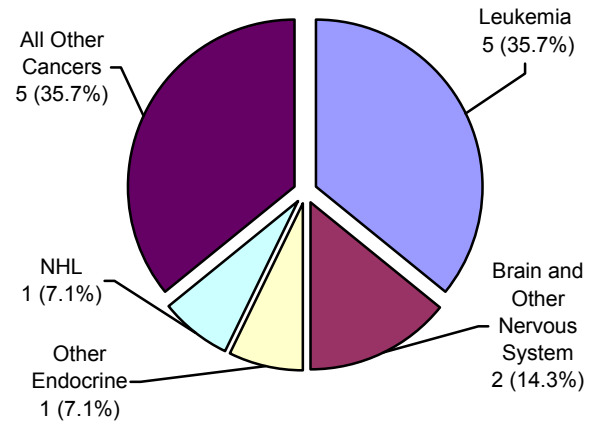
B): Time Period: 1997-2006
Age: 15-29
n=77

M: 44; F: 33



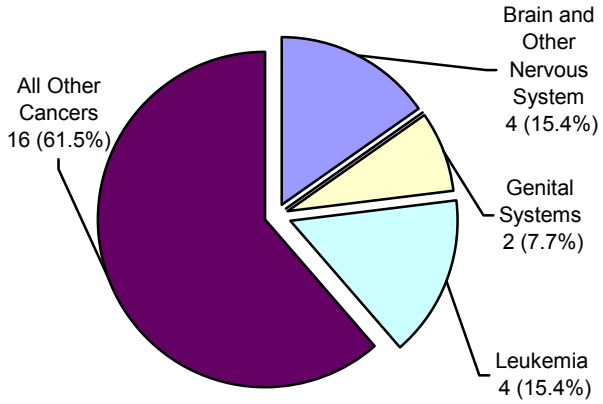
C): Time Period: 2002-2006
Age: 0-14
n=14

M: 6; F: 8



D): Time Period: 2002-2006
Age: 15-29
n=26

M: 14; F: 12



3.4 Geographic Distribution of Cancer

3.4.1 Health Zone Population Demographics

New Brunswick is divided into two *Regional Health Authorities* which includes seven different health zones (HZs). The population of each health zone varies from about 29,000 in HZ5 to approximately 193,000 in HZ1. Of the 752,000 New Brunswickers, 71.8% are located in HZ1, HZ2 and HZ3, where 28.2% residents live in the northern HZ4, HZ5, HZ6 and HZ7 (Map 1).

Given the geographic variation in population distribution, cancer frequency, incidence and mortality rates are more representative of cancers occurring in the more populated health zones (1, 2 and 3). Some HZs (e.g., HZ5) have a slightly older population or a different ratio of males to females (e.g., HZ7) which impacts on the distribution of cancer incidence as well as mortality. In the next section, we examine the frequency distributions of the ten leading cancers by health zone.

3.4.2 Ranking of Cancers by Health Zone

3.4.2.1 Ranking of the Ten Leading Cancers by Frequency

Regional frequency distributions of incidence and mortality for the ten leading cancers are presented in Figures 13-26. Frequency is defined as the percentage of each individual cancer in relation to the total number of cancers in each health zone. In this report, the percentage was calculated based on the number of cancer new cases and deaths that occurred during the period of 2002-2006.

Prostate Cancer

Prostate cancer was the most frequently diagnosed cancer in males across all health zones ranging from 24.5% of all cancers in HZ4 to 32.6% in HZ6 (Table 5). The 2004 national incidence of prostate cancer was 26.3% of all cancers diagnosed in males (Canadian Cancer Statistics 2008, Table A3). Prostate cancer was the third leading cause of cancer-related deaths across all zones, with the exception of HZ4 where it ranked in second place (Table 6).

The highest percentage of prostate cancer deaths occurred in HZ7 (11.9%), slightly over the provincial average of 10.6% and the national rate of 10.5% (Canadian Cancer Statistics 2008, Table A5).

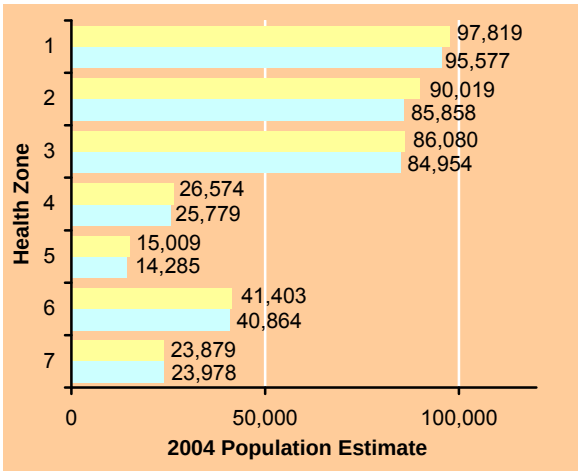
Breast Cancer

Breast cancer was the most frequently diagnosed cancer in females and constituted 23.9% of all cancers in HZ4 to 29.4% in HZ7 (Table 7); these estimates were comparable to the national rate of 27.3% (Canadian Cancer Statistics 2008, Table A3). Breast cancer was the second leading cause of cancer-related deaths across all zones, with the exception of HZ7 where it ranked in third place (Table 8). The highest percentage of breast cancer deaths occurred in HZ5 (16.6%) compared to the provincial average of 15.1% and the national rate of 15.7% in 2004 (Canadian Cancer Statistics 2008, Table A5).

Lung Cancer

The regional frequency distributions of *lung cancer* incidence in males ranged from 16.6% in HZ1 to 22.6% in HZ5 (Table 5). For females, the incidence frequencies of lung cancer varied from 12.8% in HZ4 to 16.7% in HZ2 (Table 7). The 2004 national frequencies of lung cancer incidence were 15.4% for males and 13.2% for females (Canadian Cancer Statistics 2008, Table A3). In New Brunswick, lung cancer was responsible for the highest percentages of deaths in both males and females. Specifically, mortality frequencies of lung cancer for males ranged from 30.0% in HZ1 to 40.0% in HZ5. For females, the frequencies of lung cancer deaths varied from 20.8% in HZ4 to 29.5% in HZ2. The 2004 national frequencies of lung cancer mortality were 28.7% for males and 23.6% for females (Canadian Cancer Statistics 2008, Table A5).

Map 1: New Brunswick Health Zones and Associated Population Estimates in 2004



Zone 6	Total	82,267
	M	40,864
	F	41,403

Zone 5	Total	29,294
	M	14,285
	F	15,009

Zone 4	Total	52,353
	M	25,779
	F	26,574

Zone 7	Total	47,857
	M	23,978
	F	23,879

Zone 3	Total	171,034
	M	84,954
	F	86,080

Zone 1	Total	193,396
	M	95,577
	F	97,819

Zone 2	Total	175,877
	M	85,858
	F	90,019

Colorectal Cancer

The frequencies of the incidence of *colorectal cancer* for both sexes ranked third across all zones with the exception of HZ4 and HZ7 in females, where it ranked second (Tables 5 and 7). Incidence percentages of colorectal cancer in males varied from 11.2% in HZ6 to 14.8% in HZ4 and from 9.9% in HZ5 to 15.6% in HZ4 for females. Mortality percentages of colorectal cancer in males ranged from 9.6% in HZ6 to 13.5% in HZ7 and in females, from 10.3% in HZ2 to 13.7% in HZ7 (Tables 6 and 8). Provincially, colorectal cancer was the second leading cause of cancer-related deaths in males and the third for females.

Other cancers

Bladder cancer for males was the fourth most frequently detected cancer across all zones accounting for 4.9% in HZ7 to 7.4% in HZ1 (Table 5). *Non-Hodgkin's lymphoma* for males ranked fifth in HZ1 (5.0%), HZ3 (4.0%), HZ4 (4.2%) and HZ6 (4.9%); however, *cancer of the kidney and renal pelvis* appeared to be the fifth in HZ2 (4.4%), HZ5 (4.4%) and HZ7 (4.2%, Table 5).

In HZ2, HZ3, HZ5 and HZ7, the incidence of *cancer of the body of the uterus* for females was the fourth most frequently detected and accounted for 4.4% in HZ7 to 7.2% in HZ5 of all cancers (Table 7). In HZ1, *non-Hodgkin's lymphoma* (4.7%) for females was the fourth most common cancer and in HZ4 and HZ6, *thyroid cancer* for females ranked fourth and accounted for 7.7% and 5.5% of all cancers.

In males, *pancreatic cancer* (4.6%) was the fourth most common cancer causing deaths across all zones with the exception of HZ6, where *stomach cancer* (5.6%) ranked fourth. *Non-Hodgkin's lymphoma* was the fifth most common cancer causing deaths in HZ1 (4.5%) and HZ3 (4.6%, Table 6). In HZ5 and HZ7, stomach cancer was the fifth leading cause of cancer-related deaths and accounted for 4.4% and 3.1% of all cancers (Table 6), respectively.

In HZ1, HZ2, HZ4, HZ5 and HZ6, *pancreatic cancer* for females was the fourth most frequent cause of cancer deaths accounting for 5.0% in HZ2 to 8.9% in HZ5 of all cancers. *Ovarian cancer* was the fourth most frequent cause of cancer-related deaths in HZ3 and HZ7.

Non-Hodgkin's lymphoma (4.0%) in HZ2 and *pancreatic cancer* (6.3%) in HZ7 for females were the fifth most common cause of cancer-related deaths.

Bladder, *cervical* and *stomach* cancers were identified as being among the ten leading cancers in females in one or more zones but not in the province (Table 7). Cancers of the *kidney and renal pelvis*, *multiple myeloma*, *bladder* and *"brain and other nervous system"* were identified as being among the ten leading causes of cancer-related deaths in females in one or more zones but not in the province (Table 8).

"*Brain and other nervous system*" and cancer of the *thyroid* were identified as being among the ten leading cancers in males in one or more zones but not in the province. "*Brain and other nervous system*" and cancers of the *buccal cavity and pharynx* were identified as being among the ten leading causes of cancer-related deaths in males in one or more zones but not in the province.

In summary, higher percentages of incidence and mortality occurred in males than in females for the eight leading cancers (i.e., *lung*, *non-Hodgkin's lymphoma*, *bladder*, *kidney and renal pelvis*, *leukemia*, *esophagus*, *stomach* and *melanoma of the skin*) with the exception of *colorectal* and *pancreas* cancers; whereas thyroid cancer incidence was more frequent in females across all health zones.

Figure 13: Percentage Distribution of Cancer Incidence for the Ten Leading Cancers by Sex, Health Zone 1, New Brunswick, 2002-2006

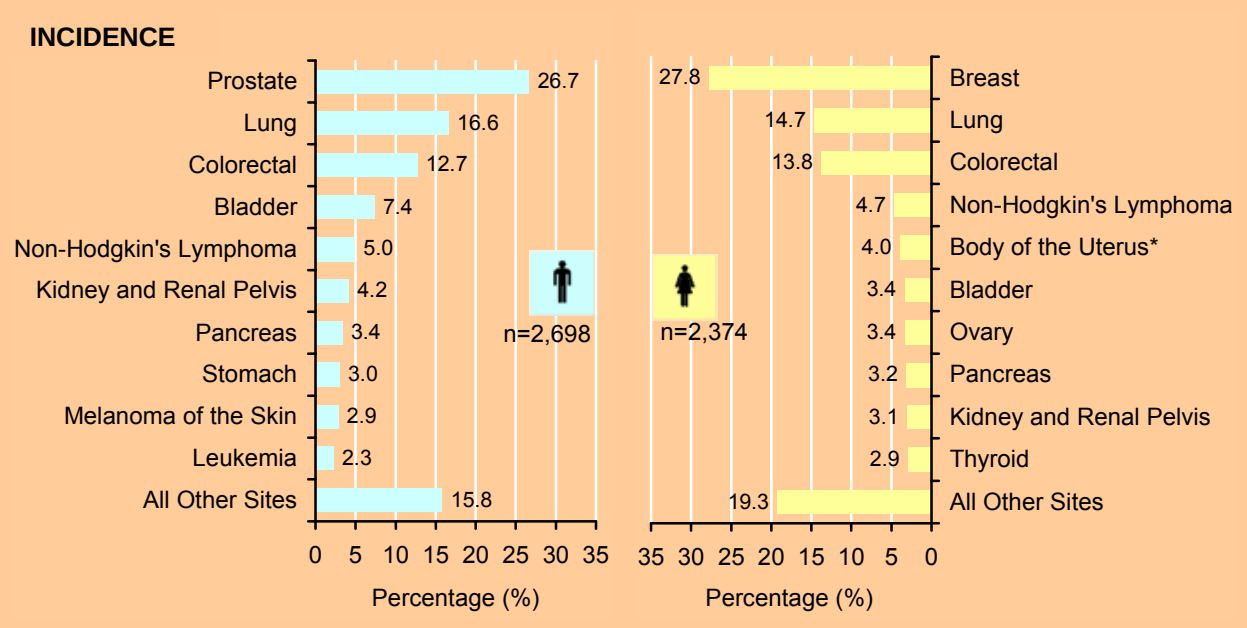
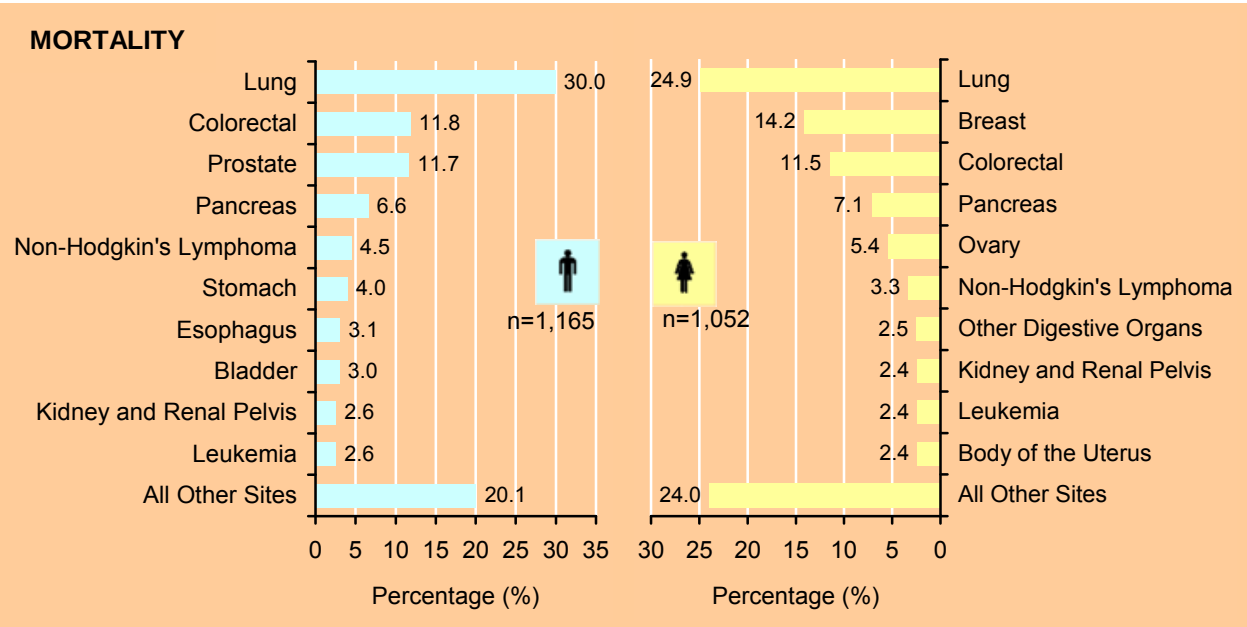


Figure 14: Percentage Distribution of Cancer Mortality for the Ten Leading Cancers by Sex, Health Zone 1, New Brunswick, 2002-2006



* Includes Corpus Uteri and Uterus, Not Otherwise Specified.

Figure 15: Percentage Distribution of Cancer Incidence for the Ten Leading Cancers by Sex, Health Zone 2, New Brunswick, 2002-2006

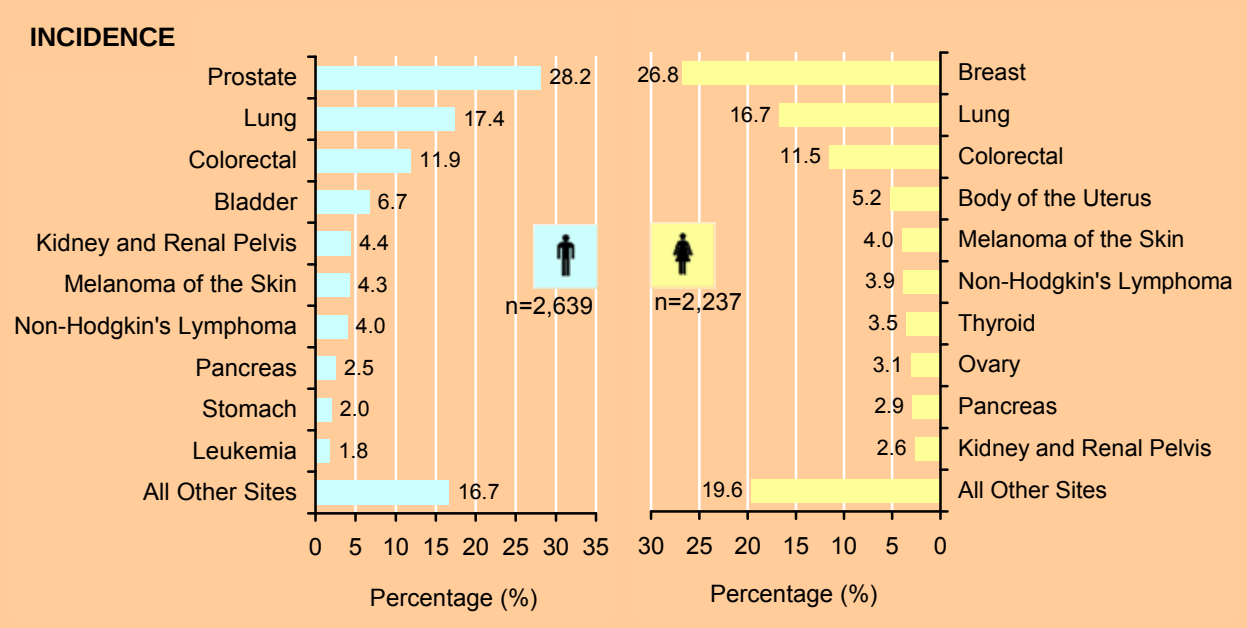
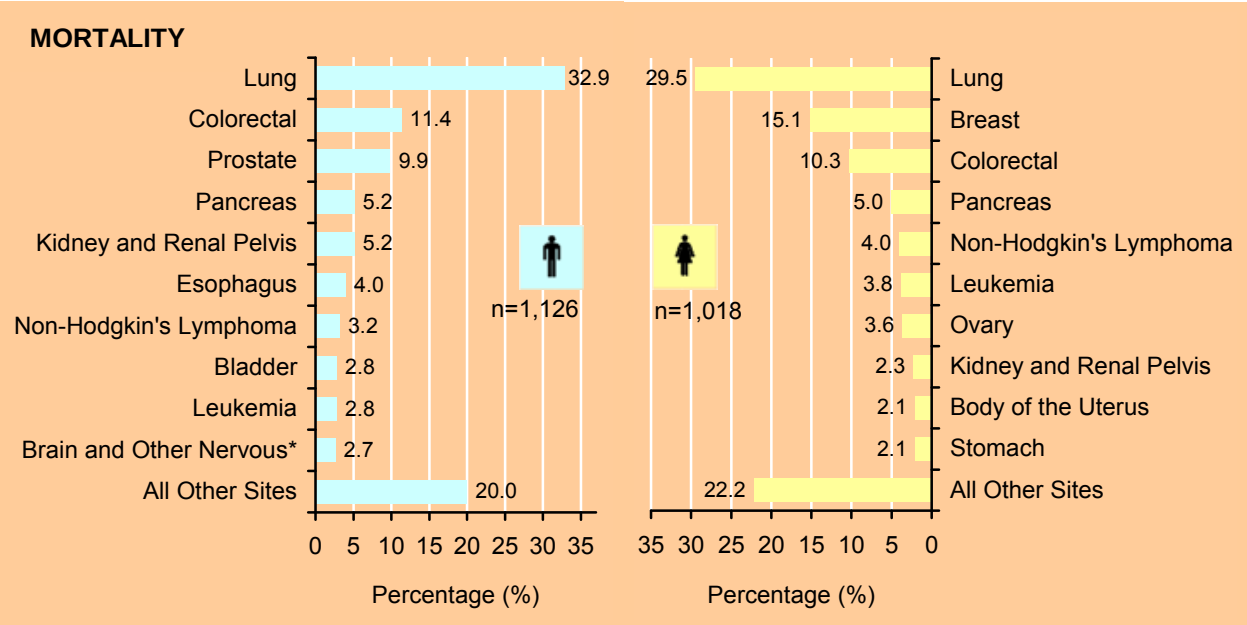


Figure 16: Percentage Distribution of Cancer Mortality for the Ten Leading Cancers by Sex, Health Zone 2, New Brunswick, 2002-2006



* Brain and Other Nervous System.

Figure 17: Percentage Distribution of Cancer Incidence for the Ten Leading Cancers by Sex, Health Zone 3, New Brunswick, 2002-2006

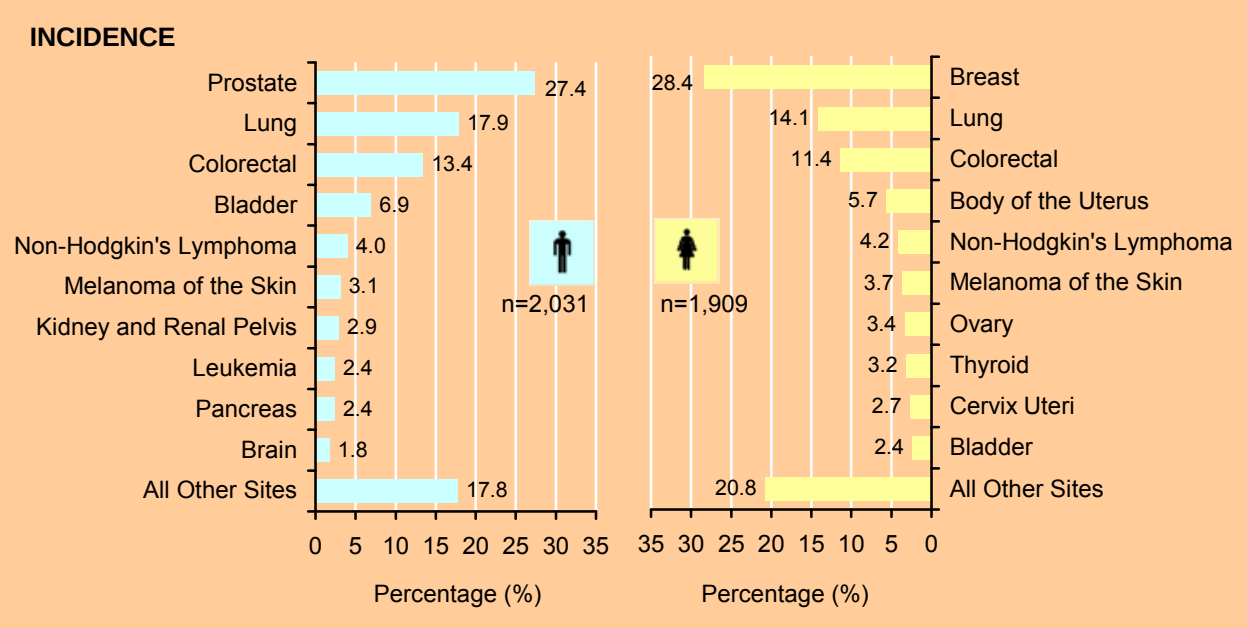


Figure 18: Percentage Distribution of Cancer Mortality for the Ten Leading Cancers by Sex, Health Zone 3, New Brunswick, 2002-2006

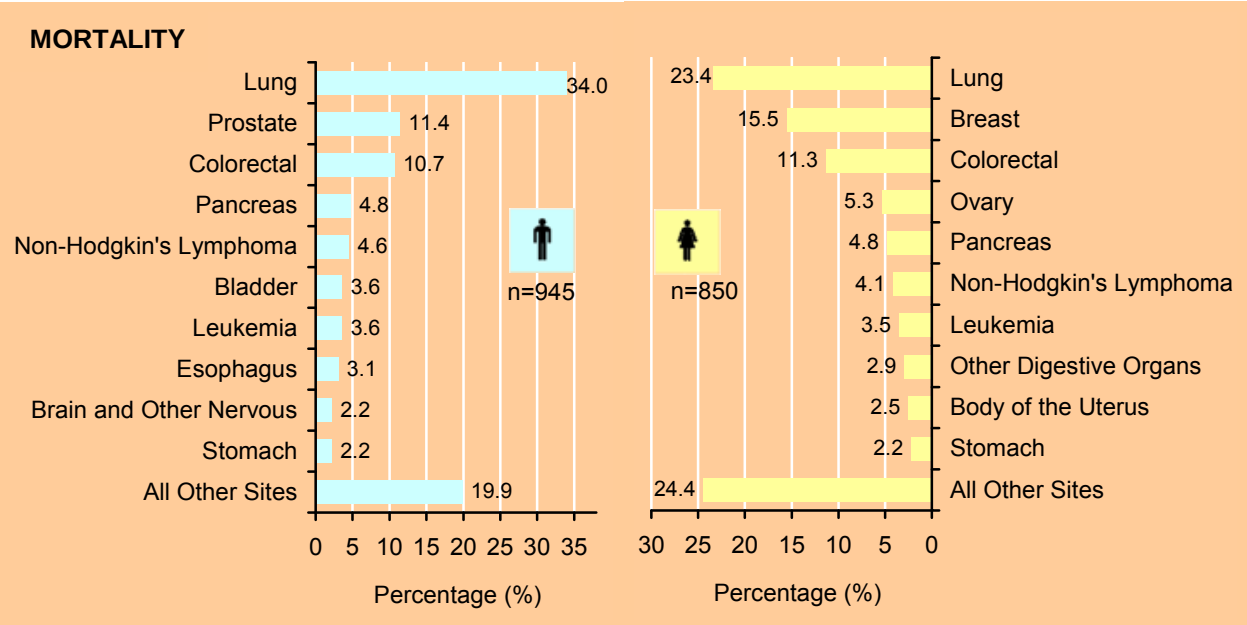


Figure 19: Percentage Distribution of Cancer Incidence for the Ten Leading Cancers by Sex, Health Zone 4, New Brunswick, 2002-2006

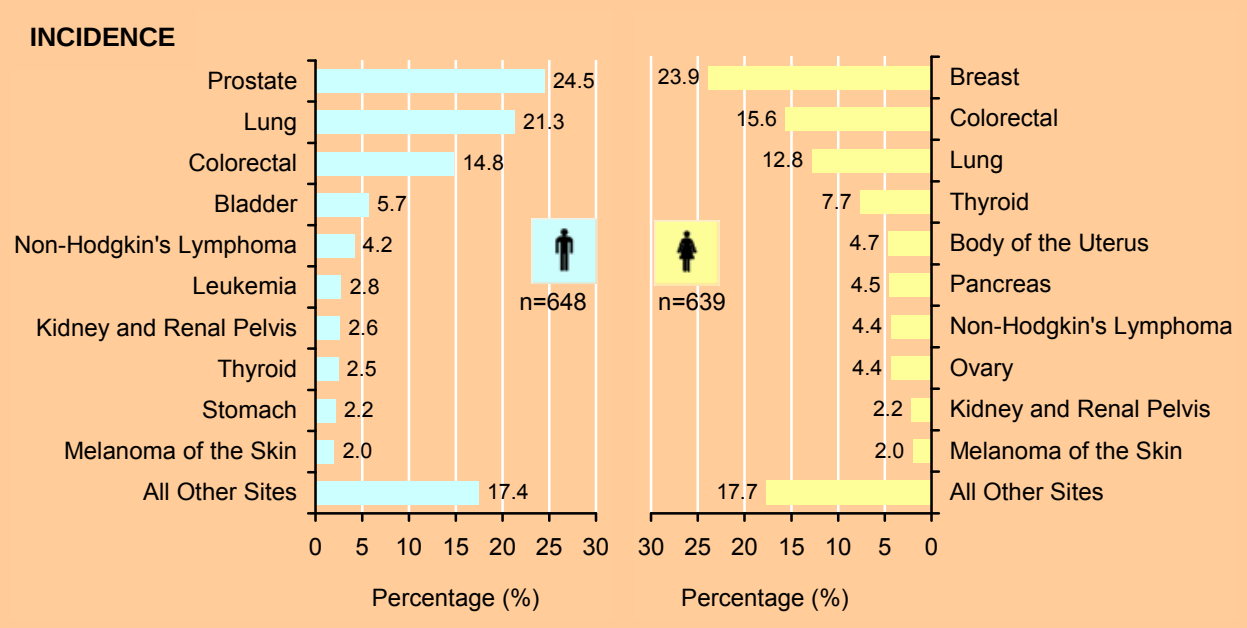


Figure 20: Percentage Distribution of Cancer Mortality for the Ten Leading Cancers by Sex, Health Zone 4, New Brunswick, 2002-2006

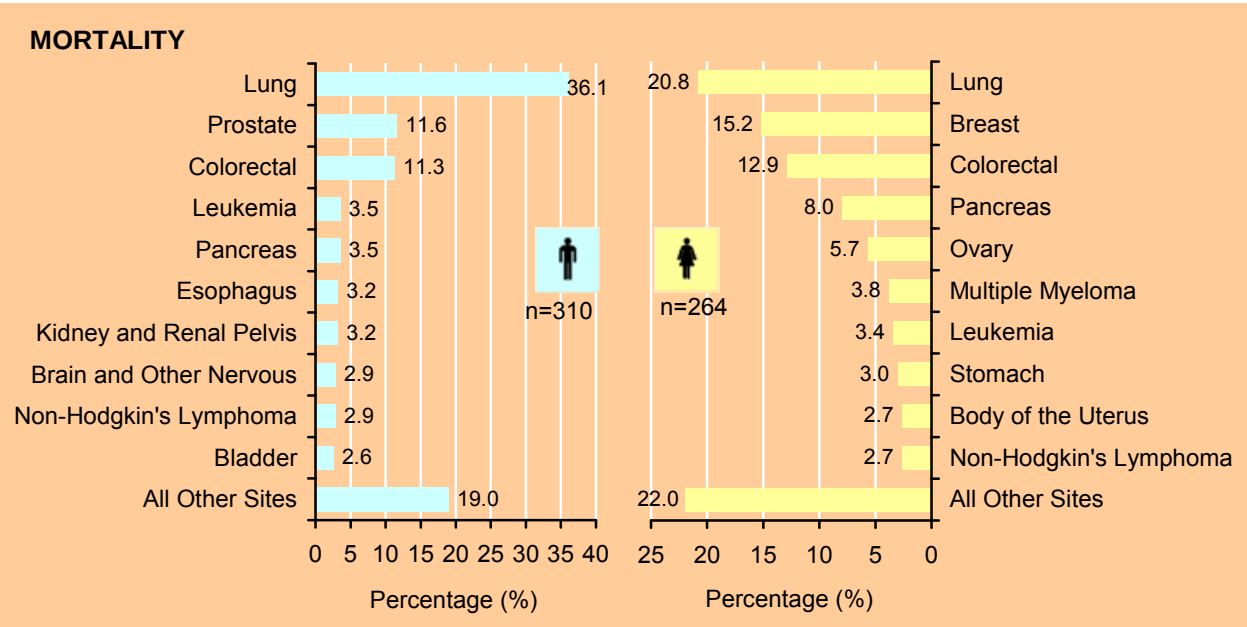


Figure 21: Percentage Distribution of Cancer Incidence for the Ten Leading Cancers by Sex, Health Zone 5, New Brunswick, 2002-2006

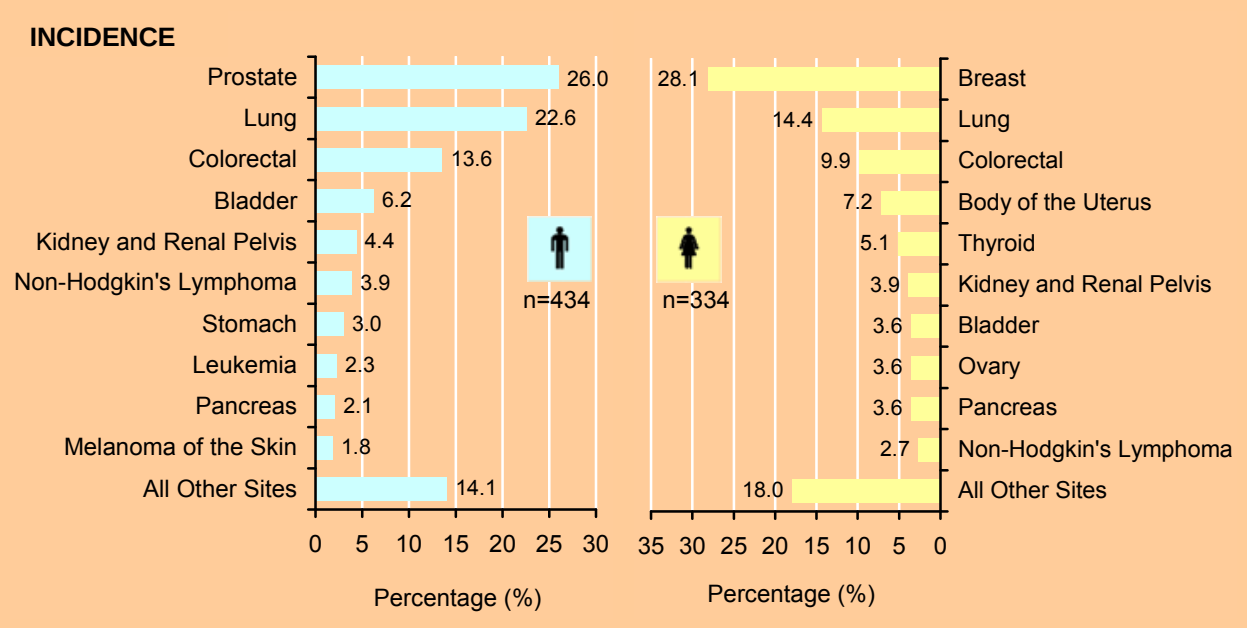


Figure 22: Percentage Distribution of Cancer Mortality for the Ten Leading Cancers by Sex, Health Zone 5, New Brunswick, 2002-2006

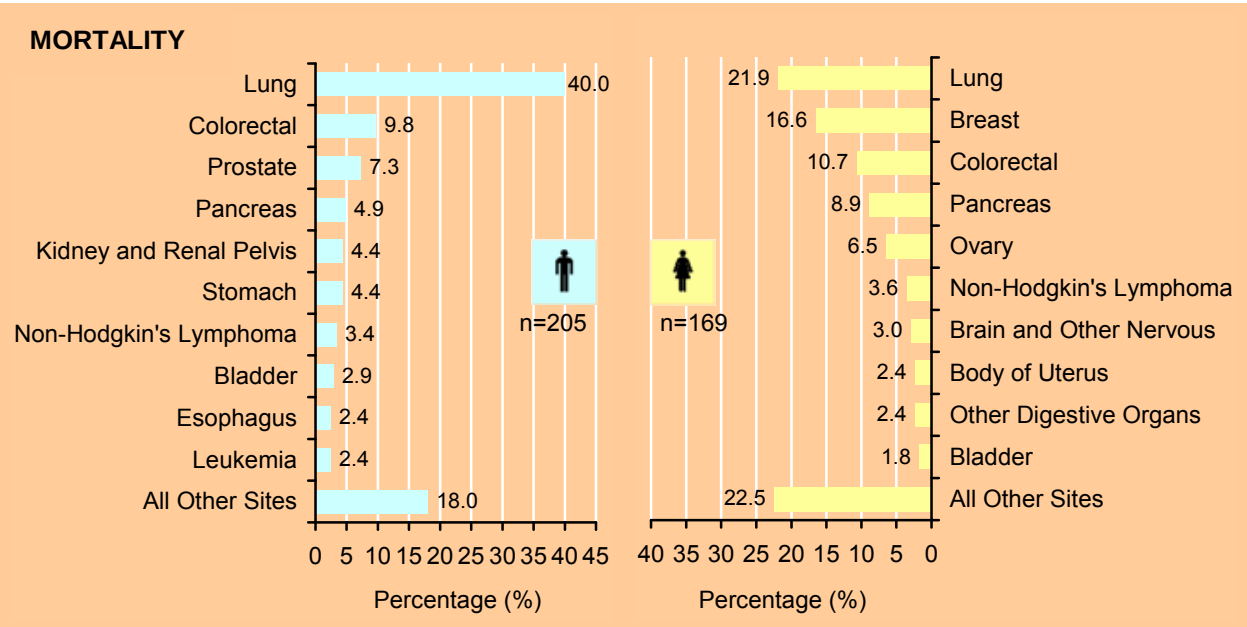


Figure 23: Percentage Distribution of Cancer Incidence for the Ten Leading Cancers by Sex, Health Zone 6, New Brunswick, 2002-2006

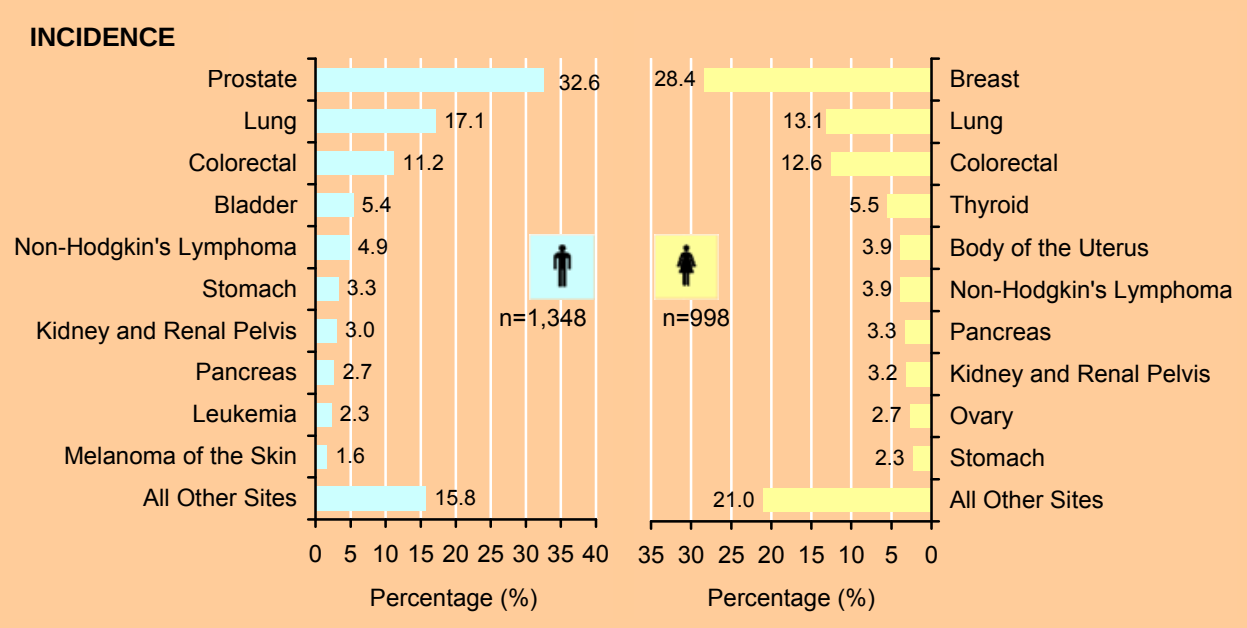


Figure 24: Percentage Distribution of Cancer Mortality for the Ten Leading Cancers by Sex, Health Zone 6, New Brunswick, 2002-2006

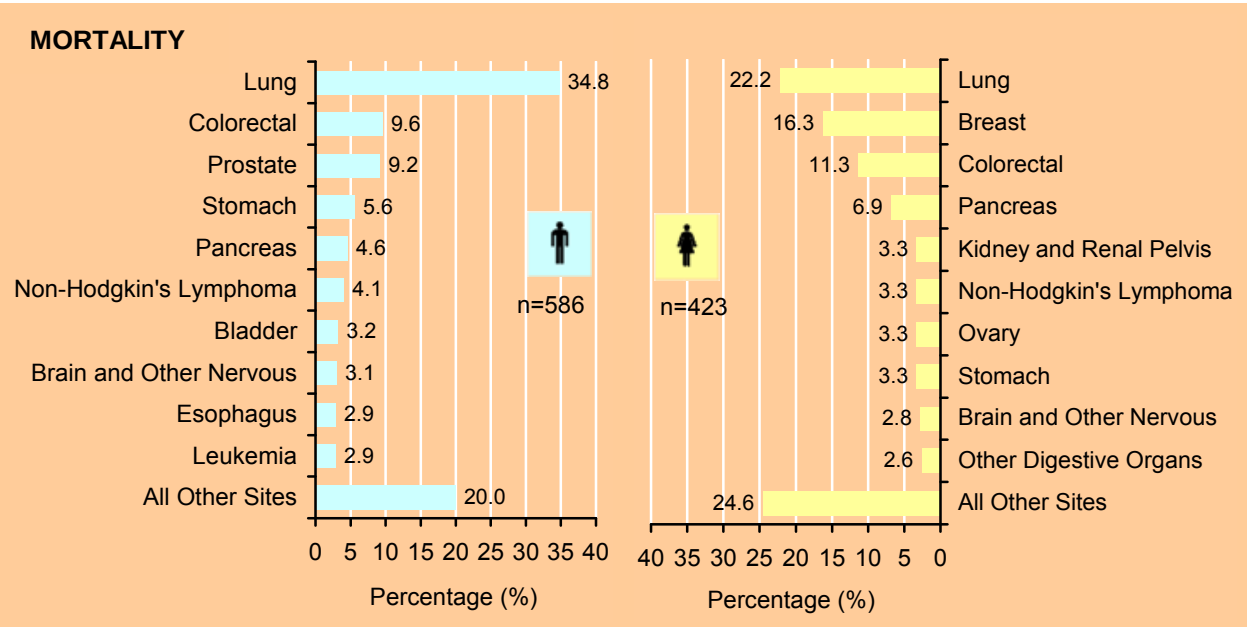


Figure 25: Percentage Distribution of Cancer Incidence for the Ten Leading Cancers by Sex, Health Zone 7, New Brunswick, 2002-2006

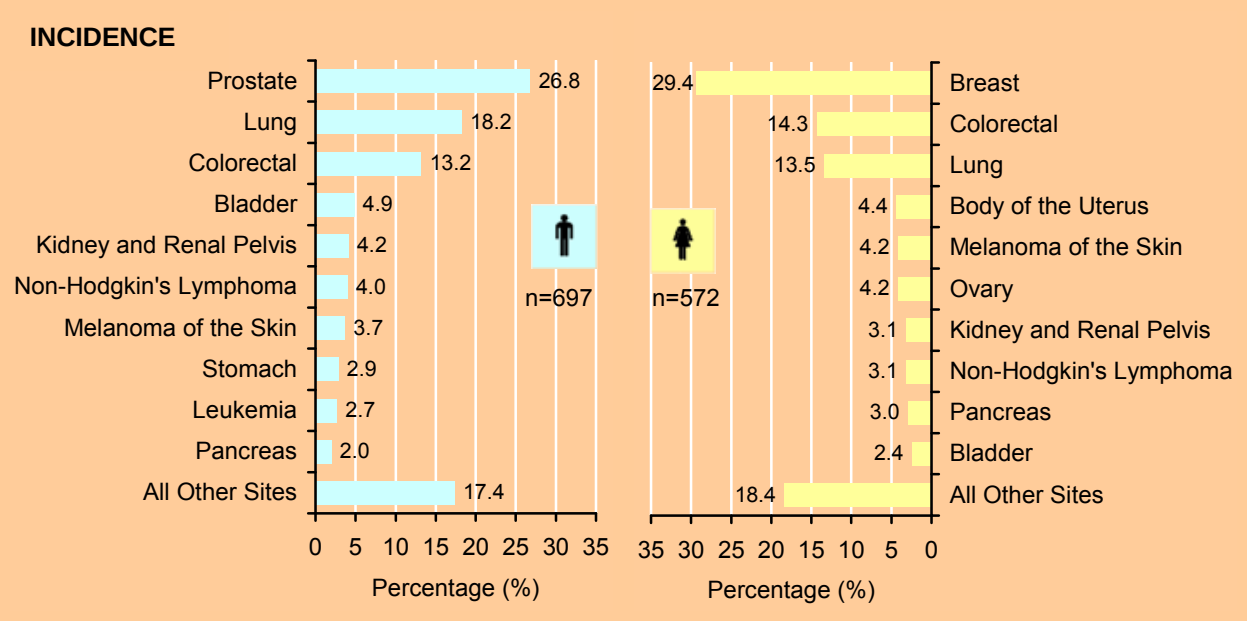
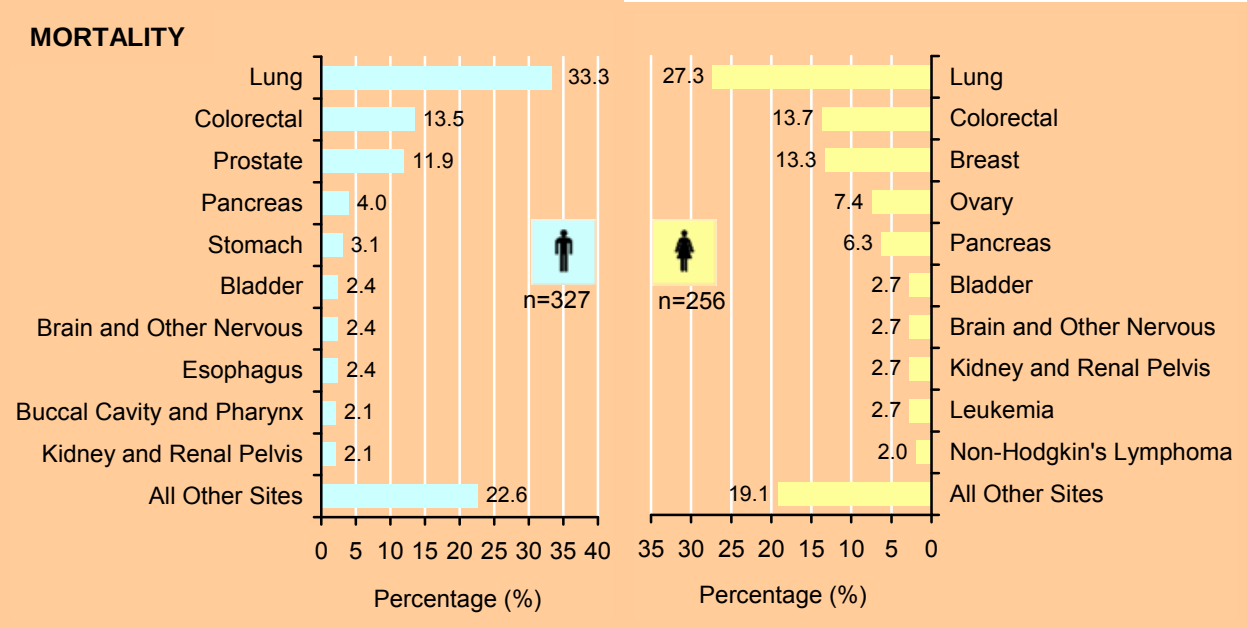


Figure 26: Percentage Distribution of Cancer Mortality for the Ten Leading Cancers by Sex, Health Zone 7, New Brunswick, 2002-2006



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3.4.3.2 Ranking of the Five Leading Cancers by Rate

Due to the difference in age structure across health zones, the age-standardized incidence and mortality rates (ASIR & ASMR) were used to compare cancer rates geographically by health zone. These rates are more meaningful comparators than frequency or crude rates of incidence and mortality which do not account for age differences. Provincial rates were the average of the seven health zones. The five cancer sites with the highest ASIR and ASMR were compared across health zones and assigned a provincial rank of 1 through 5 (Tables 9-12). In total, these five leading cancers (*lung*, *colorectal*, *prostate*, *breast* and *bladder*) represented more than 61.4% of incidence and 55.8% of mortality counts. In this report, provincial and health zone incidence and mortality rates for these five leading cancers were also compared to the national age-standardized rates in 2004 (Figures 27-34).

For males, the cancers with the highest incidence rates across all seven health zones, in descending order were: *prostate*, *lung* and *colorectal* cancers (Table 9). Those with the highest mortality rates were: *lung*, *colorectal* and *prostate* cancers (Table 10). This was consistent across all seven health zones with the exception of HZ3 and HZ4, where the mortality rates of prostate cancer were higher than those of colorectal cancer. In HZ6, the mortality rates for prostate and colorectal cancers were similar (Table 10).

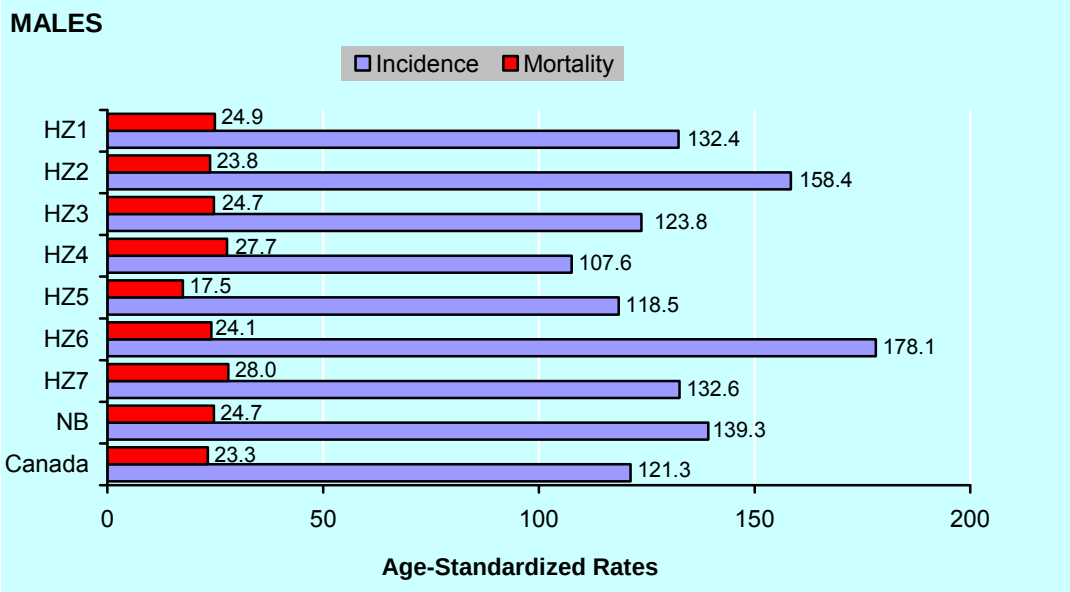
For females, the cancers with the highest incidence rates across all seven health zones, in descending order were: *breast*, *lung* and *colorectal* cancers (Table 11). However, the incidence rates of colorectal cancer were higher than those of lung cancer in HZ4 and HZ7. Lung cancer had the highest mortality rate across all seven health zones, followed by breast and colorectal cancers. Further, mortality rates of breast cancer were consistently higher than those of colorectal cancer across all health zones with the exception of HZ7, where the mortality rate of colorectal cancer appeared to be higher (Table 12).

Prostate Cancer

The highest incidence rates per 100,000 population for prostate cancer were seen in HZ2 (158.4 cases) and in HZ6 (178.1 cases, Table 9), which were significantly higher than the provincial rate of 139.3 cases and the 2004 national rate of 121.3 cases[15] (Figure 27).

Mortality rates per 100,000 population for prostate cancer varied from 17.5 in HZ5 to 28.0 deaths in HZ7 (Table 10). With the exception of HZ5, rates in all other zones were similar to the provincial (24.7 deaths) and the national rates (23.3 deaths) in 2004 (Figure 27).

Figure 27: Age-Standardized Incidence and Mortality Rates* (per 100,000 population) for Prostate Cancer by Health Zone, New Brunswick (NB) and Canada, 2002-2006

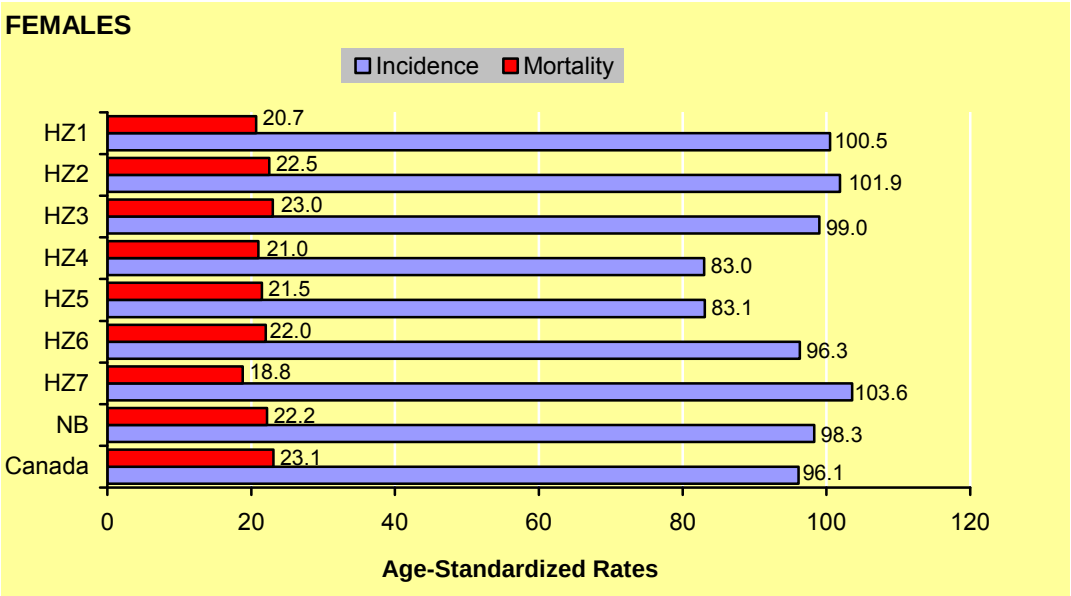


Breast Cancer

In females, breast cancer had the highest incidence rate of all cancers across all seven health zones (Table 11). Incidence rates per 100,000 population ranged from 83.0 in HZ4 to 103.6 cases in HZ7. Mortality rates per 100,000 population varied from 18.8 in HZ7 to 23.0 deaths in HZ3. Provincial incidence and mortality rates (incidence: 98.3 cases; mortality: 22.2 deaths) were similar to the national rates (incidence: 96.1 cases; mortality: 23.1 deaths) in 2004[15] (Figure 28).

* Age-standardized to the 1991 Canadian population estimates.

Figure 28: Age-Standardized Incidence and Mortality Rates* (per 100,000 population) for Female Breast Cancer by Health Zone, New Brunswick (NB) and Canada, 2002-2006



Lung Cancer

In males, the incidence rates per 100,000 population for lung cancer ranged from 80.4 in HZ3 to 105.9 cases in HZ5 (Table 9). Mortality rates per 100,000 population ranged from 64.7 in HZ1 to 90.2 deaths in HZ5 (Table 10). The provincial incidence (89.7 cases) and mortality (76.5 deaths) rates of lung cancer were higher than the 2004 national rates of 70.4 cases and 60.6 deaths[15] (Figure 29), respectively.

In females, the incidence rates of lung cancer varied from 40.3 in HZ5 to 62.8 cases in HZ2 (Table 11). Mortality rates ranged from 29.4 in HZ4 to 48.7 deaths in HZ2 (Table 12). In particular, females in HZ1 (53.8 cases), HZ2 (62.8 cases), HZ3 (51.0 cases) and HZ7 (46.5 cases) had higher incidence rates of lung cancer than the 2004 national rate (45.5 cases). Similarly, mortality rates in these zones were higher than the national rate of 36.1 deaths per 100,000 population in 2004[15] (Figure 30).

* Age-standardized to the 1991 Canadian population estimates.

Figure 29: Age-Standardized Incidence and Mortality Rates* (per 100,000 population) for Male Lung Cancer by Health Zone, New Brunswick (NB) and Canada, 2002-2006

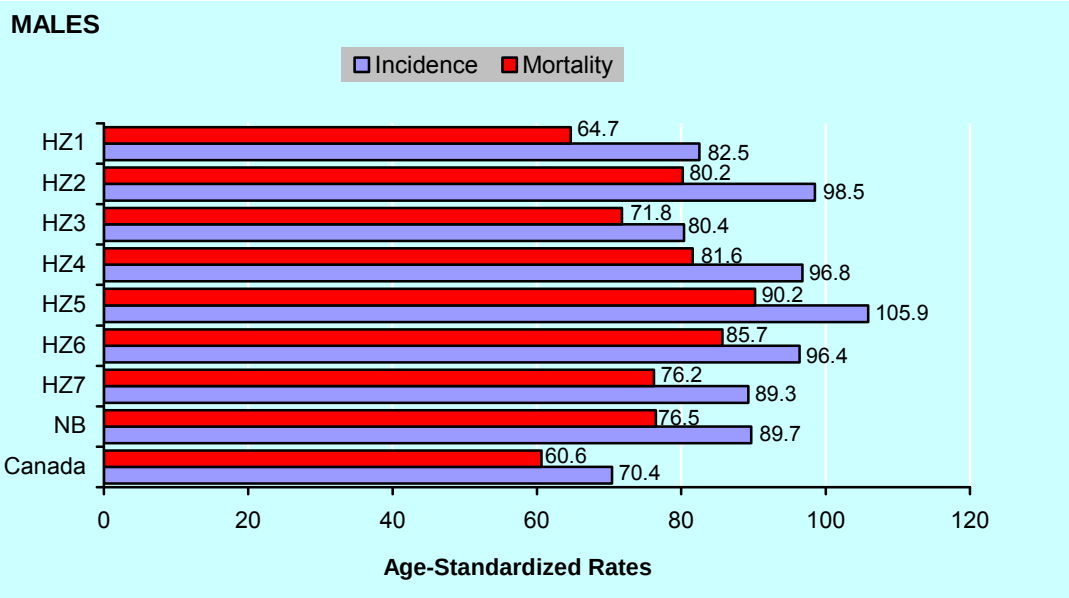
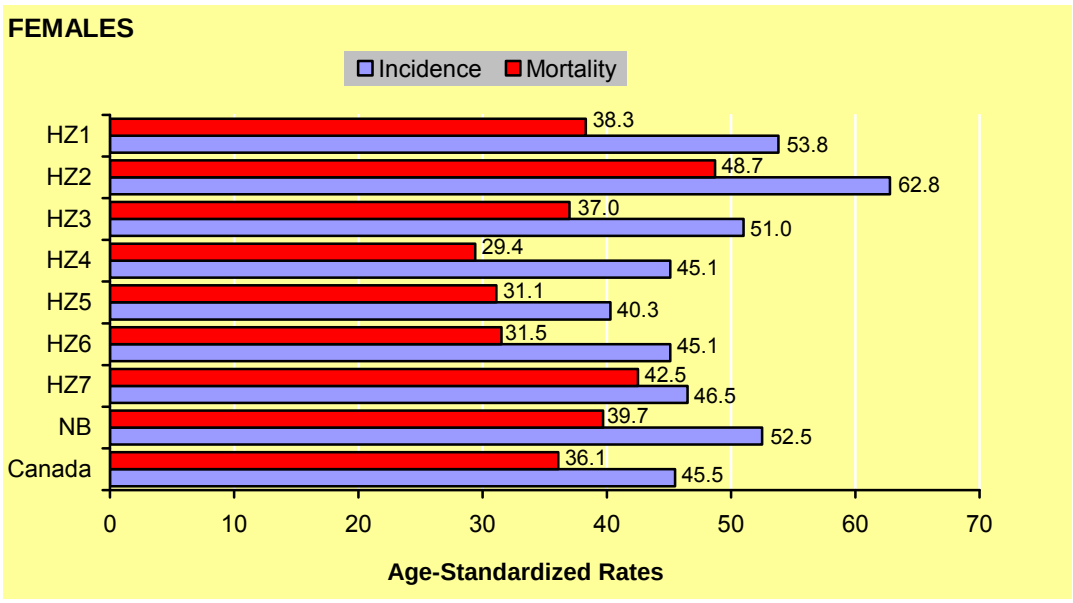


Figure 30: Age-Standardized Incidence and Mortality Rates* (per 100,000 population) for Female Lung Cancer by Health Zone, New Brunswick (NB) and Canada, 2002-2006



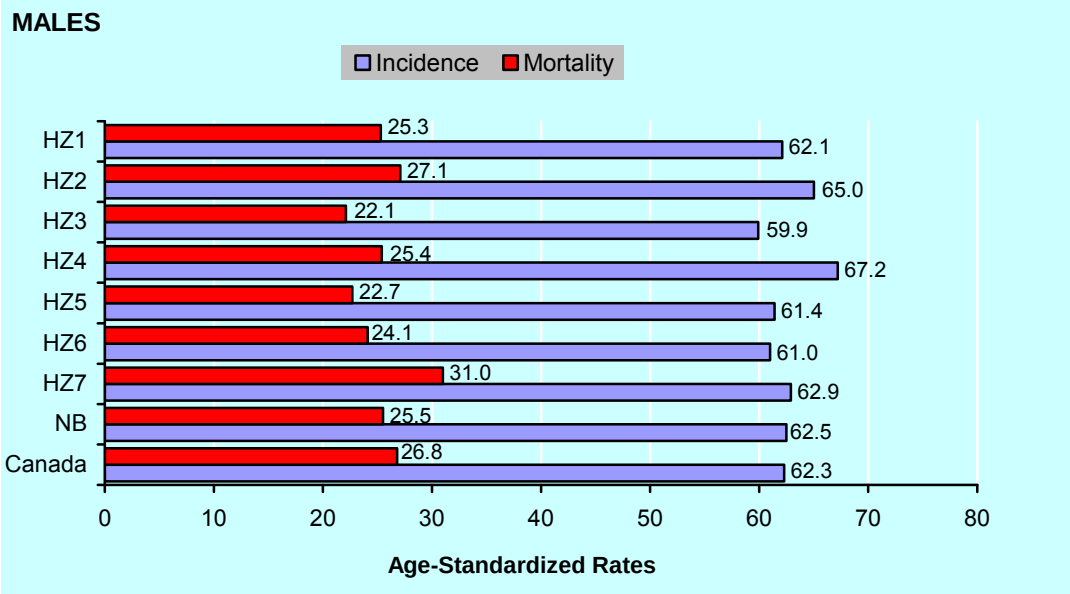
* Age-standardized to the 1991 Canadian population estimates.

Colorectal Cancer

The incidence rates per 100,000 population of colorectal cancer for males ranged from 59.9 in HZ3 to 67.2 cases in HZ4 (Table 9). Males in HZ2 (65.0 cases), HZ4 (67.2 cases) and HZ7 (62.9 cases) had higher incidence rates when compared to the 2004 national rate of 62.3 cases[15] (Figure 31). Mortality rates per 100,000 population of colorectal cancer for males ranged from 22.1 in HZ3 to 31.0 deaths in HZ7 (Table 10). Only in HZ2 (27.1 deaths) and HZ7 (31.0 deaths) were the rates higher than the 2004 national rate[15] (26.8 deaths).

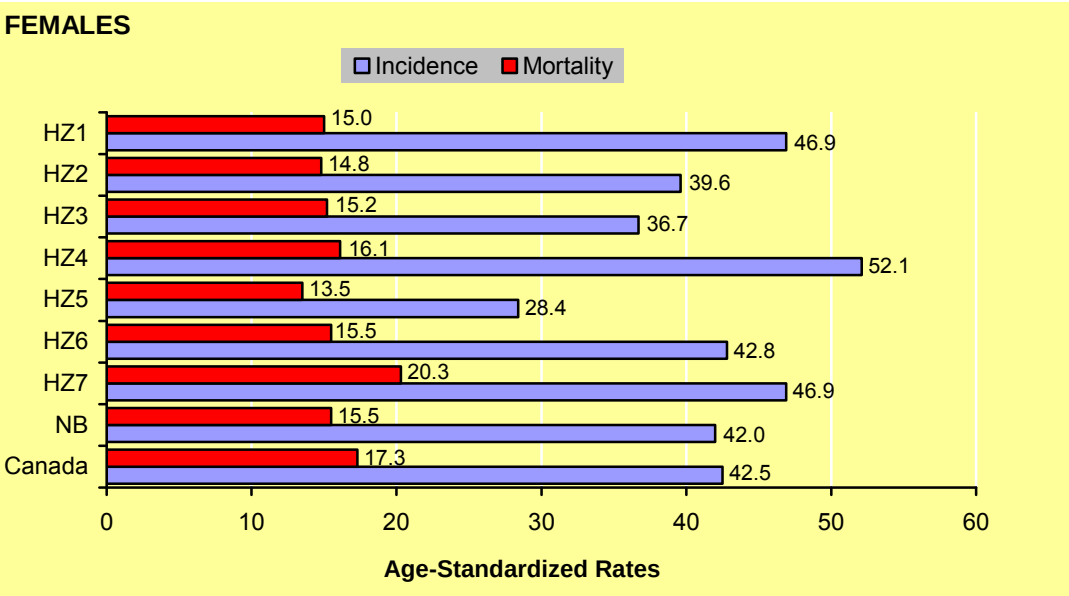
The incidence rates of colorectal cancer for females varied from 28.4 in HZ5 to 52.1 cases in HZ4 (Table 11). Incidence rates in HZ2 (39.6 cases), HZ3 (36.7 cases) and HZ5 (28.4 cases) were lower than the 2004 national rate of 42.5 cases per 100,000 population[15] (Figure 32). Mortality rates for female colorectal cancer ranged from 13.5 in HZ5 to 20.3 deaths in HZ7. Only in HZ7 did the mortality rate exceed the 2004 national rate of 17.3 deaths.[15]

Figure 31: Age-Standardized Incidence and Mortality Rates* (per 100,000 population) for Male Colorectal Cancer by Health Zone, New Brunswick (NB) and Canada, 2002-2006



* Age-standardized to the 1991 Canadian population estimates.

Figure 32: Age-Standardized Incidence and Mortality Rates* (per 100,000 population) for Female Colorectal Cancer by Health Zone, New Brunswick (NB) and Canada, 2002-2006



Bladder Cancer

Similar to the previous provincial cancer report[1], bladder ranked as the fourth leading cancer for males across all health zones (Table 9). Incidence rates per 100,000 population of bladder cancer for males ranged from 24.3 in HZ7 to 38.1 cases in HZ2. The national incidence rate of bladder cancer for males in 2004 was 28.0 cases per 100,000 population[15] (Figure 33). Between 2002 and 2006, neither the incidence for females nor the mortality rates for both sexes of bladder cancer ranked in the five leading cancers across all health zones.

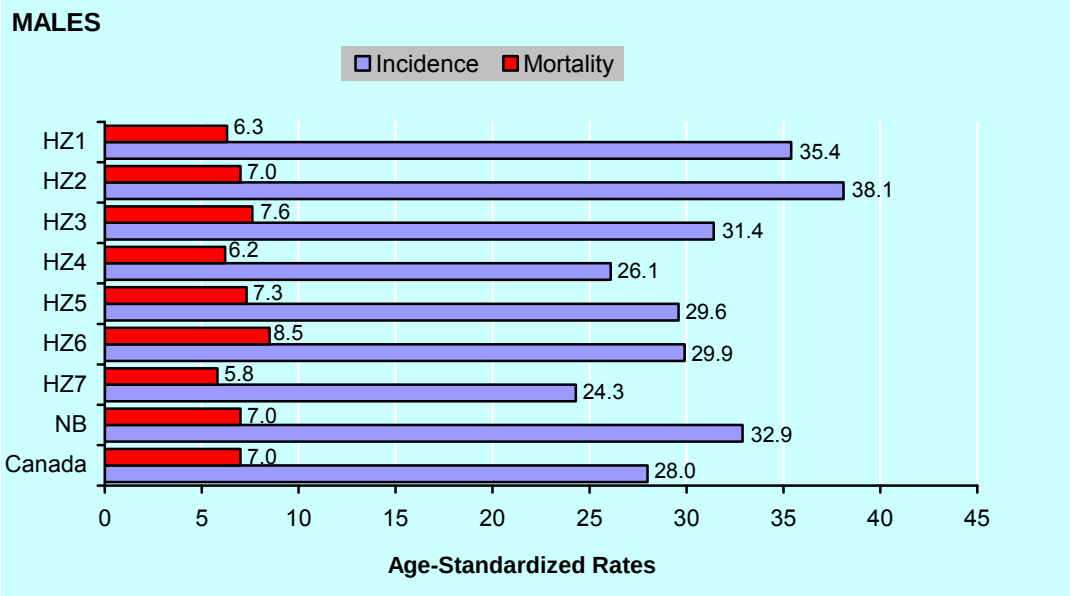
Non-Hodgkin's Lymphoma (NHL)

The incidence rates per 100,000 population of NHL for males ranged from 17.8 in HZ3 to 25.3 cases in HZ6, which were similar to the provincial rate of 21.6 (Table 9) and the national rate of 19.5 cases per 100,000 population in 2004.[15] Overall, the incidence rate of NHL for males ranked fifth; however, the rank positions of the incidence rates of NHL varied from zone to zone. Mortality rates per 100,000 population of NHL for males ranged from 3.7 deaths in HZ7 to 9.8

* Age-standardized to the 1991 Canadian population estimates.

deaths in HZ3 (Table 10) compared to the provincial rate of 8.6 deaths. Overall, NHL ranked as the fifth leading cause of cancer-related deaths in males in New Brunswick. The 2004 national mortality rate of NHL for males was 8.3 deaths per 100,000 population.[15]

Figure 33: Age-Standardized Incidence and Mortality Rates* (per 100,000 population) for Male Bladder Cancer by Health Zone, New Brunswick (NB) and Canada, 2002-2006

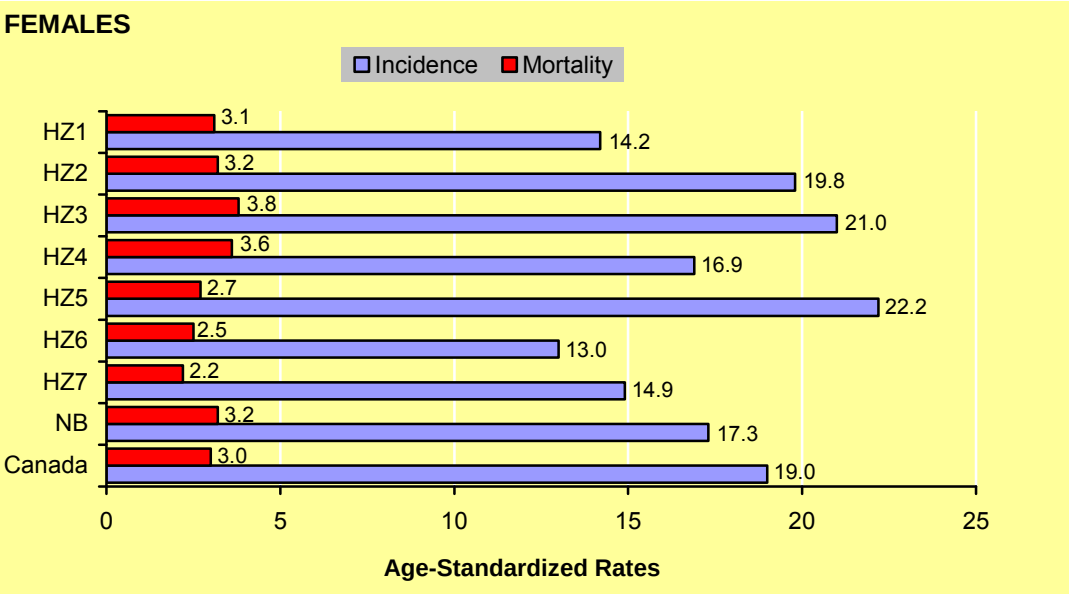


Cancer of the Body of the Uterus

In females, the incidence rates per 100,000 population of the body of the uterus cancer ranged from 13.0 in HZ6 to 22.2 cases in HZ5 (Figure 34). Overall, this cancer ranked as the fourth most common malignancy in females for the province (Table 11). The provincial incidence rate of cancer of the body of the uterus was 17.3 cases, which was lower than the 2004 national rate of 19.0 cases per 100,000 population.[15]

* Age-standardized to the 1991 Canadian population estimates.

Figure 34: Age-Standardized Incidence and Mortality Rates* (per 100,000 population) for Female Cancer of the Body of the Uterus by Health Zone, New Brunswick (NB) and Canada, 2002-2006



Thyroid Cancer

The incidence rates per 100,000 population of thyroid cancer for females varied from 10.5 in HZ7 to 31.6 cases in HZ4, compared to the provincial rate of 16.2 and the national rate of 15.0 cases per 100,000 population in 2004[15] (Table 11). Overall, incidence rates of thyroid cancer for females ranked fifth, ranging from fourth in HZ4 and HZ6 to ninth in HZ7. Between 2002 and 2006, the incidence rate of thyroid cancer has been increasing significantly in New Brunswick. This increasing trend was similar to the national observation.[2, 3, 17] Higher incidence rates of thyroid cancer across Canada were likely due to changes in diagnostic practices and imaging techniques, resulting in improved detection of earlier stage, asymptomatic thyroid cancers.[2] Thyroid cancer was more frequently diagnosed in females than in males by a ratio of 3.7:1, and it was often detected in young women aged 20 to 49 in New Brunswick. During the period of 2002-2006, 438 individuals were diagnosed with thyroid cancer accounting for a 112.6% increase relative to the previous five-year observation period (206 cases in 1997-2001). Neither incidence nor mortality rates for males ranked in the five leading cancer sites in New Brunswick.

* Age-standardized to the 1991 Canadian population estimates.

Pancreatic Cancer

For males, mortality rates due to pancreatic cancer ranked fourth in most health zones with the exception of HZ4 and HZ6, where it ranked fifth (Table 10). HZ4 had the lowest mortality rate (7.4 deaths) while the highest was seen in HZ1 (14.2 deaths, Table 10). For females, mortality rates of pancreatic cancer varied from 6.8 in HZ3 to 12.5 deaths in HZ5 (Table 12). The provincial mortality rates of pancreatic cancer for males and females were 11.7 and 8.8 deaths per 100,000 population respectively, which were slightly higher than the 2004 national rates (males: 10.0 deaths; females: 8.0 deaths).[15] Incidence rates of pancreatic cancer for both sexes did not rank in the five leading cancer sites in New Brunswick (Tables 9 and 11).

Ovarian Cancer

In females, mortality rates per 100,000 population for ovarian cancer were lowest in HZ6 (5.2 deaths) and highest in HZ7 (10.3 deaths, Table 12). Provincially, ovarian cancer ranked as the fifth most common cause of cancer-related deaths in females at 7.7 deaths which was similar to the 2004 national rate of 7.0 deaths per 100,000 population.[15] Incidence rates did not rank in the five leading cancer sites for females in New Brunswick (Table 11).

3.5 Trends in Cancer Incidence and Mortality, 1989-2006

3.5.1 Trends for All Cancer Sites Combined

Over the past 18-year period from 1989 to 2006, the incidence and mortality rates for all cancer sites combined were systematically higher in males than in females (Figures 35 and 36). In general, the observed trends for all cancer sites combined were dominated by the cancers with highest incidence or mortality rates. For example, the incidence trend of all cancer sites combined for males was similar to the trend in the incidence of prostate cancer. The mortality trend for all cancer sites combined followed the male lung cancer trend for mortality. Prostate cancer consisted of 27.8% of the incidence and lung cancer constituted 33.3% of the mortality of all cancer sites combined.

For males, the age-standardized rates per 100,000 population (499.9 cases for incidence; 229.2 deaths for mortality) for all cancer sites combined were higher than the 2004 Canadian rates (incidence: 458.9 cases; mortality: 211.7 deaths)[15], however, the patterns of cancer incidence and mortality trends were similar between New Brunswick and Canada as a whole. In this report, the average annual percentage change (AAPC), developed by the National Cancer Institute (NCI), was used to evaluate the increasing or decreasing trends in cancer incidence and mortality. Overall, for males, there has been little change in the age-standardized incidence rate for all cancer sites combined between 1989 and 2006 with an AAPC of +0.1% (95%CI: -0.3, +0.6). Mortality rates have significantly declined from a high of 242.8 in 1989 to 209.1 deaths per 100,000 population in 2006 (AAPC: -0.7%, 95%CI: -1.1, -0.3).

For females, the age-standardized incidence (357.8 cases) and mortality (148.4 deaths) rates for all cancer sites combined were similar to the 2004 Canadian rates (incidence: 349.5 cases; mortality: 147.1 deaths).[15] Since 1989, incidence rates for all cancer sites combined in New Brunswick females increased (AAPC: +0.6%, 95%CI: +0.3, +0.9), whereas mortality rates decreased with an AAPC of -0.4% (95%CI: -0.7, -0.1).

Figure 35: Trends in Age-Standardized Incidence Rates* (per 100,000 population) for All Cancer Sites Combined by Sex, New Brunswick (NB) and Canada, 1989-2006

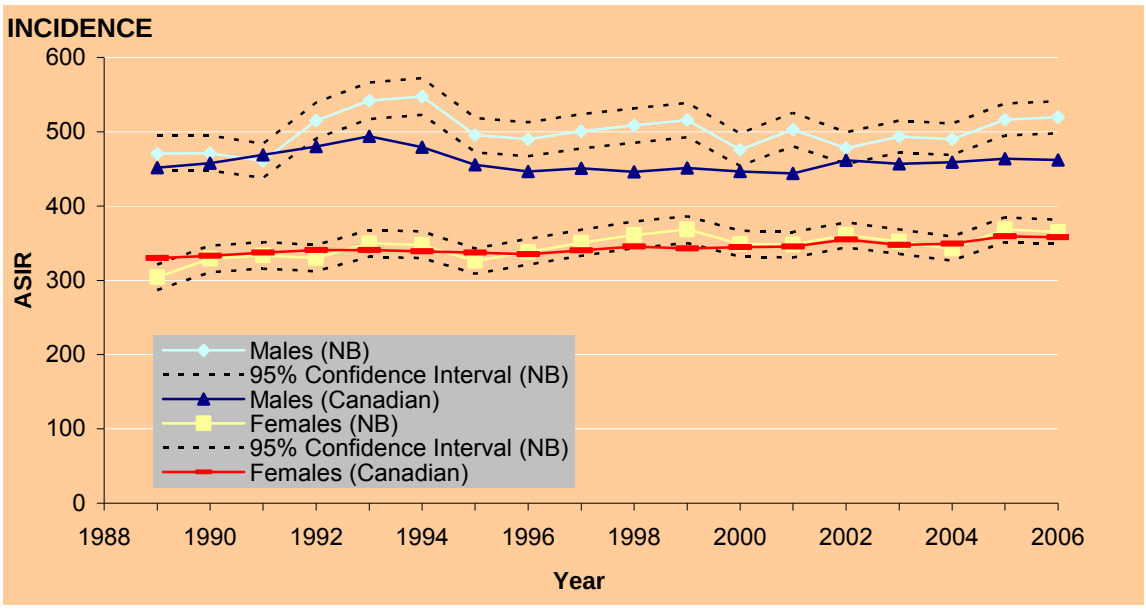
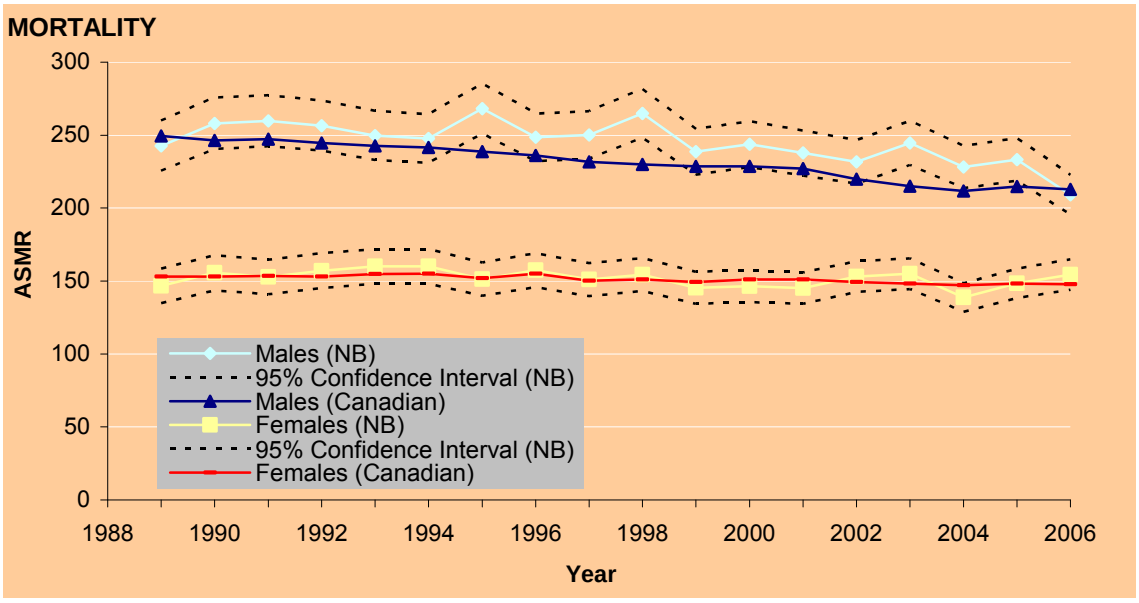


Figure 36: Trends in Age-Standardized Mortality Rates* (per 100,000 population) for All Cancer Sites Combined by Sex, New Brunswick (NB) and Canada, 1989-2006



* Age-standardized to the 1991 Canadian population estimates.

3.5.2 Trends for Selected Cancers

Prostate Cancer

Prostate cancer is the most common cancer in males in Canada, affecting 0.8% of the male population.[15] Since 1989, the incidence rate of prostate cancer in New Brunswick has increased with an AAPC of +6.5% (95%CI: -1.6, +15.2). One peak in incidence occurred in 1993, and then followed by a decline (Figure 37). This peak was compatible with the wave of intensified screening activity with the Prostate-Specific Antigen (PSA) test for early prostate cancer. In contrast to incidence, mortality slightly decreased by -1.0% (95%CI: -2.3, +0.3) per year between 1989 and 2006 and likely reflected improved treatment[15] (Figure 38).

Lung Cancer

Since 1989, the age-standardized rates for male lung cancer have dropped significantly by -1.1% (95%CI: -1.5, -0.8) per year for incidence and by -1.1% (95%CI: -1.6, -0.6) per year for mortality (Figures 37 and 38). These improvements in incidence and mortality rates were similar to the trends in the Canadian rates (incidence: -2.5%; mortality: -2.1%)[15], although the rates of lung cancer for male New Brunswickers were consistently higher. In females, incidence and mortality rates have been increasing since 1989 with an AAPC of +2.6% (95%CI: +2.2, +3.1) and +2.5% (95%CI: +1.8, +3.3; Figures 39 and 40), respectively. In New Brunswick, lung cancer incidence rates were 41.5% higher in males than in females while mortality rates were 53.4% higher in males.

Breast Cancer

Since 1989, breast cancer incidence rates for New Brunswick females have been stable with an AAPC of +0.2% (95%CI: -0.3, +0.7; Figure 39). Over the same time period, a decreasing trend in mortality rates was observed with an AAPC of -2.4% per year (95%CI: -3.4, -1.4; Figure 40). This improvement in mortality was likely the result of a combination of uptake of mammography screening and the use of effective treatments following breast cancer surgery.[17] Incidence (98.3 cases) and mortality (22.2 deaths) rates per 100,000 population for New Brunswick females were similar to the 2004 Canadian rates (incidence: 96.1 cases; mortality: 23.1 deaths).[15]

Figure 37: Trends in Age-Standardized Incidence Rates* (per 100,000 population) for the Five Leading Cancers, Males, New Brunswick, 1989-2006

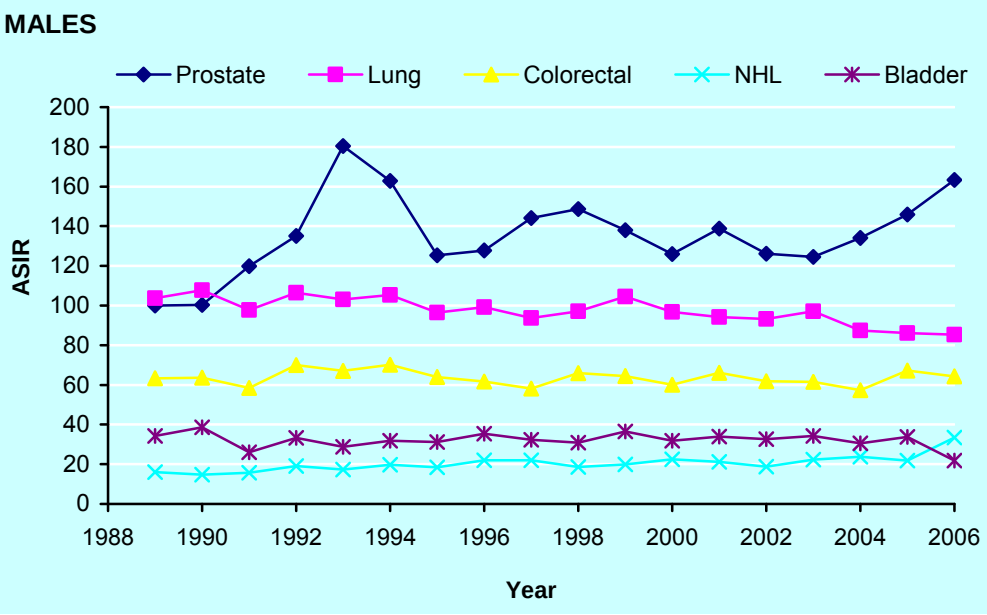
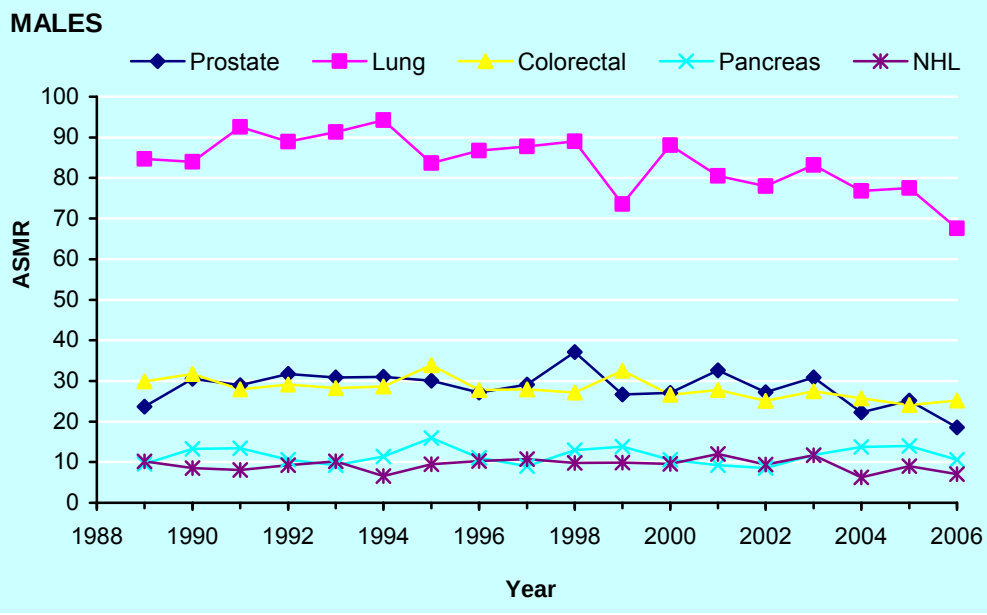


Figure 38: Trends in Age-Standardized Mortality Rates* (per 100,000 population) for the Five Leading Cancers, Males, New Brunswick, 1989-2006



* Age-standardized to the 1991 Canadian population estimates.

Figure 39: Trends in Age-Standardized Incidence Rates* (per 100,000 population) for the Five Leading Cancers, Females, New Brunswick, 1989-2006

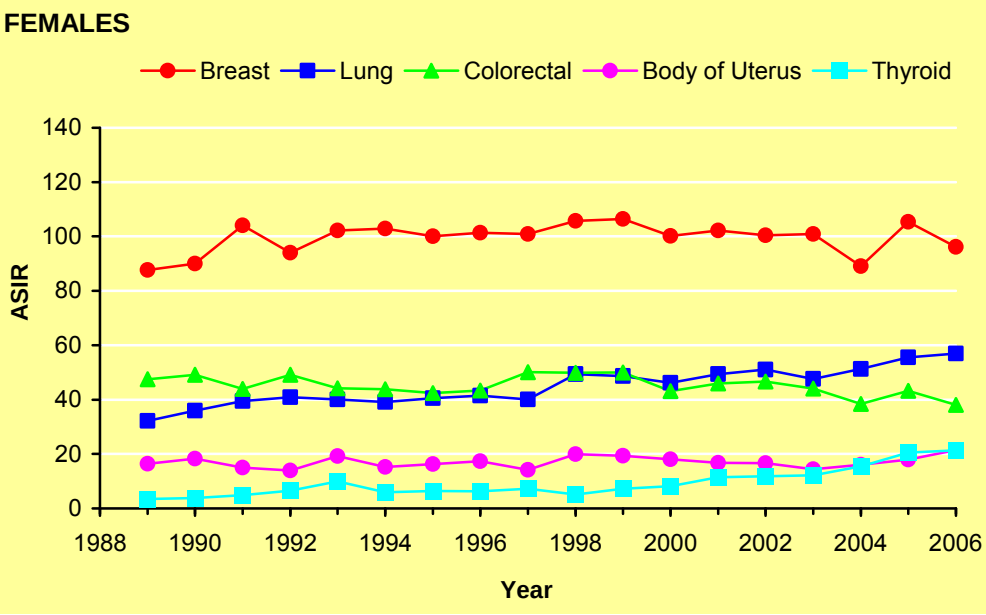
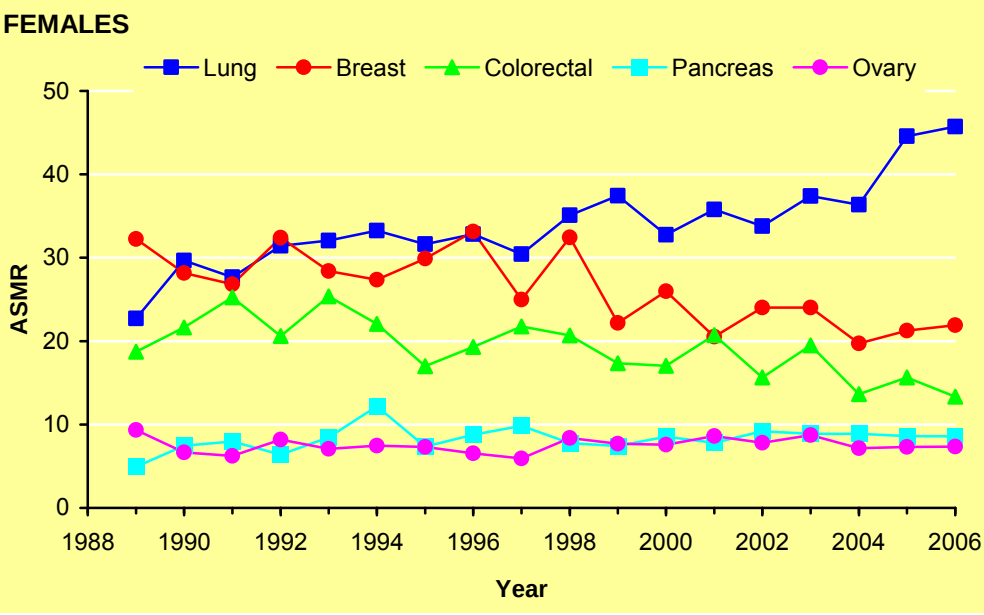


Figure 40: Trends in Age-Standardized Mortality Rates* (per 100,000 population) for the Five Leading Cancers, Females, New Brunswick, 1989-2006



* Age-standardized to the 1991 Canadian population estimates.

Colorectal Cancer

Since 1989, the incidence and mortality rates of colorectal cancer for both sexes have decreased (incidence AAPC: males: -0.2%, females: -0.8%; mortality AAPC: males: -1.1%, females: -2.5%, Figures 37-40), where females have experienced a greater decline in both rates. Mortality rates continued to significantly decline in both sexes which was likely the result of improvements in treatment, such as chemotherapy.[17] Overall, the incidence rates of colorectal cancers per 100,000 population for males and females in New Brunswick (males: 62.5 cases; females: 42.0 cases, Tables 9 and 11) were comparable to the 2004 Canadian rates (males: 62.3 cases; females: 42.5 cases)[15]; whereas the mortality rates (males: 25.5 deaths; females: 15.5 deaths, Tables 10 and 12) were lower than the Canadian rates (males: 26.8 deaths; females: 17.3 deaths) in 2004.[15]

Non-Hodgkin's Lymphoma (NHL)

Incidence rates of non-Hodgkin's lymphoma have steadily increased over the past two decades with an AAPC of +1.9% (95%CI: +1.2, +2.7; Figure 37) for males and +1.2% (95%CI: -0.4, +2.8; Table 13) for females per year. Mortality rates for males were stable (AAPC: 0.0%, 95%CI: -1.6, +1.6; Figure 38) while the rates for females showed a slight decline with an AAPC of -1.0% (95%CI: -2.6, +0.7; Table 14). These New Brunswick incidence and mortality trends were similar to the Canadian ones.[15]

Trends for Other Types of Cancer

Since 1989, the incidence rates of *cancer of the kidney and renal pelvis* have increased by +1.5% (95%CI: +0.2, +2.8) per year for males and by +0.1% (95%CI: -1.5, +1.6; Table 13) for females. However, mortality rates in males remained relatively stable with an AAPC of +0.5% (95%CI: -1.2, +2.3) while the rates increased in females by +2.3% (95%CI: -3.3, +8.3; Table 14). Increasing incidence may be partially due to improved detection or may be related to the rising prevalence of obesity, which is an important risk factor for renal cell carcinoma, the major type of kidney cancer.[17]

Thyroid cancer incidence in females has increased rapidly with an AAPC of +18.0% since 1989 (Table 13). A similar increase was noted across Canada (female AAPC: +10.1%)[17]. More frequent use of medical imaging may be improving detection of earlier stage, asymptomatic cancers more

frequently than was possible in the past.[2] The estimated five-year relative survival (*"Five-Year Relative Survival for Selected Cancers" Section, Page 54*) showed that patients diagnosed with thyroid cancer had relatively longer survival and the associated mortality rates also remained fairly stable. This was most likely because modern treatment was highly effective in the management of early thyroid cancers.[17]

Melanoma of the skin incidence rates have increased in males by +2.3% (95%CI: +1.1, +3.6) per year but decreased in females by -1.7% (95%CI: -3.8, +0.4; Table 13) between 1989 and 2006. However, the Canadian incidence rates of melanoma of the skin increased for both sexes (male AAPC: +1.6%; female AAPC: +1.0%) between 1996 and 2005.[17] Since 1989, mortality rates have showed a decline in males (AAPC: -2.9%, 95%CI: -5.3, -0.5) and an increase in females (AAPC: +3.2%, 95%CI: -1.1, +7.7) per year in New Brunswick.

Uterine, ovarian and cervical cancers (Figures 41 and 42)*:* Since 1989, the incidence rates of cancer of the body of the uterus cancer have increased with an AAPC of +0.6% (95%CI: -0.5, +1.7; Table 13); whereas mortality rates have slightly decreased by -1.2% (95%CI: -2.9, +0.5; Table 14) per year.

For the period of 1989 to 2006, *cervical cancer* incidence rates have changed irregularly over time (Figure 41). Both incidence and mortality rates for cervical cancer have decreased with AAPCs of -0.5% (95%CI: -2.1, +1.1) and -1.9% (95%CI: -5.6, +1.9) per year, respectively.

Ovarian cancer incidence rates have slightly increased with an AAPC of +0.3% (95%CI: -1.1, +1.7; Table 13) per year since 1989; however, no significant change has been noted for mortality rates between 1989 and 2006 with an AAPC of 0.0% (95%CI: -1.0, +1.1; Table 14).

The average annual percentage changes and the associated 95% confidence intervals in the age-standardized incidence and mortality rates for the ten leading cancers are also presented in Figures 43-46. In summary, decreasing trends were observed for both sexes in some cancer incidence rates: colorectal (males: -0.2%; females: -0.8%); leukemia (males: -0.3%); stomach (males: -2.1%) and melanoma of the skin (females: -1.7%; Table 13). Similarly, decreasing trends in mortality rates were also noted: colorectal (males: -1.1%; females: -2.5%); bladder (males: -0.4%); leukemia (males: -0.4%; females: -1.3%) and stomach (-3.8% for males and -3.7% for females; Table 14).

Figure 41: Trends in Age-Standardized Incidence Rates* (per 100,000 population) for Female Reproductive Cancer Sites, New Brunswick, 1989-2006

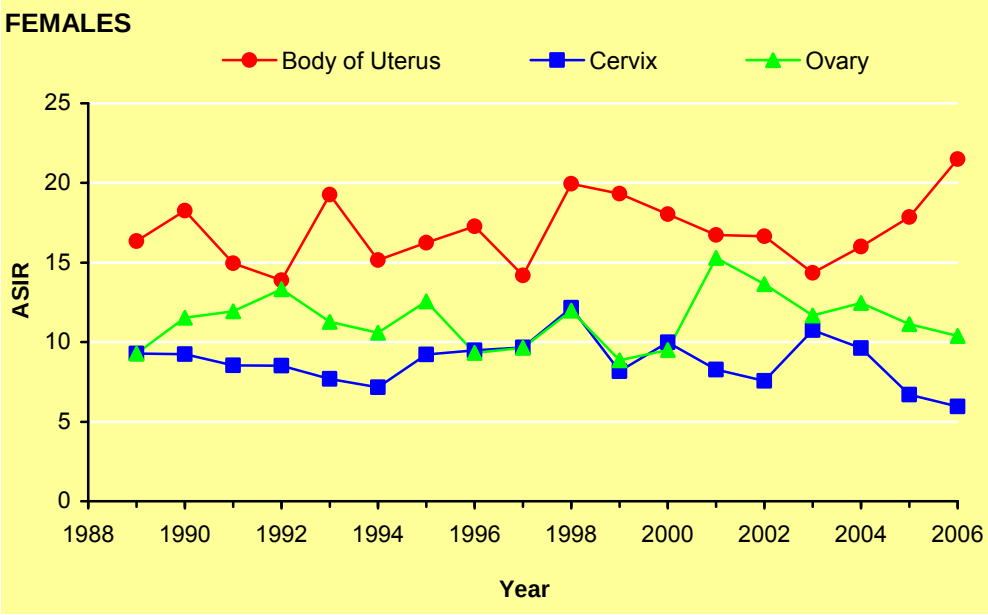
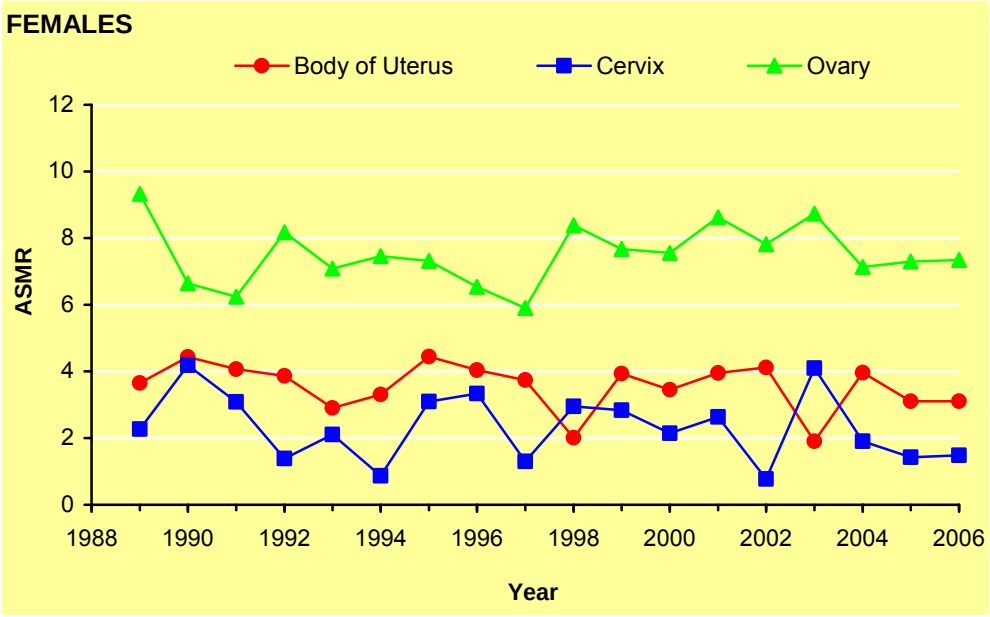
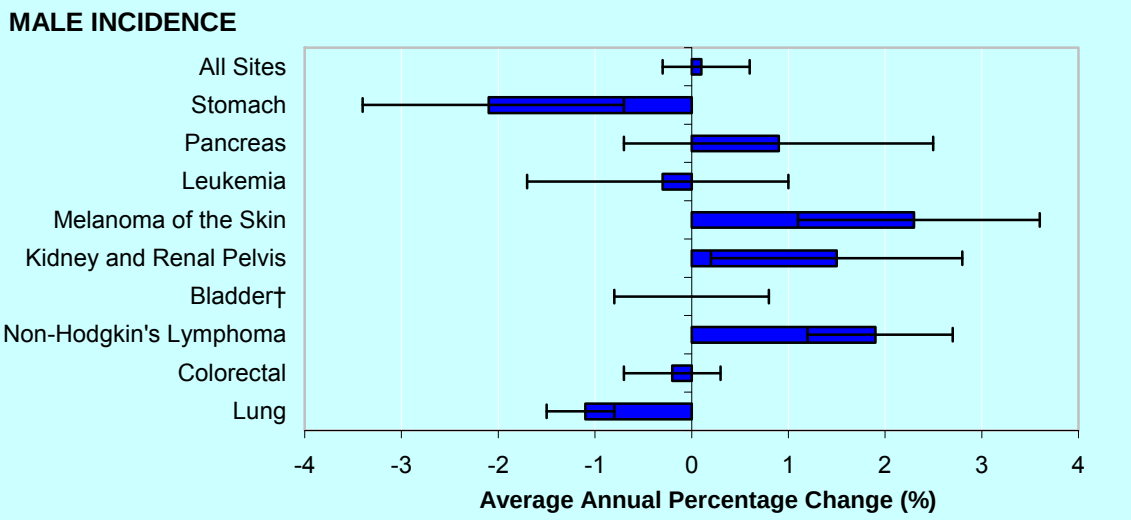


Figure 42: Trends in Age-Standardized Mortality Rates* (per 100,000 population) for Female Reproductive Cancer Sites, New Brunswick, 1989-2006



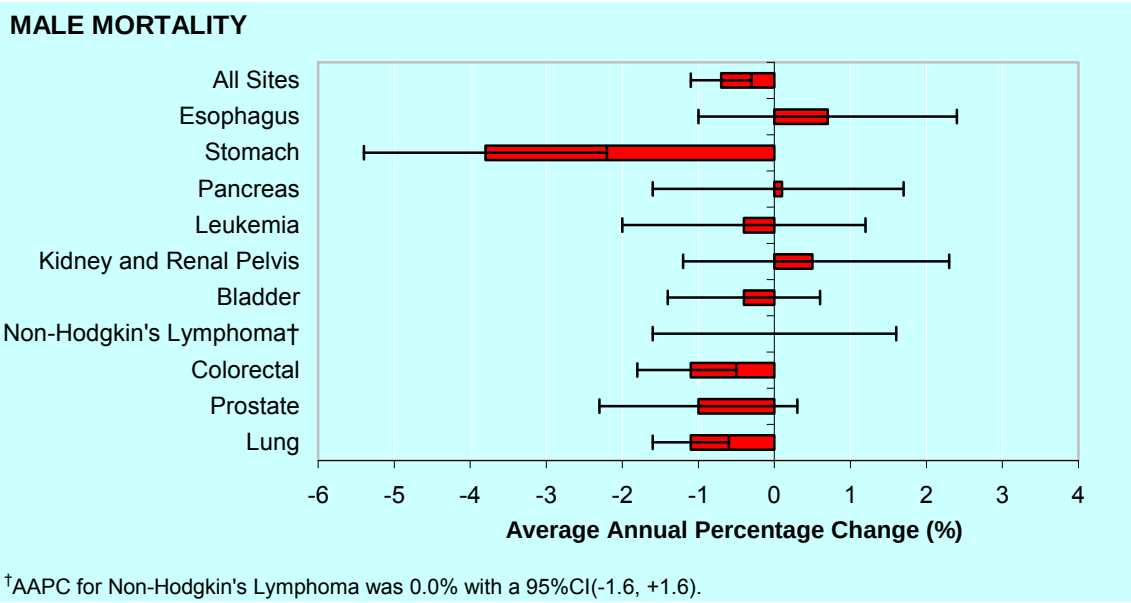
* Age-standardized to the 1991 Canadian population estimates.

Figure 43: Average Annual Percentage Change (AAPC) in Age-Standardized Incidence Rates* for the Ten Leading Cancers, Males, New Brunswick, 1989-2006



†AAPC for bladder cancer was 0.0% with a 95%CI(-0.8, +0.8).
NOTE: AAPC for prostate cancer was +6.5% with a 95%CI(-1.6, +15.2).

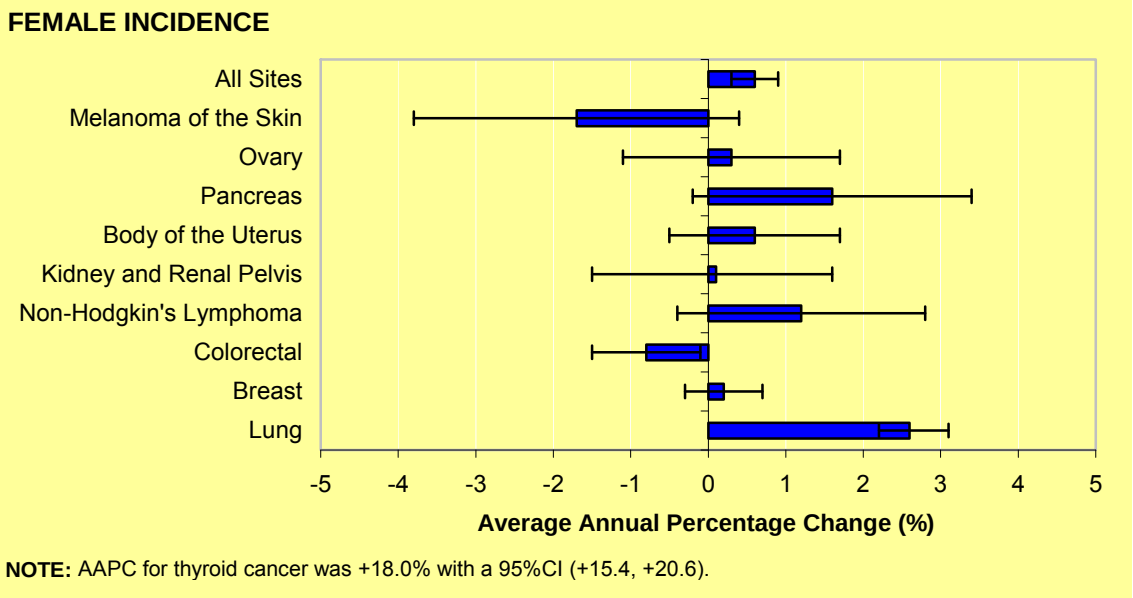
Figure 44: Average Annual Percentage Change (AAPC) in Age-Standardized Mortality Rates* for the Ten Leading Cancers, Males, New Brunswick, 1989-2006



†AAPC for Non-Hodgkin's Lymphoma was 0.0% with a 95%CI(-1.6, +1.6).

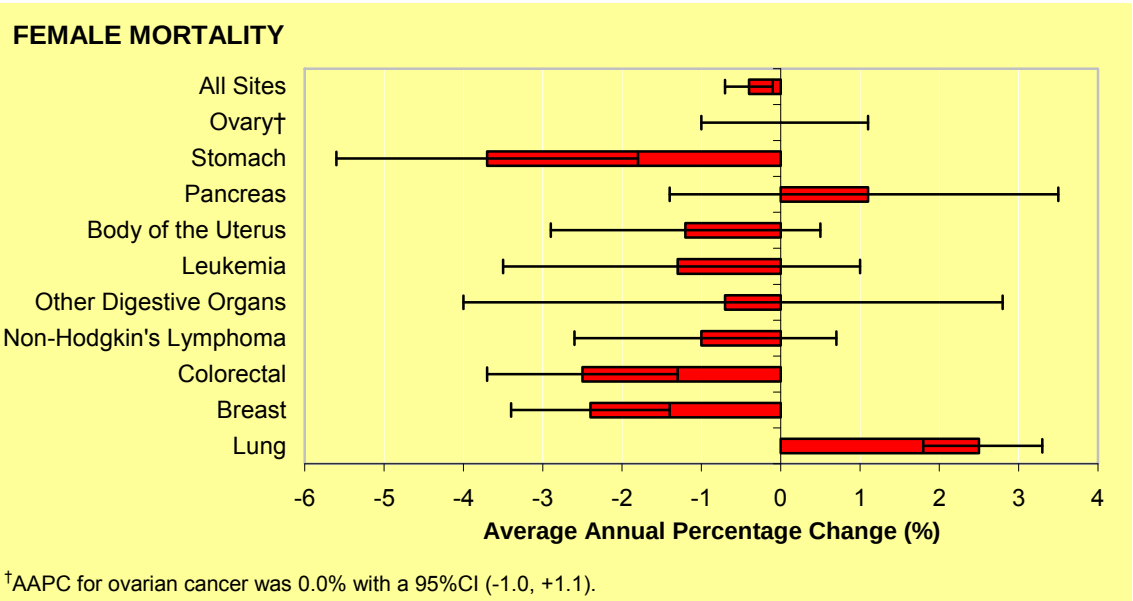
* Age-standardized to the 1991 Canadian population estimates.

Figure 45: Average Annual Percentage Change (AAPC) in Age-Standardized Incidence Rates* for the Ten Leading Cancers, Females, New Brunswick, 1989-2006



NOTE: AAPC for thyroid cancer was +18.0% with a 95%CI (+15.4, +20.6).

Figure 46: Average Annual Percentage Change (AAPC) in Age-Standardized Mortality Rates* for the Ten Leading Cancers, Females, New Brunswick, 1989-2006



†AAPC for ovarian cancer was 0.0% with a 95%CI (-1.0, +1.1).

* Age-standardized to the 1991 Canadian population estimates.

3.6 Five-Year Relative Survival for Selected Cancers

3.6.1 Five-Year Relative Survival for Selected Cancers

Similar to incidence and mortality rates, population-based cancer survival rate is an indicator of the burden of cancer. Examined across cancer types, survival estimates can be used to establish priority areas for improving prognosis.[18] Examined over time, and in conjunction with incidence and mortality trends, survival estimates represent an important indicator of progress in cancer control.[19] The statistic used to estimate survival is the relative survival ratio (RSR). The RSR is defined as the ratio of the observed survival for a group of persons diagnosed with cancer to the survival expected for people in the same general population.[20] A five-year relative survival ratio of 90% for a particular cancer indicates that patients with that cancer had a 90% likelihood of living for five years after diagnosis compared to similar people without cancer in the general population. It is important to note that RSR is an "average" estimate and does not reflect an individual's survival time.

Cancer survival refers to the amount of time between first diagnosis and death of a cancer patient. It is the realization of prognosis and is influenced by many factors such as age, sex, histological subtype, cancer stage, location of disease, presence of co-morbidity, availability and quality of early detection, diagnostic and treatment services. The stage of the disease at diagnosis is known to be an important and consistent determinant of cancer survival. Since staging information based on laboratory, radiological, clinical and surgical assessments was not available for all types of cancer for the period of interest, the RSR for breast cancer by staging was examined exclusively in this report. However, it is important to realize that although the RSR for breast cancer stage was conducted, factors such as lead time associated with the introduction of screening programs were not investigated. Furthermore, since the age of the patient at diagnosis was observed to be an important determinant of prognosis, the RSRs for selected cancers were also examined by age at diagnosis (0-44, 45-49, 50-74 and 75+).

In this report, the five-year RSRs were computed for the following cancer sites: lung, colorectal and thyroid cancers for both sexes, prostate and testicular cancers for males and breast, ovarian and cervical cancers for females.

In males, the five-year RSR was highest for prostate cancer (97.3%), followed by testicular cancer (94.8%), thyroid cancer (79.7%), colorectal cancer (59.7%) and lung cancer (16.0%, Figure 47). In females, the highest five-year RSR was for thyroid cancer (100.0%), followed by breast cancer (86.0%), cervical cancer (75.7%), colorectal cancer (63.7%), ovarian cancer (36.2%) and lung cancer (15.5%). For these cancers examined, the relative survival ratios appeared to be higher among women or similar between both sexes (Figures 47 and 48).

The estimated five-year RSRs (male thyroid: 79.7%; female thyroid: 100.0%; ovarian: 36.2% and cervical cancers: 75.7%; Tables 15 and 16) were similar to the Canadian estimates.[17] Caution should be exercised when interpreting the estimated RSR for male thyroid cancer due to the relatively small number of new cases between 2002 and 2006 (94 cases).

The five-year RSRs tended to be poorer among those diagnosed at an older age (Tables 15 and 16). Lower survival at an older age may be attributed to factors such as the provision of less aggressive treatment due to high level of co-morbidity, as well as less favorable stage distribution.[21] Significant differences in the five-year RSR estimates were observed in females with breast, lung and colorectal cancers when the data analysis was conducted based on four different age groups (0-44, 45-49, 50-74 and 75+; Table 16). For example, the five-year RSR among females with breast cancer in the 50-74 year age group was 90.5% (95%CI: 85.8, 94.1), which was statistically significantly higher than the ratio (71.6%, 95%CI: 58.2, 84.1) for those who were 75 years or older.

3.6.2 Five-Year Relative Survival for Female Breast Cancer by Stage*

As stated previously, the stage of tumour at diagnosis was an important determinant of cancer patient survival. The results showed that females with breast cancer detected at an early stage had more favorable outcomes and survived longer (Figure 49). The five-year RSRs for women diagnosed with stages I, II, III and IV breast cancer were 96.1%, 89.0%, 67.6% and 57.5%, respectively. The percentages of females diagnosed with breast cancer by stage and by different age groups (<50; 50-69 and >=70) are also reported in Appendix D.

* American Joint Committee on Cancer (AJCC) – Cancer Staging Manual: 6th Edition.

Figure 47: Five-Year Relative Survival Ratios for Selected Cancers with 95% Confidence Intervals (I), Males, New Brunswick, 2002-2006

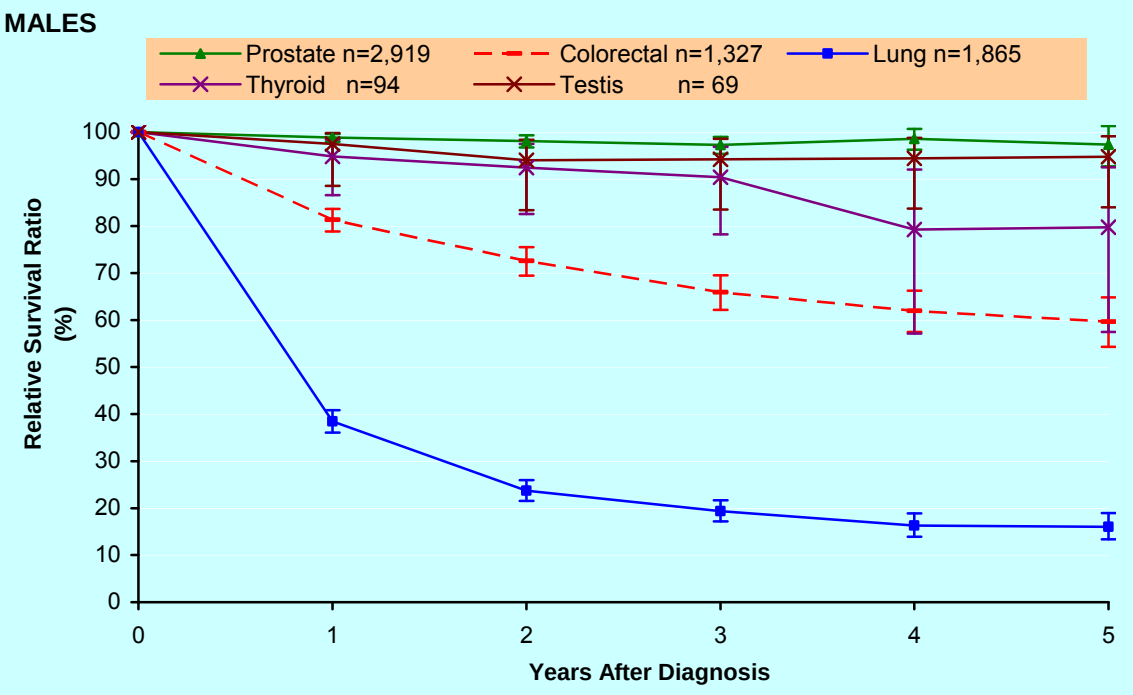


Figure 48: Five-Year Relative Survival Ratios for Selected Cancers with 95% Confidence Intervals (I), Females, New Brunswick, 2002-2006

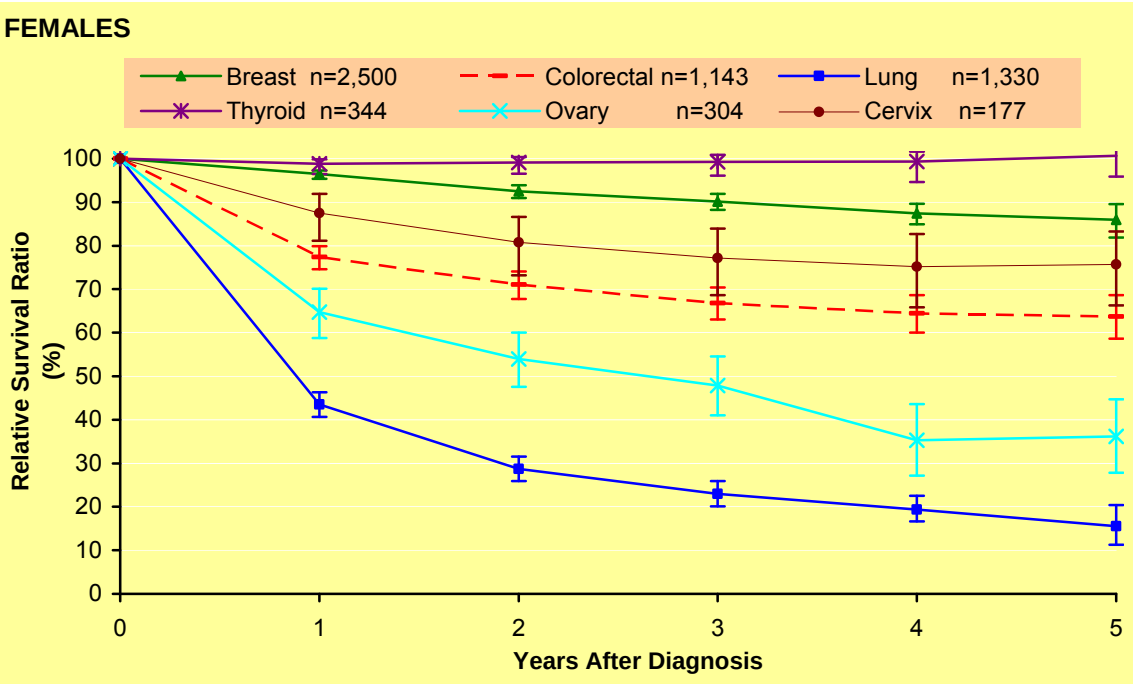
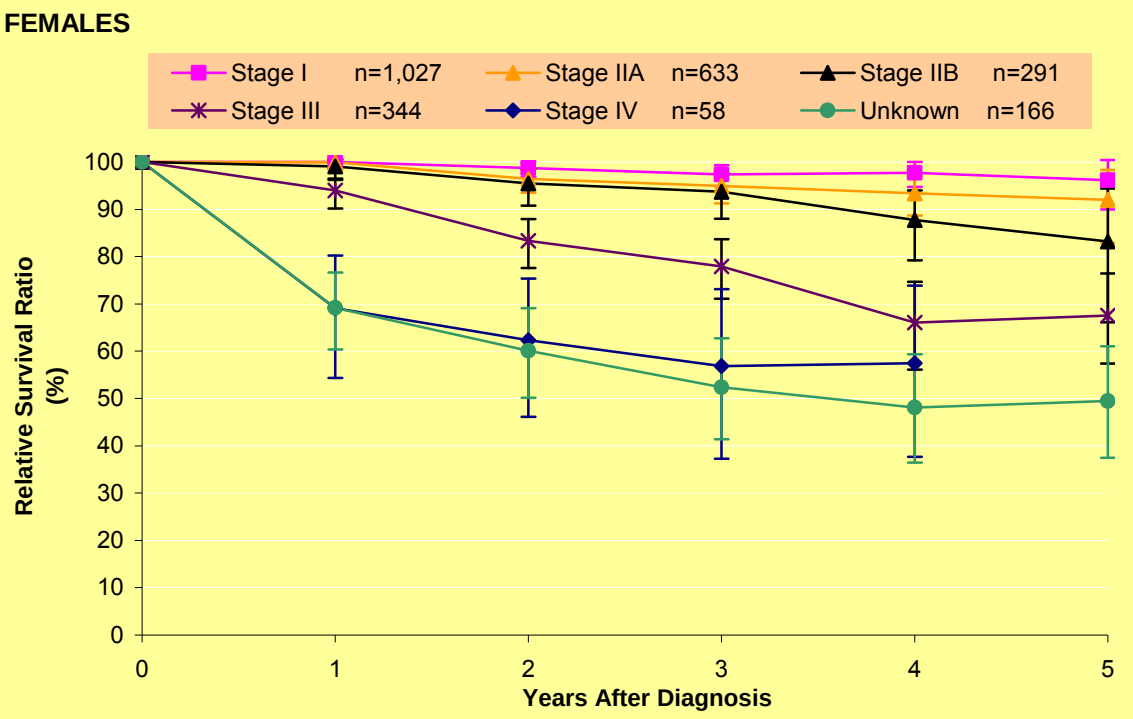


Figure 49: Five-Year Relative Survival Ratios for Female Breast Cancer by Stage with 95% Confidence Intervals (I), New Brunswick, 2002-2006



3.7 Projections for Cancer Incidence and Mortality

The age-period-cohort method, developed by B. Moller et al.[22] was used to project cancer incidence and mortality. The computer program "Nordpred", written by the Norwegian Cancer Registry, was applied to project incidence and mortality rates for the period 2006-2025 according to the rates in 1986-2005 using data from the Registry. The software uses five-year age groups and five-year periods and takes age, period and birth-cohort effects into consideration. Thus, the number of cancers and population figures were grouped in five-year periods from 1986-1990 to 2001-2005, and projected incidence and mortality rates are for five-year periods from 2006-2010 to 2021-2025. The projected population figures for New Brunswick from 2006 to 2025 were provided by the Public Health Agency of Canada (PHAC).

The software produced predicted age-sex incidence and mortality rates for each of the five-year periods 2006-2010 to 2021-2025. To provide annual numbers, the overall figure for each five-year period was divided by five. It should be noted that these cancer incidence and mortality projections do not directly consider potential changes such as introduction of new screening modalities or improved treatments, which could alter future cancer rates, i.e., the predicted numbers can be expected to differ from the values actually observed in the future. The estimation process was entirely based on the past incidence and mortality rates between 1986 and 2005. The projected cancer new cases and deaths for the ten leading cancers are presented in Tables 17-20.

Trends in the new cancer cases and their age-standardized incidence rates for all cancer sites combined are presented in Figures 50-51, along with the projected new cases for the years of 2015, 2020 and 2025. As shown, the number of newly diagnosed cancer cases is steadily increasing over time. In total, the number of newly diagnosed invasive cancer cases is expected to be 5,703 for both sexes by the year 2025 (i.e., males: 8.6 cases per day; females: 7.1 cases per day) if the past and current cancer incidence trends continue.

Compared to the actual number of new cases in the year 2006, this would represent a 36.3% increase in new invasive cancer cases, with a greater increase in males (37.5%) than in females (35.6%). The five leading cancers for males (*prostate, lung, colorectal, bladder* and *non-Hodgkin's lymphoma*) and for females (*breast, lung, colorectal, thyroid* and *ovarian*) are expected to account for 82.1% and 62.1% respectively of the total number of new cancer cases in 2025. These cancers are also expected to be the major contributors to this increase.

Figure 50: Age-Standardized Incidence Rates* (ASIRs) and Number of New Cases (left scale) for All Cancer Sites Combined with Projected Estimates for the Years 2015, 2020 and 2025 (right scale), Males, New Brunswick

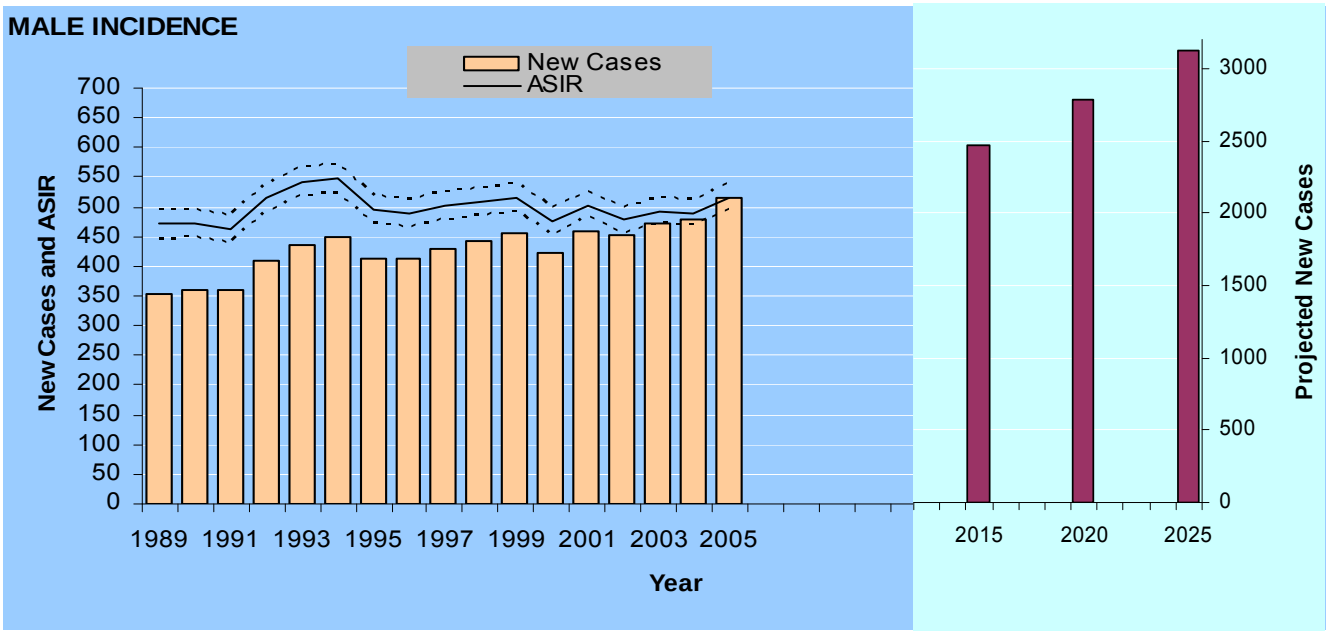
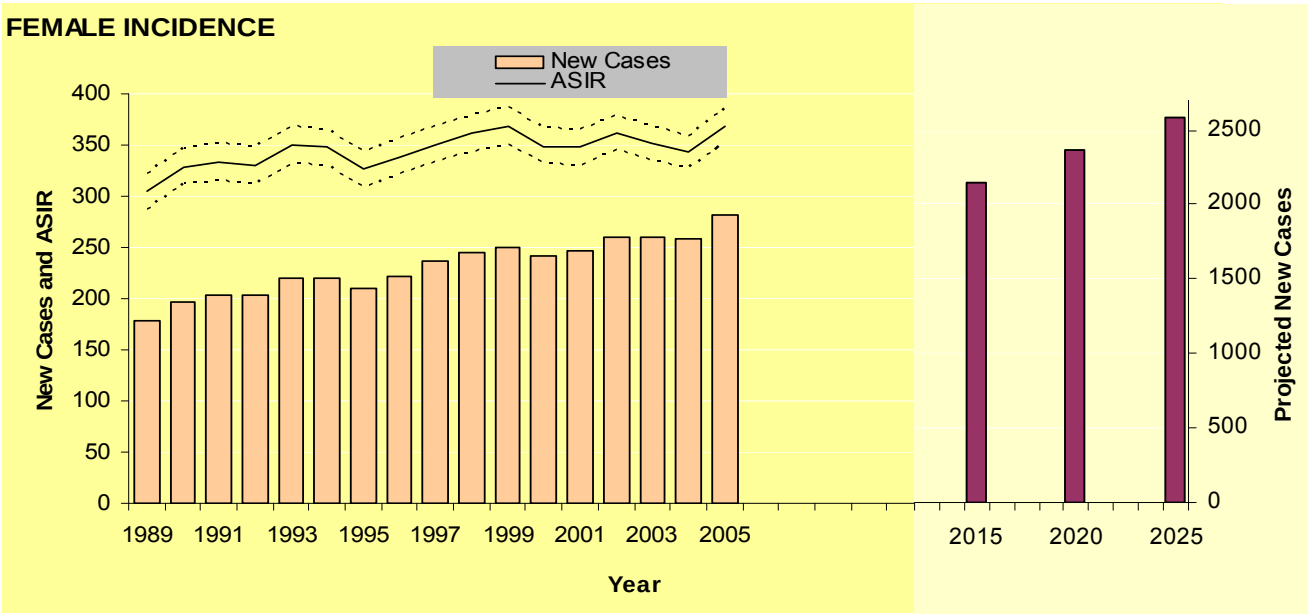


Figure 51: Age-Standardized Incidence Rates* (ASIRs) and Number of New Cases (left scale) for All Cancer Sites Combined with Projected Estimates for the Years 2015, 2020 and 2025 (right scale), Females, New Brunswick



* Age-standardized to the 1991 Canadian population estimates.
NOTE: Dotted lines indicate the 95% confidence intervals.

Figure 52: Age-Standardized Mortality Rates* (ASMRs) and Number of Deaths (left scale) for All Cancer Sites Combined with Projected Estimates for the Years 2015, 2020 and 2025 (right scale), Males, New Brunswick

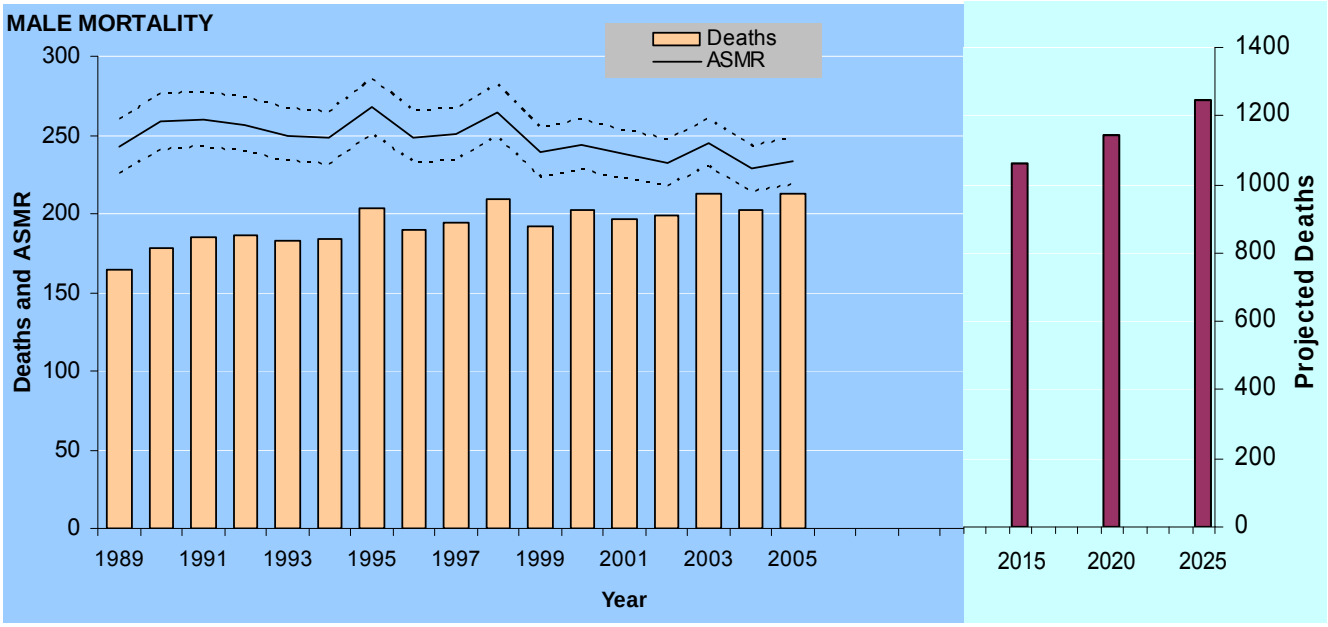
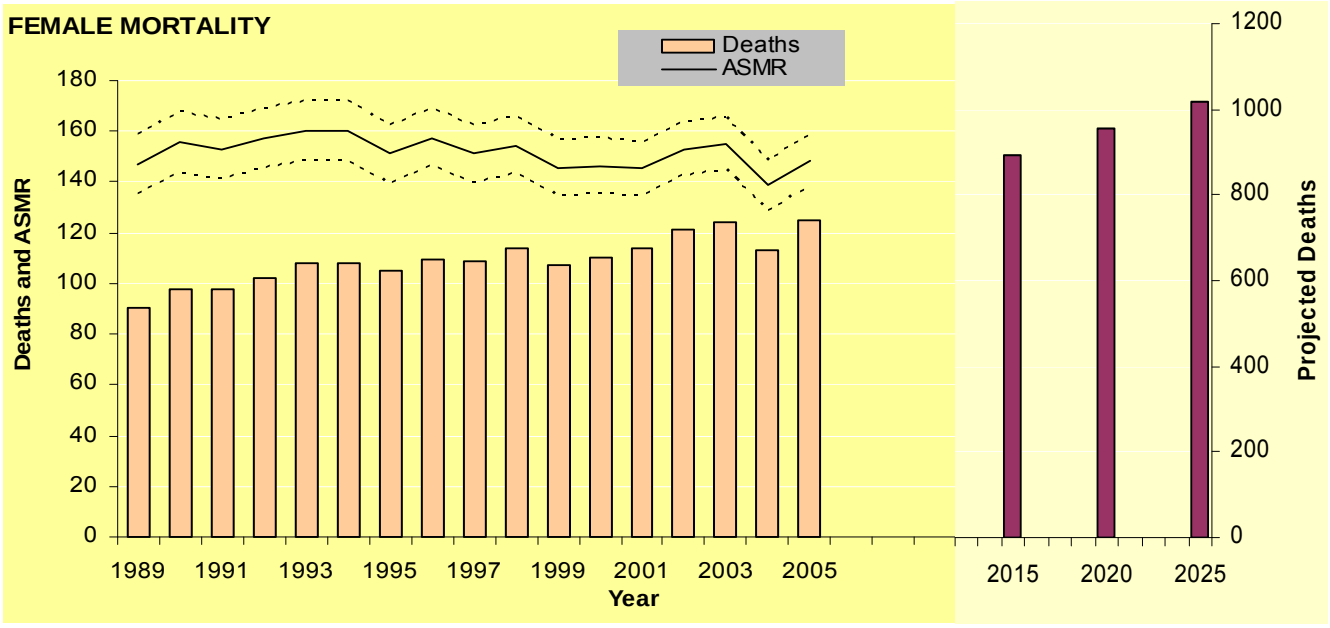


Figure 53: Age-Standardized Mortality Rate* (ASMRs) and Number of Deaths (left scale) for All Cancer Sites Combined with Projected Estimates for the Years 2015, 2020 and 2025 (right scale), Females, New Brunswick



* Age-standardized to the 1991 Canadian population estimates.
NOTE: Dotted lines indicate the 95% confidence intervals.

The increase in cancer incidence will likely be driven by the interaction of many different forces such as the aging of the population, growth of the population, increase in exposure to risk factors, enhancement of the ability to detect cancer at an early stage and improvement of cancer registration systems.

Trends in cancer deaths and their age-standardized mortality rates for all cancer sites combined are reported in Figures 52 and 53, along with projected deaths for the years of 2015, 2020 and 2025. Cancer mortality rates have gradually declined among males since 1999 with the downward trend assumed to be maintained in future years (Figure 52). On the other hand, mortality rates in females appeared to be stable since 1999 (Figure 53). Some decline may be anticipated if female lung cancer enters a downturn in the upcoming years.

While cancer mortality rates appeared to have decreased marginally since 1989, the number of individuals dying from cancer continued to steadily increase (Figures 52 and 53). An estimate of approximately 2,267 deaths due to cancer is expected by 2025 (i.e., males: 3.4 deaths per day; females: 2.8 deaths per day) if the past and current cancer mortality trends continue. This would represent a 30.5% overall increase in cancer deaths for both sexes (males: 38.5%; females: 21.9%) relative to 2006. Lung, colorectal, prostate and female breast cancers are expected to be the greatest contributors to the estimated cancer deaths (males: 55.0%; females: 49.4%) in 2025.

Conclusions and Further Considerations

The good news is that current cancer statistics show improvements in the rates and survival for some selected cancers. However, with our aging population the cancer burden in New Brunswick will continue to grow. By the year 2025 it is projected that there will be 5,703 new cancer cases and 2,267 deaths due to cancer per year in New Brunswick representing a 36.3% and 30.5% increase respectively from the 2006 actual numbers.

Cancer surveillance and *reporting* not only measures progress but also can be used to plan for changes where needed. Below are some future considerations that would help the New Brunswick Cancer Network to fulfill its mission and goals:

- One of the long-term goals of the New Brunswick Cancer Network is to reduce the incidence, morbidity, and mortality of cancer in New Brunswick. One step toward this goal is to communicate the statistical evidence to the public as educational evidence of the magnitude of the problem. It is fairly well known that smoking, unbalanced diet, excessive alcohol consumption and lack of regular exercise are controllable risk factors that play an important role in cancer incidence. Continued public-oriented awareness campaigns of the association between cancer and these life-style choices are needed.

- Like other Provinces and Territories of Canada, cancer statistics are currently reported to the public at the Health Zone level. In the future, it may be possible to examine and report on cancer at finer geographic levels such as the community or urban level, while respecting individual privacy and confidentiality.

- New Brunswick Cancer Network is utilizing various surveillance tools such as Geographic Information Systems (GIS) to enhance our cancer surveillance system. A current collaborative project is underway with the National Research Council to improve the understanding of cancer patterns.

Special Topic

Comparison of the Characteristics of Breast Tumours for Women Diagnosed with Breast Cancer through the New Brunswick Provincial Breast Cancer Screening Program with Those Who Have Never Been Screened Between 1995 And 2006

Background

Early detection, through organized screening programs combined with effective treatment, can significantly reduce deaths from breast cancer.[23] As reported in *"Five-Year Relative Survival Ratio for Female Breast Cancer by Stage"* section, the five-year relative survival ratios for women diagnosed with stages I, II, III and IV breast cancer were 96.1%, 89.0%, 67.6% and 57.5% between 2002 and 2006. However, data analysis conducted in this study was not stratified by the screening status of patients who were diagnosed with breast cancer. The characteristics (behavior, tumour grade, side affected, stage, tumour size and nodal status) of the breast tumours detected through the screening program may be significantly different from those detected outside the program. This warrants further investigation and may provide useful information on the effectiveness of the provincial breast cancer screening program. The primary source of breast tumour information was obtained from the pathology report.

Introduction

The primary goal of organized cancer screening programs is to identify cancer or premalignant disease in persons without signs or symptoms of the disease.[24] The New Brunswick Breast Cancer Screening Services Program was established in 1994 and has been providing a bilateral, two-view screening mammogram biennially at 16 fixed sites in the province's seven health zones. The target population was defined as asymptomatic women between the ages of 50 to 69 years with no prior diagnosis of breast cancer. Women aged less than 50 or greater than 69 attend the provincial breast cancer screening program on referral from a physician. In total, 34.1% of women screened in New Brunswick between 1995 and 2006 were outside the target age group. This report focuses on the characteristics of cancers detected in the screened and unscreened populations.

Objectives

The hypothesis of this study is that women who have never been screened (*unscreened group*) in New Brunswick and yet had a breast cancer diagnosed between 1995 and 2006 would have unfavourable disease characteristics (e.g., larger tumour size [> 20mm], lymph node involvement, or more advanced stage [Stages II, III and IV vs. Stage I]) than those with breast cancer detected through the breast cancer screening program.

The hypothesis was tested by linking data from the New Brunswick Breast Cancer Screening Database (*NBBCSD*) with the New Brunswick Provincial Cancer Registry Database (*NBPCRD*).

Methods

Study Population, Data Sources and Data Quality

The age group selected to test the hypothesis was females 50-69 years of age who were diagnosed with breast cancer between the years 1995 and 2006.

The NBBCSD was established in 1995. It is an Oracle database used to store data elements about screening events in New Brunswick. Data including demographic characteristics, risk factors, screening services and results, diagnostic tests and cancer information are collected at every screening event. The Department of Health conducts data quality validation quarterly. Provincial data files are shared annually with the Public Health Agency of Canada (PHAC) through the Canadian Breast Cancer Screening Initiative. Additional data cross-validation is also conducted at the PHAC for the Canadian Breast Cancer Screening Database.

The following flat files are extracted from the New Brunswick Breast Cancer Screening Database (NBBCSD): 1) Client Register; 2) Inquiry Log; 3) Program Screens; 4) Diagnostic Tests; and 5) Cancers. These files provide information on socio-demographic characteristics and dates of screening and diagnosis.

The New Brunswick Provincial Cancer Registry Database (NBPCRD) was established in 1952. It is also an Oracle database used to store data elements about reportable cancers such as patient

demographic information, date of diagnosis, and tumour and stage characteristics. A record linkage is conducted routinely with the NBBCSD and an extraction routine is run to provide the NBBCSD with breast cancer tumour information such as tumour size, histology, behavior, grade and stage. Data quality of the NBPCRD is assured through registry certification with the NAACCR (Appendix A).

The Medicare number personal identifier was used to link these two databases, allowing identification of women with breast cancer who were not screened.

Study Design

A retrospective, population-based cohort study was conducted. Three different screening groups were analyzed: 1) *Initial Screen Group*: women who attended the breast cancer screening program once between 1995 and 2006; 2) *Rescreen Group*: women who attended the breast cancer screening program at least twice in this period; and, 3) *Unscreened Group*: women who have never been screened through the breast cancer screening program but were diagnosed with breast cancer in this period.

Statistical Analysis

In order to understand the performance of the breast cancer screening program between 1995 and 2006, the detection rate of breast tumours between the initial and rescreen groups was examined. Also, the ratio of the number of breast tumours detected through the screened (initial & rescreen groups combined) versus the unscreened group over time was calculated to evaluate the effectiveness of the breast cancer screening program. Finally, the characteristics of the detected breast tumours (i.e., tumour size, grade, side affected and stage) were compared among these three comparison groups. The percentage of each individual study outcome was presented and the associated $p-value$ was used to test the association between study outcome and screening status to rule out the effect of chance. All analyses were performed using SAS version 9.1.[25]

Results

In total, 37,598 women from all age groups were identified for the *initial* screen group (Figure I), as those who attended breast cancer screening once between 1995 and 2006. Among them, 1,045 women (1,091 breast tumours) or 2.8% were diagnosed with breast cancer. Of the *rescreen* group (87,676 women who had at least two screening episodes in this period), 1,552 women (1,589 breast tumours) or 1.8% were detected with breast cancer. As described previously, the NBPCRD was used to define those women who had never participated in breast screening but were diagnosed with breast cancer. Overall, 3,585 women were identified for the unscreened group accounting for 3,719 breast tumours.

For the Target Age Group (ages:50-69), there were 619 women (642 breast tumours) in the *initial*, 1,090 women (1,117 breast tumours) in the *rescreen*, and 1,196 women (1,250 breast tumours) in the *unscreened* groups who were diagnosed with breast cancer between 1995 and 2006 (Figure II).

Table I shows that within the first five years of the breast cancer screening program, the majority of breast tumours (409/579) were detected in the *initial screen* group. Between 2000 and 2006, a larger proportion of breast tumours were found in the *rescreen* group. There was a reverse shift between the *initial* and *rescreen* groups, which indicates that at the early stage of the screening program, *initial* screening may detect more prevalent breast tumours and later on more incident cases were seen in the *rescreen* group.

The ratios of detected breast tumours between the *screened* (*initial* and *rescreen* combined) versus *unscreened* groups are reported in Table II. The number of breast tumours found in the *unscreened* group decreased from 96.1% in 1995 to 27.1% in 2006; whereas the percentage of breast tumours detected from the *rescreen* group significantly increased from 0.0% in 1995 to 59.9% in 2006. The ratio of the detected breast tumours between the *screened* and *unscreened* groups increased over time and reached the highest value of 3.6 in 2005. This indicated that female breast cancer tumours were detected 3.6 times more often through the breast cancer screening program than by other means.

The baseline characteristics such as family history of breast cancer, menopausal status, use of hormone replacement therapy and breast self-examination were analyzed and reported in Table III.

Due to the large volume of missing values in each variable, differences regarding these variables between the *initial* and *rescreen* groups were inconclusive. Geographic variation was also examined by County and Health Zone (HZ, Table IV). For example, for larger Health Zones such as HZ1, HZ2 and HZ3, higher percentages of breast tumours were detected through the breast cancer screening program when the *initial* and *rescreen* groups were combined. However, for smaller Health Zones (HZ4 and HZ6), lower percentages of breast tumours were found through the breast cancer screening program from 1995 to 2006.

Table V shows the number of breast tumours by invasive status, tumour grade, side affected, tumour size and stage diagnosed in 1995 to 2006 by screening status. The percentages of breast tumours with *in-situ* were greater in the *screened* than *unscreened* groups (*initial:* 21.0%; *rescreen:* 45.0% vs. *unscreened:* 34.0%). A higher percentage of invasive breast tumours was also detected for the *screened* when compared to the *unscreened* groups (*initial:* 21.4%; *rescreen:* 36.1% vs. *unscreened:* 42.5%). A significant proportion of screened tumours had a lower tumour grade than unscreened (*screened:* 63.7% vs. *unscreened:* 36.3%) and inversely, more unscreened tumours had worse *high grade undifferentiated tumours* (*screened:* 25.0% vs. *unscreened:* 75.0%).

Table V also shows that the probability of developing breast cancer in the left or right breast was virtually the same among these three comparison groups. Higher percentages of small tumours $\leq$ 20 mm were found in the *screened* than *unscreened* groups. However, the percentages of tumours ($\geq$ 21 mm) were evenly distributed between the *screened* and *unscreened* groups.

The percentage of early stage invasive breast cancer (Stage I) was significantly higher in the *screened* compared to *unscreened* groups (*initial:* 24.8%; *rescreen:* 42.5% vs. *unscreened:* 32.7%, Table V). The percentages of breast tumours with late stage (IIA→IIIC) were equally distributed across all of three comparison groups with the exception of those tumours with Stages IIA and IIIB. Finally, the percentage with distant metastasis (Stage IV) at the time of diagnosis was greater for the *unscreened* than *screened* groups (*initial:* 12.2%; *rescreen:* 17.1% vs. *unscreened*: 70.7%).

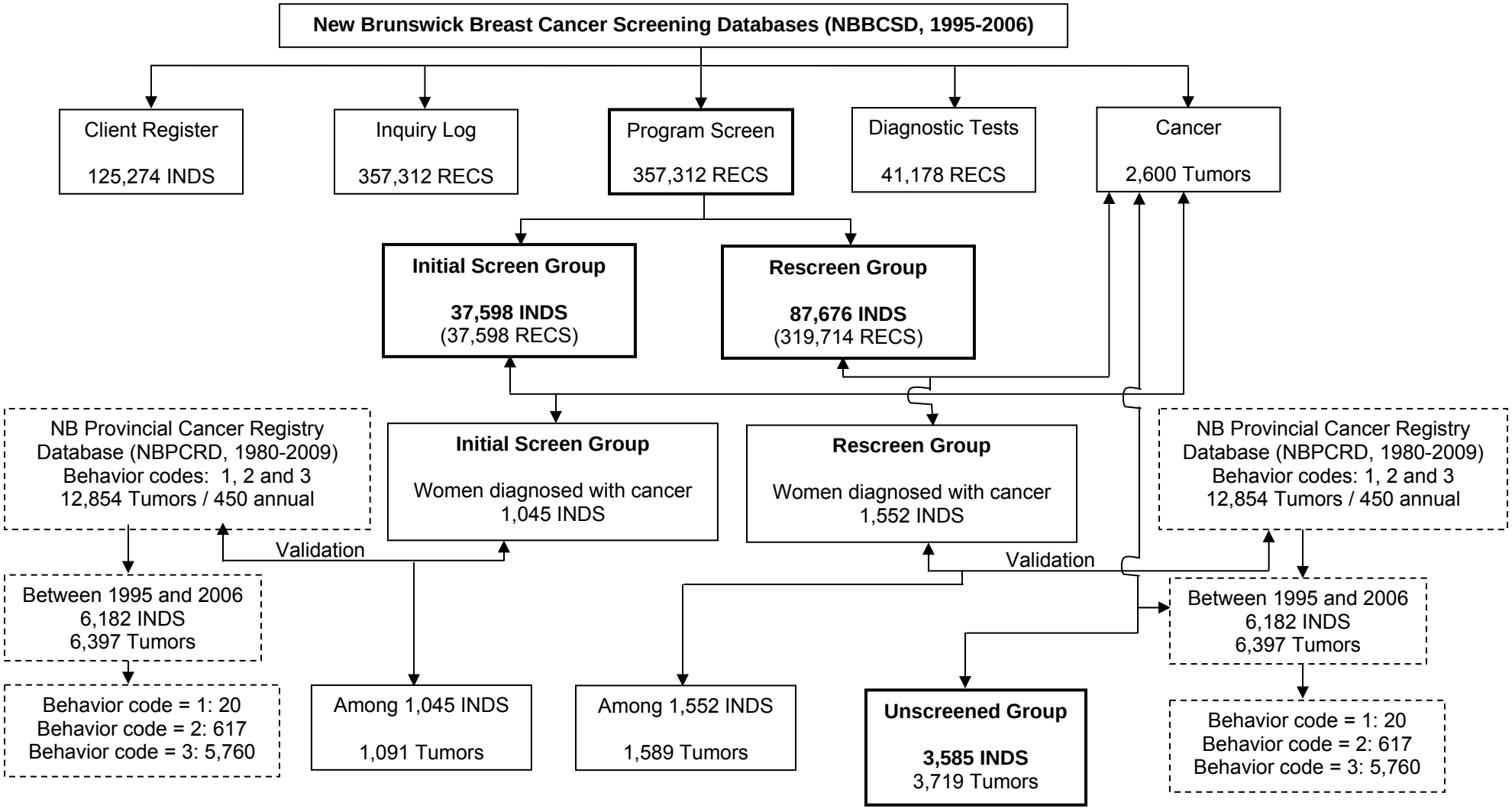
Conclusions and Recommendations

Our study provides evidence that the New Brunswick Breast Cancer Screening Services Program is most efficient in detecting cancers at an early stage when women participate in the program

regularly and not just once. Our data also suggest that women in the target age group participating in the screening program are less likely to have cancer in their lymph nodes or distant metastasis at the time of diagnosis than the ones diagnosed outside the screening program. This should result in earlier stage and improved survival.

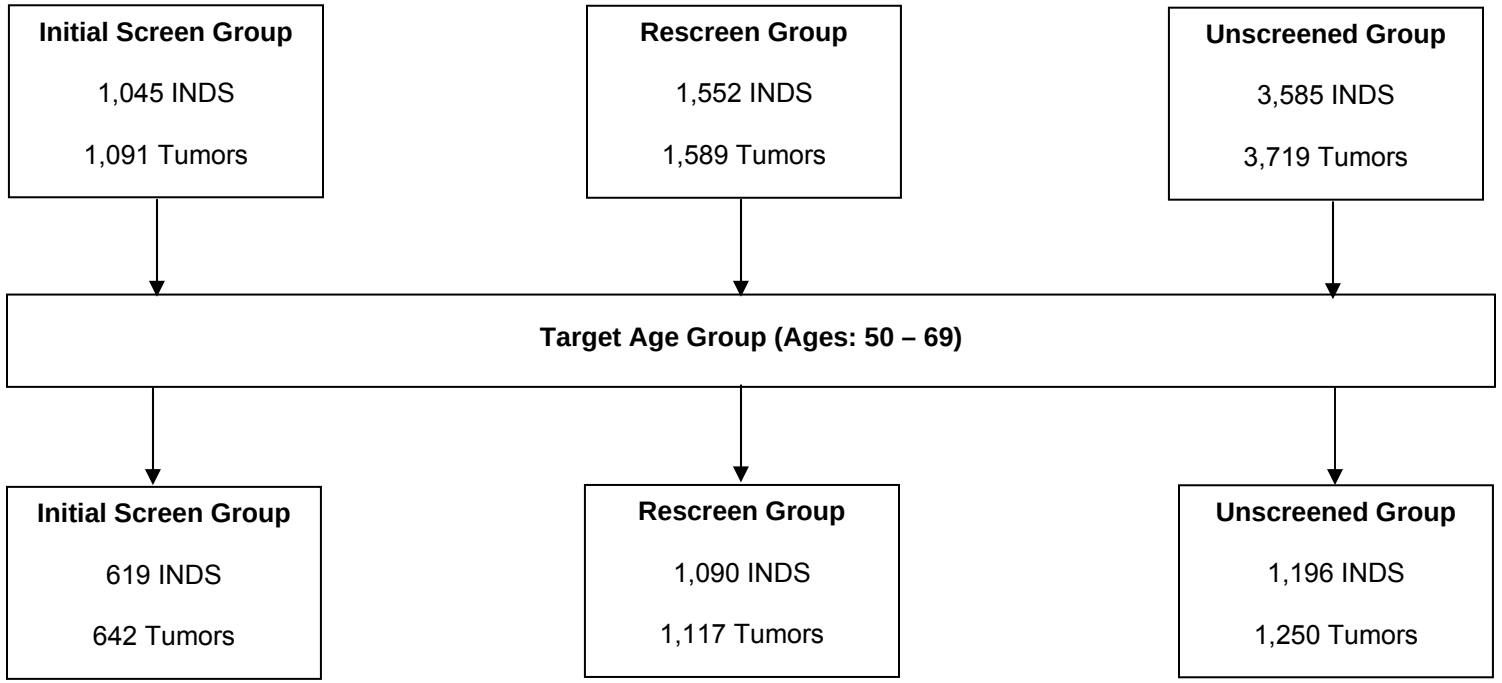
There was a large proportion of women diagnosed with breast cancer who had never visited the organized breast cancer screening program in 1995 to 2006. In particular, this may be true for those who live in small communities, remote rural areas or those who have difficulty in accessing the program for any unknown reasons. Every effort should be made to encourage participation in the provincial breast cancer screening program at regular intervals. Therefore, it is recommended that the results of this study be shared with the service providers in each *Regional Health Authority* through the *New Brunswick Breast Cancer Screening Advisory Committee*. It is also recommended that the participation of these populations be a priority for the provincial breast cancer screening program in the upcoming year 2010-2011.

Figure I: Flow of the Study Cohort through the Linkage between NBBCSD and NBPCRD



NOTE: INDS = individual women; RECS = records.

Figure II: Flow of the Final Study Cohort for Women between 50 and 69 Years Old



NOTE: INDS = individual women.

Table I: Percentage of Target Age Group (Ages: 50-69) Female Breast Cancer Tumours Associated with Breast Cancer Screening Program by Screening Status and Year, New Brunswick, 1995-2006

Screen Year	Initial Screen (%)	Rescreen (%)	Total of (Initial + Rescreen)
1995	39 (100.0%)	0 (0.0%)	39
1996	116 (98.3%)	2 (1.7%)	118
1997	83 (72.2%)	32 (27.8%)	115
1998	87 (61.3%)	55 (38.7%)	142
1999	84 (50.9%)	81 (49.1%)	165
2000	68 (34.9%)	127 (65.1%)	195
2001	40 (22.7%)	136 (77.3%)	176
2002	37 (19.8%)	150 (80.2%)	187
2003	31 (16.2%)	160 (83.8%)	191
2004	21 (11.9%)	155 (88.1%)	176
2005	22 (14.3%)	132 (85.7%)	154
2006	14 (13.9%)	87 (86.1%)	101
Total	**642***	**1,117**	**1,759**

* Represents the number of breast tumours.

Table II: Percentage of Target Age Group (Ages: 50-69) Women Diagnosed with Breast Cancer Through Initial Screen, Rescreen and Unscreened by Year, New Brunswick, 1995-2006

Screen Year	Screened		*Unscreened*	Ratio of Screened / Unscreened
	Initial Screen (%)	Rescreen (%)	*(%)*	
1995	8 (3.9%)	0 (0.0%)	*196 (96.1%)*	0.04
1996	49 (22.8%)	3 (1.4%)	*163 (75.8%)*	0.32
1997	77 (37.4%)	13 (6.3%)	*116 (56.3%)*	0.78
1998	66 (27.6%)	39 (16.3%)	*134 (56.1%)*	0.78
1999	85 (34.7%)	55 (22.4%)	*105 (42.9%)*	1.33
2000	78 (29.1%)	85 (31.7%)	*105 (39.2%)*	1.55
2001	59 (23.2%)	125 (49.0%)	*71 (27.8%)*	2.59
2002	52 (19.2%)	136 (50.2%)	*83 (30.6%)*	2.27
2003	50 (17.9%)	162 (57.8%)	*68 (24.3%)*	3.12
2004	40 (15.3%)	151 (57.6%)	*71 (27.1%)*	2.69
2005	41 (14.6%)	178 (63.6%)	*61 (21.8%)*	3.59
2006	37 (13.0%)	170 (59.9%)	*77 (27.1%)*	2.69
Total	**642***	**1,117**	***1,250***	

* Represents the number of breast tumours.

Table III: Characteristics of Target Age Group (Ages: 50-69) Women Diagnosed with Breast Cancer Through Initial Screen and Rescreen, New Brunswick, 1995-2006

Characteristic	Initial Screen	Rescreen
Family History		
No	93	472
Yes, age not specified	2	8
Yes, diagnosed at <50 years old	4	76
Yes, diagnosed at ≥50 years old	12	82
Missing	531	620
Menopausal Status		
Premenopausal	59	239
Postmenopausal	56	403
Missing	527	616
Hormone Replacement Therapy Use		
Never	46	174
Ever not current	52	233
No current with unknown history	6	67
Current	14	170
Missing	524	614
Breast Self-Examination (time/per year)		
None	26	39
1-3	24	90
4-8	22	161
9-15	27	240
≥16	14	113
Missing	529	615

Table IV: Geographical Distribution of Target Age Group (Ages: 50-69) Female Breast by Screening Status, New Brunswick, 1995-2006

Location	Initial Screen (%)	Rescreen (%)	Unscreened (%)
County			
Madawaska	68 (20.9%)	144 (44.3%)	113 (34.8%)
Restigouche	18 (15.6%)	54 (47.0%)	43 (37.4%)
Gloucester	14 (16.5%)	32 (37.6%)	39 (45.9%)
Victoria	19 (27.9%)	22 (32.4%)	27 (39.7%)
Northumberland	62 (24.9%)	121 (48.6%)	66 (26.5%)
Kent	24 (18.7%)	65 (50.8%)	39 (30.5%)
Carleton	96 (18.9%)	183 (36.1%)	228 (45.0%)
York	23 (19.5%)	53 (44.9%)	42 (35.6%)
Sunbury	57 (26.4%)	66 (30.6%)	93 (43.0%)
Queens	107 (25.0%)	161 (37.6%)	160 (37.4%)
Westmorland	16 (17.2%)	28 (30.1%)	49 (52.7%)
Albert	10 (13.5%)	25 (33.8%)	39 (52.7%)
Kings	24 (18.6%)	31 (24.0%)	74 (57.4%)
St John	30 (24.4%)	44 (35.8%)	49 (39.8%)
Charlotte	74 (21.1%)	88 (25.1%)	189 (53.8%)
Health Zone (HZ)			
HZ1	143 (19.0%)	301 (40.0%)	309 (41.0%)
HZ2	153 (21.8%)	322 (45.9%)	227 (32.3%)
HZ3	165 (22.9%)	263 (36.4%)	294 (40.7%)
HZ4	28 (15.2%)	49 (26.6%)	107 (58.2%)
HZ5	27 (26.0%)	40 (38.4%)	37 (35.6%)
HZ6	74 (21.1%)	88 (25.1%)	189 (53.8%)
HZ7	52 (26.9%)	54 (28.0%)	87 (45.1%)
Total	**642***	**1,117**	**1,250**

* Represents the number of breast tumours.

Table V: Comparison of Tumour Characteristics by Invasive Status, Tumour Grade, Side affected and Stage for Target Age Group (Ages: 50-69) Women Diagnosed with Breast Cancer by Screening Status, New Brunswick, 1995-2006

Outcome	Initial Screen n*=642 (%)	Rescreen n=1,117 (%)	Unscreened n=1,250 (%)	P Value
Behavior				
Borderline	0 (0.0%)	1 (20.0%)	4 (80.0%)	
In situ	79 (21.0%)	169 (45.0%)	128 (34.0%)	0.0016
Invasive	563 (21.4%)	947 (36.1%)	1,118 (42.5%)	
Tumour Grade				
Low grade, well differentiated	179 (23.2%)	313 (40.5%)	280 (36.3%)	
Intermediate grade, moderately differentiated	236 (21.1%)	443 (39.7%)	437 (39.2%)	
High grade, poorly differentiated	114 (18.8%)	223 (36.7%)	270 (44.5%)	<0.0001
High grade, undifferentiated	1 (25.0%)	0 (0.0%)	3 (75.0%)	
Missing	112 (22.0%)	138 (27.0%)	260 (51.0%)	
Side affected				
Left	299 (20.9%)	540 (37.7%)	593 (41.4%)	
Right	342 (21.8%)	577 (36.7%)	653 (41.5%)	0.1959
Missing	1 (20.0%)	0 (0.0%)	4 (80.0%)	
Tumour Size				
≤5 mm	52 (27.8%)	88 (47.1%)	47 (25.1%)	
>5, ≤10 mm	124 (25.9%)	193 (40.4%)	161 (33.7%)	
>10, ≤15 mm	135 (23.9%)	244 (43.2%)	186 (32.9%)	<0.0001
>15, ≤20 mm	83 (18.9%)	172 (39.1%)	185 (42.0%)	
≥ 21 mm	248 (18.5%)	420 (31.4%)	671 (50.1%)	
Stage†				
Stage 0	25 (14.4%)	110 (63.6%)	38 (22.0%)	
Stage I	299 (24.8%)	511 (42.5%)	394 (32.7%)	
Stage IIA	140 (21.7%)	248 (38.3%)	259 (40.0%)	
Stage IIB	63 (21.4%)	83 (28.1%)	149 (50.5%)	
Stage IIIA	26 (16.6%)	53 (33.7%)	78 (49.7%)	<0.0001
Stage IIIB	10 (10.7%)	17 (18.3%)	66 (71.0%)	
Stage IIIC	5 (17.9%)	9 (32.1%)	14 (50.0%)	
Stage IV	5 (12.2%)	7 (17.1%)	29 (70.7%)	
Missing	69 (18.6%)	79 (21.3%)	223 (60.1%)	

* Represents the number of breast tumours.
† American Joint Committee on Cancer (AJCC) – Cancer Staging Manual: 6th Edition.

Appendix A

New Brunswick Data Quality Report* from Canadian Cancer Registry (CCR), 2002-2006

	Indicator Name and Description	Metric	Optimal Value	Data Quality Report				
				2002	2003	2004	2005	2006
Accuracy	**1. Completeness of Case Ascertainment**	**%** **ratio**	**≥ 90** **2.60:1**	98.9 N/A	97.2 2.23:1	98.9 2.14:1	97.2 2.23:1	94.4 2.33:1
	2. Records Rejected by Edit System	**%**	**< 1**	1.4	0.7	1.4	0.7	0.9
	3. Microscopically Confirmed Cases	**%**	**≥ 93**	92.3	92.0	92.3	92.0	92.9
	4. Death Certificates Only	**%**	**0 to 3**	0.2	0.0	0.0	0.0	0.1
	5. Unknown Primary Site of Cancer	**%**	**< 2.3**	1.6	0.9	1.6	0.9	1.1
	6. Missing Information	**%**						
	Postal Code	%	**< 1**	0.0	0.0	0.0	0.0	0.0
	Month of diagnosis	%	**< 1**	0.0	0.0	0.0	0.0	0.0
	Month of birth	%	**< 1**	0.0	0.0	0.0	0.0.	0.0
	Death registration number	%	**< 10**	0.2	0.0	0.2	0.6	1.1
Comparability	**7. Reporting of Staging Data using the Collaborative Staging System**	**Yes/No**	**Yes**	No	No	No	No	No
	8. Reporting of Cancer Records using ICD-O-3†	**Yes/No**	**Yes**	Yes	Yes	Yes	Yes	Yes
	9. Reporting of Multiple Primaries (CCR rules)	**Yes/No**	**Yes**	Yes	Yes	Yes	Yes	Yes
Timeliness	**10. Data Submission Delay** Data Submission within one month of deadline.	**Yes/No**	**Yes**	Yes	Yes	Yes	Yes	Yes
Usability	**11. Cancer Incidence Fully Reported**	**Yes/No**	**Yes**	Yes	Yes	Yes	Yes	Yes

* Source: Statistics Canada.
† ICD-O-3= International Classification of Diseases for Oncology, Third Edition.
NOTE: Data quality report refers to only invasive tumours (behavior code 3).

Appendix B

SEER Site Groups* for Primary Site of ICD-O-3

Primary Site	Site / Type	Excluding Type
All Sites	All invasive sites –behavior = 3	
Buccal Cavity and Pharynx		
Lip	C000:C009	M-9590:9989
Tongue	C019:C029	M-9590:9989
Major Salivary Gland	C079:C089	M-9590:9989
Floor of Mouth	C040:C049	M-9590:9989
Gum and Other Mouth	C030:C039, C050:C059, C060:C069	M-9590:9989
Nasopharynx	C110:C119	M-9590:9989
Oropharynx	C100:C109	M-9590:9989
Hypopharynx	C129, C130:C139	M-9590:9989
Other Buccal Cavity and Pharynx	C090:C099, C140, C142:C148	M-9590:9989
Digestive System		
Esophagus	C150:C159	M-9590:9989
Stomach	C160:C169	M-9590:9989
Small Intestine	C170:C179	M-9590:9989
Colon Excluding Rectum	C180:C189, C260	M-9590:9989
Rectum and Rectosigmoid	C199, C209	M-9590:9989
Anus	C210:C212, C218	M-9590:9989
Liver	C220	M-9590:9989
Gallbladder	C239	M-9590:9989
Pancreas	C250:C259	M-9590:9989
Other Digestive System	C221, C240:C249, C268:C269, C480, C481:C482, C488	M-9590:9989
Respiratory System		
Larynx	C320:C329	M-9590:9989
Lung	C340:C349	M-9590:9989
Other Respiratory System	C300:C301, C310:C319, C339, C381:C383, C384, C388, C390, C398, C399	M-9590:9989
Bones and Joints	C400:C419	M-9590:9989
Soft Tissue (Including Heart)	C380, C470:C479, C490:C499	M-9590:9989
Skin (Excluding Basal and Squamous)		
Melanomas of the Skin	C440:C449 (types 8720:8790)	
Other Skin	C440:C449	8050:8084, 8090:8110, 8720:8790, 9590:9989
Breast	C500:C509	M-9590:9989
Female Genital System		
Cervix Uteri	C530:C539	M-9590:9989
Corpus Uteri	C540:C549	M-9590:9989
Uterus, NOS	C559	M-9590:9989
Ovary	C569	M-9590:9989 ~~M-8442~~, ~~M-8462~~, ~~M-8472~~, ~~M-8473~~
Other Female Genital System	C510:C519, C529, C570:C589	M-9590:9989

* The Data Quality Committee has requested that M-8000:8004 and M-8010:8045 be included in 'Other Skin' (C440:C449).
Red font indicates changes made in the conversion from ICD-O-2 to ICD-O-3.

Appendix B (cont'd)

Primary Site	Site / Type	Excluding Type
Male Genital System		
Prostate	C619	M-9590:9989
Testis	C620:C629	M-9590:9989
Penis	C600:C609	M-9590:9989
Other Male Genital System	C630:C639	M-9590:9989
Urinary System		
Bladder (Includes *in Situ*)	C670:C679	M-9590:9989
Kidney and Renal Pelvis	C649, C659	M-9590:9989
Ureter	C669	M-9590:9989
Other Urinary System	C680:C689	M-9590:9989
Eye	C690:C699	M-9590:9989
Brain and Other Nervous System		
Brain	C710:C719	M-953, 9590:9989
Other Nervous System	C710:C719 (type 953), C700:C709, C720:C729	M-9590:9989 M-9590:9989
Endocrine		
Thyroid	C739	M-9590:9989
Other Endocrine	C379, C740:C749, C750:C759	M-9590:9989
Lymphomas		
Hodgkin's Disease	types 9560:9667	
Non-Hodgkin's Lymphoma	types 9590:9596, 9670:9719, 9727:9729 type 9823, all sites except C420, C421, C424 type 9827, all sites except C420, C421, C424	
Multiple Myeloma	types 9731:9732, 9734	
Leukemias		
Acute Lymphocytic	types 9826, 9835:9837	
Chronic Lymphocytic	C420 (type 9823), C421 (type 9823) C424 (type 9823)	
Acute Myeloid	types 9840, 9861, 9866, 9867, 9871:9874, 9895:9897, 9910, 9920	
Chronic Myeloid	types 9863, 9875, 9876, 9945, 9946	
Other	types 9733, 9742, 9800, 9801, 9802, 9803, 9804, 9805, 9820, 9822, 9824, 9825, 9826, 9830, 9831, 9832:9834, 9841, 9842, 9850, 9860, 9862, 9864, 9870, 9880, 9890, 9891, 9892, 9893, 9894, 9900, 9930, 9931, 9932, 9940:9941, 9948, 9963, 9964 C420 (type 9827), C421 (type 9827), C424 (type 9827)	
Other, Ill-Defined and Unknown	types 9740, 9741, 9750:9758, 9760:9769, 9950:9962, 9965:9989 C760:C768 (types 8000:9589) C809 (types 8000:9589) C420:C424 (types 8000:9589) C770:C779 (types 8000:9589)	

Note: Red font indicates changes made in the conversion from ICD-O-2 to ICD-O-3.

Appendix C

SEER Site Groups for Mortality Data Based on ICD-9 and ICD-10

Underlying Cause of Death		ICD-9 Codes	ICD-10 Codes
Buccal Cavity and Pharynx		140, 141, 142, 143, 144, 145, 146, 147, 148, 149	C00, C01, C02, C03, C04, C05, C06, C07, C08, C09, C10, C11, C12, C13, C14
Digestive System			
	Esophagus	150	C15
	Stomach	151	C16
	Small Intestine	152	C17
	Colon and Rectum	153, 154.0-154.1, 159.0	C18-C20, C26.0
	Liver	155.0, 155.2	C22.0, C22.2-C22.4, C22.7, C22.9
	Pancreas	157	C25
	Other Digestive Organs	154.2-154.3, 154.8, 155.1, 156.0-156.2, 156.8-156.9, 158.0, 158.8-158.9, 159.8-159.9	C21, C22.1. C23, C24, C26.8-C26.9, C45.1, C48.0-48.2, C48.8
Respiratory System			
	Larynx	161	C32
	Lung	162.2-162.5, 162.8-162.9	C34
	Other Respiratory Organs	160, 162.0, 163, 164.2-164.3, 164.8-164.9, 165	C30-C31, C33, C38.1-C38.4, C38.8, C39, C45.0
Skin			
	Melanomas of the Skin	172	C43
	Other Skin	173	C44, C46
Breast		174-175	C50
Female Genital System			
	Cervix Uteri	180	C53
	Corpus Uterus, Not Otherwise Specified	179, 182	C54-C55
	Ovary	183	C56
	Other Female Genital System	181, 183.2-183.5, 183.8-183.9, 184.0-184.4, 184.8-184.9	C51-C52, C57-C58
Male Genital System			
	Prostate	185	C61
	Testis	186	C62
	Other Male Genital System	187.1-187.4, 187.5-187.9	C60, C63
Urinary System			
	Urinary Bladder	188	C67
	Kidney and Renal Pelvis	189.0-189.1	C64-C65
	Other Urinary System	189.2, 189.3-189.4, 189.8-189.9	C66, C68
Brain and Other Nervous System		191, 192	C70, C71, C72
Endocrine System			
	Thyroid	193	C73
	Other Endocrine System	164.0, 194	C37, C74-C75
Lymphomas			
	Hodgkin's Disease	201	C81
	Non-Hodgkin's Lymphomas	200, 202.0-202.2, 202.8-202.9	C82-C85, C96.3
Multiple Myeloma		203.0, 238.6	C90.0, C90.2

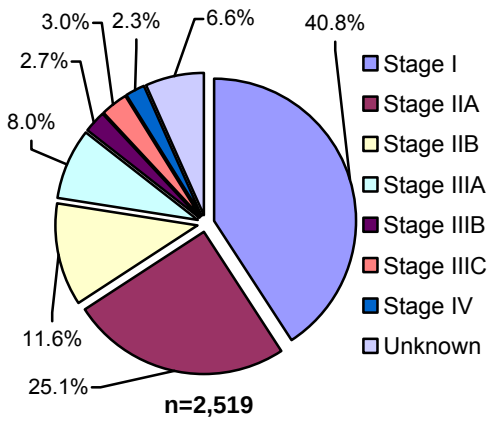
Appendix C (cont'd)

Underlying Cause of Death	ICD-9 Codes	ICD-10 Codes
Leukemias	202.4, 203.1, 204.0-204.2, 204.8-204.9, 205.0-205.3, 205.8-205.9, 206.0-206.2, 206.8-206.9, 207.0-207.2, 207.8, 208.0-208.2, 208.8-208.9	C90.1, C91.0-C91.3, C91.4-C91.5, C91.7, C91.9, C92.0, C92.1-C92.3, C92.4-C92.5, C92.7, C92.9, C93.0-C93.2, C93.7, C93.9, C94.0-C94.5, C94.7, C95.0, C95.1, C95.2, C95.7, C95.9
Other, Ill-Defined and Unknown	159.1, 164.1, 170, 171, 190, 195-199, 202.3, 202.5-202.6, 203.8	C26.1, C38.0, C40-C41, C45.2, C45.7, C45.9, C47, C49, C69, C76-C80, C88, C96.0-C96.2, C96.7, C96.9, C97

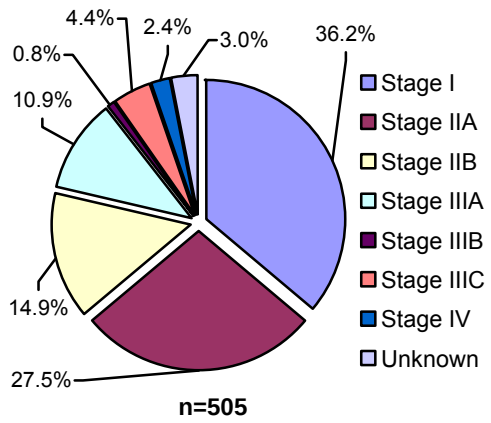
Appendix D

Staging* Distribution of Female Breast Cancer at Diagnosis by Age, New Brunswick, 2002-2006

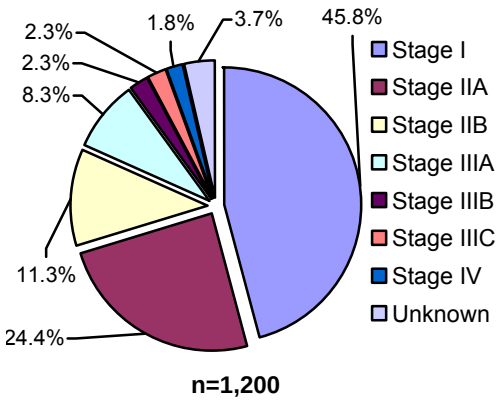
All Ages



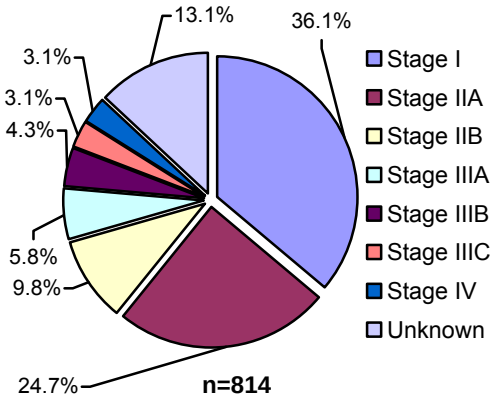
Ages < 50



Ages 50-69



Ages 70+



* American Joint Committee on Cancer (AJCC) – Cancer Staging Manual: 6th Edition.

Appendix E

Table 1: Age-Standardized Cancer Incidence Rates* for Males by Site, New Brunswick, 2002-2006

Cancer Site	Total Incidence		Crude Rate (95% CI)			Age-Standardized Rate (95% CI)		
	2002-2006	2006	2002-2006		2006	2002-2006		2006
All Sites	**10,495**	**2,272**	**565.3**	**(554.5-576.1)**	**614.9**	**499.9**	**(490.3-509.4)**	**519.7**
Buccal Cavity and Pharynx	**283**	**56**	**15.2**	**(13.5-17.0)**	**15.2**	**13.1**	**(11.6-14.7)**	**12.6**
Lip	49	15	2.6	(1.9-3.4)	4.1	2.4	(1.8-3.1)	3.6
Tongue	49	9	2.6	(1.9-3.4)	2.4	2.2	(1.6-2.8)	2.2
Major Salivary Gland	33	8	1.8	(1.2-2.4)	2.2	1.7	(1.1-2.2)	1.8
Floor of the Mouth	16	<5	0.9	(0.4-1.3)	0.8	0.8	(0.4-1.2)	0.8
Gum and Other Mouth	30	<5	1.6	(1.0-2.2)	0.8	1.5	(0.9-2.0)	0.7
Nasopharynx	23	6	1.2	(0.7-1.7)	1.6	1.0	(0.6-1.4)	1.2
Oropharynx	6	<5	0.3	(0.1-0.6)	0.0	0.3	(0.1-0.5)	0.0
Hypopharynx	19	<5	1.0	(0.6-1.5)	0.3	0.9	(0.5-1.3)	0.2
Other Buccal Cavity and Pharynx	58	11	3.1	(2.3-3.9)	3.0	2.5	(1.8-3.1)	2.1
Digestive System	**2,187**	**460**	**117.8**	**(112.9-122.7)**	**124.5**	**103.5**	**(99.2-107.9)**	**104.5**
Esophagus	149	27	8.0	(6.7-9.3)	7.3	6.9	(5.8-8.0)	6.0
Stomach	261	54	14.1	(12.4-15.8)	14.6	12.5	(11.0-14.0)	12.6
Small Intestine	33	8	1.8	(1.2-2.4)	2.2	1.6	(1.0-2.1)	2.0
Colorectal	**1,327**	**288**	**71.5**	**(67.6-75.3)**	**77.9**	**62.5**	**(59.1-65.8)**	**64.3**
Colon Excluding Rectum	754	157	40.6	(37.7-43.5)	42.5	35.9	(33.4-38.5)	35.8
Rectum and Rectosigmoid	550	126	29.6	(27.2-32.1)	34.1	25.5	(23.3-27.6)	27.5
Anus	23	5	1.2	(0.7-1.7)	1.4	1.1	(0.6-1.5)	1.0
Liver	57	19	3.1	(2.3-3.9)	5.1	2.7	(2.0-3.4)	4.2
Gall Bladder	13	<5	0.7	(0.3-1.1)	0.8	0.7	(0.3-1.0)	0.8
Pancreas	278	50	15.0	(13.2-16.7)	13.5	13.5	(11.9-15.0)	12.0
Other Digestive System	69	11	3.7	(2.8-4.6)	3.0	3.3	(2.5-4.1)	2.6
Respiratory System	**2,019**	**395**	**108.8**	**(104.0-113.5)**	**106.9**	**96.9**	**(92.7-101.2)**	**91.5**
Larynx	135	22	7.3	(6.0-8.5)	6.0	6.3	(5.2-7.4)	5.1
Lung	1,865	368	100.5	(95.9-105.0)	99.6	89.7	(85.7-93.8)	85.3
Other Respiratory System	19	5	1.0	(0.6-1.5)	1.4	0.9	(0.5-1.3)	1.2
Bones and Joints	**20**	**<5**	**1.1**	**(0.6-1.5)**	**1.1**	**1.0**	**(0.6-1.5)**	**1.2**
Soft Tissue (Including Heart)	**77**	**17**	**4.1**	**(3.2-5.1)**	**4.6**	**3.7**	**(2.8-4.5)**	**4.0**
Breast	**18**	**<5**	**1.0**	**(0.5-1.4)**	**0.8**	**0.9**	**(0.5-1.3)**	**0.7**
Male Genital System	**3,023**	**735**	**162.8**	**(157.0-168.6)**	**198.9**	**145.0**	**(139.8-150.2)**	**167.6**
Prostate	2,919	719	157.2	(151.5-162.9)	194.6	139.3	(134.3-144.4)	163.3
Testis	69	12	3.7	(2.8-4.6)	3.2	4.0	(3.1-5.0)	3.3
Penis	31	<5	1.7	(1.1-2.3)	1.1	1.5	(1.0-2.0)	1.0
Other Male Genital System	<5	<5	0.2	(0.0-0.4)	0.0	0.2	(0.0-0.3)	0.0
Urinary System	**1,104**	**226**	**59.5**	**(56.0-63.0)**	**61.2**	**51.7**	**(48.6-54.7)**	**51.3**
Bladder (Excluding In Situ)	689	146	37.1	(34.3-39.9)	39.5	32.9	(30.4-35.3)	33.4
Kidney and Renal Pelvis	395	78	21.3	(19.2-23.4)	21.1	17.9	(16.1-19.7)	17.5
Ureter	18	<5	1.0	(0.5-1.4)	0.5	0.8	(0.4-1.2)	0.5
Other Urinary System	<5	<5	0.1	(0.0-0.3)	0.0	0.1	(0.0-0.2)	0.0
Eye	**10**	**5**	**0.5**	**(0.2-0.9)**	**1.4**	**0.5**	**(0.2-0.8)**	**1.1**
Brain and Other Nervous System	**174**	**31**	**9.4**	**(8.0-10.8)**	**8.4**	**8.2**	**(7.0-9.5)**	**7.0**
Brain	167	31	9.0	(7.6-10.4)	8.4	7.9	(6.7-9.2)	7.0
Other Nervous System	7	<5	0.4	(0.1-0.7)	0.0	0.3	(0.1-0.5)	0.0
Endocrine	**102**	**32**	**5.5**	**(4.4-6.6)**	**8.7**	**4.7**	**(3.8-5.6)**	**7.4**
Thyroid	94	31	5.1	(4.0-6.1)	8.4	4.3	(3.5-5.2)	7.2
Other Endocrine	8	<5	0.4	(0.1-0.7)	0.3	0.4	(0.1-0.6)	0.2
Skin (Excluding Basal and Squamous)	**364**	**75**	**19.6**	**(17.6-21.6)**	**20.3**	**17.1**	**(15.3-18.9)**	**17.1**
Melanomas of the Skin	323	67	17.4	(15.5-19.3)	18.1	15.0	(13.4-16.7)	15.1
Skin, Non-Epithelial	41	8	2.2	(1.5-2.9)	2.2	2.1	(1.4-2.7)	1.9
Lymphoma	**516**	**106**	**27.8**	**(25.4-30.2)**	**28.7**	**24.7**	**(22.5-26.8)**	**24.4**
Hodgkin's Lymphoma	57	10	3.1	(2.3-3.9)	2.7	3.1	(2.3-3.9)	2.6
Non-Hodgkin's Lymphoma	459	96	24.7	(22.5-27.0)	26.0	21.6	(19.6-23.5)	21.8
Multiple Myeloma	**124**	**25**	**6.7**	**(5.5-7.9)**	**6.8**	**5.9**	**(4.9-6.9)**	**5.8**
Leukemia	**236**	**46**	**12.7**	**(11.1-14.3)**	**12.4**	**11.5**	**(10.0-13.0)**	**10.7**
Other, Ill-Defined, and Unknown	**238**	**56**	**12.8**	**(11.2-14.4)**	**15.2**	**11.3**	**(9.8-12.7)**	**12.9**

** Rates are per 100,000 population and are age-standardized to the 1991 Canadian population estimates. Counts are suppressed when fewer than five cases were reported for the specific cancer. The suppressed cases however, are included in the counts and rates for 'all sites' combined.*

Appendix E

Table 2: Age-Standardized Cancer Incidence Rates* for Females by Site, New Brunswick, 2002-2006

Cancer Site	Total Incidence		Crude Rate (95% CI)			Age-Standardized Rate (95% CI)		
	2002-2006	2006	2002-2006		2006	2002-2006		2006
All Sites	**9,063**	**1,903**	**476.0**	**(466.2-485.8)**	**501.2**	**357.8**	**(350.4-365.1)**	**364.9**
Buccal Cavity and Pharynx	**104**	**26**	**5.5**	**(4.4-6.5)**	**6.8**	**4.2**	**(3.4-5.0)**	**5.0**
Lip	7	<5	0.4	(0.1-0.6)	0.8	0.2	(0.1-0.4)	0.5
Tongue	22	5	1.2	(0.7-1.6)	1.3	0.9	(0.5-1.3)	0.9
Major Salivary Gland	19	<5	1.0	(0.5-1.4)	0.8	0.7	(0.4-1.0)	0.7
Floor of the Mouth	10	<5	0.5	(0.2-0.9)	0.5	0.4	(0.2-0.7)	0.4
Gum and Other Mouth	23	6	1.2	(0.7-1.7)	1.6	0.9	(0.5-1.3)	1.2
Nasopharynx	7	<5	0.4	(0.1-0.6)	0.0	0.3	(0.1-0.5)	0.0
Oropharynx	<5	<5	0.1	(0.0-0.2)	0.0	0.1	(0.0-0.1)	0.0
Hypopharynx	<5	<5	0.0	(0.0-0.0)	0.0	0.0	(0.0-0.0)	0.0
Other Buccal Cavity and Pharynx	15	7	0.8	(0.4-1.2)	1.8	0.6	(0.3-0.9)	1.3
Digestive System	**1,776**	**337**	**93.3**	**(88.9-97.6)**	**88.8**	**65.1**	**(62.1-68.2)**	**59.9**
Esophagus	50	6	2.6	(1.9-3.4)	1.6	1.8	(1.3-2.3)	1.0
Stomach	139	35	7.3	(6.1-8.5)	9.2	5.3	(4.4-6.1)	6.7
Small Intestine	27	6	1.4	(0.9-2.0)	1.6	1.0	(0.6-1.4)	1.0
Colorectal	**1,143**	**213**	**60.0**	**(56.6-63.5)**	**56.1**	**42.0**	**(39.6-44.5)**	**38.1**
Colon Excluding Rectum	778	140	40.9	(38.0-43.7)	36.9	28.1	(26.2-30.1)	24.3
Rectum and Rectosigmoid	336	66	17.6	(15.8-19.5)	17.4	12.7	(11.4-14.1)	12.6
Anus	29	7	1.5	(1.0-2.1)	1.8	1.2	(0.7-1.6)	1.1
Liver	15	<5	0.8	(0.4-1.2)	0.5	0.6	(0.3-0.9)	0.4
Gall Bladder	25	5	1.3	(0.8-1.8)	1.3	0.9	(0.6-1.3)	0.9
Pancreas	272	52	14.3	(12.6-16.0)	13.7	9.7	(8.6-10.9)	8.7
Other Digestive System	105	18	5.5	(4.5-6.6)	4.7	3.8	(3.0-4.5)	3.2
Respiratory System	**1,360**	**304**	**71.4**	**(67.6-75.2)**	**80.1**	**53.7**	**(50.8-56.5)**	**57.4**
Larynx	22	<5	1.2	(0.7-1.6)	0.3	0.8	(0.5-1.2)	0.2
Lung	1,330	301	69.9	(66.1-73.6)	79.3	52.5	(49.7-55.3)	56.9
Other Respiratory System	8	<5	0.4	(0.1-0.7)	0.5	0.3	(0.1-0.6)	0.4
Bones and Joints	**11**	**<5**	**0.6**	**(0.2-0.9)**	**0.5**	**0.6**	**(0.2-0.9)**	**0.4**
Soft Tissue (Including Heart)	**39**	**8**	**2.0**	**(1.4-2.7)**	**2.1**	**1.7**	**(1.2-2.3)**	**1.6**
Breast	**2,500**	**508**	**131.3**	**(126.2-136.5)**	**133.8**	**98.3**	**(94.4-102.1)**	**96.2**
Female Genital System	**1,007**	**213**	**52.9**	**(49.6-56.2)**	**56.1**	**40.7**	**(38.2-43.2)**	**40.5**
Cervix Uteri	177	28	9.3	(7.9-10.7)	7.4	8.1	(6.9-9.3)	6.0
Corpus Uteri	437	116	23.0	(20.8-25.1)	30.5	17.3	(15.7-19.0)	21.5
Uterus, Not Otherwise Specified	<5	<5	0.2	(0.0-0.4)	0.3	0.2	(0.0-0.3)	0.2
Ovary	304	55	16.0	(14.2-17.8)	14.5	11.8	(10.5-13.1)	10.4
Other Female Genital System	85	13	4.5	(3.5-5.4)	3.4	3.3	(2.6-4.0)	2.5
Urinary System	**500**	**100**	**26.3**	**(24.0-28.6)**	**26.3**	**19.5**	**(17.8-21.2)**	**19.1**
Bladder (Excluding In Situ)	237	46	12.4	(10.9-14.0)	12.1	9.0	(7.8-10.1)	8.6
Kidney and Renal Pelvis	249	52	13.1	(11.5-14.7)	13.7	10.0	(8.8-11.3)	10.1
Ureter	11	<5	0.6	(0.2-0.9)	0.3	0.4	(0.1-0.6)	0.1
Other Urinary System	<5	<5	0.2	(0.0-0.3)	0.3	0.1	(0.0-0.2)	0.2
Eye	**9**	**<5**	**0.5**	**(0.2-0.8)**	**0.3**	**0.3**	**(0.1-0.6)**	**0.2**
Brain and Other Nervous System	**138**	**36**	**7.3**	**(6.0-8.5)**	**9.5**	**6.1**	**(5.1-7.2)**	**8.4**
Brain	128	34	6.7	(5.6-7.9)	9.0	5.7	(4.7-6.7)	8.0
Other Nervous System	10	<5	0.5	(0.2-0.9)	0.5	0.5	(0.2-0.7)	0.4
Endocrine	**354**	**88**	**18.6**	**(16.7-20.5)**	**23.2**	**16.7**	**(15.0-18.5)**	**21.8**
Thyroid	344	87	18.1	(16.2-20.0)	22.9	16.2	(14.5-17.9)	21.4
Other Endocrine	10	<5	0.5	(0.2-0.9)	0.3	0.5	(0.2-0.8)	0.4
Skin (Excluding Basal and Squamous)	**322**	**81**	**16.9**	**(15.1-18.8)**	**21.3**	**13.7**	**(12.2-15.2)**	**16.3**
Melanomas of the Skin	288	72	15.1	(13.4-16.9)	19.0	12.4	(11.0-13.9)	14.6
Skin, Non-Epithelial	34	9	1.8	(1.2-2.4)	2.4	1.2	(0.8-1.7)	1.7
Lymphoma	**424**	**93**	**22.3**	**(20.2-24.4)**	**24.5**	**17.2**	**(15.6-18.9)**	**18.6**
Hodgkin's Lymphoma	52	13	2.7	(2.0-3.5)	3.4	2.8	(2.1-3.6)	3.3
Non-Hodgkin's Lymphoma	372	80	19.5	(17.6-21.5)	21.1	14.4	(12.9-15.9)	15.4
Multiple Myeloma	**111**	**21**	**5.8**	**(4.7-6.9)**	**5.5**	**4.3**	**(3.5-5.1)**	**3.8**
Leukemia	**194**	**30**	**10.2**	**(8.8-11.6)**	**7.9**	**8.1**	**(7.0-9.3)**	**5.9**
Other, Ill-Defined, and Unknown	**214**	**55**	**11.2**	**(9.7-12.7)**	**14.5**	**7.4**	**(6.4-8.4)**	**9.9**

** Rates are per 100,000 population and are age-standardized to the 1991 Canadian population estimates. Counts are suppressed when fewer than five cases were reported for the specific cancer. The suppressed cases however, are included in the counts and rates for 'all sites' combined.*

Appendix E

Table 3: Age-Standardized Cancer Mortality Rates* for Males by Site, New Brunswick, 2002-2006

Cancer Site	Total Mortality		Crude Rate (95% CI)			Age-Standardized Rate (95% CI)		
	2002-2006	2006	2002-2006		2006	2002-2006		2006
All Sites	**4,750**	**901**	**255.9**	**(248.6-263.1)**	**243.8**	**229.2**	**(222.6-235.7)**	**209.1**
Buccal Cavity and Pharynx	**84**	**15**	**4.5**	**(3.6-5.5)**	**4.1**	**3.9**	**(3.1-4.8)**	**3.5**
Digestive System	**1,192**	**253**	**64.2**	**(60.6-67.9)**	**68.5**	**57.2**	**(54.0-60.5)**	**58.5**
Esophagus	150	39	8.1	(6.8-9.4)	10.6	6.9	(5.8-8.0)	8.4
Stomach	156	28	8.4	(7.1-9.7)	7.6	7.5	(6.4-8.7)	6.7
Small Intestine	6	<5	0.3	(0.1-0.6)	0.8	0.3	(0.1-0.6)	0.8
Colon and Rectum	529	110	28.5	(26.1-30.9)	29.8	25.5	(23.3-27.7)	25.2
Liver	50	12	2.7	(1.9-3.4)	3.2	2.4	(1.7-3.0)	2.8
Pancreas	243	44	13.1	(11.4-14.7)	11.9	11.7	(10.3-13.2)	10.6
Other Digestive System	58	17	3.1	(2.3-3.9)	4.6	2.8	(2.1-3.6)	4.0
Respiratory System	**1,645**	**303**	**88.6**	**(84.3-92.9)**	**82.0**	**79.6**	**(75.7-83.4)**	**70.0**
Larynx	58	9	3.1	(2.3-3.9)	2.4	2.8	(2.1-3.5)	2.2
Lung	1,581	293	85.2	(81.0-89.4)	79.3	76.5	(72.7-80.3)	67.6
Other Respiratory System	6	<5	0.3	(0.1-0.6)	0.3	0.3	(0.1-0.5)	0.3
Skin	**66**	**11**	**3.6**	**(2.7-4.4)**	**3.0**	**3.2**	**(2.4-3.9)**	**2.5**
Melanoma of the Skin	45	5	2.4	(1.7-3.1)	1.4	2.2	(1.5-2.8)	1.1
Other Skin	21	6	1.1	(0.6-1.6)	1.6	1.0	(0.6-1.5)	1.4
Breast	**7**	**<5**	**0.4**	**(0.1-0.7)**	**0.8**	**0.3**	**(0.1-0.6)**	**0.7**
Male Genital System	**515**	**82**	**27.7**	**(25.3-30.1)**	**22.2**	**25.3**	**(23.1-27.5)**	**19.3**
Prostate	504	79	27.1	(24.8-29.5)	21.4	24.7	(22.6-26.9)	18.6
Testis	<5	<5	0.2	(0.0-0.4)	0.3	0.2	(0.0-0.4)	0.2
Other Male Genital System	7	<5	0.4	(0.1-0.7)	0.5	0.4	(0.1-0.6)	0.5
Urinary System	**300**	**60**	**16.2**	**(14.3-18.0)**	**16.2**	**14.2**	**(12.6-15.8)**	**13.6**
Bladder	144	28	7.8	(6.5-9.0)	7.6	7.0	(5.9-8.2)	6.5
Kidney and Renal Pelvis	148	29	8.0	(6.7-9.3)	7.8	6.8	(5.7-7.9)	6.4
Other Urinary System	8	<5	0.4	(0.1-0.7)	0.8	0.4	(0.1-0.6)	0.7
Brain and Other Nervous System	**121**	**23**	**6.5**	**(5.4-7.7)**	**6.2**	**5.6**	**(4.6-6.6)**	**5.1**
Endocrine	**14**	**5**	**0.8**	**(0.4-1.1)**	**1.4**	**0.7**	**(0.3-1.0)**	**1.2**
Thyroid	8	<5	0.4	(0.1-0.7)	0.8	0.4	(0.1-0.6)	0.7
Other Endocrine System	6	<5	0.3	(0.1-0.6)	0.5	0.3	(0.1-0.5)	0.5
Lymphoma	**183**	**29**	**9.9**	**(8.4-11.3)**	**7.8**	**8.8**	**(7.5-10.0)**	**7.0**
Hodgkin's Lymphoma	<5	<5	0.2	(0.0-0.3)	0.0	0.1	(0.0-0.3)	0.0
Non-Hodgkin's Lymphoma	180	29	9.7	(8.3-11.1)	7.8	8.6	(7.4-9.9)	7.0
Multiple Myeloma	**83**	**13**	**4.5**	**(3.5-5.4)**	**3.5**	**4.0**	**(3.2-4.9)**	**3.0**
Leukemia	**137**	**29**	**7.4**	**(6.1-8.6)**	**7.8**	**6.8**	**(5.7-7.9)**	**7.0**
Other, Ill-Defined, and Unknown	**403**	**75**	**21.7**	**(19.6-23.8)**	**20.3**	**19.5**	**(17.6-21.4)**	**17.6**

** Rates are per 100,000 population and are age-standardized to the 1991 Canadian population estimates. Counts are suppressed when fewer than five cases were reported for the specific cancer. The suppressed cases however, are included in the counts and rates for 'all sites' combined.*

Appendix E

Table 4: Age-Standardized Cancer Mortality Rates* for Females by Site, New Brunswick, 2002-2006

Cancer Site	Total Mortality		Crude Rate (95% CI)			Age-Standardized Rate (95% CI)		
	2002-2006	2006	2002-2006		2006	2002-2006		2006
All Sites	**4,083**	**836**	**214.5**	**(207.9-221.0)**	**219.8**	**148.4**	**(143.9-153.0)**	**154.5**
Buccal Cavity and Pharynx	**31**	**<5**	**1.6**	**(1.1-2.2)**	**1.1**	**1.1**	**(0.7-1.5)**	**0.5**
Digestive System	**995**	**188**	**51.7**	**(48.5-55.0)**	**49.5**	**33.9**	**(31.8-36.1)**	**31.7**
Esophagus	54	9	2.8	(2.1-3.6)	2.4	1.9	(1.4-2.4)	1.4
Stomach	94	21	4.9	(3.9-5.9)	5.5	3.2	(2.5-3.8)	3.8
Small Intestine	7	<5	0.4	(0.1-0.6)	0.3	0.2	(0.1-0.4)	0.1
Colon and Rectum	460	81	24.2	(22.0-26.4)	21.3	15.5	(14.1-16.9)	13.3
Liver	33	<5	1.7	(1.1-2.3)	0.3	1.1	(0.7-1.5)	0.2
Pancreas	248	52	13.0	(11.4-14.6)	13.7	8.8	(7.7-9.9)	8.6
Other Digestive System	89	23	4.7	(3.7-5.6)	6.1	3.2	(2.5-3.8)	4.4
Respiratory System	**1,046**	**248**	**54.9**	**(51.6-58.3)**	**65.3**	**40.2**	**(37.7-42.6)**	**45.7**
Larynx	7	<5	0.4	(0.1-0.6)	0.0	0.3	(0.1-0.5)	0.0
Lung	1,034	248	54.3	(51.0-57.6)	65.3	39.7	(37.3-42.1)	45.7
Other Respiratory System	5	<5	0.3	(0.0-0.5)	0.0	0.2	(0.0-0.3)	0.0
Skin	**64**	**12**	**3.4**	**(2.5-4.2)**	**3.2**	**2.4**	**(1.8-3.0)**	**2.1**
Melanoma of the Skin	46	7	2.4	(1.7-3.1)	1.8	1.9	(1.3-2.4)	1.3
Other Skin	18	5	0.9	(0.5-1.4)	1.3	0.6	(0.3-0.8)	0.8
Breast	**617**	**124**	**32.4**	**(29.8-35.0)**	**32.7**	**22.2**	**(20.4-23.9)**	**21.9**
Female Genital System	**370**	**76**	**19.4**	**(17.5-21.4)**	**20.0**	**13.9**	**(12.5-15.3)**	**13.5**
Cervix Uteri	49	8	2.6	(1.9-3.3)	2.1	1.9	(1.4-2.5)	1.5
Corpus and Uterus, NOS	91	19	4.8	(3.8-5.8)	5.0	3.2	(2.6-3.9)	3.1
Ovary	200	40	10.5	(9.0-12.0)	10.5	7.7	(6.6-8.7)	7.3
Other Female Genital Organs	30	9	1.6	(1.0-2.1)	2.4	1.1	(0.7-1.4)	1.6
Urinary System	**162**	**29**	**8.5**	**(7.2-9.8)**	**7.6**	**5.4**	**(4.5-6.2)**	**4.8**
Bladder	60	8	3.2	(2.4-3.9)	2.1	1.9	(1.4-2.4)	1.4
Kidney and Renal Pelvis	92	20	4.8	(3.8-5.8)	5.3	3.2	(2.5-3.8)	3.3
Other Urinary System	10	<5	0.5	(0.2-0.9)	0.3	0.3	(0.1-0.5)	0.1
Brain and Other Nervous System	**75**	**13**	**3.9**	**(3.0-4.8)**	**3.4**	**3.0**	**(2.3-3.7)**	**2.5**
Endocrine	**21**	**<5**	**1.1**	**(0.6-1.6)**	**1.1**	**0.8**	**(0.5-1.2)**	**0.7**
Thyroid	10	<5	0.5	(0.2-0.9)	0.5	0.3	(0.1-0.5)	0.2
Other Endocrine System	11	<5	0.6	(0.2-0.9)	0.5	0.5	(0.2-0.8)	0.4
Lymphoma	**154**	**36**	**8.1**	**(6.8-9.4)**	**9.5**	**5.5**	**(4.6-6.3)**	**6.3**
Hodgkin's Lymphoma	10	<5	0.5	(0.2-0.9)	0.8	0.4	(0.2-0.7)	0.6
Non-Hodgkin's Lymphoma	144	33	7.6	(6.3-8.8)	8.7	5.1	(4.2-5.9)	5.7
Multiple Myeloma	**74**	**9**	**3.9**	**(3.0-4.8)**	**2.4**	**2.6**	**(2.0-3.3)**	**1.6**
Leukemia	**123**	**27**	**6.5**	**(5.3-7.6)**	**7.1**	**4.5**	**(3.7-5.3)**	**4.9**
Other, Ill-Defined, and Unknown	**361**	**66**	**19.0**	**(17.0-20.9)**	**17.4**	**13.0**	**(11.7-14.4)**	**11.0**

** Rates are per 100,000 population and are age-standardized to the 1991 Canadian population estimates. Counts are suppressed when fewer than five cases were reported for the specific cancer. The suppressed cases however, are included in the counts and rates for 'all sites' combined.*

Appendix E

Table 5: Male Incidence: Ranking of the Ten Leading Cancers by Frequency, Health Zone and New Brunswick (NB), 2002-2006

Cancer Site	HZ1		HZ2		HZ3		HZ4		HZ5		HZ6		HZ7		NB	
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
Prostate	26.7	1	28.2	1	27.4	1	24.5	1	26.0	1	32.6	1	26.8	1	27.8	1
Lung	16.6	2	17.4	2	17.9	2	21.3	2	22.6	2	17.1	2	18.2	2	17.8	2
Colorectal	12.7	3	11.9	3	13.4	3	14.8	3	13.6	3	11.2	3	13.2	3	12.6	3
Bladder	7.4	4	6.7	4	6.9	4	5.7	4	6.2	4	5.4	4	4.9	4	6.6	4
Non-Hodgkin's Lymphoma	5.0	5	4.0	7	4.0	5	4.2	5	3.9	6	4.9	5	4.0	6	4.4	5
Kidney and Renal Pelvis	4.2	6	4.4	5	2.9	7	2.6	7	4.4	5	3.0	7	4.2	5	3.8	6
Melanoma of the Skin	2.9	9	4.3	6	3.1	6	2.0	10	1.8	10	1.6	10	3.7	7	3.1	7
Pancreas	3.4	7	2.5	8	2.4	9	-		2.1	9	2.7	8	2.0	10	2.6	8
Stomach	3.0	8	2.0	9	-		2.2	9	3.0	7	3.3	6	2.9	8	2.5	9
Leukemia	2.3	10	1.8	10	2.4	8	2.8	6	2.3	8	2.3	9	2.7	9	2.2	10
Brain	-*		-		1.8	10	-		-		-		-		-	
Thyroid	-		-		-		2.5	8	-		-		-		-	
All Other Sites	15.8		16.7		17.8		17.4		14.1		15.8		17.4		16.6	

* Not ranked in the ten leading cancers for Health Zone.

Appendix E

Table 6: Male Mortality: Ranking of the Ten Leading Cancers by Frequency, Health Zone and New Brunswick (NB), 2002-2006

Cancer Site	HZ1		HZ2		HZ3		HZ4		HZ5		HZ6		HZ7		NB	
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
Lung	30.0	1	32.9	1	34.0	1	36.1	1	40.0	1	34.8	1	33.3	1	33.3	1
Colorectal	11.8	2	11.4	2	11.4	2	11.3	3	9.8	2	9.6	2	13.5	2	11.1	2
Prostate	11.7	3	9.9	3	10.7	3	11.6	2	7.3	3	9.2	3	11.9	3	10.6	3
Pancreas	6.6	4	5.2	4	4.8	4	3.5	4	4.9	4	4.6	5	4.0	4	5.1	4
Non-Hodgkin's Lymphoma	4.5	5	3.2	7	4.6	5	2.9	9	3.4	7	4.1	6	-		3.8	5
Stomach	4.0	6	-		2.2	9	-		4.4	5	5.6	4	3.1	5	3.3	6
Esophagus	3.1	7	4.0	6	3.1	8	3.2	6	2.4	9	2.9	9	2.4	7	3.2	7
Kidney and Renal Pelvis	2.6	9	5.2	5	-		3.2	7	4.4	6	-		2.1	9	3.1	8
Bladder	3.0	8	2.8	8	3.6	6	2.6	10	2.9	8	3.2	7	2.4	6	3.0	9
Leukemia	2.6	10	2.8	9	3.6	7	3.5	5	2.4	10	2.9	10	-		2.9	10
Brain and Other Nervous System	-*		2.7	10	2.2	10	2.9	8	-		3.1	8	2.4	8	-	
Buccal Cavity and Pharynx	-		-		-		-		-		-		2.1	10	-	
All Other Sites	20.1		20.0		19.9		19.0		18.0		20.0		22.6		20.6	

* Not ranked in the ten leading cancers for Health Zone.

Appendix E

Table 7: Female Incidence: Ranking of the Ten Leading Cancers by Frequency, Health Zone and New Brunswick (NB), 2002-2006

Cancer Site	HZ1		HZ2		HZ3		HZ4		HZ5		HZ6		HZ7		NB	
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
Breast	27.8	1	26.8	1	28.4	1	23.9	1	28.1	1	28.4	1	29.4	1	27.5	1
Lung	14.7	2	16.7	2	14.1	2	12.8	3	14.4	2	13.1	2	13.5	3	14.6	2
Colorectal	13.8	3	11.5	3	11.4	3	15.6	2	9.9	3	12.6	3	14.3	2	12.6	3
Body of the Uterus	4.0	5	5.2	4	5.7	4	4.7	5	7.2	4	3.9	5	4.4	4	4.8	4
Non-Hodgkin's Lymphoma	4.7	4	3.9	6	4.2	5	4.4	7	2.7	10	3.9	6	3.1	8	4.1	5
Thyroid	2.9	10	3.5	7	3.2	8	7.7	4	5.1	5	5.5	4	-		3.8	6
Ovary	3.4	7	3.1	8	3.4	7	4.4	8	3.6	8	2.7	9	4.2	6	3.3	7
Melanoma of the Skin	-*		4.0	5	3.7	6	2.0	10	-		-		4.2	5	3.2	8
Pancreas	3.2	8	2.9	9	-		4.5	6	3.6	9	3.3	7	3.0	9	3.0	9
Kidney and Renal Pelvis	3.1	9	2.6	10	-		2.2	9	3.9	6	3.2	8	3.1	7	2.7	10
Bladder	3.4	6	-		2.4	10	-		3.6	7	-		2.4	10	-	
Cervix Uteri	-		-		2.7	9	-		-		-		-		-	
Stomach	-		-		-		-		-		2.3	10	-		-	
All Other Sites	19.3		19.6		20.8		17.7		18.0		21.0		18.4		20.1	

* Not ranked in the ten leading cancers for Health Zone.

Appendix E

Table 8: Female Mortality: Ranking of the Ten Leading Cancers by Frequency, Health Zone and New Brunswick (NB), 2002-2006

Cancer Site	HZ1		HZ2		HZ3		HZ4		HZ5		HZ6		HZ7		NB	
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
Lung	24.9	1	29.5	1	23.4	1	20.8	1	21.9	1	22.2	1	27.3	1	25.3	1
Breast	14.2	2	15.1	2	15.5	2	15.2	2	16.6	2	16.3	2	13.3	3	15.1	2
Colorectal	11.5	3	10.3	3	11.3	3	12.9	3	10.7	3	11.3	3	13.7	2	11.3	3
Pancreas	7.1	4	5.0	4	4.8	5	8.0	4	8.9	4	6.9	4	6.3	5	6.1	4
Ovary	5.4	5	3.6	7	5.3	4	5.7	5	6.5	5	3.3	5	7.4	4	4.9	5
Non-Hodgkin's Lymphoma	3.3	6	4.0	5	4.1	6	2.7	9	3.6	6	3.3	6	2.0	10	3.5	6
Leukemia	2.4	8	3.8	6	3.5	7	3.4	7	-		-		2.7	6	3.0	7
Stomach	-*		2.1	10	2.2	10	3.0	8	-		3.3	7	-		2.3	8
Other Digestive Organs	2.5	7	-		2.9	8	-		2.4	8	2.6	10	-		2.2	9
Body of the Uterus	2.4	9	2.1	9	2.5	9	2.7	10	2.4	9	-		-		2.2	10
Kidney and Renal Pelvis	2.4	10	2.3	8	-		-		-		3.3	8	2.7	7	-	
Multiple Myeloma	-		-		-		3.8	6	-		-		-		-	
Brain and Other Nervous System	-		-		-		-		3.0	7	2.8	9	2.7	8	-	
Bladder	-		-		-		-		1.8	10	-		2.7	9	-	
All Other Sites	24.0		22.2		24.4		22.0		22.5		24.6		19.1		24.1	

* Not ranked in the ten leading cancers for Health Zone.

Appendix E

Table 9: Ranking of the Five Leading Cancers in the Health Zones Compared to the Province Using Age-Standardized Incidence Rates (ASIR)* (per 100,000 population), Males, 2002-2006

Cancer Site	HZ1		HZ2		HZ3		HZ4		HZ5		HZ6		HZ7		NB	
	ASIR (95% CI)	Rank	ASIR (95% CI)	Rank	ASIR (95% CI)	Rank	ASIR (95% CI)	Rank	ASIR (95% CI)	Rank	ASIR (95% CI)	Rank	ASIR (95% CI)	Rank	**ASIR (95% CI)**	**Rank**
Prostate	132.4 (122.7-142.0)	1	158.4 (147.1-169.8)	1	123.8 (113.5-134.1)	1	107.6 (90.8-124.3)	1	118.5 (96.7-140.4)	1	178.1 (161.5-194.7)	1	132.6 (113.6-151.6)	1	**139.3 (134.3-144.4)**	**1**
Lung	82.5 (74.8-90.1)	2	98.5 (89.5-107.5)	2	80.4 (72.1-88.7)	2	96.8 (80.7-113.0)	2	105.9 (84.9-126.8)	2	96.4 (84.0-108.0)	2	89.3 (73.8-104.9)	2	**89.7 (85.7-93.8)**	**2**
Colorectal	62.1 (55.6-68.7)	3	65.0 (57.8-72.1)	3	59.9 (52.8-67.0)	3	67.2 (53.8-80.7)	3	61.4 (45.8-77.1)	3	61.0 (51.2-70.7)	3	62.9 (50.1-75.8)	3	**62.5 (59.1-65.8)**	**3**
Bladder	35.4 (30.5-40.4)	4	38.1 (32.5-43.7)	4	31.4 (26.2-36.6)	4	26.1 (17.7-34.6)	4	29.6 (18.4-40.7)	4	29.9 (23.0-36.8)	4	24.3 (16.1-32.4)	4	**32.9 (30.4-35.3)**	**4**
Non-Hodgkin's Lymphomas	24.7 (20.5-28.9)	5	21.8 (17.6-26.0)	7	17.8 (14.0-21.7)	5	18.7 (11.6-25.7)	5	18.8 (9.9-27.7)	6	25.3 (19.2-31.3)	5	19.5 (12.3-26.8)	5	**21.6 (19.6-23.5)**	**5**

Table 10: Ranking of the Five Leading Cancers in the Health Zones Compared to the Province Using Age-Standardized Mortality Rates (ASMR)* (per 100,000 population), Males, 2002-2006

Cancer Site	HZ1		HZ2		HZ3		HZ4		HZ5		HZ6		HZ7		NB	
	ASMR (95% CI)	Rank	ASMR (95% CI)	Rank	ASMR (95% CI)	Rank	ASMR (95% CI)	Rank	ASMR (95% CI)	Rank	ASMR (95% CI)	Rank	ASMR (95% CI)	Rank	**ASMR (95% CI)**	**Rank**
Lung	64.7 (57.9-71.5)	1	80.2 (72.0-88.3)	1	71.8 (64.0-79.7)	1	81.6 (66.5-96.7)	1	90.2 (70.6-109.7)	1	85.7 (74.0-97.5)	1	76.2 (61.9-90.5)	1	**76.5 (72.7-80.3)**	**1**
Colorectal	25.3 (21.1-29.5)	2	27.1 (22.4-31.8)	2	22.1 (17.8-26.4)	3	25.4 (17.0-33.8)	3	22.7 (12.7-32.6)	2	24.1 (17.8-30.4)	2	31.0 (21.8-40.1)	2	**25.5 (23.3-27.7)**	**2**
Prostate	24.9 (20.7-29.0)	3	23.8 (19.4-28.2)	3	24.7 (20.0-29.4)	2	27.7 (18.6-36.7)	2	17.5 (8.6-26.4)	3	24.1 (17.7-30.5)	3	28.0 (19.2-36.8)	3	**24.7 (22.6-26.9)**	**3**
Pancreas	14.2 (11.1-17.4)	4	12.4 (9.2-15.6)	4	9.9 (7.0-12.7)	4	7.4 (3.0-11.8)	5	11.6 (4.4-18.7)	4	11.5 (7.2-15.9)	5	9.5 (4.3-14.7)	4	**11.7 (10.3-13.2)**	**4**
Non-Hodgkin's Lymphoma	9.5 (7.0-12.1)	5	7.5 (5.1-10.0)	7	9.8 (6.9-12.8)	5	6.5 (2.3-10.8)	7	7.7 (2.0-13.4)	7	9.5 (5.7-13.3)	6	3.7 (0.5-6.9)	13	**8.6 (7.4-9.9)**	**5**

* Age-standardized to the 1991 Canadian population estimates.

Appendix E

Table 11: Ranking of the Five Leading Cancers in the Health Zones Compared to the Province Using Age-Standardized Incidence Rates (ASIR)* (per 100,000 population), Females, 2002-2006

Cancer Site	HZ1		HZ2		HZ3		HZ4		HZ5		HZ6		HZ7		NB	
	ASIR (95% CI)	Rank	ASIR (95% CI)	Rank	ASIR (95% CI)	Rank	ASIR (95% CI)	Rank	ASIR (95% CI)	Rank	ASIR (95% CI)	Rank	ASIR (95% CI)	Rank	**ASIR (95% CI)**	**Rank**
Breast	100.5 (92.8-108.2)	1	101.9 (93.7-110.0)	1	99.0 (90.7-107.4)	1	83.0 (69.9-96.2)	1	83.1 (66.3-99.9)	1	96.3 (85.0-107.5)	1	103.6 (88.0-119.3)	1	**98.3 (94.4-102.1)**	**1**
Lung	53.8 (48.1-59.4)	2	62.8 (56.4-69.1)	2	51.0 (44.9-57.1)	2	45.1 (35.4-54.9)	3	40.3 (28.9-51.7)	2	45.1 (37.4-52.8)	2	46.5 (36.1-56.8)	3	**52.5 (49.7-55.3)**	**2**
Colorectal	46.9 (41.8-52.0)	3	39.6 (34.8-44.4)	3	36.7 (31.8-41.5)	3	52.1 (41.9-62.3)	2	28.4 (18.7-38.1)	3	42.8 (35.3-50.2)	3	46.9 (36.8-57.1)	2	**42.0 (39.6-44.5)**	**3**
Corpus Uteri	14.2 (11.3-17.0)	5	19.8 (16.2-23.4)	4	21.0 (17.1-25.0)	4	16.9 (10.8-22.9)	5	22.2 (13.3-31.1)	4	13.0 (8.9-17.1)	5	14.9 (9.1-20.8)	5	**17.3 (15.7-19.0)**	**4**
Thyroid	12.5 (9.5-15.4)	6	16.9 (13.2-20.6)	6	12.8 (9.6-16.1)	7	31.6 (22.8-40.5)	4	22.0 (11.5-32.5)	5	22.4 (16.5-28.3)	4	10.5 (4.8-16.3)	9	**16.2 (14.5-17.9)**	**5**

Table 12: Ranking of the Five Leading Cancers in the Health Zones Compared to the Province Using Age-Standardized Mortality Rates (ASMR)* (per 100,000 population), Females, 2002-2006

Cancer Site	HZ1		HZ2		HZ3		HZ4		HZ5		HZ6		HZ7		NB	
	ASMR (95% CI)	Rank	ASMR (95% CI)	Rank	ASMR (95% CI)	Rank	ASMR (95% CI)	Rank	ASMR (95% CI)	Rank	ASMR (95% CI)	Rank	ASMR (95% CI)	Rank	**ASMR (95% CI)**	**Rank**
Lung	38.3 (33.7-42.9)	1	48.7 (43.2-54.3)	1	37.0 (31.8-42.1)	1	29.4 (21.6-37.1)	1	31.1 (21.1-41.2)	1	31.5 (25.1-37.8)	1	42.5 (32.5-52.4)	1	**39.7 (37.3-42.1)**	**1**
Breast	20.7 (17.4-24.1)	2	22.5 (19.0-26.1)	2	23.0 (19.1-26.9)	2	21.0 (14.5-27.5)	2	21.5 (13.6-29.5)	2	22.0 (16.8-27.2)	2	18.8 (12.5-25.1)	3	**22.2 (20.4-23.9)**	**2**
Colorectal	15.0 (12.3-17.7)	3	14.8 (11.9-17.6)	3	15.2 (12.1-18.2)	3	16.1 (10.7-21.5)	3	13.5 (7.3-19.7)	3	15.5 (11.1-19.8)	3	20.3 (13.6-27.0)	2	**15.5 (14.1-16.9)**	**3**
Pancreas	10.2 (7.9-12.5)	4	7.4 (5.3-9.4)	4	6.8 (4.7-8.9)	5	11.3 (6.5-16.1)	4	12.5 (6.2-18.8)	4	9.3 (5.9-12.6)	4	9.3 (4.8-13.9)	5	**8.8 (7.7-9.9)**	**4**
Ovary	8.6 (6.4-10.8)	5	6.2 (4.2-8.2)	5	7.9 (5.6-10.2)	4	7.3 (3.6-10.9)	5	10.1 (4.1-16.0)	5	5.2 (2.5-7.9)	5	10.3 (5.7-15.0)	4	**7.7 (6.6-8.7)**	**5**

* Age-standardized to the 1991 Canadian population estimates.

Appendix E

Table 13: Average Annual Percent Change (AAPC) in Age-Standardized Incidence Rates for the Ten Leading Cancers by Sex, New Brunswick, 1989-2006

	Incidence					
	Males			Females		
	AAPC (95% CI)	Changepoint†	Rank	AAPC (95% CI)	Changepoint†	Rank
All Sites	**0.1 (-0.3, 0.6)**			**0.6* (0.3, 0.9)**		
Prostate	6.5 (-1.6, 15.2)	1993, 2003	1	-		
Breast	-			0.2 (-0.3, 0.7)		1
Lung	-1.1* (-1.5, -0.8)		2	2.6* (2.2, 3.1)		2
Colorectal	-0.2 (-0.7, 0.3)		3	-0.8* (-1.5, -0.1)		3
Bladder	0.0 (-0.8, 0.8)		4	-		
Body of the Uterus	-			0.6 (-0.5, 1.7)		4
Non-Hodgkin's Lymphoma	1.9* (1.2, 2.7)		5	1.2 (-0.4, 2.8)		6
Thyroid	-			18.0* (15.4, 20.6)	1993, 1998	5
Kidney and Renal Pelvis	1.5* (0.2, 2.8)		6	0.1 (-1.5, 1.6)		9
Melanoma of the Skin	2.3* (1.1, 3.6)		7	-1.7 (-3.8, 0.4)		7
Pancreas	0.9 (-0.7, 2.5)		8	1.6 (-0.2, 3.4)		10
Stomach	-2.1* (-3.4, -0.7)		9	-		
Ovary	-			0.3 (-1.1, 1.7)		8
Leukemia	-0.3 (-1.7, 1.0)		10	-		

- Not Applicable.
* Significant at p=0.05.
† Changepoint indicates the baseline year, if the slope of the trend changed after 1989.

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Table 14: Average Annual Percent Change (AAPC) in Age-Standardized Mortality Rates for the Ten Leading Cancers by Sex, New Brunswick, 1989-2006

	Mortality					
	Males			Females		
	AAPC (95% CI)	Changepoint†	Rank	AAPC (95% CI)	Changepoint†	Rank
All Sites	**-0.7* (-1.1, -0.3)**			**-0.4* (-0.7, -0.1)**		
Lung	-1.1* (-1.6, -0.6)		1	2.5* (1.8, 3.3)		1
Colorectal	-1.1* (-1.8, -0.5)		2	-2.5* (-3.7, -1.3)		3
Breast	-			-2.4* (-3.4, -1.4)		2
Prostate	-1.0 (-2.3, 0.3)		3	-		
Pancreas	0.1 (-1.6, 1.7)		4	1.1 (-1.4, 3.5)		4
Non-Hodgkin's Lymphoma	0.0 (-1.6, 1.6)		5	-1.0 (-2.6, 0.7)		6
Ovary	-			0.0 (-1.0, 1.1)		5
Stomach	-3.8* (-5.4, -2.2)		6	-3.7* (-5.6, -1.8)		8
Bladder	-0.4 (-1.4, 0.6)		7	-		
Esophagus	0.7 (-1.0, 2.4)		8	-		
Body of the Uterus	-			-1.2 (-2.9, 0.5)		10
Kidney and Renal Pelvis	0.5 (-1.2, 2.3)		9	2.3 (-3.3, 8.3)		10
Other Digestive Organs	-			-0.7 (-4.0, 2.8)		9
Leukemia	-0.4 (-2.0, 1.2)		10	-1.3 (-3.5, 1.0)		7

- Not Applicable.
* Significant at p=0.05.
† Changepoint indicates the baseline year, if the slope of the trend changed after 1989.

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Table 15: Age-Specific Relative Survival Ratios (95% CI) for Selected Cancers at One, Three and Five Years, Males, New Brunswick, 2002-2006

Cancer Site	Age at Diagnosis (Years)	1 Year	3 Year	5 Year
Prostate	0-44	100.0* (N/A)	100.0* (N/A)	N/A (N/A)
	45-49	100.0* (N/A)	97.8 (80.1, 100.6)	98.6 (80.8, 101.4)
	50-74	99.6 (98.8, 100.2)	99.1 (97.4, 100.5)	99.6 (95.7, 102.8)
	75+	96.7 (93.8, 99.0)	92.0 (86.2, 97.2)	88.7 (72.1, 103.5)
Lung	0-44	52.1 (26.1, 73.0)	37.2 (14.4, 60.4)	37.3 (14.5, 60.6)
	45-49	38.4 (21.5, 55.6)	8.2 (0.8, 28.0)	N/A (N/A)
	50-74	41.9 (38.9, 44.9)	22.0 (19.2, 25.0)	18.8 (15.5, 22.3)
	75+	32.0 (28.1, 35.9)	14.3 (10.8, 18.3)	10.0 (5.8, 15.8)
Colorectal	0-44	95.0 (81.3, 98.8)	76.9 (53.3, 89.7)	77.2 (53.6, 90.1)
	45-49	87.8 (74.6, 94.5)	70.1 (50.0, 83.6)	70.6 (50.3, 84.2)
	50-74	84.7 (81.8, 87.3)	69.8 (65.3, 73.9)	63.5 (57.3, 69.2)
	75+	72.9 (67.7, 77.6)	56.7 (49.0, 64.2)	48.1 (34.8, 62.1)
Thyroid	0-44	92.8 (60.0, 99.0)	93.0 (60.1, 99.3)	93.3 (60.3, 99.5)
	45-49	100.0* (N/A)	100.0* (N/A)	100.0* (N/A)
	50-74	99.2 (86.0, 101.1)	96.1 (80.7, 101.7)	71.7 (31.9, 93.7)
	75+	25.2 (1.3, 66.7)	0.8 (0.1, 3.0)	N/A (N/A)
Testis	0-44	98.0 (85.4, 99.8)	98.2 (85.6, 100.1)	98.4 (85.8, 100.3)
	45-49	100.0* (N/A)	76.5 (12.0, 97.4)	N/A (N/A)
	50-74	88.4 (37.7, 98.9)	89.6 (38.3, 100.2)	91.6 (39.1, 102.5)
	75+	100.0* (N/A)	N/A (N/A)	N/A (N/A)

* The relative survival ratio was truncated to 100.0%.

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Table 16: Age-Specific Relative Survival Ratios (95% CI) for Selected Cancers at One, Three and Five Years, Females, New Brunswick, 2002-2006

Cancer Site	Age at Diagnosis (Years)	1 Year	3 Year	5 Year
Breast	0-44	98.7 (95.7, 99.6)	92.8 (87.7, 95.9)	92.0 (86.3, 95.5)
	45-49	99.3 (96.9, 100.0)	92.9 (87.1, 96.3)	87.2 (66.7, 95.9)
	50-74	97.6 (96.5, 98.5)	94.0 (91.9, 95.7)	90.5 (85.8, 94.1)
	75+	97.4 (87.9, 94.2)	78.0 (71.9, 83.6)	71.6 (58.2, 84.1)
Lung	0-44	58.5 (36.5, 75.2)	39.6 (19.7, 59.0)	39.7 (19.7, 59.1)
	45-49	58.5 (42.6, 71.4)	37.3 (19.5, 54.8)	37.4 (19.9, 55.1)
	50-74	48.2 (44.5, 51.8)	25.3 (21.7, 29.2)	21.0 (16.8, 25.5)
	75+	32.5 (27.9, 37.2)	16.0 (11.7, 21.0)	5.0 (1.4, 12.6)
Colorectal	0-44	92.8 (79.1, 97.7)	82.1 (63.4, 91.9)	74.4 (48.6, 88.7)
	45-49	94.2 (78.2, 98.7)	94.6 (78.5, 99.1)	95.0 (78.9, 99.5)
	50-74	82.5 (78.7, 85.7)	72.0 (66.9, 76.6)	71.1 (65.3, 76.3)
	75+	70.0 (65.5, 74.1)	58.8 (52.7, 64.6)	54.1 (44.6, 63.6)
Ovary	0-44	82.0 (59.0, 82.9)	77.3 (53.5, 90.0)	77.5 (53.6, 90.3)
	45-49	79.2 (53.6, 91.7)	71.4 (41.4, 88.1)	44.5 (9.6, 76.0)
	50-74	75.4 (67.7, 81.6)	53.6 (44.1, 62.3)	39.4 (28.2, 50.6)
	75+	36.3 (26.1, 46.7)	23.2 (13.3, 35.3)	13.5 (3.5, 32.9)
Thyroid	0-44	100.0* (N/A)	100.0* (N/A)	100.0* (N/A)
	45-49	100.0* (N/A)	100.0* (N/A)	N/A (N/A)
	50-74	99.2 (94.7, 100.3)	98.9 (91.0, 101.3)	100.0* (92.9, 103.5)
	75+	88.3 (66.3, 98.5)	93.1 (66.6, 107.1)	99.4 (63.2, 120.6)
Cervix	0-44	96.3 (85.9, 99.1)	96.4 (86.0, 99.2)	96.6 (86.2, 99.4)
	45-49	100.0* (N/A)	85.9 (39.4, 98.0)	86.3 (39.6, 98.4)
	50-74	86.0 (75.0, 92.6)	71.5 (56.9, 82.2)	67.1 (50.1, 79.6)
	75+	64.6 (42.2, 81.3)	44.0 (20.8, 67.8)	N/A (N/A)

* The relative survival ratio was truncated to 100.0%.

Appendix E

Table 17: Actual and Projected* Five-Year Cancer Incidence Cases for the Ten Leading Age-Standardized Incidence Rates (ASIRs), Males, New Brunswick

Cancer Site	Actual New Cases	Projected New Cases		
	2006	2015	2020	2025
All Sites	**2,272**	**2,469**	**2,783**	**3,123**
Prostate	719	830	1,080	1,368
Lung	368	392	404	414
Colorectal	288	325	369	418
Bladder	146	166	182	199
Non-Hodgkin's Lymphoma	96	127	148	166
Kidney and Renal Pelvis	78	120	138	151
Melanomas of the Skin	67	94	106	116
Pancreas	50	68	78	87
Stomach	54	54	58	65
Leukemia	46	68	79	87

* Age-period-cohort method with Power link function was used in the projection.

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Table 18: Actual and Projected* Five-Year Cancer Incidence Cases for the Ten Leading Age-Standardized Incidence Rates (ASIRs), Females, New Brunswick

Cancer Site	Actual New Cases	Projected New Cases		
	2006	2015	2020	2025
All Sites	**1,903**	**2,145**	**2,360**	**2,580**
Breast	508	564	600	635
Lung	301	353	388	404
Colorectal	213	268	297	332
Thyroid	87	123	150	167
Non-Hodgkin's Lymphoma	80	61	61	64
Melanomas of the Skin	72	63	68	73
Ovary	55	118	142	158
Kidney and Renal Pelvis	52	66	74	80
Pancreas	52	72	79	88
Corpus Uteri	28	94	101	109

* Age-period-cohort method with Power link function was used in the projection.

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Table 19: Actual and Projected* Five-Year Cancer Mortality Cases for the Ten Leading Age-Standardized Mortality Rates (ASMRs), Males, New Brunswick

Cancer Site	Actual Deaths	Projected Deaths		
	2006	2015	2020	2025
All Sites	**901**	**1,058**	**1,142**	**1,248**
Lung	293	343	361	383
Colorectal	110	120	132	147
Prostate	79	128	139	156
Pancreas	44	59	67	77
Esophagus	39	39	45	50
Non-Hodgkin's Lymphoma	29	54	62	71
Kidney and Renal Pelvis	29	43	48	51
Leukemia	29	28	30	33
Bladder	28	30	31	34
Stomach	28	28	30	34

* Age-period-cohort method with Power link function was used in the projection.

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Table 20 : Actual and Projected* Five-Year Cancer Mortality Cases for the Ten Leading Age-Standardized Mortality Rates (ASMRs), Females, New Brunswick

Cancer Site	Actual Deaths	Projected Deaths		
	2006	2015	2020	2025
All Sites	**836**	**891**	**955**	**1,019**
Lung	248	256	274	276
Breast	124	110	107	109
Colorectal	81	98	106	118
Pancreas	52	61	65	72
Ovary	40	50	55	62
Non-Hodgkin's Lymphoma	33	35	37	40
Leukemia	27	27	32	37
Other Digestive Organs	23	19	20	21
Stomach	21	15	14	13
Corpus and Uterus NOS	19	19	21	24

* Age-period-cohort method with Power link function was used in the projection.

Glossary

Cancer

Cancer is a disease in which cells divide and multiply without control. Cancer cells can invade nearby tissues and spread to other parts of the body. There are several main types of cancer. Carcinoma is cancer that begins in the skin or in tissues that line or cover internal organs. Sarcoma is cancer that begins in bone, cartilage, fat, muscle, blood vessels, or other connective or supportive tissue. Leukemia is cancer that starts in blood-forming tissue such as bone marrow, and causes white blood cells to be produced. Lymphoma is cancer that begins in the cells of the immune system.

Regional Health Authority (RHA)

Two new Regional Health Authorities exist in New Brunswick. Both are responsible for consolidating and managing programs and services previously delivered by the eight former RHAs. Former RHAs 1 (Beauséjour), 4, 5 and 6 were consolidated under RHA "A". Former RHAs 1 (South East), 2, 3 and 7 were consolidated under Horizon Health Network.

New Brunswick Provincial Cancer Registry

A central depository for cancer incidence data in New Brunswick, which is located in Saint John and managed by the New Brunswick Cancer Network (NBCN) of the Department of Health.

Incidence (new cases)

The number of cases of cancer newly diagnosed during a defined time period in a specified population. The basic unit of reporting is a cancer rather than a person.

Mortality (deaths)

The number of deaths attributed to a particular type of cancer during a defined time period in a specified population. Included are deaths of those whose cancer was diagnosed in an earlier time period, people with a new diagnosis during the time period, and persons for whom a diagnosis of cancer is recorded only at time of death.

Vital Statistics

A Branch of the Department of Health that compiles mortality counts and other data such as the number of births and marriages in New Brunswick.

Glossary

Invasive Cancer (Behavior Code 3)

Invasive cancer is a cancer that has spread beyond the layer of tissue in which it developed and is growing into surrounding healthy tissue.

SEER (The Surveillance, Epidemiology, and End Results) Cancer Classification

The Surveillance, Epidemiology, and End Results (SEER) Classification is a method of grouping cancer types based on body parts. It is used as the major source of information on cancer incidence and survival in North America. The SEER Program is the only comprehensive source of population-based information that includes the stage of cancer at the time of diagnosis and the survival rates within each stage.

ICD-O-02 and ICD-O-03

Published by the World Health Organization, the Second Edition of the International Classification of Disease for Oncology (ICD-O-2) permits the coding of all neoplasms (tumours or abnormal growths) by topography (site) and histology (morphology). The Third Edition (ICD-O-3) contains a topography section as it appeared in ICD-O-2, however the morphology section has been revised.

ICD-9 and ICD-10

The Ninth Revision of the International Classification of Diseases (ICD-9) and the Tenth Revision, the International Statistical Classification of Diseases and Related Health Problems (ICD-10), are coding systems published by the World Health Organization, which places diseases into certain categories for recording morbidity and mortality data.

New Brunswicker / Resident of New Brunswick

For cancer incidence and mortality data, a patient is considered a New Brunswicker – or resident of New Brunswick – if this is the province of permanent residence at the time of diagnosis or death.

In Situ Carcinoma

Refers specifically to ductal carcinoma in situ (DCIS): a non-invasive tumour of the breast arising from cells that involve only the lining of the breast duct. The cells have not spread outside the duct to other tissues in the breast.

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Stage of Cancer

The stage of cancer is the anatomic extent of the cancer at the time of diagnosis and before the application of definitive treatment.

All Sites or All Cancer Sites Combined

This refers to the total of all malignant cancer sites combined, as defined in the SEER tables in Appendices B and C. It excludes non-melanoma skin cancer (basal and squamous cell carcinoma of the skin) and invasive ovarian cancers with the following morphology: 8442/3, 8462/3, 8472/3 and 8473/3.

Rank

The cancers with the highest age-standardized rates or frequencies were numbered in descending order.

Age-Specific Incidence / Mortality Rate

The number of new cases or cancer deaths in a specific age group (usually a range of 5 or 10 years) during a year divided by the number of people in that age group during that year, multiplied by 100,000 and then expressed as a rate per 100,000 persons in that year. For wider age groups (e.g., ages 15-29 years), age-standardization would normally be used.

Crude Rate

The ratio of new cases or deaths due to cancer in the total population (from which the new cases or deaths were derived). It can be expressed as a rate per 100,000 persons in either sex or both sexes combined. Rates for this cancer report have been calculated on an annual basis using a five-year average.

Age-Standardized Incidence / Mortality Rate (ASIR, ASMR)

The incidence/mortality rate that would have occurred if the age distribution of the population of interest was the same as that of the standard population (1991 Canadian population). It is calculated as a weighted average of the age-specific rates (usually in 5 year age groups) in the population of interest, where the weight for each age group is the proportion of the standard

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population in that age group. Use of this measure permits comparisons across jurisdictions or time, independent of differences in age distribution, provided the same standard population is used.

Confidence Interval (CI)

A statistical test that shows the chance or "probability" that a number will fall within a given range. For example, a 95%CI suggests that if the procedure for computing a 95% confidence interval is used over and over, 95% of the time that interval will contain the true parameter value such as a mean or a rate.

Childhood and Adolescent and Young Adult Cancers

Types of cancers found in children (ages 0-14) and adolescents and young adults (ages 15-29) in New Brunswick.

All Other Sites

In some sections of this report, the ten leading cancer sites were selected for analysis. Those sites not included in the ten leading were grouped and labeled as 'All Other Sites' so that all cancer sites were accounted for.

Annual Percent Change (APC)

A measure to assess the rate of change over time of an incidence or mortality rate, calculated by fitting a linear model to logarithmically transformed annual rates. The method assumes that cancer rates are changing over the modeled period of time as a constant percentage of the rate of the previous year.

Relative Survival Ratio (RSR)

A measure of the impact of cancer on life expectancy. Estimated by the ratio of the observed survival for a group of persons diagnosed with cancer to the survival that would be expected for members of the general population, assumed to be practically free of the cancer of interest, who have the same main non-tumour characteristics affecting survival (e.g., sex, age, areas of residence) as those with cancer. Estimates of the relative survival ratio greater than 100% are

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possible and indicate that the observed survival of the cancer patients is better the expected survival for the general population.

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We would like to hear from you. If you wish to provide feedback that would help us improve future publications, please fill out the following evaluation form. This form should be returned to:

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2. Please rate each section of the report based on its usefulness:

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Time Trends in Cancer Incidence and Mortality, 1989-2006	❒	❒	❒
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