

# Cancer in Grey Bruce: 2000–2009

## About Cancer

Cancer is a disease that originates within the cells of the body. There are many types of cancers, but all of them feature cellular replication (cell division) that increases beyond what is considered normal (National Cancer Institute, 2009).

In the normal course of a lifetime, cells normally replicate for a set period and finally die, replicating at a rate that replaces the dying cells on about a 1:1 basis with new cells. Sometimes, there are minor mutations—or changes—that are apparent in the newly-created cells. Most of these go unnoticed, but if a mutation arises that affects the cell's normal cycle of replication and cell death, it can cause the cell to replicate too often and too abundantly or to not die as soon as it should. This is called a tumor (National Cancer Institute, 2009). Tumors can either be benign—meaning that they form and grow only where they initially started—or malignant, meaning that they can spread by *invasion* or by *metastasis* (National Cancer Institute, 2009). Malignant tumors are called cancers.

**Metastasis** is the process by which cancer cells can penetrate into lymphatic and blood vessels and thus spread to other parts of the body (National Cancer Institute, 2009).

**Invasion** is the direct movement and penetration of cancer cells into neighbouring tissues as the tumor grows in size (National Cancer Institute, 2009).

Because cancers spread to other sites in the body, they can be dangerous. As cancer cells grow, they can impede the function of the tissues they're growing in—the body's tissues and organs can stop working properly (National Cancer Institute, 2009). This can—and often does—result

in death. Cancer was responsible for 30% of the 238,418 deaths in Canada in 2009 (Statistics Canada, 2012).

In Grey Bruce, as in Canada, cancer deaths accounted for 30% of the 1496 deaths in 2009 (Source: Mortality Data 1986–2009. Ontario Registrar General: IntelliHEALTH Ontario).

## Primary Cancer Site

For the purposes of this report, cancers are categorized by the *primary site* of the cancer. The primary site is the location in the body where the cancer started (Cancer Research UK, 2014). “If some of the cancer cells break away from the primary cancer and settle in another part of the body this cancer is then called a secondary cancer” (Cancer Research UK, 2014).

## About the Information

### Data

The data for this series of fact sheets come from the Ontario Cancer Registry, and are distributed by Cancer Care Ontario. The most recent data were released in 2012 and cover the time period from 1986 to 2009.

The registry captures information on new cancer cases and deaths from four different sources: hospital discharge reports, pathology reports, records from regional cancer centres, and death certificates. This information is used to classify the cases and deaths as cancer deaths and to determine under which primary cancer site they should be classified.

**Data Source:** Cancer Care Ontario (Ontario Cancer Registry), SEER\*Stat Oct 2012 Release. **Population Data Source:** Population Estimates (Statistics Canada, Ontario Ministry of Finance), Ontario Ministry of Health and Long-term Care: IntelliHEALTH Ontario, extracted March 2012.

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## Incidence & Mortality

The Ontario Cancer Registry counts the incidence and the mortality figures for cancer. The incidence of an event or condition is the number of *new cases* in a given time period. The mortality from an event or condition is the number of *deaths* in a given time period.

## Rates

For the sake of this information series, we are presenting ten-year rates, meaning that we are averaging the incidence and mortality rates over a period of ten years. We do this in order to account for minor fluctuations in rates from year to year. Averaging over a longer time period provides a more 'stable' rate.

## Age-standardization

Rates are age-standardized to the 1991 Canadian population. Age-standardization involves first calculating rates for five-year age groups, by dividing the total number of cases for that age group in a given time period by the total population in that age group for that given time period. Then, that rate is multiplied by the proportion of the 1991 Canadian population who would fall within that age group. Age standardization is done in order to make rates comparable across geographies or time periods when the age structure of the population may have been different.

## Relative Risk (RR)

Relative risk (RR) is the rate for one population divided by the rate for another population. Doing this division allows you to compare one rate in a *relative* way to another rate. For example, if group A has a rate of 100 cases of X per 100,000 population and group B has a rate of 200 cases of X per 100,000 population, then the RR of X for A compared to B is the *rate of X for A divided by the rate of X for B*, or 100 per 100,000 population divided by 200 per 100,000 population, which gives a result of 0.5, or 50%. Group A is 50% as likely as group B to have a case of X.

If the RR is 1, the risk is equal. If the RR had been greater than 1 in our example, it would mean that group A had a greater likelihood than group B to have a case of X.

## 95% Confidence Intervals

Population rates are rates that are *parameters* and not *statistics*—that is, they are not *estimates (statistics)* but they are *actual values (parameters)*. Despite this, in public health we often treat these parameters *as* statistics, in order to account for variability over time periods.

One of the constructs often used with a statistic is a 95% confidence interval. This is the range in which 95% of the time we can expect the 'true' population value, or *parameter* to lie. It typically extends 1.96 standard deviations above and below the estimate.

Rates can be compared based on the degree to which their 95% confidence intervals overlap. If they don't overlap, they can be reasonably assumed to be statistically significantly different.

## New Cases & Deaths

In Grey Bruce, about 984 people a year are diagnosed with cancer (incidence), and 56% of those diagnoses are among males (Table 1).

Every year in Grey Bruce, about 451 people die of cancer (mortality), and 52% of those deaths occur among males (Table 1).

**Table 1. Counts of cancer incidence and mortality, Grey Bruce 2000–2009**

	# of New Cases	# of Deaths
All Persons	9835 (984/year)	4505 (451/year)
Males	5513 (551/year)	2357 (236/year)
Females	4322 (432/year)	2148 (215/year)
Grey	5567 (557/year)	2477 (248/year)
Bruce	4268 (427/year)	2028 (203/year)

## Overall Incidence

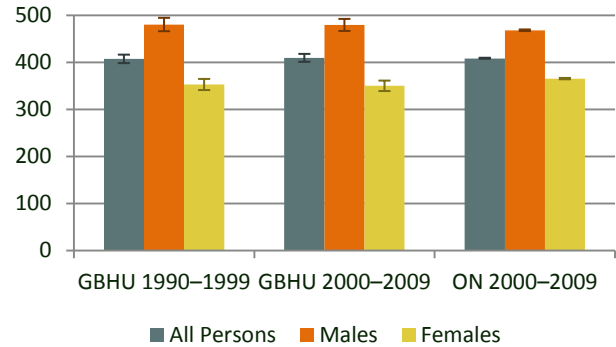
The age-standardized incidence rate of cancer in Grey Bruce for 2000–2009 has not changed significantly from the 1990–1999 rate, nor have the age-standardized rates for either sex changed over the same time frame (Figure 1, Table 2).

There is no difference in age-standardized incidence rates between Grey Bruce and Ontario for the 2000–2009 time period, nor is there a difference in age-standardized incidence among males between Grey Bruce and Ontario (Figure 1, Table 2). Grey Bruce females have a 4% lower age-standardized incidence rate than Ontario females (Figure 1, Table 2).

Males in Grey Bruce have a 37% higher age-standardized incidence rate compared to females (Figure 1, Table 2).

Bruce County residents have a 8% higher age-standardized incidence rate than Grey County residents (Table 2).

Figure 1. Age-standardized cancer incidence rate, per 100,000 population



## Overall Mortality

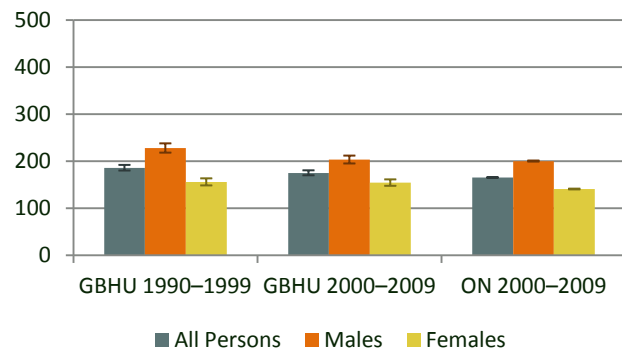
The age-standardized mortality rate of cancer in Grey Bruce for 2000–2009 may be declining, given the very small degree of confidence interval overlap (Figure 2, Table 2). This shift is entirely due to the 11% lower age-standardized mortality rate among males from 2000–2009 compared to 1990–1999 (Figure 2, Table 2).

Despite the falling rate, Grey Bruce still has a 6% higher age-standardized mortality rate compared to Ontario (Figure 2, Table 2). This difference is largely because of Grey Bruce's 10% higher age-standardized mortality rate among females relative to Ontario (Figure 2, Table 2).

Males in Grey Bruce have a 32% higher age-standardized mortality rate compared to females (Figure 2, Table 2).

Bruce County residents have a 17% higher age-standardized mortality rate compared to Grey County residents (Table 2).

Figure 2. Age-standardized cancer mortality rate, per 100,000 population



## Significant Differences

### Incidence

GBHU M : GBHU F, RR = 1.37

GBHU F : ON F, RR = 0.96

Bruce : Grey, RR = 1.08

### Mortality

GBHU : ON, RR = 1.06

GBHU M : GBHU F, RR = 1.32

GBHU F : ON F, RR = 1.10

GBHU M : Previous GBHU M, RR = 0.89

Bruce : Grey, RR = 1.17

**Table 2. Age-standardized rates of cancer incidence and mortality per 100,000 population, Grey Bruce and Ontario**

	GBHU 1990–1999	GBHU 2000–2009	ONTARIO 2000–2009
<b>Incidence</b>			
All Persons	407.2 (398.3–416.3)	409.5 (401.1–417.9)	408.7 (407.6–409.7)
Males	480.2 (466.1–494.5)	479.1 (466.3–492.2)	468.1 (466.4–469.8)
Females	352.7 (341.1–364.7)	350.0 (339.0–361.2)	365.4 (364.0–366.8)
Grey		395.9 (385.3–406.9)	
Bruce		428.5 (425.3–442.1)	
<b>Mortality</b>			
All Persons	185.9 (180.1–192.0)	175.2 (170.0–180.5)	165.2 (164.6–165.9)
Males	227.8 (218.1–237.8)	203.3 (195.1–211.8)	200.2 (199.1–201.3)
Females	155.8 (148.5–163.5)	154.3 (147.6–161.3)	140.8 (140.0–141.6)
Grey		163.9 (157.4–170.6)	
Bruce		192.0 (183.6–200.8)	

## Rates of the Most Prevalent Cancers

**Table 3. Specific Cancer Age-standardized Incidence Rates in Grey Bruce: 2000–2009**

Site	Overall	Males	Females	New Cases	# M	% M
Prostate		157.1 (150.0–164.5)		1861	1861	100
Lung and Bronchus	52.3 (49.4–55.2)	62.4 (58.0–67.2)	44.1 (40.5–47.9)	1310	737	56
Colorectal	51.3 (48.5–54.2)	59.3 (54.9–64.0)	43.4 (40.0–47.1)	1303	691	53
Female Breast*			89.9 (84.5–95.7)	1106	0	0
Non-Hodgkin Lymphoma	17.8 (16.1–19.7)	20.0 (17.4–22.9)	16.0 (13.7–18.5)	425	226	53
Melanoma of the Skin	18.0 (16.1–20.1)	17.2 (14.8–20.0)	19.2 (16.3–22.4)	387	191	49
Leukemia	14.0 (12.5–15.8)	18.0 (15.4–20.9)	10.6 (8.7–12.8)	315	191	61
Bladder	10.6 (9.3–12.0)	17.4 (15.1–20.1)	4.6 (3.6–6.0)	271	205	76
Oral Cavity & Pharynx	10.2 (8.9–11.6)	15.4 (13.2–18.0)	5.3 (4.1–6.9)	241	175	73
Corpus and Uterus, NOS			17.8 (15.4–20.4)	221	0	0
Pancreas	8.2 (7.1–9.4)	8.7 (7.1–10.6)	7.7 (6.3–9.3)	212	102	48
Kidney & Renal Pelvis	8.8 (7.6–10.1)	10.9 (9.0–13.2)	6.9 (5.4–8.6)	206	122	59
Thyroid	10.8 (9.2–12.7)	5.4 (3.9–7.3)	16.3 (13.4–19.6)	187	49	26
Ovary			13.8 (11.7–16.3)	165	0	0
Stomach	6.2 (5.2–7.3)	9.2 (7.6–11.2)	3.4 (2.5–4.7)	155	108	70
Brain and Other Nervous System	6.4 (5.3–7.6)	7.4 (5.8–9.3)	5.5 (4.1–7.3)	137	81	59
Myeloma	4.9 (4.0–5.9)	6.0 (4.6–7.7)	4.0 (3.0–5.4)	121	68	56
Esophagus	4.3 (3.5–5.2)	6.7 (5.3–8.4)	2.1 (1.4–3.1)	109	80	73
Cervix			8.1 (6.2–10.3)	76	0	0
Soft Tissue including Heart	3.2 (2.4–4.1)	4.2 (3.0–5.7)	2.3 (1.4–3.5)	68	44	65
Larynx	2.6 (2.0–3.3)	4.7 (3.6–6.2)	0.6 (0.2–1.4)	63	56	89
Liver & Intrahepatic Bile Duct	2.2 (1.7–2.9)	3.6 (2.6–4.9)	0.9 (0.5–1.7)	55	43	78
Hodgkin Lymphoma	2.7 (1.9–3.7)	3.0 (1.9–4.5)	2.4 (1.4–3.8)	45	25	56
Testis		5.6 (3.9–7.9)		37	37	100

**Table 4. Specific Cancer Age-standardized Mortality Rates in Grey Bruce: 2000–2009**

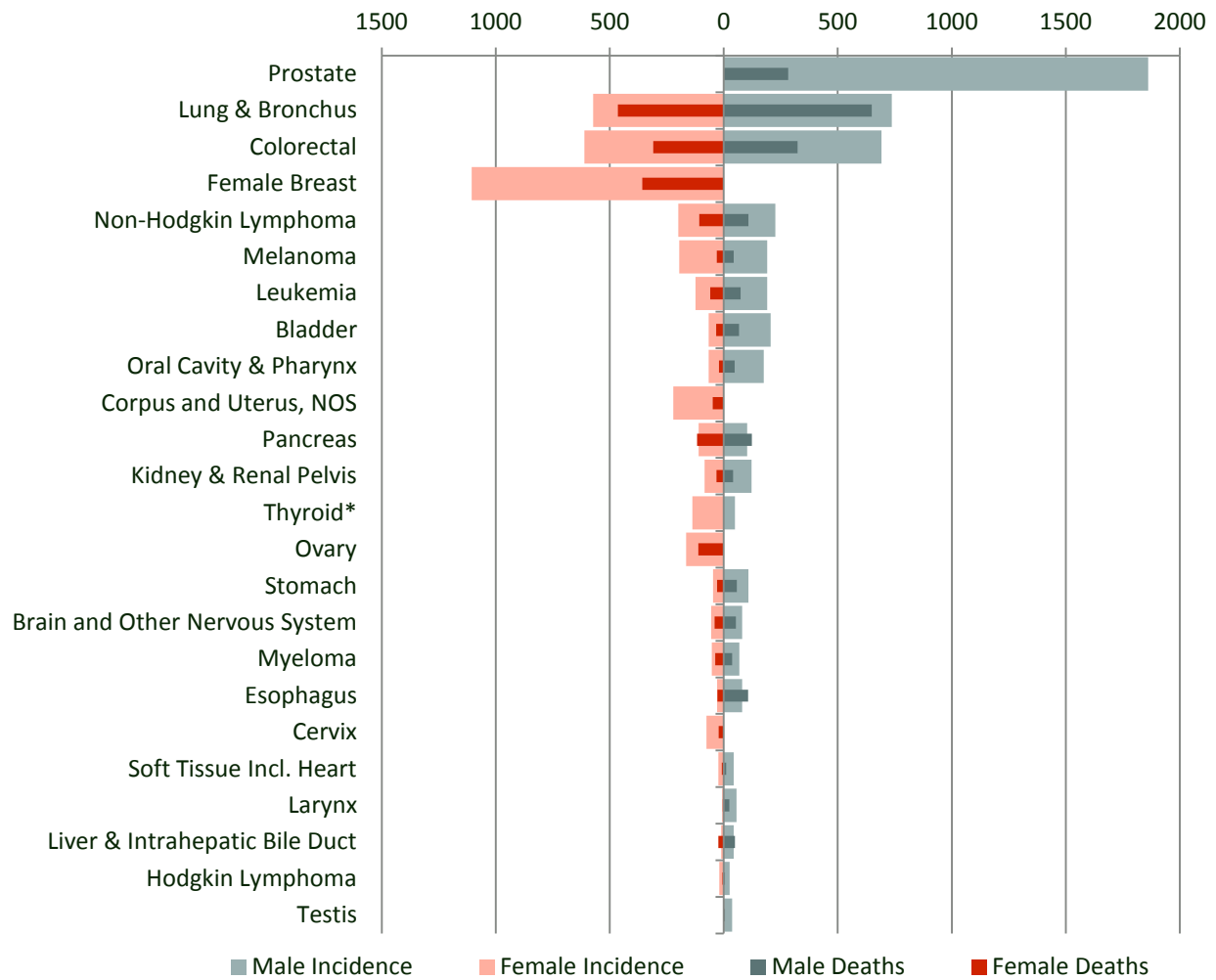
Site	Overall	Males	Females	Deaths	# M	% M
Lung and Bronchus	43.6 (41.1–46.3)	54.8 (50.7–59.3)	34.5 (31.4–37.9)	1113	649	58
Colorectal	23.7 (21.9–25.7)	28.0 (25.0–31.3)	19.9 (17.6–22.4)	632	323	51
Female Breast*			26.6 (23.8–29.7)	358	0	0
Prostate		24.6 (21.8–27.7)		283	283	100
Pancreas	9.1 (8.0–10.4)	10.4 (8.7–12.5)	7.9 (6.5–9.5)	240	123	51
Non-Hodgkin Lymphoma	8.5 (7.4–9.8)	9.6 (7.8–11.7)	7.7 (6.3–9.5)	216	108	50
Esophagus	5.2 (4.3–6.2)	9.1 (7.4–11.0)	1.9 (1.2–2.8)	135	107	79
Leukemia	5.4 (4.5–6.5)	6.6 (5.1–8.3)	4.5 (3.3–6.0)	133	74	56
Ovary			8.0 (6.5–9.7)	112	0	0
Bladder	3.8 (3.1–4.7)	5.8 (4.5–7.5)	2.0 (1.4–3.0)	101	67	66
Brain and Other Nervous System	4.1 (3.3–5.1)	4.6 (3.4–6.1)	3.8 (2.7–5.2)	94	53	56
Stomach	3.5 (2.8–4.4)	5.0 (3.8–6.6)	2.2 (1.4–3.3)	86	57	66
Melanoma of the Skin	3.2 (2.5–4.1)	4.0 (2.9–5.5)	2.7 (1.7–3.9)	75	44	59
Myeloma	2.7 (2.1–3.5)	3.1 (2.2–4.3)	2.5 (1.7–3.6)	73	36	49
Liver & Intrahepatic Bile Duct	2.8 (2.2–3.6)	4.1 (3.1–5.5)	1.6 (1.0–2.5)	73	49	67
Kidney & Renal Pelvis	2.9 (2.2–3.7)	3.4 (2.4–4.8)	2.4 (1.6–3.6)	72	40	56
Oral Cavity & Pharynx	2.7 (2.1–3.5)	4.1 (3.0–5.4)	1.6 (1.0–2.6)	69	48	70
Corpus and Uterus, NOS			3.4 (2.5–4.6)	48	0	0
Larynx	1.1 (0.8–1.7)	2.1 (1.3–3.1)	Suppressed	29	>23	>79
Cervix			2.1 (1.2–3.3)	22	0	0
Soft Tissue including Heart	0.8 (0.5–1.3)	0.9 (0.4–1.7)	0.8 (0.3–1.6)	19	10	53
Hodgkin Lymphoma	0.5 (0.2–0.9)	Suppressed	0.5–(0.2–1.1)	11	<6	<55
Thyroid	0.3 (0.1–0.6)	Suppressed	Suppressed	6	<6	
Testis		Suppressed		<6	<6	100

\* Between 2000 and 2009 there were 13 cases of male breast cancer and <6 deaths from male breast cancer, which were not included in either rate or in the new cancer cases or deaths count.

The previous tables, Table 3 and Table 4, present the age-standardized incidence and mortality rates of the most common cancers in Grey Bruce for the decade from 2000–2009 by primary cancer site. It also presents the count and proportion of the count of the new cases and deaths that are of males.

Figure 3, below, presents new cases and death counts of the most common cancers in Grey Bruce for the decade from 2000–2009 by primary cancer site, and presents these counts by sex for comparison.

Figure 3. New Cases and Death Counts in Grey Bruce for 2000–2009, by Sex



\* There were 6 deaths to thyroid cancer, but because fewer than six occurred for each sex, the respective counts by sex must be suppressed.

### Specific Cancers

Grey Bruce Health Unit has selected several specific cancers to report in-depth. These were the top twelve cancers by incidence rate, and the list of these specific cancer documents is presented below, with direct hyperlinks.

- [Prostate Cancer](#)
- [Lung Cancer](#)
- [Colorectal Cancer](#)
- [Female Breast Cancer](#)
- [Non-Hodgkin Lymphoma](#)
- [Melanoma](#)
- [Leukemia](#)
- [Bladder Cancer](#)
- [Oral Cavity & Pharynx Cancer](#)
- [Uterine Cancer](#)
- [Pancreatic Cancer](#)
- [Kidney & Renal Pelvis Cancer](#)

## For More Information about Cancer in Ontario and Canada

Cancer Care Ontario website:

[www.cancercare.on.ca](http://www.cancercare.on.ca)

Canadian Cancer Society website:

[www.cancer.ca](http://www.cancer.ca)

## References

Cancer Research UK. (2014). *What is primary and secondary cancer?* *Cancer Research UK*. Retrieved July 23, 2014, from <http://www.cancerresearchuk.org/cancer-help/about-cancer/cancer-questions/what-is-primary-and-secondary-cancer>

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