

# Cardiovascular Disease in Grey Bruce: 2000 – 2010

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## Key Findings

- The age-standardized cardiovascular disease hospitalization rate in Grey Bruce ( $872.3 \pm 35.9$  per 100,000 population) has declined by 26% since 2003, and is currently 14% higher than the Ontario rate.
  - Each week in Grey Bruce, 47 people are hospitalized with cardiovascular disease.
  - Cardiovascular disease hospitalizations are more likely among males, older persons, and Bruce County residents.
- The age-standardized cardiovascular disease mortality rate in Grey Bruce ( $188.4 \pm 15.6$  per 100,000 population) has declined by 19% since 2000, and is currently 25% higher than the Ontario rate.
  - Each week in Grey Bruce, 11 people die of cardiovascular disease.
  - Cardiovascular disease deaths are more likely among males and older persons.
- The age-standardized ischaemic heart disease hospitalization rate in Grey Bruce ( $347.9 \pm 22.4$  per 100,000 population) has declined by 39% since 2003, and is currently 17% higher than the Ontario rate.
  - Each week in Grey Bruce, 19 people are hospitalized with ischaemic heart disease.
  - Ischaemic heart disease hospitalizations are more likely among males, older persons, and Bruce County residents.
- The age-standardized ischaemic heart disease mortality rate in Grey Bruce ( $108.4 \pm 12.0$  per 100,000 population) has declined by 19% since 2000, and is currently 31% higher than the Ontario rate.
  - Each week in Grey Bruce, 6 people die of ischaemic heart disease.
  - Ischaemic heart disease deaths are more likely among males and older persons.
- The age-standardized cerebrovascular disease hospitalization rate in Grey Bruce ( $112.7 \pm 12.4$  per 100,000 population) has declined by 20% since 2000.
  - Each week in Grey Bruce, 6 people are hospitalized with cerebrovascular disease.
  - Cerebrovascular disease hospitalizations are more likely among males and older persons.
- The age-standardized cerebrovascular disease mortality rate in Grey Bruce ( $38.2 \pm 7.1$  per 100,000 population) is currently 27% higher than the Ontario rate.
  - Each week in Grey Bruce, 2 people die of cerebrovascular disease.
  - Cerebrovascular disease deaths are more likely among older persons.
- The age-standardized stroke hospitalization rate in Grey Bruce ( $93.5 \pm 11.3$  per 100,000 population) has declined by 25% since 2003.
  - Each week in Grey Bruce, 5 people are hospitalized for stroke.
  - Stroke hospitalizations are more likely among males and older persons, although locally rates do not differ significantly between the sexes.
- The age-standardized stroke mortality rate in Grey Bruce ( $29.4 \pm 6.2$  per 100,000 population) does not differ significantly from the Ontario rate.
  - Each week in Grey Bruce, 1 or 2 people die of stroke.
  - Stroke deaths are more likely among older persons.

## About the Report

In the tables and figures that follow, cardiovascular disease death and hospitalization data are presented in terms of raw counts and age-standardized rates for Grey Bruce Health Unit and for Ontario in general, as well as for sex and county of residence.

Age-standardized rates do not represent the actual number of deaths expected in our population—they are the numbers expected if our population had a similar age distribution to a reference population (Canadian population in 1991). This renders rates comparable between counties, to another region, or over time.

Other rates that are presented in the document include crude (unadjusted) rates by age group (or age-specific rates). These are reflective of what is actually occurring in the population because they are not adjusted to a reference population.

Figures are displayed only if and when differences between or among groups are statistically significant.

Differences in rates are discussed in the text only if they are statistically significant (if they are mentioned and noted to be not statistically significant, as with the local age-standardized stroke hospitalization rate between males and females, it is because the rates are similar to the Ontario rates, which *are* statistically significantly different).

### Legend

*These symbols will appear in figures, tables and in the body text of the report.*

- † Estimate should be used with caution, as there is a high degree of variance in the measure.
- Supp. Estimate has been suppressed because of unreliability or low counts.
- (S) Count has been suppressed to prevent identification of cells with counts of less than 5.

## Cardiovascular Disease Classification

The Association of Public Health Epidemiologists of Ontario (APHEO) lists 4 specific cardiovascular disease death code and hospitalization groupings within the Chronic Disease Mortality/Hospitalizations indicator groups that are distinguishable using diagnosis codes from the International Classification of Diseases (ICD) version 10 (known as ICD-10)

The 4 specific code groupings are:

- Cardiovascular Disease (I00–I99)
  - o Ischaemic Heart Disease (I20–I25)
  - o Cerebrovascular Disease (I60–I69), and
    - Stroke (I60, I61, I63 and I64).

## Requirements of the Ontario Public Health Standards

In accordance with the Ontario Public Health Standards (2008) and associated Protocol documents, boards of health are required to assess trends and changes in local population health and to collect or access mortality and morbidity data relating to the goals of reducing the burden of preventable chronic diseases of public health importance (which include cardiovascular diseases, cancer, respiratory diseases and type 2 diabetes) (Ontario Ministry of Health and Long-term Care 2008).

## About the Data

All data for this report were extracted from IntelliHEALTH Ontario, the medical services and demography database query system provided and managed by the Ontario Ministry of Health and Long-term Care.

## Population Estimates

Population estimates were used as denominators to determine the population rates of hospitalizations and deaths. These estimates are prepared by Statistics Canada based on post/intercensal estimates depending on the time period, and shared with the Ministry of Health and Long-term Care for distribution via IntelliHEALTH Ontario. The data citation for these population estimates is:

**Population Estimates 1986–2011, Ontario Ministry of Health and Long-term Care, IntelliHEALTH Ontario, Date Extracted: December 15, 2011.**

## Hospitalizations

Hospital visits data were extracted from the Inpatient Discharges tables, which contain records from the Discharge Abstract Database (DAD), originally developed in 1974 by the Hospital Medical Records Institute, which later became the Canadian Institute for Health Information (CIHI). Technically, hospitalizations are not counted—rather, “discharges”—or hospital separations—are counted in this data source. The data citation for these hospitalizations data is:

**Inpatient Discharges 1996–2010, Ontario Ministry of Health and Long-term Care, IntelliHEALTH Ontario, Date Extracted: December 13, 2011.**

## Deaths

Deaths data were extracted from the Deaths tables, which contain mortality data collected by the Ontario Registrar General. These tables contain only data for deaths that occurred in Ontario regardless of the residence of the deceased. While the Ontario Registrar General does collect data on deaths that occurred outside the province, they will not provide this information to the province.

In order for a death record to be created, two documents must be submitted to the Ontario Registrar General: one from the medical certifier (physician) and one from next-of-kin or a legal certifier. The data citation for the deaths data is:

**Ontario Mortality Data 1986–2007, Ontario Ministry of Health and Long-term Care, IntelliHEALTH Ontario, Date Extracted: October 12, 2010.**

## Query Criteria

Data for deaths and hospitalizations were retrieved for residents based on geography: residents of Grey Bruce, residents of Ontario, residents of the SW LHIN region, and residents of Grey and Bruce counties.

For deaths, each case counts as one *death*. Therefore, a mortality rate of 2 per 100,000 population means that 2 in 100,000 people died. For hospitalizations, each case is a *hospital stay*. As previously noted, hospitalizations are technically defined as *hospital discharges*—i.e., counts of the *ends* of hospitalization periods. Thus, a hospitalization rate of 2 per 100,000 population means that there were 2 cases discharged per 100,000 people. Hospitalizations have the potential to double count (or more) individuals, as they are counts of hospitalizations experienced by patients, not counts of the patients who were hospitalized or provided care at an emergency department. Multiple hospitalizations or readmissions of single individuals can drive up hospitalization counts.

You cannot add hospitalizations and deaths to get the total number of ‘incidents’ of a certain type. You also cannot take the number of hospitalizations for a certain condition to represent the number of separate conditions that led to hospitalization. Unlike in the case of death, a person can have multiple hospital stays for the same condition. In addition to possible hospital readmission for the same condition, it’s possible that a person was admitted to hospital and later died of the same condition.



## Background

Cancer and cardiovascular disease are nearly tied as the two leading causes of death in Ontario, each accounting for about 38% of all deaths in 2007 (Cancer Care Ontario and Public Health Ontario 2012). In Canada, Ontario and Grey Bruce, however, cardiovascular disease mortality rates have declined by a statistically significant amount during the last decade (Statistics Canada 2011) and cardiovascular disease morbidity rates have been on the decline since the middle of the last century when they were more than three times as high as the current rates (Heart & Stroke Foundation 2012).

The prevention of cardiovascular disease falls under the umbrella of chronic disease prevention in public health programming. As specified in the Ontario Public Health Standards, the stated goal of the Chronic Disease Prevention Standard is: “To reduce the burden of preventable chronic diseases of public health importance,” and a footnote to the goal adds: “Chronic diseases of public health importance include cardiovascular diseases, cancer, respiratory diseases, and type 2 diabetes. Risk factors for chronic diseases include, but are not limited to, poor diet, obesity, tobacco use, physical inactivity, alcohol misuse, and exposure to ultraviolet radiation” (Ontario Ministry of Health and Long-term Care 2008). Local and current information about cardiovascular disease trends as a whole and within subpopulations is necessary to help inform Public Health’s cardiovascular disease prevention activities in our region.

Public health interventions that have been found to be effective in reducing cardiovascular disease include smoking cessation and physical activity, as well as nutrition (Mead et al. 2006; Pennant et al. 2010; Boone-Heinonen et al. 2009; Angermayr and Melchart 2010).

## Cardiovascular Disease

### ICD-10 Cause Codes

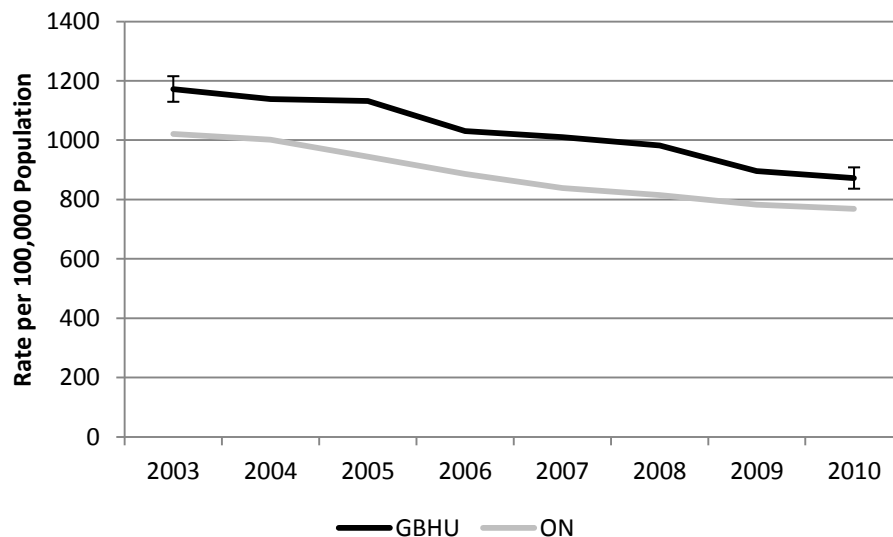
- I00–I99 Diseases of the circulatory system, includes blocks:
  - Acute rheumatic fever
  - Chronic rheumatic heart diseases
  - Hypertensive diseases
  - Ischaemic heart diseases
  - Pulmonary heart disease and diseases of pulmonary circulation
  - Other forms of heart disease
  - Cerebrovascular diseases
  - Diseases of arteries, arterioles and capillaries
  - Diseases of veins, lymphatic vessels and lymph nodes, not elsewhere classified
  - Other and unspecified disorders of the circulatory system

### Cardiovascular Disease Hospitalizations

#### Trend Over Time

Overall, age-standardized rates of cardiovascular disease hospitalization in Grey Bruce and in Ontario have been falling steadily since 2003—by 26%—while provincial rates have fallen by 25%.

**Figure 1. Time trend in rates of cardiovascular disease hospitalization, Grey Bruce and Ontario**



## Snapshot in Time

**Table 1. Rates and raw counts of cardiovascular disease hospitalization, Grey Bruce and Ontario**

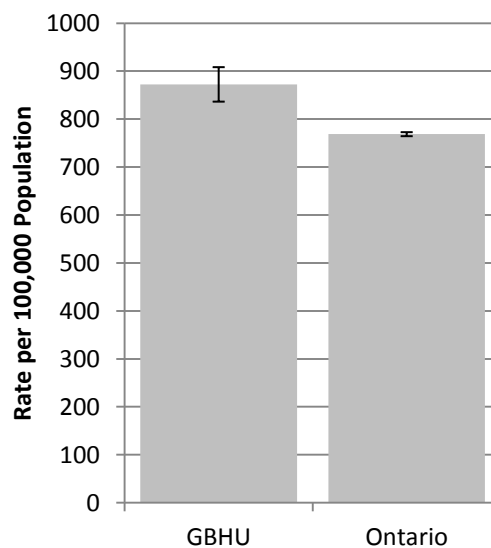
	<b>GBHU 2003</b>	<b>GBHU 2010</b>	<b>Ontario 2010</b>	<b>Grey 2010</b>	<b>Bruce 2010</b>
<b>Overall ASR</b>	1172.4 ± 43.1	872.3 ± 35.9	768.6 ± 4.2	814.2 ± 45.0	956.3 ± 59.2
<b>count</b>	(2851)	(2421)	(131,940)	(1347)	(1074)
<b>Male ASR</b>	1501.4 ± 71.2	1096.3 ± 58.3	999.3 ± 7.0	990.9 ± 72.2	1250.9 ± 97.8
<b>count</b>	(1651)	(1404)	(76,799)	(750)	(654)
<b>Female ASR</b>	872.2 ± 51.2	664.5 ± 43.3	567.0 ± 4.9	654.8 ± 56.0	679.3 ± 68.3
<b>count</b>	(1200)	(1017)	(55,141)	(597)	(420)
<b>0–14</b>	Supp.	44.5* ± 26.3	34.5 ± 2.4	Supp.	Supp.
<b>count</b>	(8)	(11)	(760)	(5)	(5)
<b>15–24</b>	129.6* ± 48.0	Supp.	52.6 ± 3.3	Supp.	Supp.
<b>count</b>	(28)	(7)	(950)	(5)	(5)
<b>25–44</b>	661.4 ± 81.6	186.9 ± 46.5	165.2 ± 4.2	164.8 ± 56.2	220.4 ± 80.1
<b>count</b>	(251)	(62)	(6069)	(33)	(29)
<b>45–64</b>	2430.0 ± 141.2	1114.4 ± 90.0	1050.2 ± 10.4	1034.2 ± 113.8	1225.7 ± 145.8
<b>count</b>	(1110)	(582)	(38,737)	(314)	(268)
<b>65+</b>	5138.0 ± 257.2	5480.4 ± 249.0	4658.1 ± 30.5	5204.0 ± 315.5	5883.7 ± 403.7
<b>count</b>	(1454)	(1759)	(85,424)	(991)	(768)

\* Use with caution.

ASR: age-standardized rate

In spite of the encouragingly steady decline in rates of cardiovascular disease hospitalization both locally and provincially, Grey Bruce still has a 14% higher age-standardized rate of cardiovascular disease hospitalization than Ontario. Each week on average in Grey Bruce, 47 people are hospitalized with cardiovascular disease.

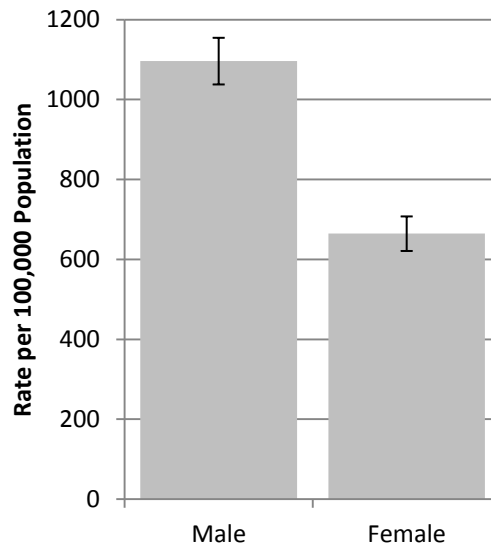
**Figure 2. Rates of cardiovascular disease hospitalization, Grey Bruce and Ontario, 2010**



### **By Sex**

As demonstrated by their age-standardized cardiovascular disease hospitalization rates, males in Grey Bruce have a 65% higher age-standardized rate of cardiovascular disease hospitalization than females. In Ontario, males have a 76% higher age-standardized rate of cardiovascular disease hospitalization than females. The lower local male:female hospitalization rate ratio can be attributed to the 17% higher rate of females hospitalized with cardiovascular disease in Grey Bruce compared to Ontario.

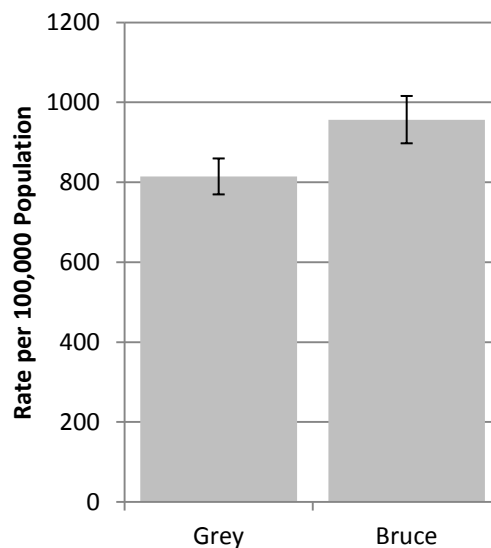
**Figure 3. Rates of cardiovascular disease hospitalization in Grey Bruce, by sex, 2010**



### **By County**

Bruce County residents have a 17% higher age-standardized rate of cardiovascular disease hospitalization than Grey County residents.

**Figure 4. Rates of cardiovascular disease hospitalization in Grey Bruce, by county, 2010**

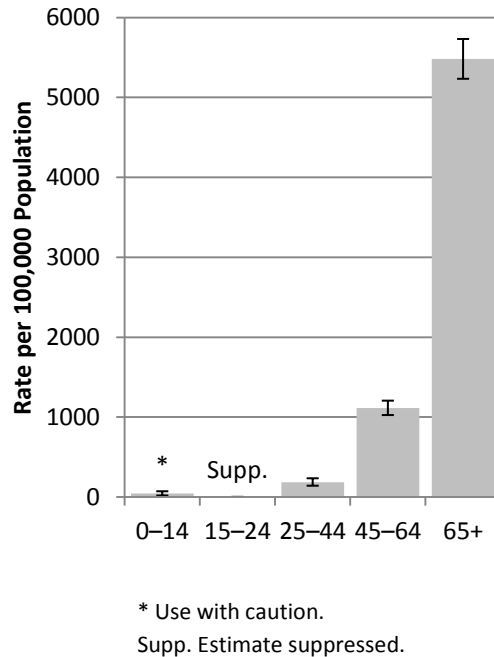


### By Age

Older adults aged 45–64 and seniors aged 65+ are substantially more likely than younger age groups to experience hospitalization for a cardiovascular disease, across all geographies. Seniors aged 65+ in Grey Bruce have a 17% higher age-specific cardiovascular disease hospitalization rate than seniors in Ontario.

Since 2003, the local age-specific rate of cardiovascular disease hospitalizations for older adults aged 45–64 has declined by 54%. By contrast, it has risen by 7% for seniors aged 65+.

**Figure 5. Rates of cardiovascular disease hospitalization in Grey Bruce, by age group, 2010**

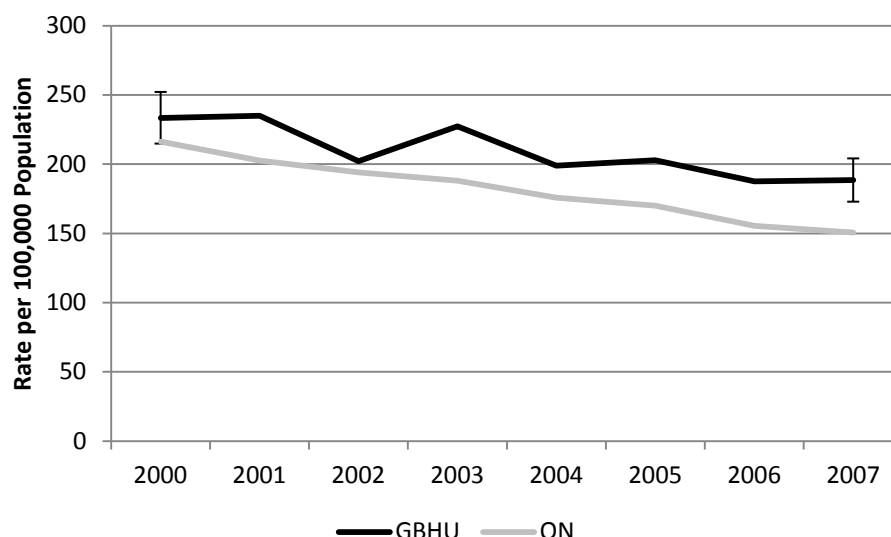


## Cardiovascular Disease Mortality

### Trend Over Time

Since 2000, age-standardized cardiovascular disease mortality rates have fallen by 19% in Grey Bruce and by 30% in Ontario. Each week in Grey Bruce, 11 people die of cardiovascular disease.

Figure 6. Time trend in rates of cardiovascular disease mortality, Grey Bruce and Ontario



### Snapshot in Time

Table 2. Rates and raw counts of cardiovascular disease mortality, Grey Bruce and Ontario

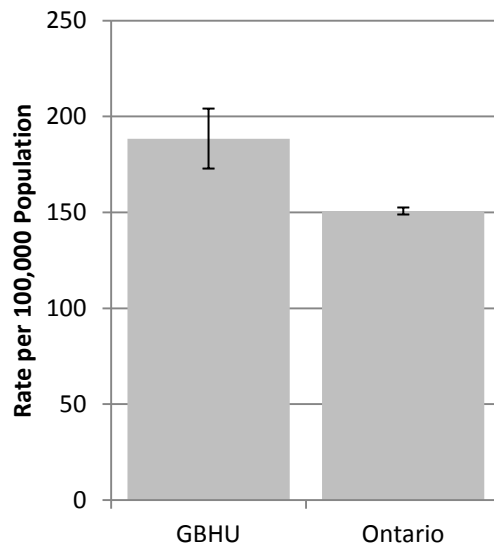
	GBHU 2000	GBHU 2007	Ontario 2007	Grey 2007	Bruce 2007
<b>Overall ASR</b>	233.4 ± 18.7	188.4 ± 15.6	150.7 ± 1.8	180.1 ± 19.8	201.1 ± 25.4
<b>count</b>	(592)	(557)	(26,102)	(319)	(238)
<b>Male ASR</b>	296.2 ± 33.4	217.5 ± 25.9	190.7 ± 3.3	200.6 ± 32.5	241.9 ± 42.5
<b>count</b>	(294)	(264)	(12,975)	(143)	(121)
<b>Female ASR</b>	183.1 ± 21.2	166.6 ± 19.6	119.0 ± 2.1	167.7 ± 25.5	166.4 ± 30.8
<b>count</b>	(298)	(293)	(13,127)	(176)	(117)
<b>0–14</b>	Supp.	0	0.6* ± 0.3	0	0
<b>count</b>	(S)		(14)		
<b>15–24</b>	Supp.	0	1.5 ± 0.1	0	0
<b>count</b>	(S)		(26)		
<b>25–44</b>	Supp.	Supp.	10.7 ± 1.1	Supp.	Supp.
<b>count</b>	(S)	(S)	(396)	(S)	(S)
<b>45–64</b>	98.4 ± 30.1	114.9 ± 29.6	93.9 ± 3.3	113.5* ± 38.7	116.9* ± 45.8
<b>count</b>	(41)	(S)	(3178)	(S)	(S)
<b>65+</b>	2021.4 ± 167.8	1650.3 ± 144.0	1327.7 ± 17.2	1589.8 ± 183.4	1739.0 ± 232.0
<b>count</b>	(546)	(496)	(22,488)	(284)	(212)

\* Use with caution.

ASR: age-standardized rate

Grey Bruce has a 25% higher age-standardized rate of cardiovascular disease mortality than Ontario. Each week on average in Grey Bruce, about 11 people die of cardiovascular disease.

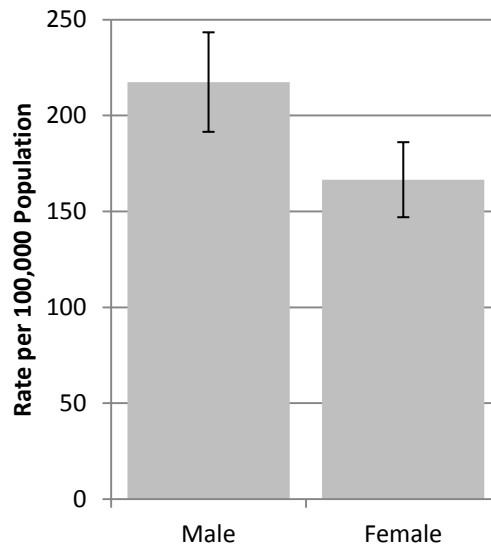
**Figure 7. Rates of cardiovascular disease mortality, Grey Bruce and Ontario, 2007**



### **By Sex**

Males in Grey Bruce have a 31% higher age-standardized rate of cardiovascular disease mortality than females, while at the provincial level they have a 60% higher age-standardized rate of cardiovascular disease than females. As with hospitalizations, our lower local rate ratio arises because of the 40% higher age-standardized rate of female cardiovascular disease mortality in Grey Bruce compared to Ontario.

**Figure 8. Rates of cardiovascular disease mortality in Grey Bruce, by sex, 2007**





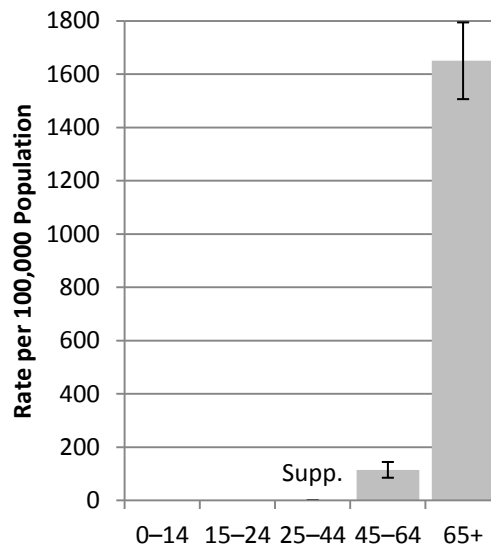
***By County***

There is no significant difference in age-standardized cardiovascular disease mortality rate between Grey and Bruce Counties.

***By Age***

Older adults aged 45–64 and seniors aged 65+ in particular are substantially more likely than younger age groups to die of cardiovascular disease, across all geographies. Also, seniors aged 65+ in Grey Bruce have a 24% higher age-specific cardiovascular disease mortality rate than seniors in Ontario.

**Figure 9. Rates of cardiovascular disease mortality in Grey Bruce, by age group, 2007**



Supp. Estimate suppressed.

## Ischaemic Heart Disease

### ICD-10 Cause Codes

- I20–I25 Ischaemic heart diseases, includes:
  - Angina pectoris
  - Acute myocardial infarction
  - Subsequent myocardial infarction
  - Certain current complications following acute myocardial infarction
  - Other acute ischaemic heart diseases
  - Chronic ischaemic heart disease

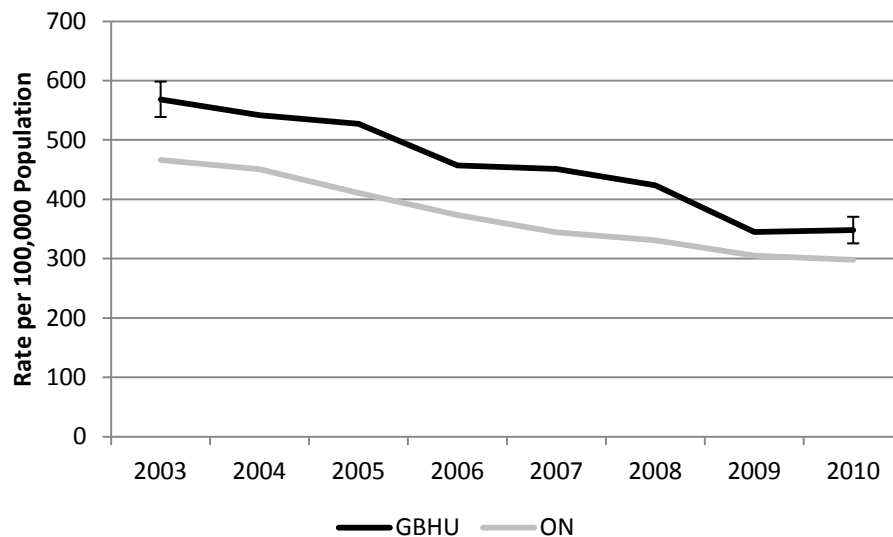
### Summary

### Ischaemic Heart Disease Hospitalizations

#### Trend Over Time

Since 2003, age-standardized ischaemic heart disease hospitalization rates have fallen by 39% in Grey Bruce and by 36% in Ontario.

**Figure 10. Time trend in rates of ischaemic heart disease hospitalization, Grey Bruce and Ontario**



## Snapshot in Time

Table 3. Rates and raw counts of ischaemic heart disease hospitalization, Grey Bruce and Ontario

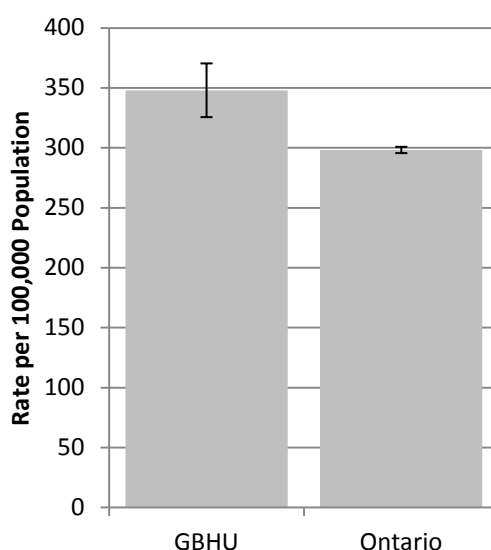
	GBHU 2003	GBHU 2010	Ontario 2010	Grey 2010	Bruce 2010
<b>Overall ASR</b>	568.3 ± 29.8	347.9 ± 22.4	298.1 ± 2.6	316.7 ± 27.9	391.5 ± 36.9
<b>count</b>	(1393)	(971)	(51,190)	(521)	(450)
<b>Male ASR</b>	805.6 ± 51.9	484.5 ± 38.6	435.5 ± 4.6	437.1 ± 48.2	552.0 ± 63.9
<b>count</b>	(908)	(631)	(34,310)	(333)	(298)
<b>Female ASR</b>	347.3 ± 31.5	217.1 ± 23.4	175.6 ± 2.7	204.3 ± 29.6	235.6 ± 37.9
<b>count</b>	(485)	(340)	(16,880)	(188)	(152)
<b>0–14 count</b>	0	0	0.5* ± 0.3 (12)	0	0
<b>15–24 count</b>	0	Supp. (S)	1.0* ± 0.5 (18)	0	Supp. (S)
<b>25–44 count</b>	81.7* ± 28.7 (31)	54.3* ± 25.1 (S)	53.0 ± 2.4 (1949)	54.9* ± 32.5 (11)	Supp. (S)
<b>45–64 count</b>	1018.0 ± 92.1 (465)	585.9 ± 65.5 (306)	544.5 ± 7.5 (20,084)	520.4 ± 80.9 (158)	676.9 ± 108.7 (148)
<b>65+ count</b>	3169.7 ± 204.1 (897)	2012.7 ± 153.6 (646)	1588.3 ± 18.1 (29,127)	1848.5 ± 191.3 (352)	2252.4 ± 254.5 (294)

\* Use with caution.

ASR: age-standardized rate

Grey Bruce has a 17% higher age-standardized rate of ischaemic heart disease hospitalization than Ontario. Every week on average in Grey Bruce, 19 people are hospitalized with ischaemic heart disease.

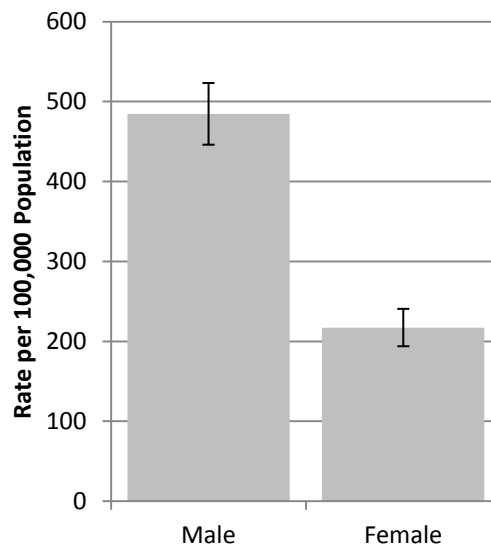
Figure 11. Rates of ischaemic heart disease hospitalization, Grey Bruce and Ontario, 2010



### **By Sex**

Males in Grey Bruce have a 23% higher age-standardized rate of ischaemic heart disease hospitalization than females, while at the provincial level it is 48% higher. As with hospitalizations, our lower local rate ratio arises because of our 24% higher age-standardized rate of female hospitalizations as compared to Ontario.

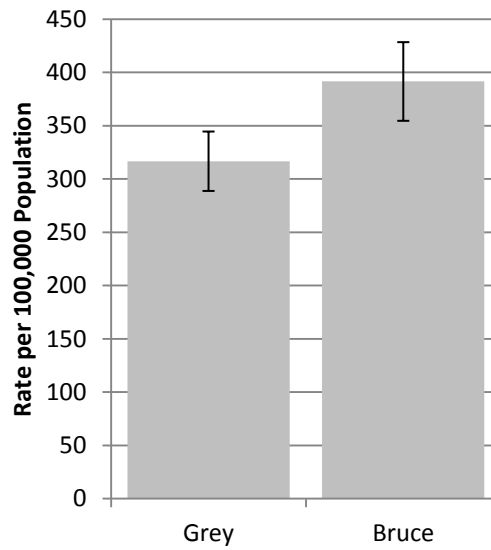
**Figure 12. Rates of ischaemic heart disease hospitalization, Grey Bruce and Ontario, 2010**



***By County***

Bruce County residents have a 24% higher age-standardized rate of ischaemic heart disease hospitalization than Grey County residents.

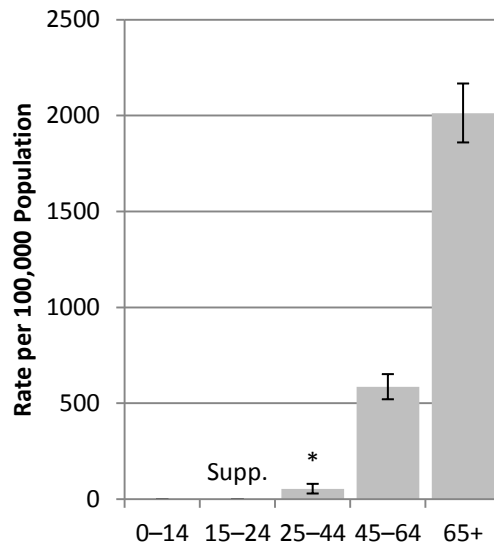
**Figure 13. Rates of ischaemic heart disease hospitalization in Grey Bruce, by county, 2010**



### By Age

Older adults aged 45–64 and seniors aged 65+ in particular are substantially more likely than younger age groups to be hospitalized with ischaemic heart disease, across all geographies. Also, seniors aged 65+ in Grey Bruce have a 27% higher age-specific ischaemic heart disease hospitalization rate than seniors in Ontario.

**Figure 14. Rates of ischaemic heart disease hospitalization in Grey Bruce, by age group, 2010**



\* Use with caution.

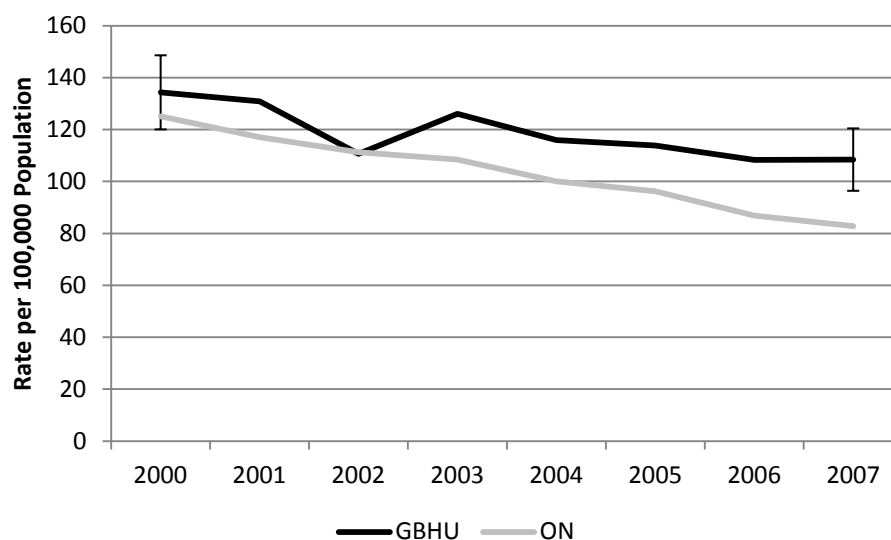
Supp. Estimate suppressed.

## Ischaemic Heart Disease Mortality

### Trend Over Time

Since 2000, age-standardized ischaemic heart disease mortality rates have fallen by 19% in Grey Bruce and by 34% in Ontario.

Figure 15. Time trend in rates of ischaemic heart disease mortality, Grey Bruce and Ontario



### Snapshot in Time

Table 4. Rates and raw counts of ischaemic heart disease mortality, Grey Bruce and Ontario

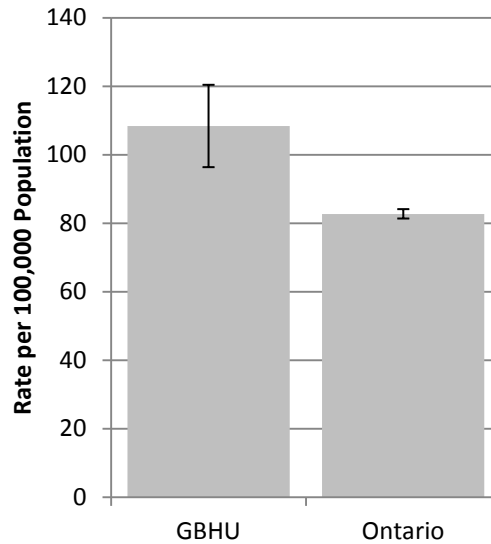
	GBHU 2000	GBHU 2007	Ontario 2007	Grey 2007	Bruce 2007
<b>Overall ASR</b>	134.3 ± 14.3	108.4 ± 12.0	82.7 ± 1.4	106.4 ± 15.5	111.3 ± 19.1
<b>count</b>	(338)	(318)	(14,179)	(187)	(131)
<b>Male ASR</b>	183.3 ± 26.3	132.2 ± 20.5	113.1 ± 2.5	119.4 ± 25.5	151.2 ± 33.8
<b>count</b>	(184)	(161)	(7758)	(85)	(76)
<b>Female ASR</b>	96.9 ± 15.6	89.3 ± 14.4	58.6 ± 1.5	96.7 ± 19.5	78.7 ± 21.3
<b>count</b>	(154)	(157)	(6421)	(102)	(55)
<b>0–14</b>	0	0	0	0	0
<b>count</b>					
<b>15–24</b>	0	0	Supp. (S)	0	0
<b>count</b>					
<b>25–44</b>	Supp. (S)	Supp. (S)	5.1 ± 0.7 (S)	Supp. (S)	Supp. (S)
<b>count</b>					
<b>45–64</b>	67.2* ± 24.9	73.3* ± 23.6	60.1 ± 2.6	82.6* ± 33.0	60.8* ± 33.0
<b>count</b>	(S)	(S)	(2036)	(S)	(S)
<b>65+</b>	1136.6 ± 126.4	928.3 ± 108.4	705.6 ± 12.6	901.3 ± 138.6	967.9 ± 173.8
<b>count</b>	(307)	(279)	(11,951)	(161)	(118)

\* Use with caution.

ASR: age-standardized rate

Grey Bruce has a 31% higher age-standardized rate of ischaemic heart disease mortality than Ontario. Each week on average in Grey Bruce, 6 people die of ischaemic heart disease.

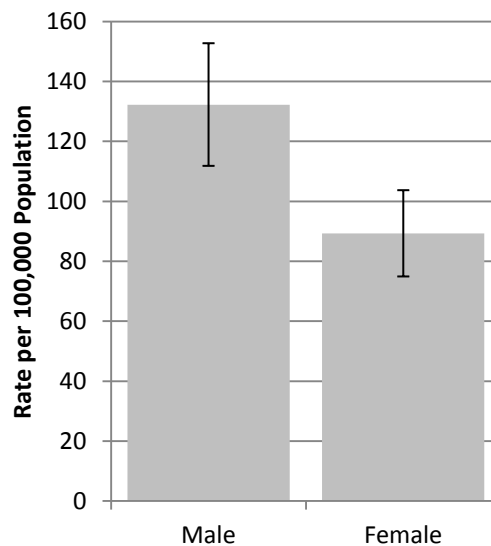
**Figure 16. Rates of ischaemic heart disease mortality, Grey Bruce and Ontario, 2007**



### **By Sex**

Males in Grey Bruce have a 48% higher age-standardized rate of ischaemic heart disease mortality than females, while at the provincial level they have a 93% higher age-standardized rate of ischaemic heart disease than females. As with hospitalizations, our lower local rate ratio arises because of our 52% higher rate of female hospitalizations as compared to Ontario.

**Figure 17. Rates of ischaemic heart disease mortality in Grey Bruce, by sex, 2007**





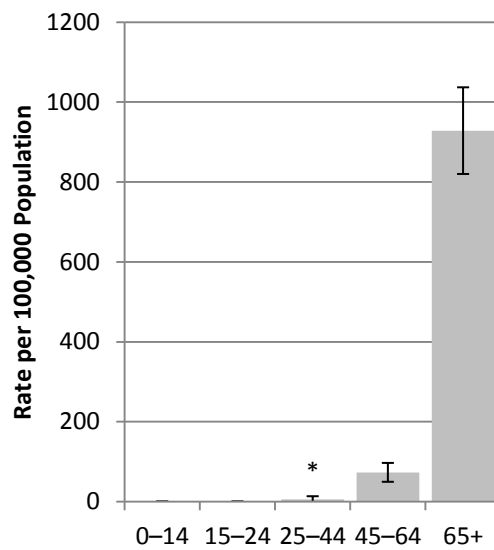
### **By County**

There is no significant difference in age-standardized ischaemic heart disease mortality rate between Grey and Bruce Counties.

### **By Age**

As with previous mortality categories, older adults aged 45–64 and seniors aged 65+ in particular are substantially more likely than younger age groups to die of ischaemic heart disease, across all geographies. Seniors aged 65+ in Grey Bruce have a 32% higher age-specific ischaemic heart disease mortality rate as compared to seniors in Ontario.

**Figure 18. Rates and raw counts of ischaemic heart disease mortality in Grey Bruce, by age group, 2007**



\* Use with caution.

## Cerebrovascular Disease

### ICD-10 Cause Codes

- I60–I69 Cerebrovascular diseases, includes:
  - Subarachnoid haemorrhage
  - Intracerebral haemorrhage
  - Other nontraumatic intracranial haemorrhage
  - Cerebral infarction
  - Stroke, not specified as haemorrhage or infarction
  - Occlusion and stenosis of precerebral arteries, not resulting in cerebral infarction
  - Occlusion and stenosis of cerebral arteries, not resulting in cerebral infarction
  - Other cerebrovascular diseases
  - Cerebrovascular disorders in diseases classified elsewhere
  - Sequelae of cerebrovascular disease

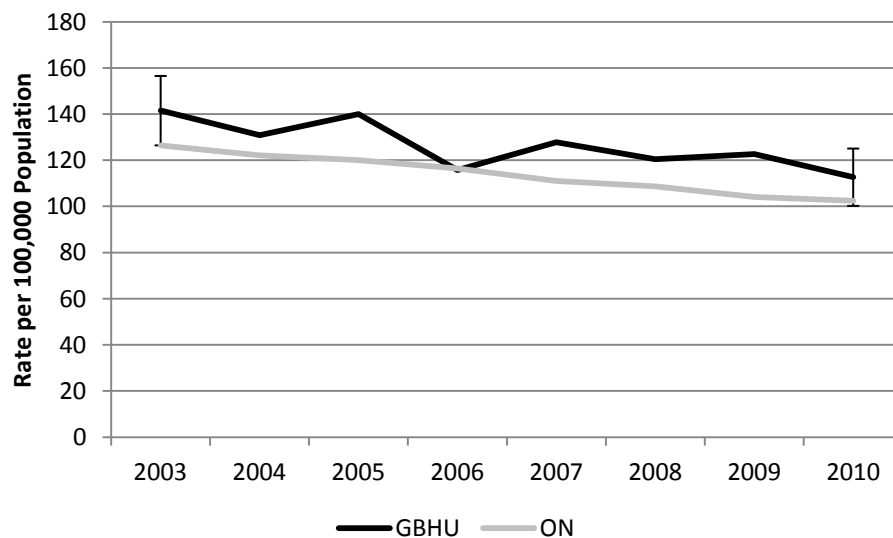
### Summary

### Cerebrovascular Disease Hospitalizations

#### Trend Over Time

Since 2003, age-standardized cerebrovascular disease hospitalization rates have fallen by 20% in Grey Bruce and by 19% in Ontario.

Figure 19. Time trend in rates of cerebrovascular disease hospitalization, Grey Bruce and Ontario



## Snapshot in Time

Table 5. Rates and raw counts of cerebrovascular disease hospitalization, Grey Bruce and Ontario

	<b>GBHU 2003</b>	<b>GBHU 2010</b>	<b>Ontario 2010</b>	<b>Grey 2010</b>	<b>Bruce 2010</b>
<b>Overall ASR</b>	141.5 ± 15.0	112.7 ± 12.4	102.5 ± 1.5	114.4 ± 16.1	110.8 ± 19.7
<b>count</b>	(354)	(330)	(17,862)	(200)	(130)
<b>Male ASR</b>	174.7 ± 25.0	124.8 ± 19.3	120.3 ± 2.5	128.8 ± 25.5	118.7 ± 29.5
<b>count</b>	(191)	(165)	(9199)	(101)	(64)
<b>Female ASR</b>	115.0 ± 18.7	100.0 ± 15.8	87.3 ± 1.9	100.3 ± 20.2	100.9 ± 25.9
<b>count</b>	(163)	(165)	(8663)	(99)	(66)
<b>0–14</b>	Supp.	0	3.3 ± 0.8	0	0
<b>count</b>	(S)		(73)		
<b>15–24</b>	Supp.	0	4.7 ± 1.0	0	0
<b>count</b>	(S)		(84)		
<b>25–44</b>	26.4* ± 16.3	Supp.	18.5 ± 1.4	Supp.	Supp.
<b>count</b>	(S)	(S)	(680)	(S)	(S)
<b>45–64</b>	146.7 ± 35.1	120.6* ± 29.8	118.2 ± 3.5	135.0 ± 41.3	100.6* ± 42.0
<b>count</b>	(67)	(S)	(4358)	(S)	(S)
<b>65+</b>	971.8 ± 114.3	822.5 ± 98.8	690.7 ± 12.0	829.7 ± 128.8	812.1 ± 154.0
<b>count</b>	(275)	(264)	(12,667)	(158)	(106)

\* Use with caution.

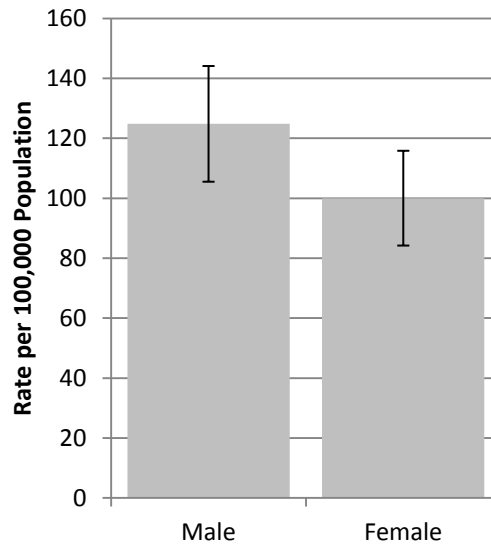
ASR: age-standardized rate

Grey Bruce does not have a significantly higher age-standardized rate of cerebrovascular disease hospitalization than Ontario. Each week on average in Grey Bruce, 6 people are hospitalized with cerebrovascular disease.

***By Sex***

Males in Grey Bruce do not have a significantly different age-standardized rate of cerebrovascular disease hospitalization than females. At the provincial level, however, they have a 37% higher rate than females.

**Figure 20. Rates of cerebrovascular disease hospitalization, Grey Bruce and Ontario, 2010**

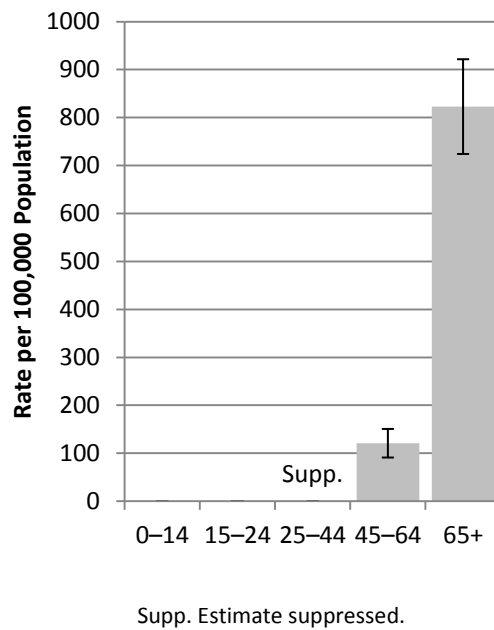
***By County***

Bruce and Grey County residents do not have age-standardized rates of cerebrovascular disease hospitalization that differ significantly.

### *By Age*

Older adults aged 45–64 and seniors aged 65+ in particular are substantially more likely than younger age groups to be hospitalized with a cerebrovascular disease, across all geographies. Locally, seniors aged 65+ have a 19% higher age-standardized rate of cerebrovascular disease hospitalization than Ontario seniors.

**Figure 21. Rates of cerebrovascular disease hospitalization in Grey Bruce, by age group, 2010**

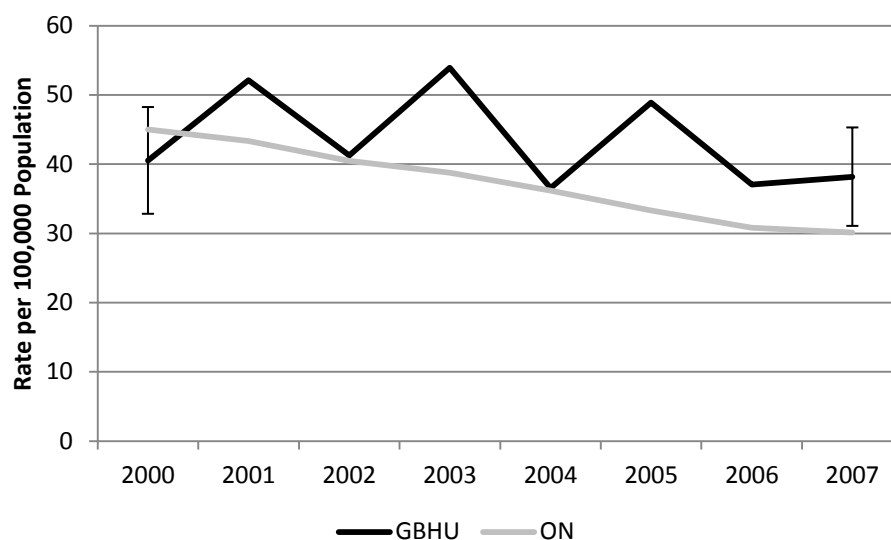


## Cerebrovascular Disease Mortality

### Trend Over Time

Since 2000, age-standardized cerebrovascular disease mortality rates have not changed significantly in Grey Bruce, while in Ontario they declined by 33%.

Figure 22. Time trend in rates of cerebrovascular disease mortality, Grey Bruce and Ontario



### Snapshot in Time

Table 6. Rates and raw counts of cerebrovascular disease mortality, Grey Bruce and Ontario

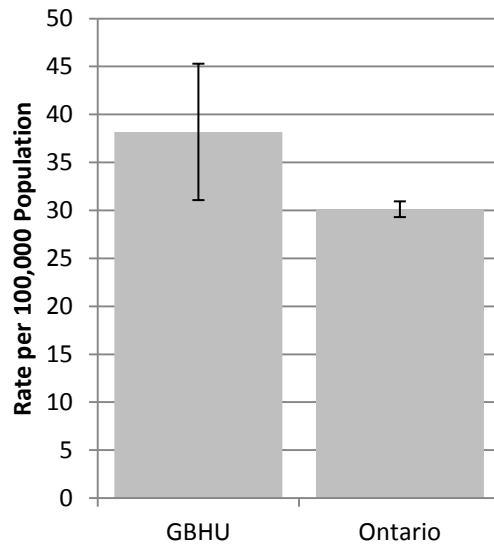
	GBHU 2000	GBHU 2007	Ontario 2007	Grey 2007	Bruce 2007
<b>Overall ASR</b>	40.5 ± 7.7	38.2 ± 7.1	30.1 ± 0.8	37.5 ± 9.1	39.3 ± 11.4
<b>count</b>	(106)	(113)	(5314)	(66)	(47)
<b>Male ASR</b>	46.9 ± 13.6	37.3 ± 10.9	32.5 ± 1.4	37.0* ± 14.2	37.5* ± 17.0
<b>count</b>	(46)	(45)	(2184)	(26)	(19)
<b>Female ASR</b>	35.0 ± 9.0	40.1 ± 9.9	28.1 ± 1.0	40.6 ± 13.0	39.9* ± 15.6
<b>count</b>	(60)	(68)	(3130)	(40)	(27)
<b>0–14</b>	0	0	Supp. (S)	0	0
<b>count</b>					
<b>15–24</b>	0	0	Supp. (S)	0	0
<b>count</b>					
<b>25–44</b>	Supp. (S)	Supp. (S)	1.7 ± 0.4 (64)	0	Supp. (S)
<b>count</b>					
<b>45–64</b>	Supp. (S)	23.7* ± 13.5 (S)	13.5 ± 1.2 (456)	Supp. (5)	Supp. (S)
<b>count</b>					
<b>65+</b>	377.6 ± 73.1	309.4 ± 62.8	282.6 ± 8.0	341.5 ± 85.5	319.9 ± 100.2
<b>count</b>	(S)	(100)	(4787)	(61)	(39)

\* Use with caution.

ASR: age-standardized rate

Grey Bruce has a 27% higher age-standardized rate of cerebrovascular disease mortality than Ontario. Each week on average in Grey Bruce, 2 people die of cerebrovascular disease.

**Figure 23. Rates of cerebrovascular disease mortality, Grey Bruce and Ontario, 2007**



**By Sex**

Males in Grey Bruce do not have a significantly different age-standardized rate of cerebrovascular disease mortality than females, while at the provincial level they have a 16% higher rate than females.

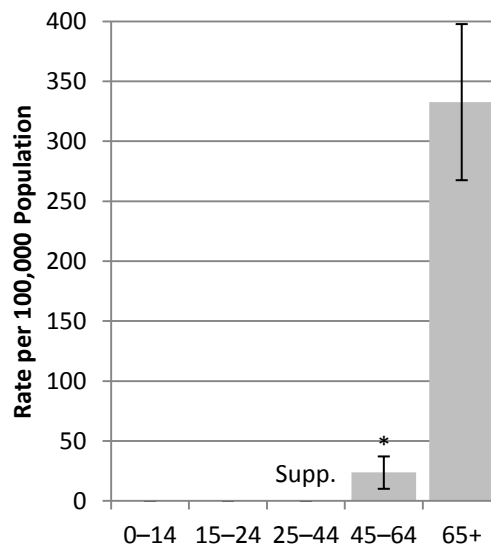
**By County**

There is no significant difference in age-standardized cardiovascular disease mortality rate between Grey and Bruce Counties.

**By Age**

As with previous mortality categories, older adults aged 45–64 and seniors aged 65+ in particular are substantially more likely than younger age groups to die of a cerebrovascular disease, across all geographies.

**Figure 24. Rates of cerebrovascular disease mortality in Grey Bruce, by age group, 2007**



\* Use with caution.

Supp. Estimate suppressed.



## Stroke

### ICD-10 Cause Codes

- I60 Subarachnoid haemorrhage
- I61 Intracerebral haemorrhage
- I63 Cerebral infarction
- I64 Stroke, not specified as haemorrhage or infarction

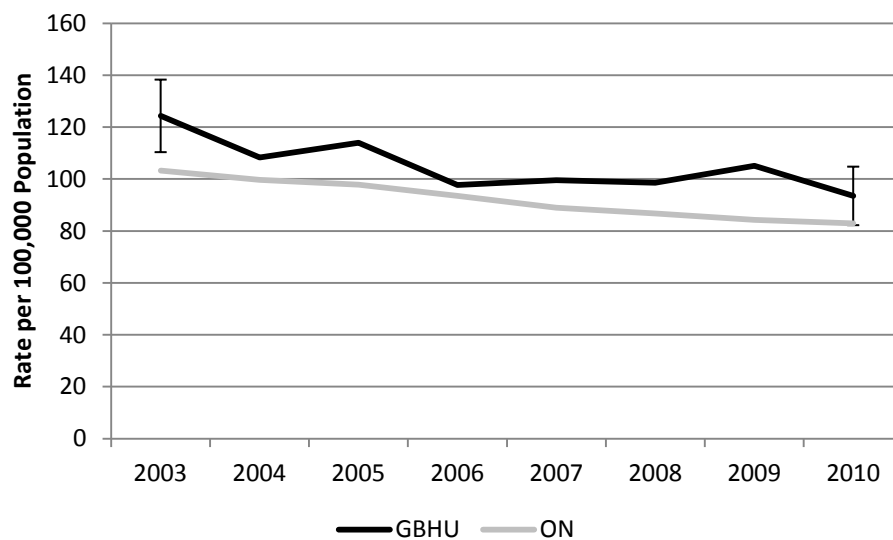
### Summary

### Stroke Hospitalizations

#### Trend Over Time

Since 2003, age-standardized stroke hospitalization rates have fallen by 25% in Grey Bruce and by 20% in Ontario.

**Figure 25. Time trend in rates of stroke hospitalization, Grey Bruce and Ontario**



## Snapshot in Time

Table 7. Rates and raw counts of stroke hospitalization, Grey Bruce and Ontario

	GBHU 2003	GBHU 2010	Ontario 2010	Grey 2010	Bruce 2010
<b>Overall ASR</b>	124.3 ± 14.0	93.5 ± 11.3	82.8 ± 1.4	98.6 ± 15.0	86.3 ± 17.1
<b>count</b>	(314)	(276)	(14,582)	(173)	(103)
<b>Male ASR</b>	154.7 ± 23.5	98.8 ± 17.1	94.7 ± 2.2	107.9 ± 23.6	85.1 ± 24.3
<b>count</b>	(169)	(131)	(7253)	(84)	(47)
<b>Female ASR</b>	100.1 ± 17.0	87.5 ± 14.8	72.5 ± 1.7	89.8 ± 19.1	85.2 ± 24.0
<b>count</b>	(145)	(145)	(7329)	(89)	(56)
<b>0–14</b>	Supp.	0	1.9 ± 0.6	0	0
<b>count</b>			(42)		
<b>15–24</b>	0	0	2.5 ± 0.7	0	0
<b>count</b>			(46)		
<b>25–44</b>	Supp.	Supp.	15.0 ± 1.3	Supp.	Supp.
<b>count</b>	(S)	(S)	(551)	(S)	(S)
<b>45–64</b>	133.5 ± 33.5	90.0 ± 25.7	91.6 ± 3.1	102.1* ± 35.9	73.2* ± 35.8
<b>count</b>	(61)	(S)	(3378)	(S)	(S)
<b>65+</b>	862.2 ± 107.7	707.3 ± 91.7	576.1 ± 11.0	740.4 ± 121.8	658.9 ± 138.8
<b>count</b>	(244)	(227)	(10,565)	(141)	(86)

\* Use with caution.

ASR: age-standardized rate

Grey Bruce does not have a significantly higher age-standardized rate of stroke hospitalization than Ontario. Each week on average in Grey Bruce, 5 people are hospitalized for stroke.

### By Sex

Males in Grey Bruce do not have a significantly different age-standardized rate of stroke hospitalization than females. At the provincial level, however, they have a 31% higher rate than females.

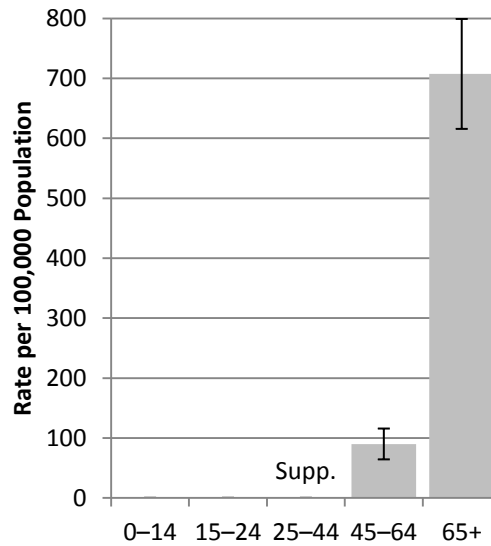
### By County

Bruce and Grey County residents do not have significantly different age-standardized rates of stroke hospitalization.

### *By Age*

Older adults aged 45–64 and seniors aged 65+ in particular are substantially more likely than younger age groups to be hospitalized with a stroke, across all geographies. Locally, seniors aged 65+ have a 23% higher age-standardized rate of stroke hospitalization than Ontario seniors.

**Figure 26. Rates of stroke hospitalization in Grey Bruce, by age group, 2010**



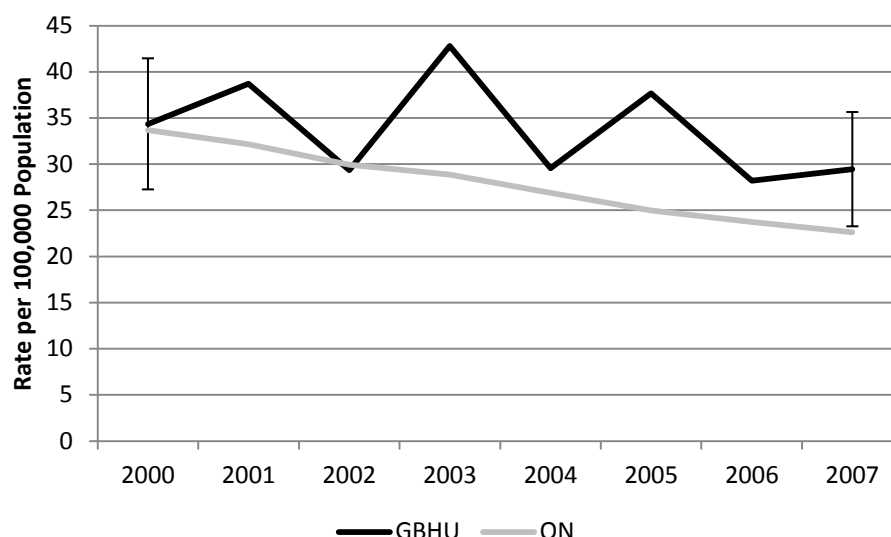
Supp. Estimate suppressed.

## Stroke Mortality

### Trend Over Time

Since 2000, age-standardized stroke mortality rates have not changed significantly in Grey Bruce, while they have declined by 33% in Ontario.

Figure 27. Time trend in rates of stroke mortality, Grey Bruce and Ontario



### Snapshot in Time

Table 8. Rates and raw counts of stroke mortality, Grey Bruce and Ontario

	GBHU 2000	GBHU 2007	Ontario 2007	Grey 2007	Bruce 2007
<b>Overall ASR</b>	34.4 ± 7.1	29.4 ± 6.2	22.6 ± 0.7	28.8 ± 8.0	30.4 ± 9.8
<b>count</b>	(90)	(88)	(3981)	(51)	(37)
<b>Male ASR</b>	41.4 ± 12.9	30.5 ± 9.9	24.2 ± 1.2	28.5* ± 12.5	33.0* ± 15.8
<b>count</b>	(40)	(37)	(1635)	(20)	(17)
<b>Female ASR</b>	29.3 ± 8.3	30.1 ± 8.5	21.2 ± 0.9	32.1* ± 11.6	27.5* ± 12.3
<b>count</b>	(50)	(51)	(2346)	(31)	(20)
<b>0–14</b>	0	0	Supp. (S)	0	0
<b>count</b>					
<b>15–24</b>	0	0	Supp. (S)	0	0
<b>count</b>					
<b>25–44</b>	0	0	3.4 ± 0.6 (53)	0	0
<b>count</b>					
<b>45–64</b>	Supp. (S)	19.8* ± 12.3 (10)	16.5 ± 1.4 (373)	Supp. (S)	Supp. (7)
<b>count</b>					
<b>65+</b>	318.4 ± 67.2	259.5 ± 57.5	193.9 ± 6.6	268.7 ± 75.9	246.1* ± 88.0
<b>count</b>	(S)	(78)	(3550)	(S)	(30)

\* Use with caution.

ASR: age-standardized rate

Grey Bruce does not have a significantly different age-standardized rate of stroke mortality than Ontario. Each week on average in Grey Bruce, 1 or 2 people die of stroke.

### *By Sex*

Males in Grey Bruce do not have a significantly different age-standardized rate of stroke mortality than females, while at the provincial level they have a 14% higher rate than females.

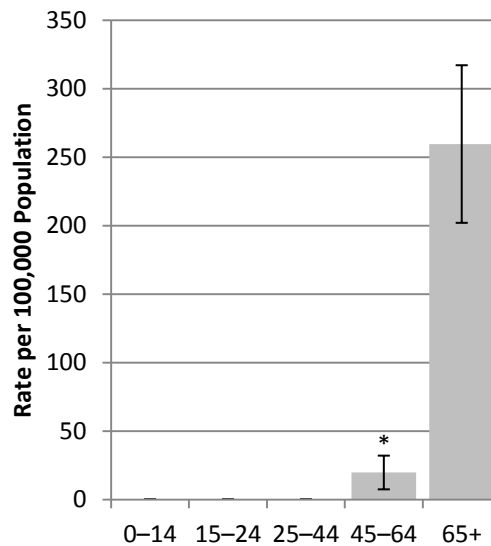
### *By County*

There is no significant difference in age-standardized stroke mortality rate between Grey and Bruce Counties.

### *By Age*

As with previous mortality categories, older adults aged 45–64 and seniors aged 65+ in particular are substantially more likely than younger age groups to die of a stroke, across all geographies. Grey Bruce seniors aged 65+ have a 34% higher age-specific stroke mortality rate as compared to Ontario seniors.

**Figure 28. Rates of stroke mortality in Grey Bruce, by age group, 2007**



\* Use with caution.



## Appendix I: Explanation of Selected Statistical Concepts

### ***What's a Population Parameter?***

A population parameter is a true value that in some way describes a population. For example, if you were to add up the ages of the entire population of Canada and then take the mean (divide the total by the number of people in the population) the result would be a population parameter. There is no doubt about a population parameter: if you know all the values present in the population, you can compute any true value for a population. Population parameters do not need confidence intervals. If you have calculated it, you know what it is and there is no doubt about the validity or the reliability of the number.

### ***What's a Statistic?***

A statistic is an *estimate* of a value of a population parameter. Because it's neither cost-effective to talk to everyone in a population, nor is it time-effective, smaller samples are taken of a population in order to generalize to the larger population. Unlike a population parameter, there is the possibility of error for a statistic. We can't be sure it equals the true population parameter.

### ***But Isn't a Population Rate a Parameter?***

Yes, a population rate is a parameter. Therefore, it doesn't technically *need* a confidence interval calculated around it. That said, epidemiologists usually construct confidence intervals around population rates because they recognize that rates fluctuate, and they want to be able to assess whether a rate is reasonably similar or different from other rates. For example, if a rate is 3 per 100,000 population in 2006, but it's 2 per 100,000 population in 2007, we want to know if that could be qualified as a significant difference. We therefore treat the population rate as a statistic and construct confidence intervals around it to help us decide whether or not the difference is *significant*, and we use relative risk to determine whether the difference is *meaningful*.

### ***What Are Confidence Intervals & How Should I Interpret Them?***

Confidence intervals are "windows" that we generate around a sample statistic that we estimate with a degree of certainty to contain the true population parameter. The data in this report are presented with 95% confidence intervals, which means that there is a 95% chance that the true population parameter would fall within the window—the interval for which the upper and lower limits are provided.

Confidence intervals, when used to present rates with a common denominator (such as percentages—a *number per 100 persons*) are useful tools that can allow you to easily compare an estimate with one or more other estimates. They are used to identify situations where population values are likely to be different from group to group.

If confidence intervals overlap, it is not possible to say with any degree of certainty that the real population values are different. The reason for this is because since there is overlap, it is possible that the true values for two different groups fall within that same overlap, which gives them a chance of having the same value. If there is a chance that they are equal (represented by overlapping confidence intervals), you cannot conclude that they aren't equal.

If confidence intervals DO NOT overlap, you can say with a reasonable degree of certainty that the two population values are likely to be different.

### **Relative Risk**

The relative risk or risk ratio is a measure of one group's probability of an event occurring divided by another group's probability of the same event occurring. It is a measure of *effect size*, which is simply the amount of 'effect' that an independent variable has on an outcome. In this case, the independent variables are political geography—that is, health unit region, province, country or LHIN region—and time.

Relative risk is important to present because knowing that something is significantly different in itself doesn't mean it's an important or large difference.

A relative risk above 1 means that one group is more likely to experience a certain event than the comparison group, geography or time frame. A relative risk below 1 conversely means that that event is less likely. A relative risk can be used to communicate how many times as likely a group is to experience an event. A relative risk of 2 would mean they're twice as likely, a relative risk of 0.5 would mean they're half as likely.

### **What is Age Standardization?**

Age standardization is used to standardize (or make comparable) the rates for two or more different groups. It does this by calculating the rates as though the groups have the same age distribution. In this report, the overall, male and female rates are standardized to the 1991 Canadian population, which means that they are the rates you would see if our population had the same proportion of people in each five-year age range (0–4, 5–9, 10–14, etc.) as Canada did in 1991.



## Appendix II: Health Behaviours

Many health behaviours can impact cardiovascular disease rates and the rates of other illnesses or conditions. What follows are some self-reported rates of chronic conditions and modifiable health behaviours that have some degree of influence on risk of cardiovascular disease. It is important to bear in mind that modifiable health behaviours may need to be targeted as a systemic rather than individual level in order to achieve improved public health status.

### *Diabetes*

In 2009/10, the rate of diabetes in Grey Bruce was 9.0%, not significantly different from the rate in Ontario but higher than the rate in Canada (Grey Bruce Health Unit 2012c). Diabetes puts people at risk of injury, specifically at risk of falls injury, because of decreased sensory capacity in the extremities (including the feet) and diabetic eye disease (including glaucoma, diabetic retinopathy and cataracts).

### *Asthma*

In 2009/10, the rate of asthma in Grey Bruce was 8.3%, similar to the rates in Ontario and Canada (Grey Bruce Health Unit 2012a). Children with asthma are several times as likely as children without asthma to experience injury (Schwebel and Brezaussek 2009).

### *Hypertension*

In 2009/10, the rate of hypertension in Grey Bruce was 20.8%, a rate that is significantly higher than the rates in Ontario and Canada (Grey Bruce Health Unit 2012f). Antihypertensive medications may be associated with an increased risk of falls in older people (Gribbin et al. 2010).

### *Pain and Activity Limitation*

In 2009/10, the percentage of population with severe pain in Grey Bruce was 13.8%, similar to the rates in Ontario and Canada (Grey Bruce Health Unit 2012h).

### *Pain or Discomfort that Prevents Activities*

In 2009/10, 14.9% of the Grey Bruce population reported pain or discomfort that prevents activities, similar to the rates in Ontario and Canada (Grey Bruce Health Unit 2012h).

### *Participation and Activity Limitation*

In 2009/10, 32.9% of the Grey Bruce population reported sometimes or often being unable to participate in selected activities, similar to the rates in Ontario and Canada (Grey Bruce Health Unit 2012h).

### *Alcohol Consumption*

In 2009/10, 18.7% of the Grey Bruce population reported heavy drinking, a rate that is similar to those of Ontario and Canada (Grey Bruce Health Unit 2012j).

### *Obesity*

In 2009/10, 57.5% of Grey Bruce residents reported being overweight or obese, a rate that is 1.11 times the Ontario rate and the Canadian rate (Grey Bruce Health Unit 2012g).

### ***Physical Inactivity***

In 2009/10, 47.2% of Grey Bruce residents reported being physically inactive, a rate not significantly different from those of Ontario and Canada (Grey Bruce Health Unit 2012i).

### ***Nutrition***

In 2009/10, 42.6% of Grey Bruce residents reported consuming five or more servings of fruits and vegetables a day, a rate not significantly different from those of Ontario and Canada (Grey Bruce Health Unit 2012d).

### ***Smoking***

Smoking is associated with an increased risk of certain injuries, including pelvis fracture in older adults (Sacks and Nelson 1994; Kelsey et al. 2005). Smokers experience impaired healing following some types of injury than non-smokers and may require more vigilant medical follow-up after treatment of an injury (Moghaddam et al. 2011).

In 2009/10, 17.9% of the Grey Bruce population reported being current smokers, similar to the rates in Ontario and Canada (Grey Bruce Health Unit 2012b).

### ***Health Care Utilization***

Patterns of health care utilization and health care accessibility impact the rates of hospitalizations and emergency room visits in different geographic areas, and may impact mortality rates if proper care is not sought or is inaccessible or delayed soon after an injury occurs.

In 2009/10, 89.0% of Grey Bruce residents reported having a regular doctor, however only 78.2% reported having visited a doctor in the last 12 months (lower than the Ontario rate) (Grey Bruce Health Unit 2012e).

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