

HEALTH SURVEILLANCE INDICATORS: COLORECTAL CANCER



Public Health Relevance

Colorectal cancer is the third most diagnosed cancer in Ontario. It is the second leading cause of cancer mortality in Ontario among males and the third most common among females, accounting for over 10% of total cancer deaths.

Risk factors for colorectal cancer include advancing age, physical inactivity, obesity, alcohol consumption, smoking, a diet high in red and/or processed meat, and a diet low in fibre. Colorectal screening through the administration of the Fecal Occult Blood Test is recommended every two years for men and women aged 50 to 74 with no family history of colorectal cancer. Screening by colonoscopy is recommended for people with a family history of colorectal cancer starting at age 50, or 10 years earlier than the age their relative was diagnosed, whichever occurs first.

Highlights

1. Colorectal cancer hospitalization and mortality rates in Toronto decreased from 2003 to the most recent year of data available.
2. Toronto colorectal cancer hospitalization, incidence and mortality rates were lower than the rest of Ontario.
3. South Scarborough and the area just northwest of downtown had clusters of neighbourhoods with significantly higher colorectal cancer hospitalization rate than the city as a whole.
4. Toronto colorectal cancer incidence, hospitalization and mortality rates all increased with age, and were higher for males compared to females.

Trends Over Time

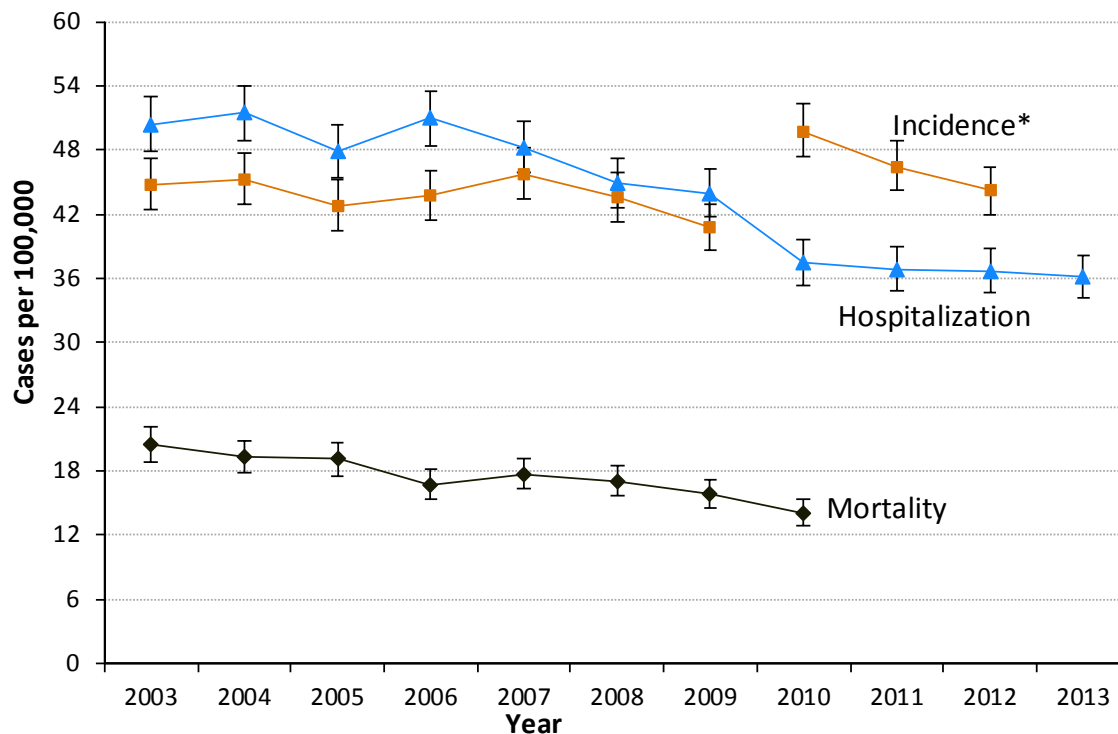
Colorectal cancer hospitalization and mortality rates in Toronto decreased from 2003 to the most recent year of data available.

Figure 1 shows age-standardized colorectal cancer incidence, hospitalization and mortality rates per 100,000 people from 2003 to the most recent available data year.

Colorectal cancer hospitalization decreased significantly, from 50 cases per 100,000 people in 2003 to 36 cases per 100,000 people in 2013. The mortality rate also decreased significantly from 21 deaths per 100,000 people in 2003 to 14 deaths per 100,000 people in 2010.

Colorectal cancer incidence remained stable from 2003 to 2009. The incidence rate (44 per 100,000) in 2012 was significantly lower than the rate in 2010 (50 per 100,000). In 2010, a new rule for counting cancer cases was adopted, therefore the rates from 2010 onwards cannot be directly compared to those from previous years. Please see the data notes for details.

Figure 1: Age-Standardized Incidence*, Hospitalization and Mortality from Colorectal Cancer, Toronto, 2003 to 2013**



*Incidence: A new rule for counting cancer cases was adopted for 2010 onwards. Please see data notes.

**Hospitalization rate was from 2003 to 2013, mortality rate was from 2003 to 2010, incidence rate was from 2003 to 2012.

Error bars (\bar{I}) represent 95% confidence intervals.

Data Source: see Data Notes.

Regional Comparisons

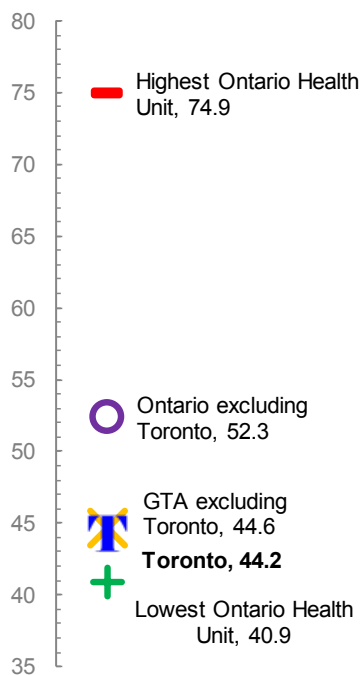
Toronto colorectal cancer hospitalization, incidence and mortality rates were lower than the rest of Ontario.

Figures 2a, 2b and 2c show age-standardized incidence, hospitalization and mortality per 100,000 people for colorectal cancer in Toronto compared the rest of Ontario (Ontario excluding Toronto), the rest of the Greater Toronto Area (GTA excluding Toronto), and the Ontario health units with the highest and lowest rates.

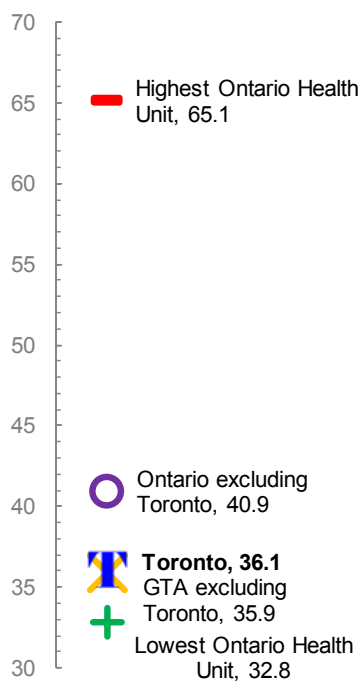
Toronto had significantly lower colorectal cancer incidence, hospitalization and mortality rates compared to the rest of Ontario and the Ontario health unit with the highest rates. There were no significant differences for hospitalization, mortality or incidence rates between Toronto and the rest of the GTA or the Ontario health unit with the lowest rates.

Figure 2: Age Standardized Incidence, Hospitalization and Mortality Rates from Colorectal Cancer, Selected Regions in Ontario

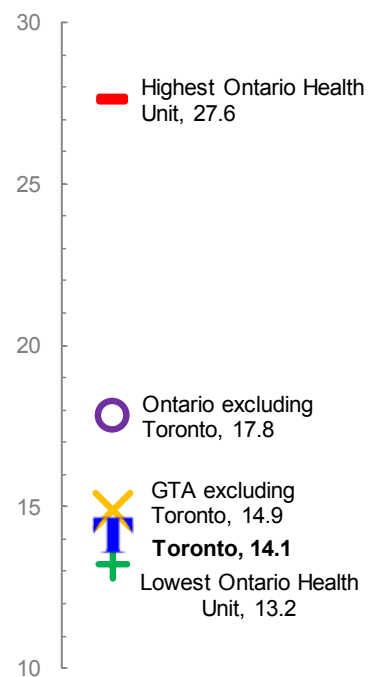
2a: Incidence, 2012



2b: Hospitalization, 2013



2c: Mortality, 2010



Ontario total: Hospitalization: 40.0; Mortality: 17.1; Incidence: 50.8.

Data Source: see Data Notes.

Toronto Neighbourhood Comparisons

South Scarborough and the area just northwest of downtown had clusters of neighbourhoods with significantly higher colorectal cancer hospitalization rate than the city as a whole.

Table 1 shows age-standardized hospitalization and mortality rates per 100,000 people for colorectal cancer, by Toronto Public Health's Chronic Disease and Injury Prevention (CDIP) Service Delivery Areas. The estimates presented are for the most recent available 3 years of data, which gives us large enough numbers to look at the data for smaller areas. Incidence rates are not currently available on geographic areas smaller than Toronto.

No CDIP Service Delivery Areas had significantly different colorectal cancer hospitalization or mortality compared to Toronto as a whole.

Table 1: Age-Standardized Hospitalization and Mortality for Colorectal Cancer by Service Delivery Area*, Toronto

CDIP Service Delivery Area	Hospitalization (2011 to 2013 Combined)	Mortality (2008 to 2010 Combined)
Rexdale Etobicoke	40.8	16.3
York South Humber	40.7	17.8
Humber Downsview	38.9	15.7
Willowdale Don Mills	35.5	13.6
Toronto Centre	37.0	15.0
Danforth East York	38.4	15.6
West Scarborough	33.5	13.4
East Scarborough	37.1	14.7
Toronto	37.3	15.0

* Toronto Public Health's Service Delivery Areas for Chronic Disease and Injury Prevention
Data Source: see Data Notes.

Map 1 shows age-standardized colorectal cancer hospitalization by Toronto neighbourhood, 2011 to 2013 combined.

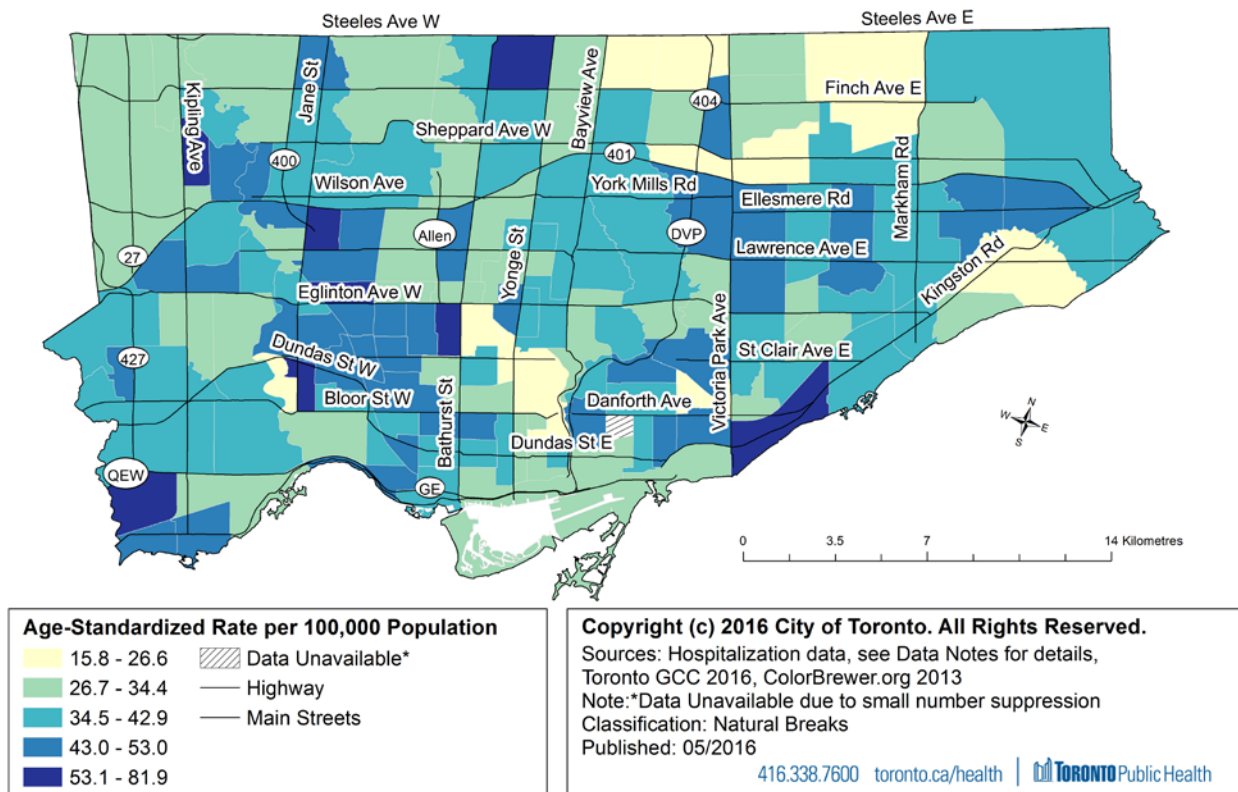
South Scarborough and the area just northwest of downtown had clusters of neighbourhoods with significantly higher colorectal cancer hospitalization rates than the city. Some significantly higher neighbourhoods included Beechborough-Greenbrook, Alderwood, Birchcliffe-Cliffside, and Newtonbrook West.

Central Toronto and northern Scarborough had clusters of neighbourhoods with significantly lower colorectal cancer hospitalization rates than the city. Some significantly lower neighbourhoods included:

- Woodbine-Lumsden
- Cabbagetown-South St. James Town
- Forest Hill South
- Hillcrest Village
- West Hill
- Agincourt North
- Tam O'Shanter-Sullivan
- Rosedale-Moore Park

Mortality rate is not available by neighbourhood due to small numbers.

Map1: Age-Standardized Hospitalization for Colorectal Cancer by Neighbourhood, Toronto, 2011 to 2013 combined*



Socio-demographics

Toronto colorectal cancer incidence, hospitalization and mortality rates all increased with age, and were higher for males compared to females.

Table 2 shows Toronto age-standardized incidence, hospitalization and mortality rates per 100,000 people for colorectal cancer by sex. Toronto colorectal cancer incidence, hospitalization and mortality rates were all significantly higher in males compared to females.

Table 2: Age-Standardized Incidence, Hospitalization and Mortality Rates per 100,000 People for Colorectal Cancer by Sex, Toronto

Sex	Incidence (2012)	Hospitalization (2013)	Mortality (2010)
Male	53.3 ^H	43.3 ^H	19.2 ^H
Female	37.0 ^L	30.7 ^L	10.2 ^L

^H Significantly higher than the other sex indicating an unfavourable result for this group.

^L Significantly lower than the other sex indicating a favourable result for this group.

Please see Definition for sex.

Data Sources:, see Data Notes.

Table 3 shows incidence, hospitalization and mortality rates per 100,000 people for colorectal cancer by age groups. Toronto colorectal cancer incidence, hospitalization and mortality rates all increased with age.

Table 3: Incidence, Hospitalization and Mortality Rates per 100,000 People for Colorectal Cancer by Age Group, Toronto

Age	Incidence (2012)	Hospitalization (2013)	Mortality (2010)
20 to 39 years	6.1	4.2	0.6
40 to 64 years	57.1	46.2	10.8
65 plus years	262.1	213.8	26.5

Data Sources: see Data Notes.

Table 4 shows age-standardized hospitalization and mortality rates per 100,000 people for colorectal cancer by income quintile. Quintile 1 contains the areas in Toronto with the highest percent of people living below the low-income cut off, making it the lowest income quintile. Quintile 5 contains the areas in Toronto with the lowest percent of people living below the low-income cut off, making it the highest income quintile.

There were no significant differences in hospitalization and mortality rates between Quintile 5 and Quintile 1, 2, 3 or 4.

Table 4: Age-Standardized Hospitalization and Mortality Rates per 100,000 People for Colorectal Cancer by Income Quintile, Toronto

Income Level	Hospitalization (2011 to 2013 combined)	Mortality (2008 to 2010 combined)
Quintile 1 (lower)	37.9	15.0
Quintile 2	35.0	14.2
Quintile 3	37.7	15.3
Quintile 4	40.5	15.2
Quintile 5 (higher)	35.3	15.3

Please see definitions for income level.

Data Source: Hospitalization, Mortality and Income quintiles, see Data Notes for details.

Data Notes

Notes

- Significant differences were estimated using overlapping confidence intervals. Although this method is conservative ($\alpha \sim < 0.01$) and most appropriate when comparing mutually exclusive groups, it was chosen as an objective means of making conclusions on population-based data. Also note that the multiple comparisons performed in the analysis were not taken into consideration when choosing the level of significance to test. The inverse chi-squared distribution is used by the U.S. National Cancer Institute's SeerStat program and has been adopted by Cancer Care Ontario to calculate confidence intervals for age-standardized cancer incidence rates in Ontario. The Poisson distribution, the standard used by Toronto Public Health, was used to calculate confidence intervals for age-standardized cancer hospitalization and mortality rates.
- Toronto is compared to the rest of Ontario (Ontario excluding Toronto) as opposed to the Ontario total because Toronto comprises such a large proportion of the Ontario population. Toronto is also compared to the rest of the GTA (Greater Toronto Area) for the same reason.
- Tables 1 and 3 and Maps 1 are based on three years of data combined in order to obtain a sample size large enough to analyze the data at smaller geographic levels. By combining years of data, changes over time in and between geographic areas may be hidden.
- For comparisons of smaller geographic areas, any person who could not be linked to a valid Toronto postal code was excluded from the total.
- Estimates are age-standardized to the 1991 Canadian population. This allows for comparison of estimates over time and geography. However, because the standard population's distribution is younger than the current Toronto population, the age-standardized estimates are lower than the true rates.
- For cancer cases diagnosed from 2010 onwards, the new Ontario Cancer Registry (OCR) adopted the Surveillance, Epidemiology and End Results (SEER) rules for identifying multiple primary cancers and assigning histology to cases. Prior to 2010, the OCR did not recognize a second primary cancer unless it differed substantially from the first primary on both topography and morphology. With the new rules, the number of newly diagnosed cancer cases registered by the OCR in 2010–2012 is 5.8 per cent higher than the number of cases that would have been reported using the old rules due to greater recognition of multiple primaries. The impact of the change in multiple primary rules varies by cancer. This does not mean more people are being diagnosed or treated, just that more cases of certain types of cancer are being registered. This impacts understanding trends over time. The trend line in Figure 1 is broken to show where this change occurred.

Definitions

Colorectal Cancer includes cancer of the colon and rectum, and is defined by ICD-10 codes C18 to C20 and C26.0 and ICD-9 codes 153, 154.0, 154.1, and 159.0.

Hospitalization includes people who have stayed in a hospital bed overnight because of colorectal cancer.

Mortality includes people whose primary cause of death is colorectal cancer.

Income Quintiles: Five groups, each containing approximately 20% of the population, were created by ranking Toronto's census tracts based on the percent of residents living below the Statistics Canada after-tax Low Income Measure (LIM). Quintile 1 includes the census tracts with the highest percent of people living below the LIM and is therefore the lowest income quintile. Quintile 5 includes the census tracts with the lowest percent of people living below the LIM, making it the highest income quintile. LIM is an income level set at 50% of the median income in Canada in a given year, adjusted for household size.

95% Confidence Interval is the range within which the true value lies, 19 times out of 20.

Age Standardization is a technique based on weighted averaging which removes the effects of the distribution of age when comparing two or more populations.

Sex defines people based on their biological characteristics, whereas gender is a socially constructed concept. From a social determinants of health perspective, certain health conditions can be associated with gender, and from a biological perspective, health conditions can be associated with sex. Although reporting based on both concepts would be preferable, the data source used here only collects information on sex, and not gender.

Sources

Cancer Incidence: SEER*Stat Package Release 10 – Ontario Cancer Registry, Cancer Care Ontario, August 2015. Used in:

- Figures 1, 2a, 2b, and 2c
- Table 2 and 3

Hospitalization: Inpatient Discharges 2003 to 2013, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO. Date Extracted: June 2015. Used in:

- Figures 1, 2a, 2b, and 2c
- Tables 1, 2, 3 and 4
- Map 1

Mortality: Ontario Mortality Data 2003 to 2010, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO. Date Extracted: June 2015. Used in:

- Figures 1, 2a, 2b, and 2c
- Tables 1, 2, 3 and 4

Income Quintiles: Income Estimates for Census Families and Individuals (T1 Family File), Table F-18, Statistics Canada, 2009-2013. Used in:

- Table 4

Denominator data:

Population for Toronto and Larger Areas: Population Estimates 2003 to 2013, Ontario Ministry of Health and Long-Term Care: IntelliHEALTH ONTARIO. Date extracted: June 2015. The population estimates from cancer incidence was extracted in May 2016. Used in:

- Figures 1 and 2
- Table 2 and 3

Population for Neighbourhood or Service Delivery Areas or Income Quintile: 2011 Canada Census, Statistics Canada. Used in:

- Tables 1 and 4
- Map 1

Health Surveillance Indicator: Colorectal Cancer

Category: Chronic Disease

Prepared: June, 2017

This indicator report is part of a series that informs the ongoing assessment of Toronto's health status. For a full list of the indicators, please go to: www.toronto.ca/health