# HEALTH SURVEILLANCE INDICATORS:
# ALL CANCERS

## Public Health Relevance

Cancer is one of the leading causes of illness and death in Toronto. The term cancer represents more than 200 different diseases. Different kinds of cancer have different risk factors, some of which can be modified. Examples include tobacco use, poor diet, overweight/obesity and not enough exercise. Reducing these risks can lower the chances of getting cancer. Regular visits to the doctor and screening are also important for early identification and treatment.

Understanding trends, patterns, and populations at higher risk, provides evidence for planning, evaluating and modifying public health services and policies intended to control and/or reduce cancer.

This document deals with all types of cancers combined.

## Highlights

1. Cancer hospitalization and mortality rates in Toronto decreased from 2003 to the most recent year of data.
2. Cancer incidence in Toronto was similar to the rest of the Greater Toronto Area and lower than the rest of Ontario.
3. West Scarborough had lower hospitalization and mortality rates for cancer than Toronto as a whole.
4. The lowest rates for cancer hospitalization and mortality were in the second lowest income group.
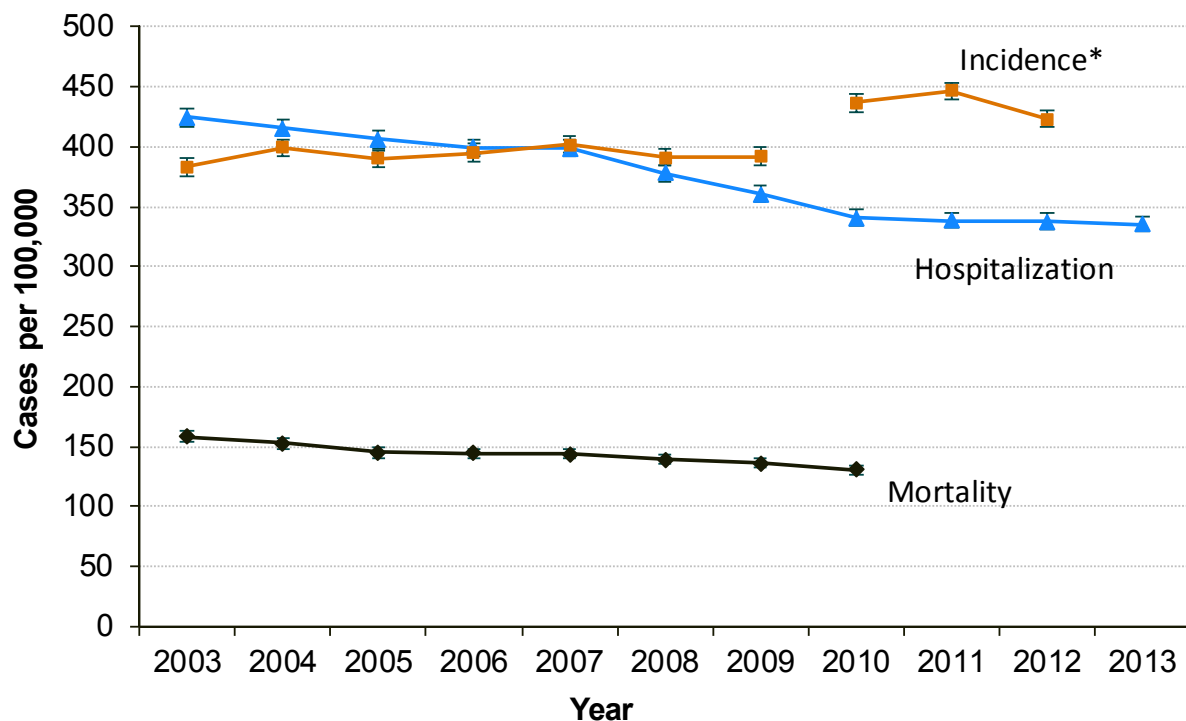
# Trends Over Time

**Cancer hospitalization and mortality rates in Toronto decreased from 2003 to the most recent year of data.**

Figure 1 shows age-standardized cancer incidence, hospitalization and mortality rates. Incidence remained stable between 2003 and 2009 at about 400 cases per 100,000 people. In 2012 the rate was 423 cases per 100,000. The apparent increase that occurred beginning in 2010 was primarily due to a change in the way new cancer cases were counted (please see data notes for details). Thus, results for years prior to 2010 cannot be directly compared to those for 2010 and later.

Hospitalization rates decreased over time from 424 cases per 100,000 in 2003 to 335 in 2013.

Mortality rates also decreased from 158 cases per 100,000 in 2003 to 130 in 2010.

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



\*Incidence: A new rule for counting new cancer cases was adopted in 2010, see Data Notes.

\*\*Data is presented to most recent year available. Incidence includes data to 2012, hospitalization to 2013, and mortality to 2010.

Error bars (I) represent 95% confidence intervals.

Data Sources: see Data Notes.

# Regional Comparisons

Cancer incidence in Toronto was similar to the rest of the Greater Toronto Area and lower than the rest of Ontario.
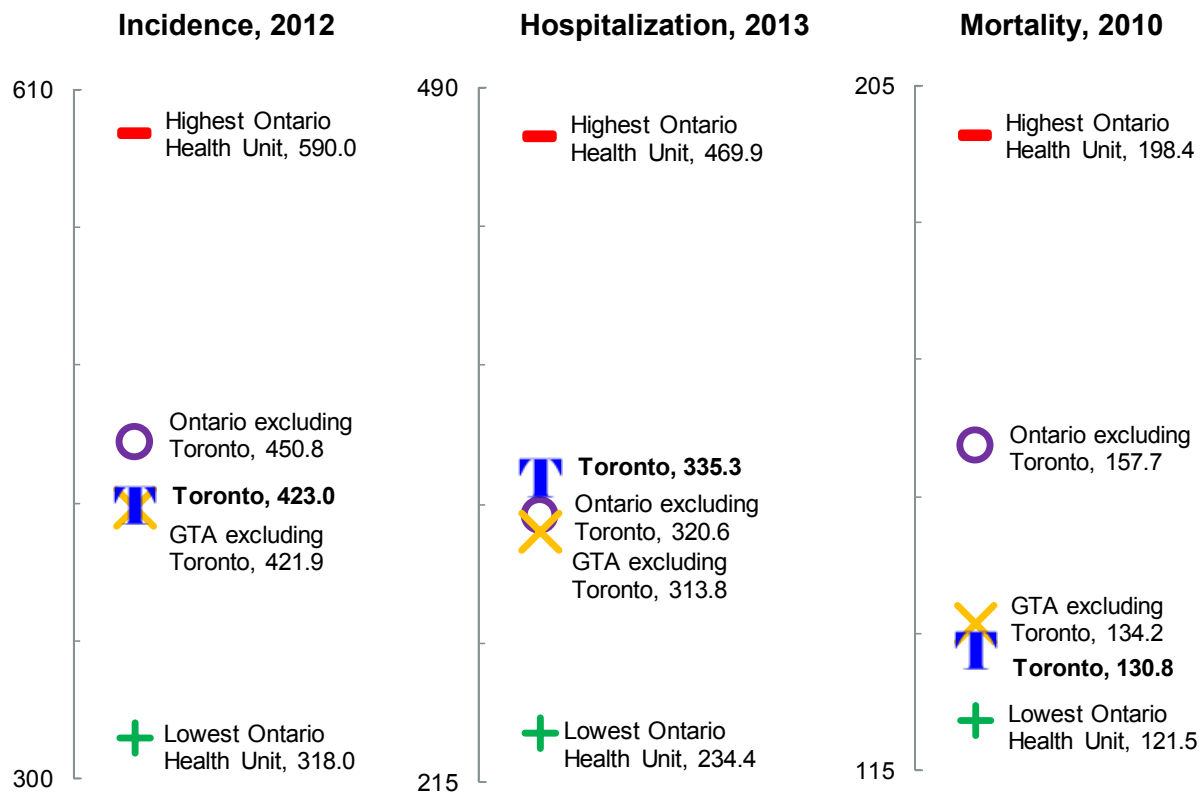
Figure 2 shows age-standardized cancer incidence, hospitalization and mortality rates for Toronto compared to the rest of Ontario (Ontario excluding Toronto), the rest of the Greater Toronto Area (GTA excluding Toronto), and the Ontario health units with the highest and lowest rates.

Incidence was significantly lower in Toronto compared to the rest of Ontario. Compared to the rest of the GTA, Toronto was not significantly different. Toronto ranked 33rd of the 36 health units in Ontario, with the 36th ranked health unit having the lowest (most favourable) rate.

Hospitalization was significantly higher in Toronto than in the rest of Ontario and in the rest of the GTA. Toronto ranked 17th of the 36 health units in Ontario.

Mortality was significantly lower in Toronto than in the rest of Ontario. Compared to the rest of the GTA, Toronto was not significantly different. Toronto ranked 33rd of the 36 health units in Ontario. The mortality rate was significantly different from the health unit with the lowest rate.

**Figure 2: Age-Standardized Cancer Incidence, Hospitalization and Mortality Rates per 100,000, Toronto Compared to Other Regions in Ontario**

### Incidence, 2012

610

— Highest Ontario Health Unit, 590.0

○ Ontario excluding Toronto, 450.8

**Toronto, 423.0**

GTA excluding Toronto, 421.9

+ Lowest Ontario Health Unit, 318.0

300

### Hospitalization, 2013

490

— Highest Ontario Health Unit, 469.9

**Toronto, 335.3**

Ontario excluding Toronto, 320.6
GTA excluding Toronto, 313.8

+ Lowest Ontario Health Unit, 234.4

215

### Mortality, 2010

205

— Highest Ontario Health Unit, 198.4

○ Ontario excluding Toronto, 157.7

GTA excluding Toronto, 134.2
**Toronto, 130.8**

+ Lowest Ontario Health Unit, 121.5

115

Data Sources: see Data Notes.

# Toronto Neighbourhood Comparisons

West Scarborough had lower hospitalization and mortality rates for cancer than Toronto as a whole.

Table 1 shows age-standardized cancer hospitalization and mortality rates for Toronto Public Health's Chronic Disease and Injury Prevention (CDIP) Service Delivery Areas (SDA). When compared to Toronto as a whole, significantly lower rates were found in:

- East Scarborough (hospitalization)
- West Scarborough (hospitalization and mortality)
- Willowdale Don Mills (mortality)

Significantly higher rates were found in:

- Danforth East York (mortality)
- York South Humber (hospitalization and mortality)

Geographic location reflects where people are living at the time they are hospitalized or die. It does not necessarily reflect the varied risk factors for cancer that are related to lifestyle, social determinants, environmental exposures and genetics. Incidence data was not available at the SDA or neighbourhood level.

**Table 1: Age-Standardized Cancer Hospitalization and Mortality Rates per 100,000 by Service Delivery Areas\*, Toronto**

| Service Delivery Area | Hospitalization (2011 to 2013 Combined) | Mortality (2008 to 2010 Combined) |
|---|---|---|
| Rexdale Etobicoke | 356.8 | 133.8 |
| York South Humber | 379.8 H | 144.6 H |
| Humber Downsview | 359.3 | 127.5 |
| Willowdale Don Mills | 336.8 | 121.7 L |
| Toronto Centre | 354.5 | 130.8 |
| Danforth East York | 351.3 | 149.9 H |
| West Scarborough | 312.2 L | 118.5 L |
| East Scarborough | 322.9 L | 123.2 |
| **Toronto** | **345.5** | **130.4** |

H Significantly higher than the Toronto total indicating a less favourable result for that area.

L Significantly lower than the Toronto total indicating a more favourable result for that area.

\* Toronto Public Health's service delivery areas for Chronic Disease and Injury Prevention
    Data Sources: see Data Notes.

Map 1 shows age-standardized cancer hospitalization rates for 140 Toronto neighbourhoods, for 2011 to 2013 combined.

Hospitalization rates ranged from 241.4 to 473.9 per 100,000. North Etobicoke and central Scarborough had clusters of neighbourhoods with significantly lower hospitalization rates than Toronto as a whole. Some of the specific neighbourhoods with significantly lower rates included:

- Agincourt North
- Cabbagetown-South St. James Town
- Hillcrest Village
- Steeles
- West Humber-Clairville
- Willowdale East

Neighbourhoods with significantly higher hospitalization rates were scattered across the city and included:

- Beechborough-Greenbrook
- Elms-Old Rexdale
- Long Branch
- Roncesvalles
- Runnymede-Bloor West Village
- Yonge-Eglinton

**Map 1: Age-Standardized Cancer Hospitalization Rates by Neighbourhood, Toronto, 2011 to 2013 Combined**
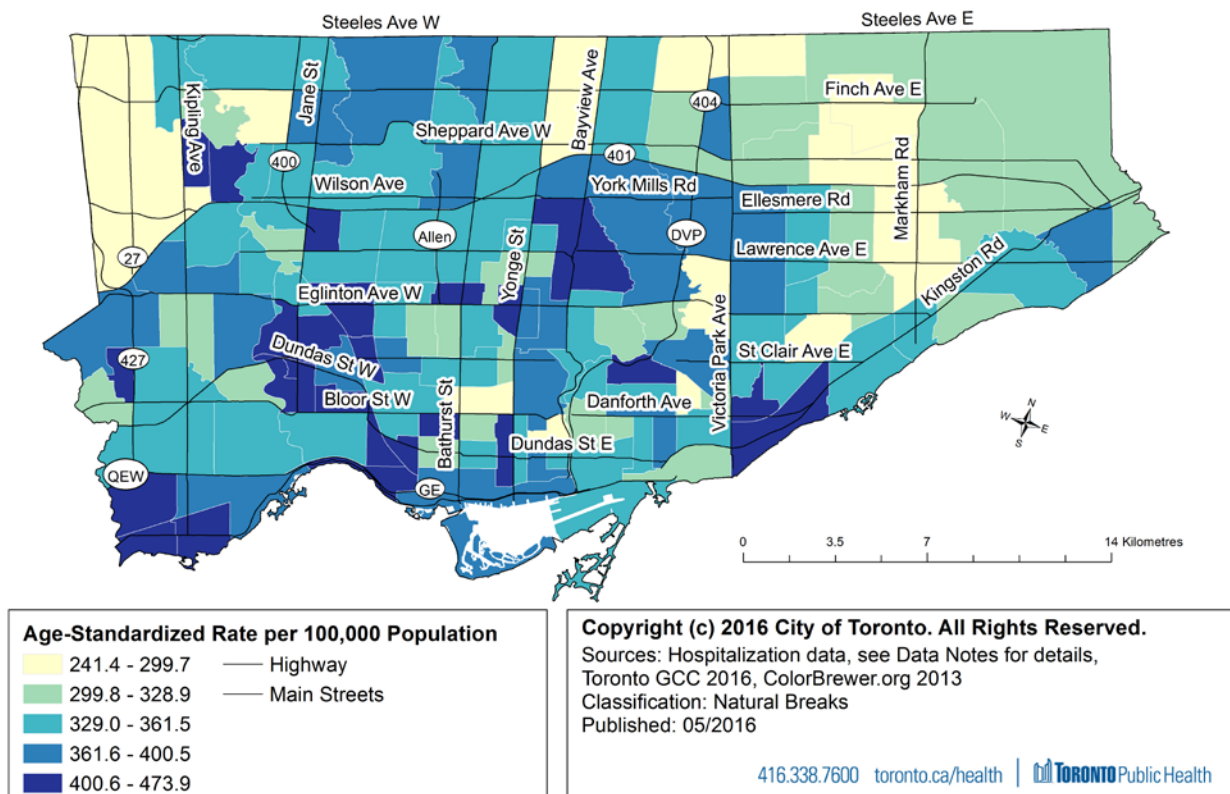
Map 2 shows age-standardized cancer mortality rates for 140 Toronto neighbourhoods, for 2008 to 2010 combined.
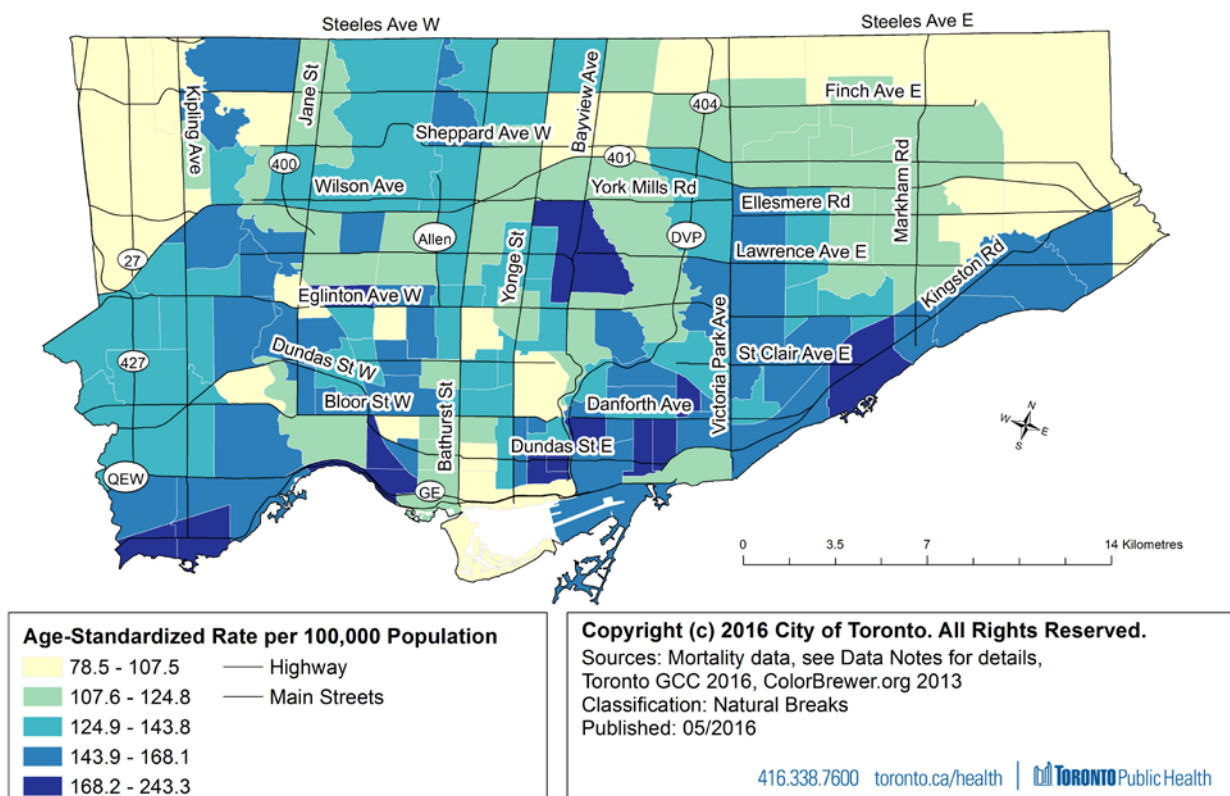
Mortality rates ranged from 78.5 to 243.3 per 100,000. Midtown, northwest Etobicoke, and northern Scarborough had clusters of neighbourhoods with significantly lower cancer mortality rates compared to Toronto as a whole. Some significantly lower neighbourhoods included:

- Bayview Village
- Highland Creek
- Milliken

- Morningside
- Mount Olive-Silverstone-Jamestown
- Steeles

Clusters of neighbourhoods with significantly higher mortality rates compared to Toronto as a whole were found along the waterfront and south Scarborough. Some significantly higher neighbourhoods included:

- Greenwood-Coxwell
- New Toronto
- North Riverdale

- Roncesvalles
- South Parkdale
- Woodbine Corridor

**Map 2: Age-Standardized Cancer Mortality Rates by Neighbourhood, Toronto, 2008 to 2010 Combined**



Age-Standardized Rate per 100,000 Population

| | |
|---|---|
| 78.5 - 107.5 | —— Highway |
| 107.6 - 124.8 | —— Main Streets |
| 124.9 - 143.8 | |
| 143.9 - 168.1 | |
| 168.2 - 243.3 | |

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Sources: Mortality data, see Data Notes for details,
Toronto GCC 2016, ColorBrewer.org 2013
Classification: Natural Breaks
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# Socio-demographics

The lowest rates for cancer hospitalization and mortality were in the second lowest income group.

Table 2 shows cancer rates by sex.  Males had significantly higher rates compared to females for incidence, hospitalization and mortality.

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

| Sex | Incidence (2012) | Hospitalization (2013) | Mortality (2010) |
|---|---|---|---|
| Male | 457.9 ᴴ | 354.1 ᴴ | 159.2 ᴴ |
| Female | 402.1ᴸ | 326.9 ᴸ | 111.0 ᴸ |

**H** Significantly higher than the other sex indicating a less favourable result for this group.

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

Data Source: see Data Notes.

Table 3 shows cancer rates for each of three age groups.  All rates increased as age increased for incidence, hospitalization and mortality.

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

| Age Group | Incidence (2012) | Hospitalization (2013) | Mortality (2010) |
|---|---|---|---|
| 20 to 39 years | 96.9 | 75.7 | 9.0 |
| 40 to 64 years | 606.0 | 474.4 | 118.9 |
| 65 plus years | 2,069.8 | 1,594.3 | 946.0 |

Data Source: see Data Notes.

Table 4 shows age-standardized cancer hospitalization and mortality rates per 100,000 people by income quintile. Quintile 1 includes areas in Toronto with the highest percent of people living below the low income measure (LIM), making it the lowest income quintile. Quintile 5 includes areas in Toronto with the lowest percent of people living below the LIM, making it the highest income quintile.

The second lowest income quintile (Quintile 2) had significantly lower hospitalization and mortality rates compared to the highest income quintile (Quintile 5). Other income quintiles (Quintile 1, 3 and 4) had no significant differences compared to the highest income group.

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

| Income Level | Hospitalization (2011 to 2013 Combined) | Mortality (2008 to 2010 Combined) |
|---|---|---|
| Quintile 1 (Lower income) | 345.9 | 132.8 |
| Quintile 2 | 328.1 L | 120.4 L |
| Quintile 3 | 338.0 | 132.2 |
| Quintile 4 | 357.4 | 133.9 |
| Quintile 5 (Higher income) | 355.0 | 132.1 |

L  Significantly lower than Quintile 5, the higher income quintile, indicating a more favourable result for that group.

   Data Source: see Data Notes.

# 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. 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 with Toronto removed) as opposed to the Ontario total because Toronto comprises a large proportion of the Ontario population. Toronto is also compared to the rest of the Greater Toronto Area (GTA) for the same reason.

- Data used for regional comparisons normally shows the rates for the Ontario health units with the highest and the lowest rates. The purpose of these comparisons is to show the rate for Toronto relative to other areas in Ontario. If data for the health unit with the lowest rate is suppressed due to small numbers, the rate for the next lowest health unit with sufficient numbers is shown instead.

- Tables 1 and 4 and Maps 1 and 2 are based on three years of data combined in order to obtain a sample size large enough to analyze at smaller geographic levels or income groups. 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.

- Neighbourhoods identified as having significantly higher or lower rates than Toronto as a whole do not necessarily represent all such neighbourhoods. Cut-offs are arbitrary.

- Rates (except for age-specific rates) are age-standardized to the 1991 Canadian population. This allows for comparison over time and geography. Because the standard population's distribution is younger than the current Toronto population, the age-standardized rates 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, due to greater recognition of multiple primaries. Prior to 2010, the OCR did not recognize a second primary cancer unless is 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 to 2012 is 5.8 percent higher than the number of cases that would have been reported using the old rules. 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 for incidence. The line graph has a gap bewteen 2009 and 2010 to show where this change occurred.

## Definitions

**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 that removes the effects of the distribution of age when comparing two or more populations.

**Cancer** includes all malignant neoplasms, and is defined by ICD-10 codes C-00 to C-97 and ICD-9 codes 140 to 208.

**Hospitalization** includes Toronto residents who have stayed in a hospital bed overnight because of cancer. It counts hospital admission not individual people, such that if an individual was hospitalized two times in a year they would be counted twice.

**Incidence** includes Toronto residents diagnosed with a cancer by a medical professional.

**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.

**Mortality** includes deceased Toronto residents whose primary cause of death was cancer.

**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 and 2 (Incidence)
- Tables 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 and 2 (Hospitalization)
- Tables 1, 2, 3 and 4
  Map 1

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

- Table 4

**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 and 2 (Mortality)
- Tables 1, 2, 3 and 4
- Map 2

**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 for 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
- Maps 1 and 2

Health Surveillance Indicator: All Cancers

Category: Chronic Disease

Prepared: July, 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