HEALTH SURVEILLANCE INDICATORS:
ALL-CAUSE MORTALITY AND LIFE EXPECTANCY

Public Health Relevance

All-cause mortality rates and life expectancy are used to measure the overall health of a population. These two measures reflect the upper limit of the disease severity continuum and can be used to look at trends in overall health over time, compare different geographic areas, and identify inequalities among different groups of people. In Canada and elsewhere, mortality and life expectancy are largely influenced by chronic diseases which may be amenable to public health actions.

Highlights

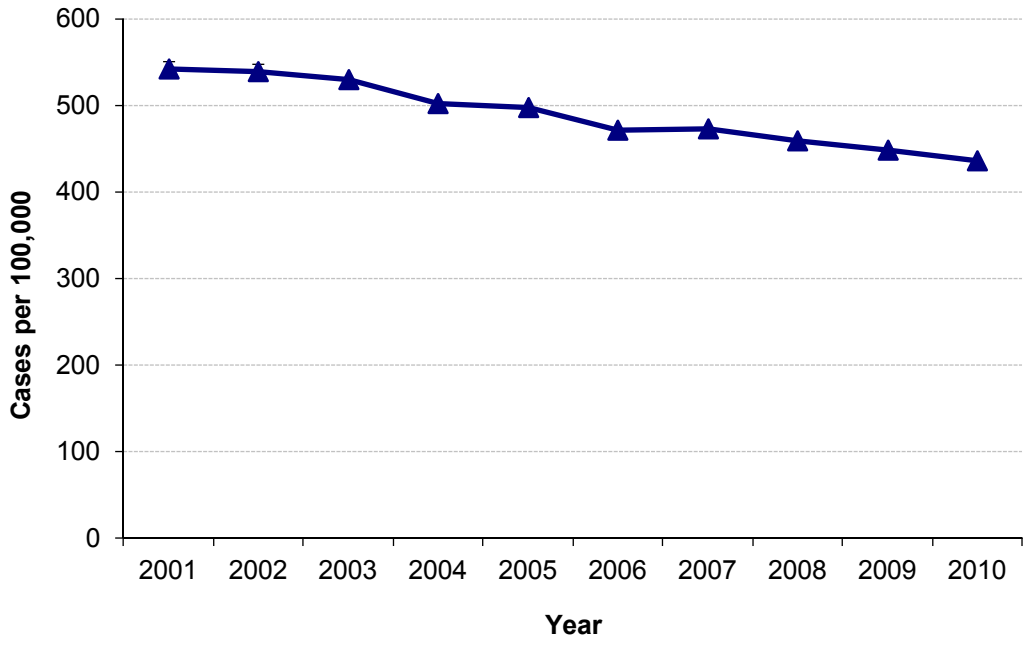
1. Toronto's age-standardized all cause mortality rate declined from 2001 to 2010.
2. Toronto had a higher life expectancy than other areas in Ontario.
3. Some neighbourhoods close to the city's waterfront had significantly higher age-standardized mortality rates than the city overall.
4. Males in Toronto had a significantly higher mortality rate than females.
5. The lowest income quintile had a significantly higher age-standardized mortality rate than the highest income quintile.
6. Females in Toronto live five years longer on average than males and stay healthy for longer.
7. Ischemic heart disease is the leading cause of death for both females and males in Toronto.

Trends Over Time

Toronto's age-standardized all cause mortality rate declined from 2001 to 2010.

Figure 1 shows the age-standardized all-cause mortality rate per 100,000 people in Toronto from 2001 to 2010. Age-standardized all-cause mortality decreased from 542 deaths per 100,000 people in 2001 to 436 in 2010. This indicates that, on average, people in Toronto are living longer lives.

Figure 1: Age-Standardized All-Cause Mortality, Toronto, 2001 to 2010



Error bars representing confidence intervals are not visible due to the scale of the graph.

Data Source: see Data Notes.

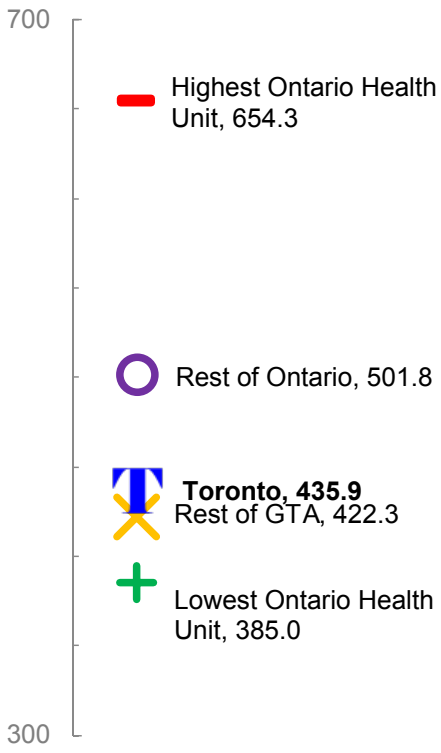
Regional Comparisons

Toronto had a higher life expectancy than other areas in Ontario.

Figure 2 shows the age-standardized all-cause mortality rate per 100,000 people for Toronto, the rest of the Greater Toronto Area (GTA without Toronto), the rest of Ontario (Ontario without Toronto), and the highest and lowest Ontario health units in 2010.

Toronto's all-cause mortality rate was significantly lower than the rest of Ontario. This indicates that Toronto has a higher life expectancy than other areas in Ontario. Toronto ranked 34th of the 36 health units in Ontario, with the first ranked health unit having the highest rate.

Figure 2: Age-Standardized All-Cause Mortality per 100,000 Population, Selected Regions in Ontario, 2010



Data Source: see Data Notes.

Toronto Neighbourhood Comparisons

Some neighbourhoods close to the city's waterfront had significantly higher age-standardized mortality rates than the city overall.

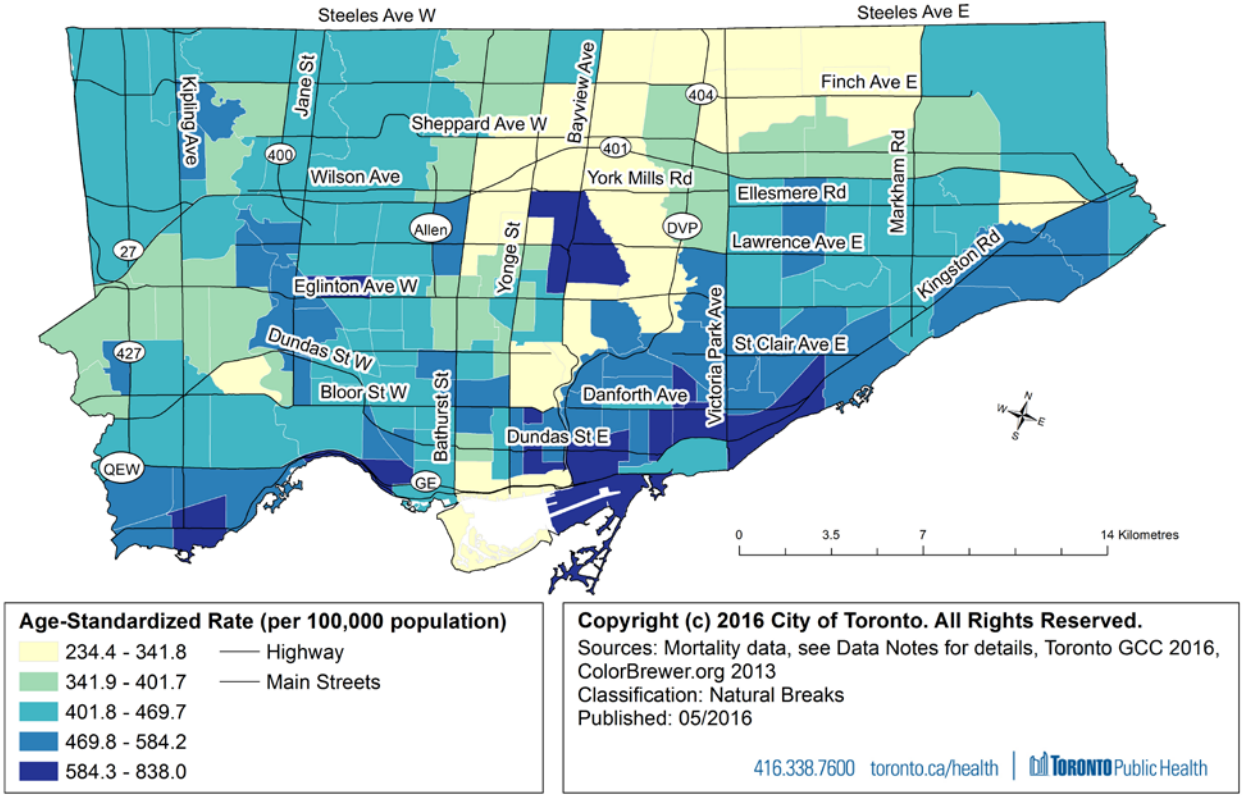
Map 1 shows age-standardized all-cause mortality by Toronto's neighbourhoods for 2008 to 2010 combined. Areas close to the waterfront had clusters of neighbourhoods with higher mortality rates than the city as a whole. Less favourable results were found in the following neighbourhoods:

- Moss Park
- South Parkdale
- Woodbine Corridor
- New Toronto
- East End-Danforth
- North St. Jamestown.

Midtown and north-western Scarborough had clusters of neighbourhoods with lower all-cause mortality rates than the city as a whole. Favourable results were found in some neighbourhoods including:

- Milliken
- Bayview Village
- Steeles, Hillcrest Village
- Rosedale-Moore ParkWillowdale
- East Kingsway and Bedford Park-Nortown

Map 1: Age-Standardized All-Cause Mortality by Neighbourhood, 2008 to 2010 Combined



Socio-demographics

Males in Toronto had a significantly higher mortality rate than females.

The lowest income quintile had a significantly higher age-standardized mortality rate than highest income quintile.

Females in Toronto live five years longer on average than males and stay healthy for longer.

Ischemic heart disease is the leading cause of death for both females and males in Toronto.

Table 1 shows the all-cause mortality rates per 100,000 people for four age groups. Mortality rates were similar in the 0 to 19 and 20 to 39 age groups, and then increased with age.

Table 2 shows the all-cause mortality rates per 100,000 people by sex (age-standardized estimates). All cause mortality rates were significantly higher in men compared to women.

Table 1: All-Cause Mortality by Age Group, Toronto, 2010

Age	Age-Specific Mortality (per 100,000)
0 to 19 years	43.9
20 to 39 years	45.3
40 to 64 years	305.5
65 plus years	3,566.1

Data Source: see Data Note.

Table 2: All-Cause Mortality by Sex, Toronto, 2010

Sex	Age Standardized Mortality (per 100,000)
Male	540.8 H
Female	355.3 L

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

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

Data Source: see Data Notes.

Table 3 shows the age-standardized all-cause mortality rates per 100,000 people by income quintile. Quintile 1 contains the areas in Toronto with the highest percent of people living below the low income measure, making it the lowest income quintile. Quintile 5 contains the areas in Toronto with the lowest percent of people living below the low income measure, making it the highest income quintile.

Quintile 1, 3 and 4 had significantly higher all-cause mortality rates compared to Quintile 5. The mortality rate of the lowest income quintile was 63.5 deaths per 100,000 more than rate of the highest income quintile.

Table 3: Age-Standardized All-Cause Mortality by Income Quintile, Toronto, 2008 to 2010 combined

Income Level	Mortality per 100,000
Quintile 1 (Lower)	461.2 [H]
Quintile 2	407.9
Quintile 3	447.7 [H]
Quintile 4	436.6 [H]
Quintile 5	397.7

[H] Significantly higher than Quintile 5, the higher income group, indicating a health inequality and an unfavourable result for that group. Data Source: see Data Notes.

Table 4 shows life expectancy and health-adjusted life expectancy (HALE) for females and males in Toronto at birth in 2010. Life expectancy is a measure of how long someone at a particular age is predicted to live, based on the patterns in age-specific deaths at that time. HALE takes health-related quality of life into consideration and shows how long someone can expect to live a healthy life. For more information, please see the data notes.

Life expectancy at birth in 2010 was 85.4 for females and 80.7 for males. HALE was 77.2 for females and 74.3 for males.

Table 4: Life Expectancy and Health-Adjusted Life Expectancy† at Birth, Toronto, 2010

	Male	Female
Life Expectancy	80.7	85.4
Health-Adjusted Life Expectancy	74.3	77.2

Data Sources: see Data Notes.

Tables 5 and 6 show the ten leading causes of death for females and males respectively in 2010 by age-standardized mortality rate per 100,000 people. The table also shows the number of deaths for each cause.

Ischemic heart disease is the leading cause of death for both females and males, with almost 2,400 deaths combined in 2010 and an age-standardized mortality rate of 39.5 for females and 83.5 for males. Other top leading causes of death for females and males include dementia and Alzheimer's disease, lung cancer, and cerebrovascular disease (such as stroke).

Table 5: Age-Standardized Mortality Rate and Number of Deaths for Leading Causes*, Females, Toronto, 2010

Leading Cause of Death*	Mortality (per 100,000)	Number of Deaths
1. Ischaemic Heart Disease	39.5	1036
2. Dementia and Alzheimer's Disease	29.2	909
3. Cancer of Lung and Bronchus	22.0	445
4. Cerebrovascular Diseases	19.8	534
5. Cancer of Breast	16.9	327
6. Chronic Lower Respiratory Diseases	10.5	256
7. Diabetes	10.5	256
8. Cancer of Lymph, Blood, and Related	10.4	219
9. Cancer of Colon, Rectum and Anus	10.3	231
10. Influenza and Pneumonia	8.5	249
11. Disease of Urinary System	7.9	219

Table 6: Age-Standardized Mortality Rate and Number of Deaths for Leading Causes*, Males, Toronto, 2010

Leading Cause of Death*	Mortality (per 100,000)	Number of Deaths
1. Ischaemic Heart Disease	83.5	1331
2. Cancer and Lung and Bronchus	41.1	625
3. Cerebrovascular Diseases	27.2	435
4. Dementia and Alzheimer's Disease	25.9	440
5. Cancer of Colon, Rectum and Anus	19.0	291
6. Chronic Lower Respiratory Diseases	18.9	305
7. Diabetes	16.7	258
8. Cancer of Lymph, Blood, and Related	15.5	236
9. Cancer of Prostate	14.0	225
10. Falls	12.0	198

* Leading causes ordered by age-standardized mortality rate, see data notes for definitions and classifications.

Data Sources: see Data Notes.

Data Notes

Notes

- Significant differences were estimated using overlapping confidence intervals. Although this method is conservative ($\alpha < 0.01$) 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.
- Time trend analysis is based on data from the most recent 10 year-period or, when there are fewer than 10 years of data, from the earliest available year of complete and reliable data. The number of years available for reporting is determined by the frequency of data collection.
- Toronto is compared to Ontario without Toronto as opposed to the Ontario total because Toronto comprises such a large proportion of the Ontario population.
- Map 1 and Table 3 are based on three years of data combined in order to obtain a sample size large enough to analyze the data at smaller levels. By combining years of data we may be hiding changes over time in and between geographical areas.
- 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.

Definitions

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

Age Standardization is a technique which removes the effects of the distribution of age in two or more populations.

Health-Adjusted Life-Expectancy is life expectancy weighted or adjusted for a measure of health-related quality of life (HRQOL). The HRQOL measure used here is adapted from the Health Utilities Index Mark 3 (HIU3), which provides a description of an individual's overall functional health, based on eight attributes: vision, hearing, speech, ambulation (ability to get around), dexterity (use of hands and fingers), emotion (feelings), cognition (memory and thinking) and pain.

Income Quintiles are five groups, each containing approximately 20% of the population. They 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), based on 2009 income tax filer data. 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 family income in Canada in a given year, adjusted for household size.

Leading Causes of Death are based on a standard list developed by Becker, et al. (2006) for the World Health Organization (WHO) that was modified by the Association of Public Health Epidemiologists of Ontario(APHEO) in 2008. The original methodology and WHO **categories can be** found at http://www.who.int/bulletin/volumes/84/4/297.pdf, and the APHEO modifications can be found at http://www.apheo.ca/resources/indicators/APHEO%20Modifications%20to%20Lead%20CauseDeath%20Becker%20at%20al.,16Dec2008.pdf

The following ICD-10 codes correspond to the leading cause groups found in this report:

Ischaemic Heart Disease	*I20-I25*
Cancer of Lung and Bronchus	*C34*
Dementia and Alzheimer's Disease	*F00, F01, F03, G30*
Cerebrovascular Diseases	*I60-I69*
Cancer of Colon, Rectum and Anus	*C18-C21, C26.0*
Diabetes	*E10-E14*
Chronic Lower Respiratory Diseases	*J40-J47*
Cancer of Lymph, Blood and Related	*C81-C86*
Cancer of Prostate	*C61*
Cancer of Breast	*C50*
Influenza and Pneumonia	*J10-J18*

Life Expectancy is the average length of time that an individual will live if subjected to the mortality experience for the specified population and time period. The period life table approach is used, which takes into consideration the current age-specific mortality rate for the population. Generally, life expectancy should not be used as a predictor of future health.

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

Health-Related Quality of Life: Canadian Community Health Survey, 2007-2008, Statistics Canada, Share File, Knowledge Management and Reporting Branch, Ontario Ministry of Health and Long-Term Care.

Used in:

- Table 4

Income Quintiles: Income Estimates for Census Families and Individuals (T1 Family File), Table F-18, Statistics Canada, 2010.

Used in:

- Table 3

Mortality: Vital Statistics, 2001- 2010, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 2015.

Used in:

- Figures 1 and 2
- Tables 1, 2, 3, 4, 5 and 6
- Map 1

Denominator data:

Population for Toronto and Larger Areas: Population Estimates 2001 to 2010, Ontario Ministry of Health and Long term Care, IntelliHEALTH ONTARIO. Date extracted: December 2012.

Used in:

- Figure 1 and 2
- Table 1, 2, 4, 5 and 6

Population for Neighbourhood or Service Delivery Areas: 2011 Canada Census, Statistics Canada.

Used in:

- Map 1
- Table 3

Health Surveillance Indicator: All Cause Mortality and Life Expectancy

Category: Overall Health and Well-being

Prepared: April, 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

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