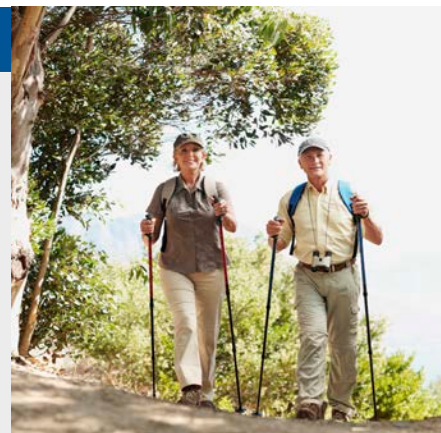## HEALTH SURVEILLANCE INDICATORS:
DIABETES

Public Health Relevance

Diabetes is a disease characterized by high blood sugar, either because the body does not produce enough insulin or because the cells do not respond to the insulin that is produced. Insulin allows sugar to be moved out of the blood and into storage in the muscles, liver, and fat.

Diabetes can lead to serious complications such as blindness, kidney failure, stroke and heart disease. It can also cause premature death. Among adults aged 20 years and older, mortality rates of individuals with diabetes are twice as high as those for individuals without diabetes.

There are two types of diabetes. Type 2 diabetes, previously known as adult-onset diabetes, has many modifiable risk factors, including carrying excess fat, particularly around the waist, and physical inactivity. Diets high in sugar and fat or low in vegetables and fruit also increase the risk of Type 2 diabetes. Type 1 diabetes, also known as juvenile diabetes or insulin dependent diabetes, is generally developed in childhood and is not caused by the same risk factors as Type 2. The data reported here include Type 1 and Type 2 diabetes. The International Diabetes Federation states that over 90% of all diabetes cases are Type 2.

Highlights

1. Diabetes prevalence in Toronto increased from 2003 to 2014. The incidence remained stable over this same time period.
2. Diabetes prevalence and incidence in Toronto were lower than in the rest of the Greater Toronto Area but higher than the rest of Ontario.
3. York South Humber, Toronto Centre, Danforth East York, and Willowdale Don Mills had lower diabetes prevalence and incidence than Toronto as a whole.
4. The lowest income group had the highest rates of prevalence and incidence for diabetes.
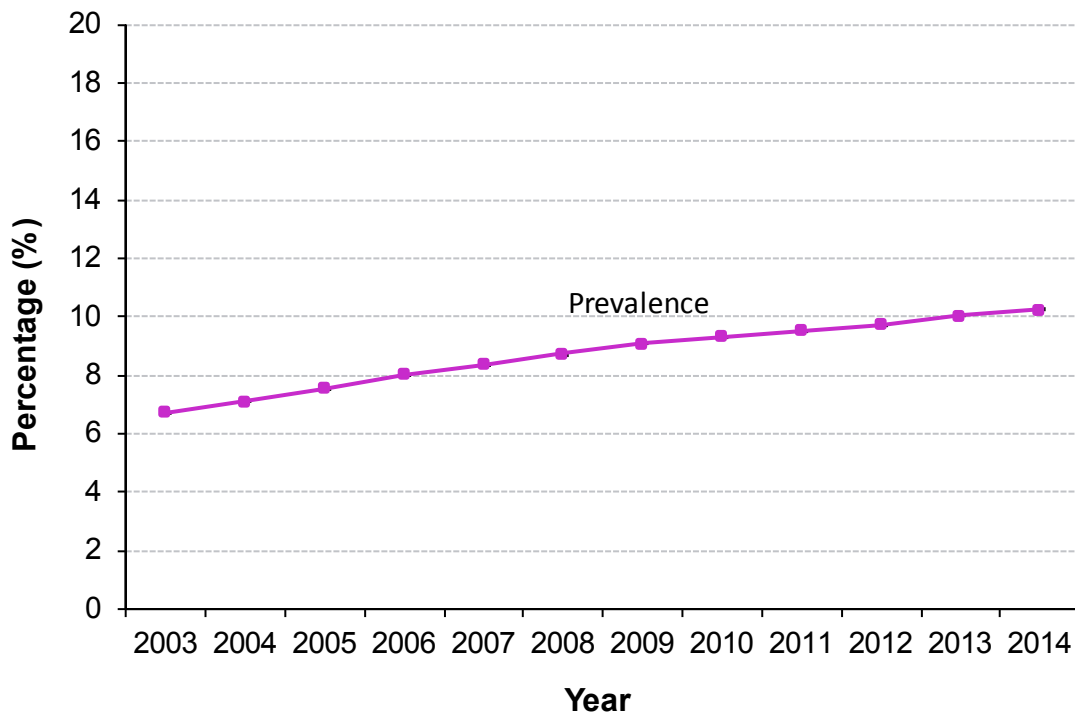
Trends Over Time

Diabetes prevalence in Toronto increased from 2003 to 2014. Incidence remained stable over this same time period.

Figure 1a shows age-standardized diabetes prevalence (%) from 2003 to 2014.

Toronto diabetes prevalence increased from 6.7% in 2003 to 10.2% in 2014.

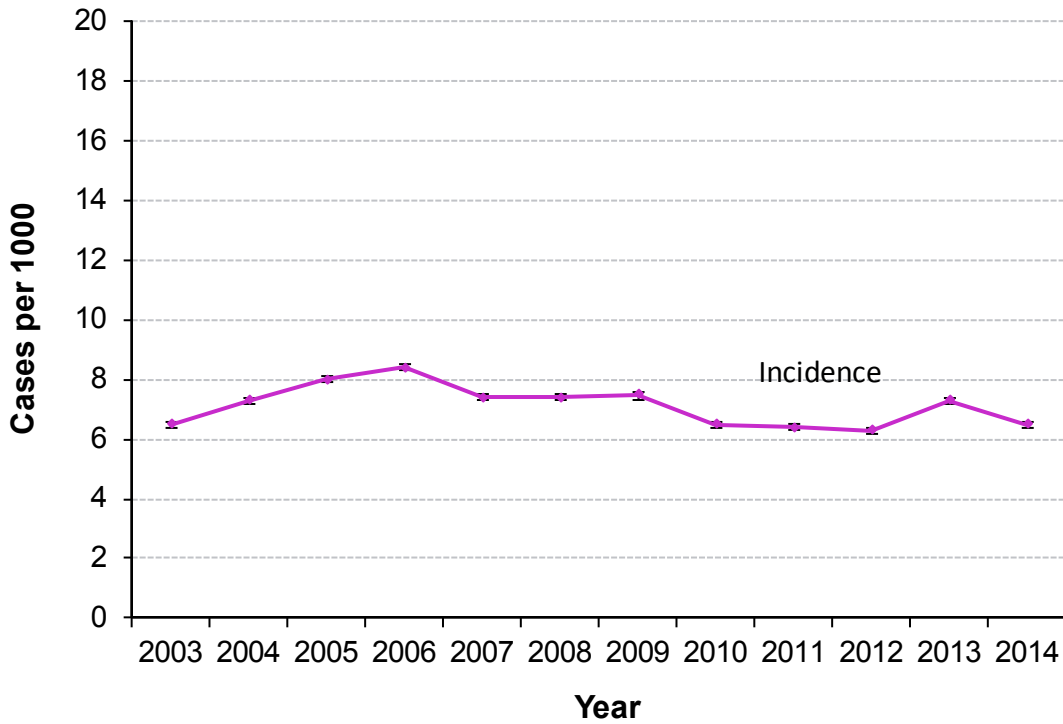**Figure 1a: Age-standardized Prevalence (%) of Diabetes in Toronto, 2003 to 2014**

95% confidence intervals not visible due to the their small size relative the scale of the graph
Data Source: see Data Notes.

Figure 1b shows age-standardized diabetes incidence per 1000 individuals from 2003 to 2014.

From 2003 to 2014, diabetes incidence in Toronto remained stable with a rate of 6.5 cases/1000 individuals in 2014.

Figure 1b: Age-standardized Incidence (per 1000) of Diabetes in Toronto, 2003 to 2014

95% confidence intervals not visible due to the their small size relative the scale of the graph.
Data Source: see Data Notes.
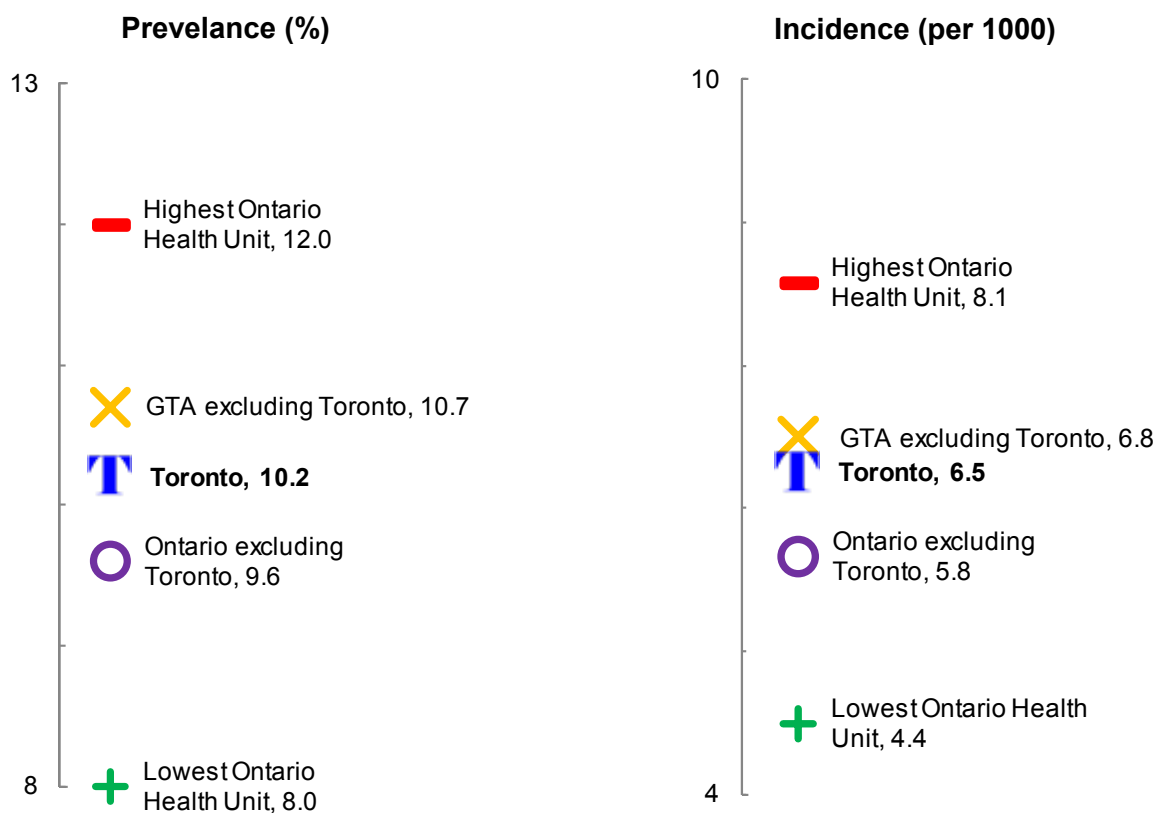
Regional Comparisons

Diabetes prevalence and incidence in Toronto were lower than the Greater Toronto Area but higher than in the rest Ontario.

Figure 2 shows age-standardized diabetes prevalence and incidence for Toronto compared to the rest of Ontario (Ontario excluding Toronto), the rest of the Greater Toronto Area (GTA excluding Toronto), and the health units in Ontario with the highest and lowest rates.

Diabetes prevalence in Toronto was significantly higher compared to the rest of Ontario but was significantly lower compared to the rest of GTA. Toronto ranked 10th of the 36 health units in Ontario (a drop from its 4th ranking in 2013), with the 36th ranked health unit having the lowest (most favourable) rate. Toronto's prevalence was significantly lower than the health unit with the highest prevalence in 2014.

Diabetes incidence was significantly higher in Toronto compared to the rest of Ontario but was significantly lower compared to the rest of GTA. Toronto ranked 6th of the 36 health units in Ontario (a drop from its 2nd ranking in 2013), with the 36th ranked health unit having the lowest (most favourable) rate. Toronto's incidence was significantly lower than the health unit with the highest incidence in 2014.

Figure 2: Age-Standardized Diabetes Prevalence (%) and Incidence (per 1000), Selected Regions in Ontario, 2014

Prevelance (%)

- Highest Ontario Health Unit, 12.0
- GTA excluding Toronto, 10.7
- **Toronto, 10.2**
- Ontario excluding Toronto, 9.6
- Lowest Ontario Health Unit, 8.0

(axis range 8 to 13)

Incidence (per 1000)

- Highest Ontario Health Unit, 8.1
- GTA excluding Toronto, 6.8
- **Toronto, 6.5**
- Ontario excluding Toronto, 5.8
- Lowest Ontario Health Unit, 4.4

(axis range 4 to 10)

Data Sources: see Data Notes.

Toronto Neighbourhood Comparisons

York South Humber, Toronto Centre, Danforth East York, and Willowdale Don Mills had lower diabetes prevalence and incidence than Toronto as a whole.

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

- Danforth East York
- Toronto Centre
- Willowdale Don Mills
- York South Humber

Significantly higher rates were found in:

- East Scarborough
- Humber-Downsview
- Rexdale Etobicoke
- West Scarborough

Table 1: Age-Standardized Diabetes Prevalence (%) and Incidence (per 1000), by Service Delivery Areas*, Toronto, 2014

Service Delivery Area	Prevalence (%)	Incidence (per 1000)
Rexdale Etobicoke	11.3 H	6.9 H
York South Humber	9.4 L	5.8 L
Humber-Downsview	13.4 H	8.5 H
Willowdale Don Mills	8.9 L	6.2 L
Toronto Centre	8.0 L	4.7 L
Danforth East York	9.4 L	6.3 L
West Scarborough	9.4 L	8.4 H
East Scarborough	9.4 L	9.2 H
Toronto	**10.2**	**6.5**

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

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

* Toronto Public Health's Chronic Disease and Injury Prevention (CDIP) Service Delivery Areas. Data Sources: see Data Notes.

Map 1 shows age-standardized diabetes prevalence for Toronto's 140 neighbourhoods for 2014.
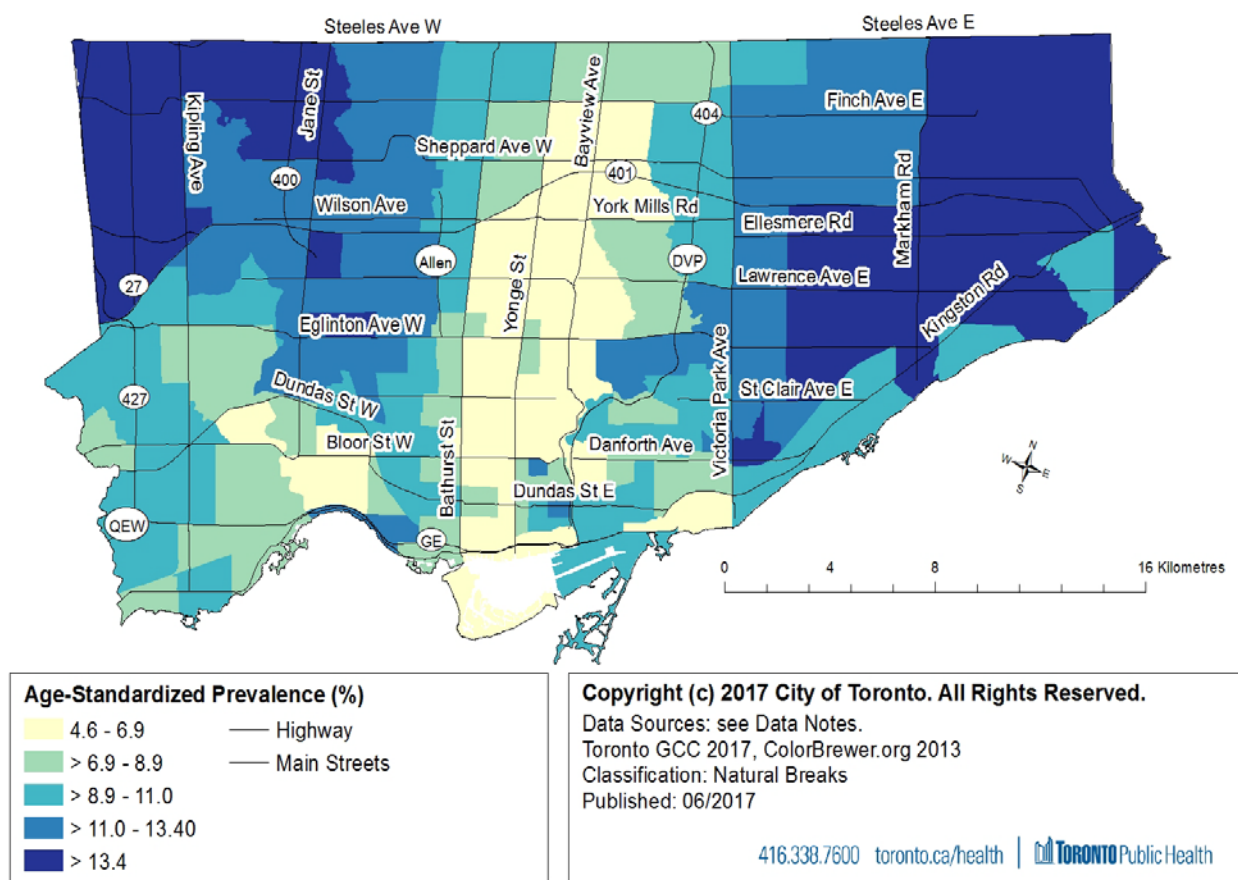
Prevalence ranged from 4.6% to 16.8%. The centre of city and southern Etobicoke area had clusters of neighbourhoods with significantly lower prevalence than Toronto as a whole. Some neighbourhoods with significantly lower rates included:

- Forest Hill South
- Lawrence Park North
- Lawrence Park South

- Rosedale-Moore Park
- The Beaches
- Yonge-St. Clair

The city's northeast (Scarborough) and northwest (northern Etobicoke) areas had clusters of neighbourhoods with significantly higher prevalence than Toronto as a whole. Some neighbourhoods with significantly higher rates included:

- Eglinton East
- Malvern
- Morningside

- Mount Olive-Silverstone-Jamestown
- Rouge
- Scarborough Village

Map 1: Age-Standardized Diabetes Prevalence (%) by Neighbourhood, Toronto, 2014.

Map 2 shows age-standardized diabetes incidence for Toronto's 140 neighbourhoods for 2014.
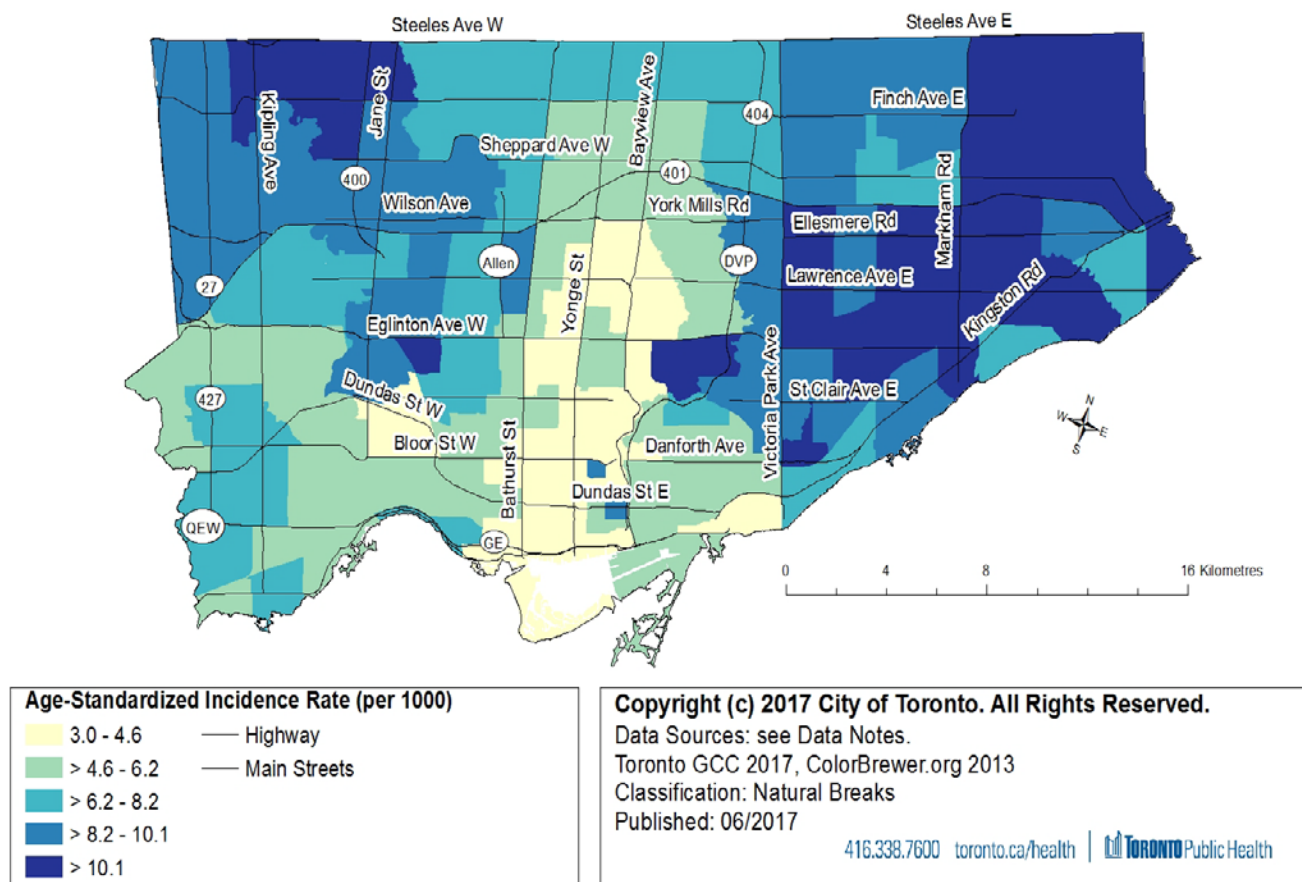
Incidence ranged from 3.0 to 12.4 per 1000. The centre of the city and southern Etobicoke area had clusters of neighbourhoods with significantly lower incidence than Toronto as a whole. Some neighbourhoods with significantly lower rates include:

- Annex
- Bay Street Corridor
- Lawrence Park South

- Niagara
- Palmerston-Little Italy
- University

The city's northeast (Scarborough) and northwest (northern Etobicoke) areas had clusters of neighbourhoods with significantly higher incidence than Toronto as a whole. Some neighbourhoods with significantly higher rates include:

- Eglinton East
- Humbermede
- Ionview

- Oakridge
- Scarborough Village
- Thorncliffe Park

Map 2: Age-Standardized Diabetes Incidence (per 1000) by Neighourhood, Toronto, 2014

Age-Standardized Incidence Rate (per 1000)

3.0 - 4.6	—— Highway
> 4.6 - 6.2	—— Main Streets
> 6.2 - 8.2	
> 8.2 - 10.1	
> 10.1	

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Data Sources: see Data Notes.
Toronto GCC 2017, ColorBrewer.org 2013
Classification: Natural Breaks
Published: 06/2017

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Socio-demographics

The lowest income group had the highest prevalence and incidence rates for diabetes.

Table 2 shows age-standardized diabetes prevalance and incidence by sex in Toronto. Females had a significantly higher prevalence compared to males. There was no significant difference between males and females for incidence.

Table 2: Age-Standardized Diabetes Prevalence (%) and Incidence (per 1000) by Sex, Toronto, 2014

Sex	Prevalence (%)	Incidence (per 1000)
Male	10.2 **L**	6.5
Female	10.3 **H**	6.6

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 Sources: see Data Notes.

Table 3 shows diabetes prevalence and incidence by age group for Toronto in 2014. Prevalence and incidence rates increased as age increased.

Table 3: Diabetes Prevalence (%) and Incidence (1000) by Age Group, Toronto, 2014

Age Group	Prevalence (%)	Incidence (per 1000)
20 to 39 years	2.6	3.4
40 to 64 years	14.3 **H**	10.1 **H**
65 plus years	31.2 **H**	12.0 **H**

H Significantly higher than the youngest age group, indicating a less favourable result for this group
Data Sources: see Data Notes.

Table 4 shows age-standardized diabetes prevalence and incidence rates by income quintile. Quintile 1 includes areas in Toronto with the highest percentage of people living below the low income measure (LIM). Quintile 5 includes areas in Toronto with the lowest percentage of people living below the LIM.

The lower income quintiles (Quintile 1, 2, 3 and 4) all had significantly higher rates of diabetes prevalence and incidence compared to the highest income quintile (Quintile 5).

Table 4: Age-Standardized Diabetes Prevalence (%) and Incidence (per 1000) by Income Quintile, Toronto, 2014

Income Level	Prevalence (%)	Incidence (per 1000)
Quintile 1(lower income)	11.9 **H**	7.7 **H**
Quintile 2	10.7 **H**	7.1 **H**
Quintile 3	11.0 **H**	6.9 **H**
Quintile 4	9.9 **H**	6.1 **H**
Quintile 5 (higher income)	8.2	5.2 **H**

H Significantly higher than Quintile 5, the higher income group, indicating a less favourable result for that group.
Data Sources: see Data Notes.

Data Notes

Notes

- Significant differences were estimated using overlapping confidence intervals. Although this method is conservative (α ~< 0.01) and most appropriate when comparing mutually exclusive groups, it was chosen as an objective means of drawing conclusions on population-based data. Multiple comparisons performed in the analyses were not taken into consideration when choosing the level of significance to test.

- 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 GTA (Greater Toronto Area) for the same reason.

- 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.

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

Incidence reflects the number of new diabetes cases age 20 and older diagnosed between the fiscal year of April 1, 2014 and March 31, 2015 derived from the Ontario Diabetes Database (ODD). The denominator is all individuals age 20 and older with a valid OHIP card and gender (male/female), who were alive during this period and living in the City of Toronto. This information was derived from the Registered Person Data Base (RPDB).

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.

Prevalence reflects the number of diabetes cases for the Toronto population age 20 and older between the fiscal year of April 1, 2014 and March 31, 2015 derived from the Ontario Diabetes Database. The denominator is all individuals age 20 and older with a valid OHIP card and gender (male/female), who were alive during this period and living in the City of Toronto. This information was derived from the Registered Person Data Base (RPDB).

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

Numerator Data:

Diabetes: Ontario Diabetes Database (ODD), Fiscal 2014/2015, Institute for Clinical Evaluative Sciences (ICES).

Used in:

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

Denominator Data:

OHIP: Registered Person Data Base (RPDB), Fiscal 2014/2015, Institute for Clinical Evaluative Sciences (ICES).

Used in:

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

Income Quintiles: Income Estimates for Census Families and Individuals (T1 Family File), Table F-18, Statistics Canada, 2009-2014.

Used in:

- Table 4

Health Surveillance Indicator: Diabetes

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