

## TECHNICAL NOTES

# Potentially Avoidable Mortality Snapshot

Updated: February 2024

## Introduction

This Snapshot captures individuals under 75 years of age who have died with a condition considered as avoidable recorded as the primary cause of death, reported by calendar year of death for 34 Public Health Units (PHUs), 14 Local Health Integration Networks (LHINs), and other geographic comparators in Ontario for the calendar years 2012 to 2021. (Note: Public Health Ontario will continue to report indicators by LHIN until the Snapshot can be updated with Ontario Health Region geography).

## Adapted From

APHEO Potentially Avoidable Mortality Core Indicator<sup>1</sup>

## Specific Indicators

### Avoidable Causes of Mortality

**Mortality from avoidable causes – UPDATED. See Summary of Revisions**

- All ICD-10 codes listed below for preventable and treatable causes are included in this mortality from avoidable causes indicator.

### Preventable Causes of Mortality

**Mortality from preventable causes**

- All ICD-10 codes for disease groups listed below are included in this mortality from preventable causes indicator. Selected disease groups (marked with an asterisk) are presented as separate indicators.

#### Preventable infections

- Enteritis and other diarrhoeal disease: A00–A09
- Vaccine-preventable diseases: A35–A37, A39, A40.3, A41.3, A49.2, A80, B01, B05, B06, J09–J11, J13, J14, G00.0, G00.1
- Sexually transmitted infections, except HIV/AIDS: A50–A60, A63, A64
- Viral hepatitis: B15–B19
- HIV/AIDS: B20–B24

**\*Preventable neoplasms (cancers)**

- Lip, oral cavity and pharynx cancer: C00–C14
- Esophageal cancer: C15
- Stomach cancer: C16
- Liver cancer: C22
- Lung cancer: C33, C34
- Melanoma skin cancer: C43
- Non-melanoma skin cancer: C44

**\*Preventable diseases of the circulatory system (cardiovascular diseases)**

- Rheumatic heart disease: I01, I02, I05–I09
- Cerebrovascular diseases (50% of deaths): I60–I62, I63–I64, I67, I69
- Ischaemic heart disease (50% of deaths): I20–I25
- Other atherosclerosis (50% of deaths): I70, I73.9
- Aortic aneurysm: I71
- Venous thromboembolism: I26, I80, I82.9

**\*Preventable diseases of the respiratory system**

- Chronic obstructive pulmonary disorders: J40–J44
- Lung diseases due to external agents: C45, J60–J64, J66–J70, J82, J92

**Preventable diseases of the digestive system**

- Chronic liver disease (excluding alcohol-related disease): K73, K74.0,1,2,6

**Preventable infant and maternal causes**

- Complications of perinatal period: A33

**\*Preventable injuries**

- Transport accidents: V01–V99
- Falls: W00–W19
- Other external causes of accidental injury: W20–W64, W75–W99, X10–X39, X50–X59
- Drowning: W65–W74
- Fires and flames: X00–X09
- Accidental poisonings: X40–X49
- Injuries of Undetermined Intent: Y10–Y34
- Suicide and self-inflicted injuries: X60–X84, Y87.0
- Assault: X85–X99, Y00–Y09, Y87.1

### **Preventable alcohol and drug use disorders**

- Alcohol-related diseases, excluding external causes: F10, G31.2, G62.1, I42.6, K29.2, K70, K85.2, K86.0
- Drug use disorders: F11–F16, F18, F19
- Preventable nutritional, endocrine and metabolic disorders
- Nutritional deficiency anaemia: D50–D53
- Diabetes mellitus (50% of deaths): E10–E14

### **Preventable adverse effects of medical and surgical care**

- Drugs, medicaments and biological substances causing adverse effects in therapeutic use: Y40–Y59
- Misadventures to patients during surgical and medical care: Y60–Y66, Y69
- Medical devices associated with adverse incidents in diagnostic and therapeutic use: Y70–Y82
- Surgical and other medical procedures as the cause of abnormal reaction: Y83, Y84

**NOTE: For those diseases where only 50% of the deaths were considered preventable, potential years lost in the dataset were weighted as 0.5 (compared to 1.0 for all other potential years lost).**

## **Treatable Causes of Mortality**

### **Mortality from treatable causes**

All ICD-10 codes for disease groups listed below are included in this mortality from treatable causes indicator.

#### **Treatable infections**

- Tuberculosis: A16-A19, B90, J65
- Selected invasive bacterial infections: A38, A48.1, A49.1
- Sepsis: A40 (except A40.3), A41 (except A41.3)
- Malaria: B50-B54
- Meningitis: G00.2,3,8,9
- Cellulitis: A46, L03
- Pneumonia: J12, J15, J16, J18

#### **Treatable neoplasms (cancers)**

- Colorectal cancer: C18-C21
- Malignant neoplasm of breast: C50 (female only)
- Cervical cancer: C53
- Uterus cancer: C54, C55
- Testicular cancer: C62
- Bladder cancer: C67
- Thyroid cancer: C73

- Hodgkin's disease: C81
- Leukemia: C91.0, C91.1, C92.1 (age < 45)
- Benign neoplasms: D10–D36

#### **Treatable diseases of the circulatory system (cardiovascular diseases)**

- Hypertensive diseases: I10, I11–I13, I15
- Cerebrovascular diseases (50% of deaths): I60–I62, I63–I64, I67, I69
- Ischaemic heart disease (50% of deaths): I20–I25
- Other atherosclerosis (50% of deaths): I70, I73.9

#### **Treatable diseases of the respiratory system – UPDATED. See Summary of Revisions**

- Asthma and bronchiectasis: J45, J46, J47
- Acute lower respiratory infections: J20, J22
- Upper respiratory infections: J00–J06, J30–J39
- Adult respiratory distress syndrome: J80
- Pulmonary oedema: J81
- Abscess of lung and mediastinum; pyothorax: J85, J86
- Other pleural disorders: J90, J93, J94
- Other respiratory disorders: J98

#### **Treatable diseases of the digestive system**

- Peptic ulcer disease: K25–K28
- Diseases of appendix; hernia; disorders of gallbladder, biliary tract and pancreas: K35–K38, K40–K46, K80–K83, K85.0,1,3,8,9, K86.1,2,3,8,9

#### **Treatable diseases of the genitourinary system**

- Nephritis and nephrosis: N00–N07
- Renal failure: N17–N19
- Obstructive uropathy, urolithiasis and prostatic hyperplasia: N13, N20, N21, N23, N35, N40
- Inflammatory diseases of genitourinary system: N34.1, N70–N73, N75.0, N75.1, N76.4, N76.6
- Disorders resulting from impaired renal tubular function: N25

#### **Treatable infant and maternal causes**

- Complications of perinatal period: H31.1, P00–P96
- Congenital malformations, deformations and chromosomal anomalies: Q00–Q99
- Pregnancy, childbirth and the puerperium: O00–O99

### **Treatable nutritional, endocrine and metabolic disorders**

- Thyroid disorders: E00–E07
- Diabetes mellitus (50% of deaths): E10–E14
- Adrenal disorders: E24, E25, E27
- Congenital metabolic disorders: E74.0, E74.2

### **Treatable neurological disorders**

- Epilepsy: G40, G41

### **Treatable disorders of the musculoskeletal system**

- Osteomyelitis: M86

**NOTE: For those diseases where only 50% of the deaths were considered treatable, years lost in the dataset were weighted as 0.5 (compared to 1.0 for all other potential years lost).**

## **Measures Included**

### **Age-standardized rates**

- Age-standardized rate (both sexes)
- Age-standardized rate (males)
- Age-standardized rate (females)

### **Standardized morbidity ratios (SMR)**

- Standardized mortality ratio (both sexes)
- Standardized mortality ratio (males)
- Standardized mortality ratio (females)

### **Crude rates**

- Crude rate (both sexes)
- Crude rate (males)
- Crude rate (females)

### **Age-specific rates**

- Age-specific rate (ages 0 to 19) / (age 10 to 19 for intentional self-harm)
- Age-specific rate (ages 20 to 44)
- Age-specific rate (ages 45 to 64)
- Age-specific rate (ages 65 to 74)

# Metrics Included

- Rates (Age-standardized, SMRs, crude, age-specific)
- 95% confidence intervals (CIs for rates calculated using a Poisson approximation of the binomial distribution, CIs for SMRs calculated using Byar’s Approximation)
- Statistical significance compared to Ontario (for rates, confidence interval around the difference between the health unit rate and the Ontario rate does not include zero; for SMRs, confidence interval around SMR does not include one)
- Deaths (numerator)
- Population (denominator)

# Geographic Comparisons Included

- Ontario
- Ontario minus Toronto
- Snapshots peer groups (based on Statistics Canada peer groups). For more information on Statistics Canada peer group methodology see: [Health region peer groups – working paper, 2018 on the Statistics Canada website](#).<sup>2</sup> Table 1 shows the mapping between the peer groupings used in Snapshots and the nationally defined 2018 Statistics Canada peer groups:

**Table 1: Mapping Between Snapshots Peer Groups and Statistics Canada 2018 Peer Groups**

| Snapshot Peer Groups   | Component Public Health Units  |
|--|--|
| Mainly urban centres with moderate population density (Statistics Canada peer group B) | <ul style="list-style-type: none"> <li>• Durham Region Health Department</li> <li>• Halton Region Public Health</li> <li>• City of Hamilton Public Health Services</li> <li>• Middlesex-London Health Unit</li> <li>• Ottawa Public Health</li> <li>• Region of Waterloo Public Health and Emergency Services</li> <li>• Windsor-Essex County Health Unit</li> </ul>   |
| Sparsely populated urban-rural mix (Statistics Canada peer group C)                    | <ul style="list-style-type: none"> <li>• Algoma Public Health</li> <li>• Brant County Health Unit</li> <li>• Chatham-Kent Public Health</li> <li>• Eastern Ontario Health Unit</li> <li>• Haliburton, Kawartha, Pine Ridge District Health Unit</li> <li>• Hastings Prince Edward Public Health</li> <li>• Kingston, Frontenac and Lennox &amp; Addington Public Health</li> <li>• Lambton Public Health</li> <li>• Niagara Region Public Health</li> <li>• North Bay Parry Sound District Health Unit</li> <li>• Porcupine Health Unit</li> <li>• Peterborough Public Health</li> <li>• Public Health Sudbury &amp; Districts</li> <li>• Thunder Bay District Health Unit</li> <li>• Timiskaming Health Unit</li> </ul> |

| Snapshot Peer Groups  | Component Public Health Units  |
|---|--|
| Mainly rural (Statistics Canada peer group D)   | <ul style="list-style-type: none"> <li>• Grey Bruce Health Unit</li> <li>• Haldimand-Norfolk Health Unit</li> <li>• Huron Perth Public Health</li> <li>• Leeds, Grenville &amp; Lanark District Health Unit</li> <li>• Northwestern Health Unit</li> <li>• Renfrew County and District Health Unit</li> <li>• Simcoe Muskoka District Health Unit</li> <li>• Southwestern Public Health</li> <li>• Wellington-Dufferin-Guelph Public Health</li> </ul> |
| Largest population centres with high population density (Statistics Canada peer groups G & H) | <ul style="list-style-type: none"> <li>• Toronto Public Health</li> <li>• Peel Public Health</li> <li>• York Region Public Health</li> </ul>   |

## Exclusion Criteria

- Records without a valid age have been excluded from overall age-standardized rates and standardized incidence ratios. Records without a valid gender have been excluded from sex-specific age standardized rates, standardized incidence ratios and crude rates. Ontario rates include those with missing information for public health unit.
- While those aged 75 year and older have been excluded, this upper limit on mortality due to avoidable causes is still regarded as somewhat arbitrary as there are deaths in the population aged 75 and older that can be prevented.
- Individuals less than age ten are excluded from preventable mortality due to suicide and self-inflicted injuries.<sup>1</sup>

## Other Methodological Notes

- Calculated age-standardized rates and associated variances using methodology described on the APHEO website.<sup>3</sup>
- Calculated indicators for merged public health units (i.e., Southwestern Public Health and Huron Perth Public Health) by summing case counts and population counts from their component public health units (Table 2).

**Table 2: Merged Public Health Units**

| Public Health Unit (Year of Merger) | Component Public Health Units  |
|-------------------------------------|--|
| Southwestern Public Health (2018)   | <ul style="list-style-type: none"> <li>• Elgin St. Thomas Public Health</li> <li>• Oxford County Public Health and Emergency Services</li> </ul> |
| Huron Perth Public Health (2020)    | <ul style="list-style-type: none"> <li>• Huron County Health Unit</li> <li>• Perth District Health Unit</li> </ul>                               |

## Considerations

- Fewer than 1% of Ontario vital statistics mortality records are missing PHU over the years 2012-2021. While generally fewer than 1% of these records are missing LHIN, in 2017 over 2% were missing this information. Therefore, LHIN rates in 2017 may provide an underestimation compared to other years.
- Minor differences were identified in total deaths extracted using a PHO-defined report compared to counts obtained using the IntelliHealth standard mortality report (i.e., 1.2 PHU deaths x ICD10 chap). The data in this Snapshot were extracted using the PHO-defined report and contain an additional 128 deaths distributed across 24 PHUs in 2021, and one additional death in each of two PHUs in 2018. PHO and the IntelliHealth Support Team are investigating the discrepancies.

## Data Sources

### Numerator

#### Mortality Data (2012-2021)

- Original source: Ontario Office of Registrar General (ORG)
- Distributed by: Ontario. Ministry of Health and Long-Term Care: IntelliHEALTH ONTARIO
- Ontario Mortality Data, 2012-2021, Ontario. Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO [date extracted 2023 Oct 11].

### Denominator

#### Population Estimates (2012–2021)

- Statistics Canada. Table 17-10-0134-01: estimates of population (2016 census and administrative data), by age group and sex for July 1<sup>st</sup>, Canada, provinces, territories, health regions (2018 boundaries) and peer groups [Internet]. Ottawa, ON: Government of Canada; 2023 Mar 2 [extracted 2023 Mar 13]. Available from: <https://doi.org/10.25318/1710013401-eng>

## How to Cite this Snapshot

### Generic Citation

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## References

1. Association for Public Health Epidemiologists in Ontario (APHEO). Core indicators table [Internet]. Toronto, ON: APHEO; c2023 [cited 2023 Mar 2]. Available from: <https://www.apheo.ca/temporary-core-indicators-table>
2. Statistics Canada. Health region peer groups – working paper, 2018. Ottawa, ON: Her Majesty the Queen in Right of Canada as represented by the Minister of Industry; 2018. Available from: <https://www150.statcan.gc.ca/n1/en/pub/82-622-x/82-622-x2018001-eng.pdf?st=D4mJ-jo5>
3. Association of Public Health Epidemiologists in Ontario (APHEO). Methods for age standardizing survey estimates. [Internet]. Toronto, ON: APHEO; c2011-2023 [cited 2023 Feb 24]. Available from: <https://www.apheo.ca/methods-for-age-standardizing-survey-estimates>

## Summary of Revisions

| Description of Changes  | Page |
|---|------|
| Mortality from avoidable causes indicator <ul style="list-style-type: none"><li data-bbox="253 394 565 422">• Added ICD-10 code J46</li></ul> | 1    |
| Mortality from treatable causes indicator <ul style="list-style-type: none"><li data-bbox="253 489 565 516">• Added ICD-10 code J46</li></ul> | 4    |

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