



Understanding our Communities' Health

Current Health Status of People Residing in the
Southwestern Public Health Region

Technical Appendix
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Understanding our Community's Health:

Technical Appendix

The technical appendix describes the methods used in the corresponding population health assessment report. The methodological information will be presented under headings that follow the same order as the main report. Throughout the report, data is presented for the Southwestern Public Health (SWPH) region compared to Ontario, where possible. In some instances, data was only available for Elgin St. Thomas and Oxford County separately. Generally, when SWPH data is presented, any notable differences between Elgin St. Thomas and Oxford County are highlighted. For some data sources, it was not possible to provide trends over time due to changes in methodology (e.g., Census, Canadian Community Health Survey) or limited data availability. In those cases, the most recent available data was presented. Up to five years of data were presented in all other instances. Future iterations of population health assessment reports will describe these indicators by sociodemographic characteristics.

Demographics

Most of this section used the 2016 Census as the data source. The Census was used to describe community demographics over other data sources because it gathers information from most people living in Canada. Statistics Canada is required by law to conduct a Census of Population every five years and people living in Canada are required by law to complete their Census questionnaires.¹ Overall, the 2016 Census had a response rate of 97.6% in Ontario.² However, there are some groups of people who may not be well represented in the Census, including people living on eight Indigenous reserves in Ontario that did not permit Statistics Canada to administer the questionnaire.³ Additionally, the Low German Speaking Mennonite, Amish and Netherlands Reformed communities that live in the SWPH region are not directly identifiable in the Census. However, inferences were made about the Low German Speaking Mennonite population based on immigration and language data.

Some important definitions to interpret the data in the report are:

- **Census families in private households:** a married or common-law couple with or without children of either and/or both spouses or a lone parent of any marital status with at least one child living in the same dwelling. This is used as the denominator to calculate the per cent of lone-parent families.
 - **Private households:** dwellings that have a separate set of living quarters with a private entrance either from outside the building or from a common hall, lobby, stairwell, etc. inside the building. The entrance cannot pass through the living quarters of another person(s). This definition excludes people living in hospitals, residential care facilities (e.g., group homes, nursing homes), correctional and custodial facilities, shelters, lodging and rooming houses, hotels and motels, campgrounds and parks, school residences and training centres and religious establishments.
- **Indigenous identity:** includes people who identify as First Nations, Métis or Inuk (Inuit) and/or people who have membership in a First Nation or Indian band.
- **Visible minority:** includes people who belong to a visible minority group as defined in the *Employment Equity Act*, which does not include Indigenous peoples. It includes people who are non-Caucasian in race or non-white in colour, which mainly consists of the following groups: South Asian, Chinese, Black, Filipino, Latin American, Arab, Southeast Asian, West Asian, Korean and Japanese.⁴

There are some questions in the Census that are based on 25% sample data (i.e., the long form Census, which not everyone was asked to complete). One of these indicators is immigration status (i.e., people who have obtained their landed immigrant or permanent resident status). Recent immigration includes people who obtained their landed immigrant or permanent resident status between January 1, 2011 and May 10, 2016. The place of birth for people who immigrated is based on current geographic boundaries and not geographic boundaries at the time of birth.⁴

Health Equity

In the population health assessment report, health equity was measured by socioeconomic status (i.e., income, employment and education), the cost of living in the community, housing affordability and the Ontario Marginalization Index (ON-Marg), which combines several demographic indicators.

Income

Like the demographics section, many of the health equity indicators are from the 2016 Census. In the 2016 Census, income data was collected exclusively using administrative sources (i.e., Canada Revenue Agency (CRA)'s tax and benefits records). This includes information for tax filers and non-tax filers, which improved the data quality compared to previous years (historically was based on self-reported income data). Overall, 95% of Ontarians 15 years and older were linked to a record from the CRA. Because this data is based on CRA's records, the income data is from the calendar year 2015 whereas the rest of the Census is from the calendar year 2016.⁵

Household income includes income from regular or recurring sources (e.g., employment, investments, pensions/registered retirement income funds, child/spousal support payments, scholarships and income from government sources such as social assistance, employment insurance and disability income).⁴ Household income was limited to people living in private households.

Low income was measured using the low-income measure after-tax (LIM-AT). The LIM-AT is a relative measure of low income that identifies people who are substantially worse off than average compared to the Canadian population. The cut-off to identify low income is based on 50% of the Canadian after-tax median income from private households and varies by family size (Table 1). Notably, because this is a relative measure, there will always be people living in low income when using this definition. It is important to consider the thresholds to understand what living with a low income means. Additionally, using after-tax income is important because those measures take into consideration the reduced spending power of households because of paid income taxes, which are used to level out income between individuals.

Table 1. Low income thresholds after-tax, private households in Canada, 2015⁶

Household size	After-tax income
One person	\$22,133
Two people	\$31,301
Three people	\$38,335
Four people	\$44,266
Five people	\$49,491
Six people	\$54,215
Seven people	\$58,558

The working poor estimates also use the LIM-AT thresholds but come from a different data source than the 2016 Census; that data comes from tax filer records (T1 Family Files). Therefore, people who did not file their taxes are not included in the denominator (unlike the Census data). To be considered working poor, individuals had to be 18 years and older and earn a minimum annual income of \$3,000, which is based on the eligibility criteria to receive the federal government's Working Income Tax Benefit.⁷ The working poor excludes individuals that were post-secondary students (part-time or full-time) and children of any age living at home.

Employment

Labour force data is based on 25% sample data from the long form Census and specifically referenced the week of Sunday, May 1 to Saturday, May 7, 2016 to determine if people aged 15 years and older were employed, unemployed or not in the labour force.⁴ The denominator for the unemployment rate is the number of people in the labour force rather than the total population.

Education

Similarly, the education data is based on the long form Census and represents the highest level of education that a person 15 years and older living in a private household successfully completed. The categories of "less than high school", "high school diploma" and "postsecondary certificate, diploma or degree" were derived by Statistics Canada from the certificates, diplomas

and degrees that people reported. The categorization was largely based on the amount of time spent in class. Someone at a higher level of education may not necessarily have completed all lower levels of education (e.g., someone with an apprenticeship or trades certificate may not have a high school diploma).⁴

Cost of Living in the Community

The living wage calculation was based on existing methodology outlined in the Canadian Living Wage Framework and the 2017 British Columbia (BC) Calculation Guide.⁸ A living wage is calculated by determining family expenses (e.g., food, clothing, shelter, transportation), government credits and government deductions (including taxes and payroll deductions). The data sources used to calculate many of these costs are outlined in the 2017 BC Calculation Guide to standardize the calculation across communities (e.g., food costs are based on local Nutritious Food Basket data). However, there are areas of ambiguity in the calculation and opportunities to modify the calculation to meet local needs. These differences may affect comparability of living wage calculations across communities.

The calculation uses a standard reference family of four people: two parents working full-time at 37.5 hours/week and two children (ages 4 and 7). However, a living wage has the potential to support other family structures, such as a single adult, a lone parent with one child, a young couple considering starting a family and older working adults transitioning to retirement. Please see the living wage reports recently completed for Oxford County and Elgin St. Thomas for more information.^{9,10}

Housing Affordability

Housing affordability is based on the long form Census and includes tenants and owners that spent 30% or more of their household income on shelter costs. Some households were excluded, including private households living in band housing, farms and households with no income. Some discrepancies may be a result of comparing shelter costs from 2016 with household income data from 2015.⁴

Ontario Marginalization Index (ON-Marg)

The Ontario Marginalization Index (ON-Marg) tool was developed by researchers at Public Health Ontario and the Centre for Urban Health Solutions at St. Michael's Hospital. It is a mapping tool that allows users to visibly identify areas of marginalization based on four dimensions that combine different aspects of marginalization into overarching concepts:

1. Residential instability
2. Material deprivation
3. Dependency
4. Ethnic concentration¹¹

The most recent version uses data from the 2016 Census. Data sources were modified in the 2011 version due to data quality concerns with using the National Household Survey (NHS); therefore, caution should be used when comparing the data to previous versions. The most recent indicators and data sources are summarized in Table 2. The ON-Marg technical document outlines the methods in more detail, including how the four indicators were created.¹¹

Table 2. ON-Marg indicators and measures, 2016¹¹

Indicator	Measures
Residential instability	% living alone
	% population not 5 to 15 years old
	average number of persons per dwelling
	% of dwellings that are apartment buildings
	% single, divorced or widowed
	% dwellings not owned
	% who moved during the past 5 years
Material deprivation	% 20+ years without a high school diploma
	% lone-parent families
	% income from government transfers
	% 15+ years who are unemployed
	% below the low-income cut-off (LICO)

Indicator	Measures
	% households living in dwellings that need major repair
Dependency	% seniors (65+ years)
	dependency ratio
	% not participating in the labour force
Ethnic concentration	% recent immigrants (past 5 years)
	% visible minority

Quintiles for the four ON-Marg indicators were created based on Ontario-wide data. Therefore, a dissemination area in the highest quintile (scoring 5) is interpreted as being one of the most deprived 20% of areas in Ontario.¹¹

At the time of this report, Public Health Ontario linked the ON-Marg with four health indicators (available through Snapshots):

- **potentially avoidable mortality:** deaths before 75 years from causes that could be avoided by preventing the onset of disease or preventing or delaying death once a disease or condition has developed.¹²
- **mental health emergency department visits:** emergency department visits by individuals 15 years and older for substance use-related disorders; schizophrenia, delusional and non-organic psychotic disorders; mood/affective disorders; anxiety disorders; and adult personality and behavioural disorders.¹³
- **alcohol-attributable hospitalizations:** hospitalizations among individuals 15 years and older for conditions that are 100% attributable to alcohol use (e.g., alcoholic liver disease, fetal alcohol syndrome, alcohol dependence).¹⁴
- **low birth weight:** singleton (i.e., not twins or multiples) live births less than 2,500 g.¹⁵

The health indicators and quintiles in Snapshots have been weighted using local cut-offs, which means that each quintile of marginalization contains 20% of all dissemination areas within Elgin St. Thomas and Oxford County (analyzed separately), as opposed to Ontario.¹² This defines the level of marginalization based on the local population characteristics rather than population characteristics of Ontario.¹² The rates presented in the corresponding report have been age-standardized using the 2011 Canadian population to account for differences in the age structure

of populations (i.e., the effects that age structure can have on rates of health outcomes).¹² More information about how these health indicators were calculated and displayed is available in the Snapshots technical appendices (e.g., data sources, International Statistical Classification of Diseases and Related Health Problems (ICD-10-CA) codes, exclusions).

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Healthy Growth and Development

Reproductive Health

In the accompanying health status report, reproductive health includes pregnancy rates, live birth rates, multiple birth rates, preterm birth rates and infant size for gestational age. This data is from the Better Outcomes & Registry Network (BORN) Information System, which does not include data for people living on First Nations reserves out of respect to the Ownership, Control, Access and Possession (OCAP) guidelines released by the First Nations Information Governance Centre.

- **Pregnancy rate:** the number of pregnancies per 1,000 females of reproductive age (15-49 years). Pregnancies include live births, stillbirths and therapeutic abortions. Therapeutic abortion may be an indicator of unwanted or unplanned pregnancy or may be performed to discontinue pregnancies with abnormal findings (e.g., neural tube defects) because of prenatal screening. Changes in rates over time may be related to access to medical care. Medically/pharmacologically-induced abortions, those induced by the emergency contraceptive pill, RU 486, or methotrexate (usually reserved for ectopic pregnancies) are not captured in the therapeutic abortion data.
 - **Teen pregnancy rate:** the number of pregnancies per 1,000 females aged 15-19 years. Age of mother is recorded at the time of event, therefore, a female who becomes pregnant when 19 but who delivers at age 20 will not count as a teen pregnancy. Residence of mother is recorded at time of event. An area may have a high teen pregnancy rate because of pregnant teens moving to that area to have their babies because of good support services and affordable housing.
 - **Young adult pregnancy rate:** the number of pregnancies per 1,000 females aged 20-24 years. Young adult pregnancy rates may vary in certain religious, cultural, and ethnic groups, particularly those where birth control is not allowed and where marriage before age 20 is common.
- **Live birth rate:** crude live birth rate per 1,000 population. A live birth is the complete expulsion or extraction from its mother of a product of conception, irrespective of the

duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life such as heartbeat, umbilical cord pulsation, or definite movement of voluntary muscles, whether the umbilical cord has been cut or the placenta is attached. A live birth is not necessarily a viable birth. Crude birth rate is influenced by the age structure of the population - it will be higher in populations with more women of childbearing age.

- **Multiple birth rate:** proportion of live births and stillbirths that are multiple births (e.g., twins, triplets). The upward trends in multiple birth rates in Canada are likely the result of increased use of assisted reproductive technology (ART) to enhance fertility as well as an increasingly older average maternal age at conception.
- **Preterm (premature) birth rate:** proportion of live births with a gestational age at birth of less than 37 completed weeks. Gestational age data can be affected by recall errors, post-conception bleeding, irregular or long/short menstrual cycles, delayed ovulation, pregnant women or partner's desires to indicate a later conception and unrecognized fetal loss. These types of errors with gestational age data have become less of an issue in the last decade with the increasing use in Ontario of early ultrasound technology to estimate length of gestation.
- **Infant size for gestational age:** weight in relation to gestational age, reported using a reference population and specific percentile cut-offs.
 - **Small for gestational age:** singleton (i.e., not twins, triplets, etc.) live births with a birth weight less than the 10th percentile of birth weights of the same sex and same gestational age in weeks, expressed as a percentage of live singleton births with gestational ages from 22 to 43 weeks.
 - **Large for gestational age:** singleton live births with a birth weight more than the 90th percentile of birth weights of the same sex and the same gestational, expressed as a percentage of live singleton births with gestational ages from 22 to 43 weeks.

Maternal Mental Health and Substance Use

Maternal mental health and substance use includes self-reported mental health concerns during pregnancy such as depression and anxiety as well as tobacco, alcohol and drug use. This data is from the BORN Information System.

- **Mental health concerns:** any maternal mental health concerns during pregnancy, including those pre-existing, diagnosed during pregnancy or active during pregnancy, both diagnosed or self-reported. Notably, a history of postpartum depression does not necessarily indicate a mental health concern during the current pregnancy. However, a previous experience with a perinatal mood or anxiety disorder such as post-partum depression increases one's risk of experiencing it again. This indicator largely focuses on the mental health of the mother during and post-pregnancy due to the availability of the data; however, the preconception period (before pregnancy) is also an important predictor of pregnancy complications and adverse birth outcomes.
- **Tobacco use:** self-reported smoking at the time of birth (includes live births and stillbirths), which is subject to under-reporting and social desirability bias.
- **Alcohol use:** self-reported alcohol consumption during pregnancy, which is subject to under-reporting and social desirability bias.
- **Drug use:** self-reported drug and substance use during pregnancy, which is subject to under-reporting and social desirability bias. This refers to the use of street drugs (e.g., sniffing glue, gasoline, other solvents) and the inappropriate use of prescription and non-prescription drugs.

Infant Feeding

Infant feeding data was obtained from two data sources: BORN Information System and BFI Online. BORN is the most comprehensive data source for births in Ontario as it is a registry that includes hospital and home births, including births with midwifery practice groups. BORN was used to obtain intention to breastfeed and breastfeeding at entry to service data.

- **Intention to breastfeed:** women who intended to feed their infant breast milk, regardless of the actual method of feeding, expressed as a percentage of the total number of women who had a live birth or stillbirth (in a given place and time). This includes intention to feed at the breast or provide expressed breast milk or donor milk. This data is self-reported during pregnancy or at time of birth.
- **Breastfeeding at entry to service:** type of infant feeding at discharge from a hospital or birth centre or the type of infant feeding three days postpartum for home births. Any breastfeeding includes infant feeding with breast milk only or a combination of breastmilk and formula. Exclusive breastfeeding includes infant feeding with breast milk only.

BFI Online was used to calculate any and exclusive breastfeeding at 2 months, 6 months and 12 months. BFI Online is a platform that many health units use to administer infant feeding surveys. There is currently no standardized survey or platform used across all of Ontario; therefore, Ontario comparator data is not available. Currently, Elgin St. Thomas and Oxford County administer slightly different surveys and use separate BFI Online databases. Therefore, results were presented separately for these two geographies.

Using BFI Online data, exclusive breastfeeding means that infants did not receive formula or other liquids such as water, juice and tea (does not apply to vitamins or medications). This also excludes infants that had solids before five and a half months of age.¹ There is no exclusive breastfeeding measure for 12 months due to the importance of introducing solids. Although both SWPH sites use the prospective infant feeding surveys, the data were analyzed cross-sectionally not longitudinally.¹ Therefore, each time point (i.e., 2 months, 6 months and 12 months) could include a different denominator. This was done to maximize the number of participants kept in the analysis and to reduce bias. At each time point, mothers were lost to follow-up and mothers who completed all three surveys were more likely to be breastfeeding.

Early Childhood Development

The Early Development Instrument (EDI) is administered every three years and measures children's ability upon school entry to meet age-appropriate developmental expectations.¹ The EDI includes five domains:

1. Physical health and well-being
2. Social competence
3. Emotional maturity
4. Language and cognitive development
5. Communication skills and general knowledge

Children can be categorized as vulnerable, at risk or on track based on the Ontario baseline for EDI scores (determined by the first province-wide cycle completed between 2004-2006).

Children with EDI scores below the 10th percentile (i.e., have a score that is lower than 90% of the children completing the EDI) are vulnerable. Children with EDI scores between the 10th percentile and the 25th percentile are at risk. Children above the 25th percentile are on track.²

Often, the EDI is administered with the Kindergarten Parent Survey (KPS). The KPS provides the context for understanding EDI scores by asking parents about their child's health and development, child care, pre-kindergarten, senior kindergarten, family and neighbourhood.

However, the KPS is not administered in all school boards falling within the SWPH region.

Currently, only Thames Valley District School Board (TVDSB) administers a modified version of the questionnaire. Therefore, KPS data was not included in the report.

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School Health

The school health section of the population health assessment report included four main topic areas: oral health, vision screening, immunization coverage and sleep.

Oral Health

The Oral Health Information Support System (OHISS) contains oral health surveillance data for junior kindergarten (JK), senior kindergarten (SK), and grade 2 children in all public schools and some private schools. Data in OHISS are largely based on screening results, therefore if a child had more than one screening result in a year, they will be counted more than once. This is not a major concern as most health units only screen children once per year.¹ Three indicators were calculated using OHISS:

1. **Caries-free children:** the percentage of children who have never had any cavities (i.e., no decayed, missing/extracted or filled teeth at the time they are surveyed). However, this may include children with early stage caries that are not visible to the naked eye.
2. **Dental screening intensity:** grade 2 screening results determine each school's screening intensity level. Schools with a higher intensity level are required to have additional grades screened in addition to the mandatory JK, SK and grade 2 screening.
 - If 14% or more of grade 2 students had at least two teeth affected by decay, then that school would be considered **high intensity** and grade 4 and grade 7 students would also need to be screened in the same school year.
 - If between 9.5% and less than 14% of grade 2 students had at least two teeth affected by decay, then that school would be considered **medium intensity** and grade 7 students would also need to be screened in the same school year.
 - If less than 9.5% of grade 2 students had at least two teeth affected by decay, then that school would be considered **low intensity** and only the mandatory grades would need to be screened in the same school year.

3. **Children in need of urgent dental treatment:** children in this category used to be eligible for Children in Need of Treatment (CINOT), which as of January 1, 2016 became part of Healthy Smiles Ontario along with five other publicly funded dental programs, including: preventive oral health services provided by public health units and dental benefits for children under Ontario Works, Temporary Care Assistance, Assistance for Children with Severe Disabilities and Ontario Disability Support Programs. Children in this category may have any of the following conditions: pain, infection, hemorrhage, trauma, large open caries in permanent teeth or in crucial primary teeth, pathology requiring further investigation and irreversible periodontal disease.

The rate of children (<18 years) undergoing day surgeries for caries was obtained through the National Ambulatory Care Reporting System (NACRS), which is accessed via IntelliHEALTH. The International Statistical Classification of Diseases and Related Health Problems (ICD-10-CA) codes that were used are listed in Table 3. The number of day surgeries and population aged <18 years were used to calculate an age-specific rate per 100,000 population.

Table 3. Caries-related day surgery ICD-10-CA codes

Code	Description
K020	Caries limited to enamel
K021	Caries of dentine
K022	Caries of cementum
K023	Arrested dental caries
K025	Caries with pulp exposure
K028	Other dental caries
K029	Dental caries, unspecified

Visual Health

The visual assessment data includes assessments conducted by family physicians, ophthalmologists and optometrists. This data is based on the Ministry of Health and Long-Term Care schedule of benefits (i.e., fee codes) outlined in Table 4. This data was limited to children, specifically 4- and 5-year-olds, as a proxy for the JK and SK school cohort. The population of

children aged 4 to 5 years was used as the denominator to calculate the per cent of children who had a visual assessment in each year.

Table 4. Visual assessment schedule of benefits codes^{2,3}

Schedule of Benefits	Code	Description
Physician Services	A110, A237	A periodic oculo-visual assessment for people aged 19 years or less
	A251	Special ophthalmologic assessment for people with a psychological problem, developmental delay, learning disability, or significant physical disability that limits their ability to participate in the assessment
Optometry Services	V402	Oculo-visual minor assessment (i.e., assessing a single ocular condition) for people aged 19 years or less
	V404	A periodic oculo-visual assessment for people aged 19 years or less

Immunization Coverage

Immunization coverage data is available at the health unit level from Public Health Ontario, which is based on the location of school attendance versus location of residence.⁴ This data is obtained from the Digital Health Immunization Repository (DHIR), which is accessed via Panorama Enhanced Analytical Reporting (PEAR). The most recently available report includes estimates for up-to-date coverage^a for the 2016-2017 school year (September 1, 2016 to August 31, 2017). Immunization coverage focused on students aged 7 years, 12 years, 13 years and 17 years as those ages are milestones for being covered by most vaccines. Although most school-based immunization programs are based on grade, year of birth was used as a proxy for grade due data quality limitations. For immunizations administered as a combination vaccine (e.g., measles, mumps, rubella), coverage is reported by antigen. However, when multiple antigens

^a Up-to-date coverage means that the student has an age-appropriate number of valid doses of the specified antigen-containing vaccine or has a recorded exemption based on evidence of immunity. Up-to-date coverage is a measure of protection against a disease. The number of doses and minimum intervals needed for up-to-date coverage for each antigen/vaccine are described in detail by Public Health Ontario.⁵

are present in the vaccine but protect against one disease (e.g., pneumococcal conjugate vaccines), coverage is reported by vaccine.

Sleep, Sun Safety and Tanning Bed Use

These questions were asked as part of the Canadian Community Health Survey (CCHS), a national cross-sectional telephone survey with in-person interviews that collects information about health from the Canadian population aged 12 years and older. The CCHS excludes people living on reserves and other Indigenous settlements, full-time members of the Canadian Forces and people living in institutions. Data is self-reported and may be subject to recall bias and social desirability bias. The 2015-2016 survey interviewed 575 individuals from Oxford County and 623 individuals from Elgin St. Thomas. Data from 2015-2016 is not comparable to previous years due to substantial changes in the content and sampling methodology of the survey.

'Don't know', 'refused' and 'not stated' responses were removed from analysis when together they represented less than 10% of the unweighted sample. This assumes that data are missing at random, which is not always the case. Throughout the report, some numbers may be suppressed because they are unstable due to high variability, as measured by the coefficient of variation (CV). The CV indicates how precise an estimate is. Higher CVs indicate more variability, which often occurs when there is a small sample size. When the CV is greater than 15.0 and less than or equal to 35.0, the estimate should be interpreted with caution due to high variability. In tables, this is shown with an asterisk (*). Estimates with a CV of 35.1 or more are not reportable and the estimates are replaced with double asterisks (**). Estimates are also not reportable if there are less than 10 observations in the numerator and 20 in the denominator based on the unweighted sample.

In the graphs, the confidence interval (CI) is shown by an error bar. Each estimate is based on the survey sample, and a CI is a range of values that describes the uncertainty surrounding an estimate. The 95% CI shows a range of values that have a 95% chance of including the true estimate in the population if the survey was repeated. The wider a 95% CI, the more caution should be used when using the estimate. CIs that do not overlap show statistically significant differences between groups. Statistically significant results indicate the finding is unlikely to be due to chance alone.

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Chronic Disease Prevention and Well-being

Mortality, Morbidity and Self-reported Health

Mortality data were obtained from the Ontario Office of the Registrar General, Service Ontario which receives information from death certificates completed by physicians. This report includes only the number of deaths for Ontario residents who died in Ontario. It is released to public health units through IntelliHEALTH ONTARIO and includes only the primary (i.e., underlying) cause of death, which is categorized according to the ICD-10-CA codes. The underlying cause of death is (a) the disease or injury which initiated the chain of events leading directly to death, or (b) the circumstances of the accident or violence which produced the fatal injury. There may be some uncertainty when classifying the underlying cause of death when comorbidities are present. Analysis by leading cause group was completed by using the Association of Public Health Epidemiologists in Ontario (APHEO) modifications to the lead cause tabulation by Becker et al.¹

Hospitalization data were obtained from the Discharge Abstract Database (DAD), which is available to public health units through IntelliHEALTH ONTARIO. This includes the total number of hospital separations (i.e., any time a patient leaves a health care facility due to death, discharge or transfer) in a given year. Causes of hospitalization were categorized according to ICD-10-CA chapters and are based on the most responsible diagnosis (i.e., diagnosis associated with the longest duration of treatment) during a given hospital stay (Table 1). There may be some uncertainty when classifying the most responsible diagnosis when comorbidities are present.

Mental disorders (ICD-10-CA Chapter V) are excluded from this indicator because of changes in reporting mental disorders that started on April 1, 2006. As of that date, patients with mental disorders who occupy designated psychiatric beds in acute care hospitals have been reported through the Ontario Mental Health Reporting System (OHMRS) rather than through the DAD. External causes of morbidity and mortality (ICD-10-CA Chapter XX) are never reported as the most responsible diagnosis for an inpatient discharge; therefore, external causes are excluded from the all-cause hospitalization indicator. Chapters XXI and Chapter XXIII are excluded as they do not represent diseases or conditions.

Table 1. Leading cause of hospitalization groupings based on ICD-10-CA chapter

Chapter	Chapter Title	ICD-10-CA Codes
I	Certain infectious and parasitic diseases	A00-B99
II	Neoplasms	C00-D49
III	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D59
IV	Endocrine, nutritional and metabolic diseases	E00-E99
V ¹	Mental and behavioural disorders	F00-F99
VI	Diseases of the nervous system	G00-G99
VII	Diseases of the eye and adnexa	H00-H59
VIII	Diseases of the ear and mastoid process	H60-H99
IX	Diseases of the circulatory system	I00-I99
X	Diseases of the respiratory system	J00-J99
XI	Diseases of the digestive system	K00-K99
XII	Diseases of the skin and subcutaneous tissue	L00-L99
XIII	Diseases of the musculoskeletal system and connective tissue	M00-M99
XIV	Diseases of the genitourinary system	N00-N99
XV	Pregnancy, childbirth and the puerperium	O00-O99
XVI	Certain conditions originating in the perinatal period	P00-P99
XVII	Congenital malformations, deformations, and chromosomal abnormalities	Q00-Q99
XVIII	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	R00-R99
XIX	Injury, poisoning and certain other consequences of external causes	S00-T99
XX	External causes of morbidity and mortality	V00-Y99
XXI	Factors influencing health status & contacts with health services	Z00-Z99
XXIII	Provisional codes for research & temporary assignment	U Codes

Similar to the leading cause of death analysis, potentially avoidable mortality data were obtained from the Ontario Office of the Registrar General, Service Ontario. Potentially avoidable mortality is the sum of potentially treatable and potentially avoidable deaths among persons under 75 years of age. The conditions and their classification as preventable or treatable in the APHEO indicator are the same as the Canadian potentially avoidable mortality indicator established by the Canadian Institute for Health Information (Figure 2 and 3).² However, not all conditions can

be completely classified as preventable or treatable. When assigning avoidable deaths to one of the two categories (preventable or treatable), priority was given to prevention in cases where there were clear arguments for both categories. Exceptions were made for ischaemic heart disease, stroke and diabetes, for which deaths were assigned as 50% preventable and treatable.

Population estimates (2008-2016) and projections (2017) were used as the denominator to calculate age-standardized rates for leading causes of death, hospitalization as well as potentially avoidable mortality and were obtained through IntelliHEALTH ONTARIO. Age-standardized rates were based on the 2011 Canadian standard population and were used to account for differences in the age structure of different populations (i.e., SWPH region compared to Ontario).³

Table 2. ICD-10-CA codes for deaths due to preventable causes

Cause of Death	ICD-10 Codes	Notes
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	
Neoplasms		
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	
Diseases of the Circulatory System		
Rheumatic heart disease	I01, I02, I05–I09	
Cerebrovascular diseases*	I60–I62, I63–I64, I67, I69	50% of the deaths

Cause of Death	ICD-10 Codes	Notes
Ischaemic heart disease*	I20–I25	50% of the deaths
Other atherosclerosis	I70, I73.9	50% of the deaths
Aortic aneurysm	I71	
Venous thromboembolism	I26, I80, I82.9	
Diseases of the Respiratory System		
Chronic obstructive pulmonary disorders	J40–J44	
Lung diseases due to external agents	C45, J60–J64, J66–J70, J82, J92	
Diseases of the Digestive System		
Chronic liver disease (excluding alcohol-related disease)	K73, K74.0,1,2,6	
Diseases of the Genitourinary System		
No preventable causes		
Infant and Maternal Causes		
Complications of perinatal period	A33	
Unintentional 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		
Injuries of undetermined intent	Y10–Y34	
Intentional Injuries		
Suicide and self-inflicted injuries	X60–X84, Y87.0	
Assault	X85–X99, Y00–Y09, Y87.1	
Alcohol and Drug Use Disorders		

Cause of Death	ICD-10 Codes	Notes
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	
Nutritional, Endocrine and Metabolic Disorders		
Nutritional deficiency anaemia	D50–D53	
Diabetes mellitus	E10–E14	50% of the deaths
Neurological Disorders		
No preventable causes		
Disorders of the Musculoskeletal System		
No preventable causes		
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	

Table 3. ICD-10-CA codes for deaths due to treatable causes

Causes of Death	ICD-10 Codes	Notes
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	

Causes of Death	ICD-10 Codes	Notes
Neoplasms		
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 less than 45
Benign neoplasms	D10–D36	
Diseases of the Circulatory System		
Hypertensive diseases	I10, I11–I13, I15	
Cerebrovascular diseases	I60–I62, I63–I64, I67, I69	50% of the deaths
Ischaemic heart disease	I20–I25	50% of the deaths
Other atherosclerosis	I70, I73.9	50% of the deaths
Diseases of the Respiratory System		
Asthma and bronchiectasis	J45, 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	
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	
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	

Causes of Death	ICD-10 Codes	Notes
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	
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	
Unintentional Injuries		
No treatable causes		
Injuries of Undetermined Intent		
No treatable causes		
Intentional Injuries		
No treatable causes		
Alcohol and Drug Use Disorders		
No treatable causes		
Nutritional, Endocrine and Metabolic Disorders		
Thyroid disorders	E00–E07	
Diabetes mellitus	E10–E14	50% of the deaths
Adrenal disorders	E24, E25, E27	
Congenital metabolic disorders	E74.0, E74.2	
Neurological Disorders		
Epilepsy	G40, G41	
Disorders of Musculoskeletal System		
Osteomyelitis	M86	
Adverse Effects of Medical and Surgical Care		
No treatable causes		

Chronic Diseases

Similar to leading causes of death, chronic disease death data were obtained from the Ontario Office of the Registrar General, Service Ontario and released to public health units through IntelliHEALTH ONTARIO. It includes only the primary (i.e., underlying) cause of death, which is categorized into selected chronic diseases according to the ICD-10-CA codes (Figure 4). Elgin and Oxford County-specific mortality rates for chronic diseases were obtained through Public Health Ontario's Chronic Disease Mortality Snapshots.⁴ Rates were presented separately for Elgin St. Thomas and Oxford County when a statistically significant difference was observed, otherwise they were presented as Southwestern Public Health.

Hospitalization data were obtained from the Discharge Abstract Database (DAD), which is available to public health units through IntelliHEALTH ONTARIO. Causes of hospitalization were categorized according to the ICD-10-CA codes and are based on the most responsible diagnosis (i.e., diagnosis associated with the longest duration of treatment) during a given hospital stay (Figure 4). Elgin and Oxford County-specific hospitalization rates for chronic diseases were obtained through Public Health Ontario's Chronic Disease Hospitalization Snapshots.⁴ Rates were presented separately for Elgin St. Thomas and Oxford County when a statistically significant difference was observed, otherwise rates were presented as Southwestern Public Health.

Of note, the APHEO definition of stroke excludes the ICD-10-CA code I62 (i.e., "other non-traumatic intracranial haemorrhage") and is therefore different from the definition used by the Canadian Institute of Health Information. Mortality rates due to diabetes may be an underestimated as other diseases may be specified as the underlying cause of death; diabetes is often listed as a contributing cause on death certificates. Hospitalization data is incident-based; therefore, it can include multiple admissions for a single individual.

Population estimates (2008-2016) and projections (2017) were used as the denominator to calculate age-standardized rates for selected chronic diseases and were obtained through IntelliHEALTH ONTARIO. Age-standardized rates were based on the 2011 Canadian standard population and were used to account for differences in the age structure of different populations (i.e., SWPH region compared to Ontario).³

Table 4. ICD-10-CA codes for chronic disease deaths and hospitalizations

Condition	ICD-10-CA codes
Cardiovascular disease	I00-I99
Hypertension	I10-I13, I15
Ischemic heart disease	I20-I25
Cerebrovascular disease	I60-I69
Stroke	I60, I61, I63, I64
Respiratory disease	J00-J99
Lower respiratory disease	J40-J47
Chronic obstructive pulmonary disease (COPD)	J40-J44
Asthma	J45
Diabetes	E10-E14

Cancer

The Ontario Cancer Registry is a database that contains information for all Ontario residents newly diagnosed with cancer (except basal cell carcinoma and squamous cell carcinoma of the skin) or who have died of cancer. This information is collected from hospitals, regional cancer registries, pathology reports and death certificates. From 2010 onwards, the database follows the standards set by the National Cancer Institute's Surveillance, Epidemiology and End Results (SEER) multiple primary and histology coding rules for counting additional primary cancers (i.e., a cancer of a different site or histologic type than the original cancer is considered a separate primary cancer).⁵ As these standards are slightly less conservative compared to the previous rules for counting multiple primary cancers, this might increase the incidence of certain types of cancers. However, this change is due to a change in the reporting criteria and not due to more individuals being diagnosed with or dying of cancer. Therefore, data prior to 2010 was not reported.

Cancer data was obtained from Cancer Care Ontario (CCO) through the SEER*Stat package, which includes de-identified Ontario cancer incidence and mortality data for the years 1981 to 2012 derived from the Ontario Cancer Registry. Benign, borderline and in situ cases are included in this release of incidence data. Ontario residents who died outside of Ontario are excluded from the mortality database file as are non-residents of Ontario who died in Ontario.

Incidence and mortality rates were age-standardized using 2011 Canadian standard population. Rates were suppressed for years with fewer than six cases. CCO has adopted the SEER Site recode ICD-O-3/WHO 2008 as the variable for reporting cancer incidence and SEER Cause of Death recode with Kaposi and mesothelioma variable for reporting cancer mortality. The Site recode ICD-O-3/WHO 2008 values are based on ICD-O-3 codes, where the ICD-O-3 ranges M-9050-M-9055 (mesothelioma), M-9140 (Kaposi sarcoma) and M-9590-M-9989 (lymphoma, leukemia and related) were removed for comparability with international and national agencies (Table 5). The cause of death recode with Kaposi and mesothelioma variables are based on ICD-10-CA codes (Figure 6).

Table 5. Site recode ICD-O-3/WHO 2008 definitions used to classify cancer incidence⁶

Cancer	ICD-O-3 codes
All malignant cancers	C000 to C809
Female breast	C500 to C509 (excluding M-9590 to M-9989, and sometimes M-9050 to M-9055, M-9140+)
Cervix uteri	C530 to C539 (excluding M-9590 to M-9989, and sometimes M-9050 to M-9055, M-9140+)
Colon/rectum	C180 to C189, C199, C209, C260 (excluding M-9590 to M-9989, and sometimes M-9050 to M-9055, M-9140+)
Lung/bronchus	C340 to C349 (excluding M-9590 to M-9989, and sometimes M-9050 to M-9055, M-9140+)
Malignant melanoma	C440 to C449 and M-8720 to M-8790 (morphology "M" codes must be included)
Prostate	C619 (excluding M-9590 to M-9989, and sometimes M-9050 to M-9055, M-9140+)
Oral cavity and pharynx	C000 to C009, C019 to C069, C079 to C119, C129 to C140, C142 to C148 (excluding M-9590 to M-9989, and sometimes M-9050 to M-9055, M-9140+)

+ The Site recode variable can be created with or without mesothelioma (9050-9055) and Kaposi Sarcoma (9140) as separate groupings.

Table 6. SEER cause of death ICD-10-CA codes used to classify cancer deaths

Cancer	ICD-10-CA codes
All malignant cancers	C00-C97
Female breast	C50
Cervix uteri	C53
Colon/rectum	C18-C20, C26.0
Lung/bronchus	C34
Malignant melanoma	C43
Prostate	C61
Oral cavity and pharynx	C00-C14

Self-perceived Health, Physical Activity, Nutrition and Healthy Weights and Mental Health Measures

Self-perceived health, adult and youth physical activity, sedentary behavior, youth active transport, adult and youth BMI, fruit and vegetable consumption, self-perceived mental health, life satisfaction, sense of belonging, life and work stress and depression were obtained all from the Canadian Community Health Survey (CCHS), a national cross-sectional telephone survey that collects information about health from the Canadian population aged 12 years and older.¹ The CCHS excludes people living on reserves and other Indigenous settlements, full-time members of the Canadian Forces and people living in institutions. Data is self-reported and may be subject to recall bias and social desirability bias. The 2015-2016 survey interviewed 575 individuals from Oxford County and 623 individuals from Elgin St. Thomas. Data from 2015-2016 is not comparable to previous years due to substantial changes in the content and sampling methodology of the survey.

'Don't know', 'refused' and 'not stated' responses were removed from analysis when together they represented less than 10% of the unweighted sample. This assumes that data are missing at random, which is not always the case. Throughout the report, some numbers may be suppressed because they are unstable due to high variability, as measured by the coefficient of variation (CV). The CV indicates the preciseness of an estimate. Higher CVs indicate more variability, which often occurs when there is a small sample size. When the CV is greater than 15.0 and less than or equal to 35.0, the estimate should be interpreted with caution due to high variability. In tables, this is shown with an asterisk (*). Estimates with a CV of 35.1 or more are not reportable and the estimates are replaced with double asterisks (**). Estimates are also not reportable if there are less than 10 observations in the numerator and 20 in the denominator based on the unweighted sample.

Estimates were age-standardized using the 2011 Canadian population to account for differences due to varying age structures of the populations in different geographies (i.e., SWPH region versus Ontario).² In the graphs, the confidence interval (CI) is shown by an error bar. Each estimate is based on the survey sample, and a CI is a range of values that describes the uncertainty surrounding an estimate. The 95% CI shows a range of values that have a 95% chance of including the true estimate in the population if the survey was repeated. The wider a 95% CI, the more caution should be used when using the estimate. CIs that do not overlap

show statistically significant differences between groups. Statistically significant results indicate the finding is unlikely to be due to chance alone.

Mental health hospitalization data was obtained from both the Discharge Abstract Database (DAD) and the Ontario Mental Health Reporting System (OMHRS). DAD is a discharge-based system that identifies mental disorders by most responsible diagnosis, which is assigned at discharge based on ICD-10-CA chapter V codes. As of the 2006 fiscal year, the only care types remaining in the DAD are acute inpatient, specialized children's institutions offering rehab, children's mental health care, and acute adult mental health patients not in designated adult psychiatric beds. Conversely, OMHRS includes any patient occupying an adult designated mental health bed (which can include cases under the age of 18) and cases are classified based on the DSM-V codes. Since OMHRS is an admission-based system, it includes cases still being treated at the time of reporting.

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Substance Use and Injury Prevention

The substance use and injury prevention section of the report includes measures such as alcohol use, tobacco use and second-hand smoke exposure, illicit drug use, emergency department visits, hospitalizations and deaths due to injuries, sun safety and tanning bed use and violence.

Alcohol, Tobacco and Illicit Drug Use

These measures were all obtained from the Canadian Community Health Survey (CCHS), a national cross-sectional telephone survey with in-person interviews that collects information about health from the Canadian population aged 12 years and older.¹ The CCHS excludes people living on reserves and other Indigenous settlements, full-time members of the Canadian Forces and people living in institutions. Data is self-reported and may be subject to recall bias and social desirability bias. The 2015-2016 survey interviewed 575 individuals from Oxford County and 623 individuals from Elgin St. Thomas. Data from 2015-2016 is not comparable to previous years due to substantial changes in the content and sampling methodology of the survey.

'Don't know', 'refused' and 'not stated' responses were removed from analysis when, together, they represented less than 10% of the unweighted sample. This assumes that data are missing at random, which is not always the case. Throughout the report, some numbers may be suppressed because they are unstable due to high variability, as measured by the coefficient of variation (CV). The CV indicates how precise an estimate is. Higher CVs indicate more variability, which often occurs when there is a small sample size. When the CV is greater than 15.0 and less than or equal to 35.0, the estimate should be interpreted with caution due to high variability. In figures, this is shown with an asterisk (*). Estimates with a CV of 35.1 or more are not reportable and the estimates are replaced with double asterisks (**). Estimates are also not reportable if there are less than 10 observations in the numerator and 20 in the denominator based on the unweighted sample.

Estimates were age-standardized using the 2011 Canadian population to account for differences due to varying age structures of the populations in different geographies (i.e., SWPH region versus Ontario).² Age-standardization was not done for household level questions,

including smoke-free homes. In the graphs, the confidence interval (CI) is shown by an error bar. Each estimate is based on the survey sample, and a CI is a range of values that describes the uncertainty surrounding an estimate. The 95% CI shows a range of values that have a 95% chance of including the true estimate in the population if the survey was repeated. The wider a 95% CI, the more caution should be used when using the estimate. CIs that do not overlap show statistically significant differences between groups. Statistically significant results indicate the finding is unlikely to be due to chance alone.

Alcohol-attributable Deaths and Hospitalizations

The National Ambulatory Care Reporting System (NACRS) contains information about unscheduled emergency department visits. The data submitted by emergency departments is validated by CIHI and released to public health units on a quarterly basis through IntelliHEALTH ONTARIO. NACRS can also be used to obtain information about inpatients that were admitted from the emergency room to critical care units/operating rooms, other units within a hospital or to another acute care facility. This information was used to capture injury-related hospitalizations attributable to alcohol. Table 3 outlines the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Canada (ICD-10-CA) codes included under injury hospitalizations attributable to alcohol. Many of the ICD-10-CA codes are external causes and an individual can have more than one external cause diagnosis for each hospitalization. However, only one hospitalization will be counted within each of the categories. There may be some overlap between the categories.

Table 3. Description of injury hospitalizations attributable to alcohol use³

Condition group	Condition	ICD-10-CA codes
Motor vehicle collisions	Motor vehicle collisions	V codes (please see the InterMAHP user guide ³ for a complete list), Y85.0
Unintentional injuries	Falls	W00-W19, Y30
	Drowning	W65-W74
	Fires	X00-X09, Y26
	Accidental poisoning by substances other than alcohol	T36-T50, T52-T65, T96-T97, X40-X44, X46-X49, Y10-Y14, Y16-Y19
	Accidental poisoning by alcohol	T51, X45, Y15

	Other unintentional injuries	V codes (please see the InterMAHP user guide ³ for a complete list), W20-W64, W75-W84, X10-X33, Y20, Y22-Y25, Y27-Y29, Y31-Y34, Y85.9, Y86, Y87.2, Y89.9
Intentional injuries	Intentional self-poisoning by substances other than alcohol	T36-T50, T52-T65, T96-T97, X60-X64, X66-X69
	Intentional self-poisoning by alcohol	T51, X65
	Other intentional self-harm	X70-X84, Y87.0
	Assault or homicide	X85-Y09, Y87.1
	Other intentional injuries	Y35, Y89.0

The Discharge Abstract Database (DAD) contains information about hospital discharges and therefore does not capture people treated and released from emergency departments, those treated in doctors' offices or clinics or those who did not seek treatment in a hospital. This may underestimate the burden of alcohol-attributable hospitalizations. The data submitted by hospitals is validated by CIHI and released to public health units on a quarterly basis through IntelliHEALTH ONTARIO. Table 2 outlines the ICD-10-CA codes used to capture alcohol-attributable hospitalizations from causes other than injuries. Importantly, an individual may be hospitalized and discharged for the same reason more than once over the time period; therefore, hospitalizations cannot measure disease incidence.

Table 2. Description of hospitalizations for conditions attributable to alcohol use (other than injuries)³

Condition group	Condition	ICD-10-CA codes
Communicable diseases	Tuberculosis	A15-A19
	HIV	B20-B24, Z21
	Lower respiratory tract infections	J09-J22
Cancer	Oral cavity and pharynx cancer	C00-C05, C08-C10, C12-C14, D00.0
	Esophageal cancer, squamous cell carcinoma	C15, D00.1
	Colorectal cancer	C18-C21, D01.0-D01.4
	Liver cancer	C22, D01.5

	Pancreatic cancer	C25, D01.7
	Laryngeal cancer	C32, D02.0
	Breast cancer	C50, D05
Endocrine conditions	Type 2 diabetes mellitus	E11, E13, E14
	Alcohol-induced pseudo-Cushing's syndrome	E24.4
Neuropsychiatric conditions	Alcoholic psychoses	F10.0, F10.3-F10.9
	Alcohol abuse	F10.1
	Alcohol dependence syndrome	F10.2
	Degeneration of nervous system due to alcohol	G31.2
	Epilepsy	G40, G41
	Alcoholic polyneuropathy	G62.1
	Alcoholic myopathy	G72.1
Cardiovascular conditions	Hypertension	I10-I15
	Ischaemic heart disease	I20-I25
	Alcoholic cardiomyopathy	I42.6
	Atrial fibrillation and cardiac arrhythmia	I47-I49
	Haemorrhagic stroke	I60-I62, I69.0-I69.2
	Ischaemic stroke	I63-I67, I69.3-I69.4
	Esophageal varices	I85
Digestive conditions	Alcoholic gastritis	K29.2
	Liver cirrhosis	K70, K74
	Acute pancreatitis	K85.0, K85.1, K85.8, K85.9
	Chronic pancreatitis	K86.1-K86.9
	Alcohol-induced pancreatitis	K85.2, K86.0

Ontario Mortality Data is obtained through the Office of the Registrar General, Service Ontario, which receives information from death certificates completed by physicians. This information is released to public health units through IntelliHEALTH ONTARIO and includes only the primary (i.e., underlying) cause of death. There may be some uncertainty when classifying the underlying cause of death when comorbidities are present. The same ICD-10-CA codes from Table 1 and Table 2 were used to capture alcohol-attributable deaths using this data source.

Cannabis

Cannabis data (in addition to the CCHS) was obtained from a Tell City Hall (Advanis) survey about cannabis opinions and knowledge. This survey was conducted from May to June 2018 using random interactive voice response (IVR) to recruit people living in the SWPH region with a mobile phone. Those who agreed to participate in the survey were then sent a text message with a link to a mobile-optimized online survey. The survey asked participants about their general attitudes towards cannabis and cannabis use as well as awareness of provincial plans and their desire for different rules in their own community. The SWPH region survey data was weighted based on Census data for age and gender to more closely represent the SWPH region population. However, almost half (48%) of participants reported that they live in Woodstock.

Impaired Driving

The impaired driving data is from the Uniform Crime Reporting Survey (UCRS); a mandatory survey that collects police-reported crime statistics using administrative files.⁴ Statistics Canada publicly shares the rate of people aged 12 years and older (per 100,000 population) charged for impaired driving as well as impaired operation causing death, impaired operation causing bodily harm, failure to provide a breath sample or blood sample and failure to comply or refusal by police service areas.⁵ This includes impaired driving of vehicles, vessels and aircraft.

Injury Deaths, Hospitalizations and Emergency

Department Visits

Data for deaths due to injuries is from the Ontario Office of the Registrar General, Service Ontario, which receives information from death certificates completed by physicians. This information is released to public health units through IntelliHEALTH ONTARIO and includes only the primary (i.e., underlying) cause of death. There may be some uncertainty when classifying the underlying cause of death when comorbidities are present. Deaths due to injuries were categorized according to the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Canada (ICD-10-CA) codes listed in Table 3. These categories are the same as those used in Public Health Ontario's Potentially Avoidable Mortality Snapshot.

Table 3. ICD-10-CA codes used to categorize deaths due to injuries⁶

Description	ICD-10-CA codes
Transportation accidents	V01–V99
Falls	W00–W19
Drowning	W65–W74
Fires and flames	X00–X09
Accidental poisonings	X40–X49
Suicide and self-inflicted injuries	X60–X84, Y87.0
Assault	X85–X99, Y00–Y09, Y87.1
Injuries of undetermined intent	Y10–Y34
Other external causes of accidental injury	W20–W64, W75–W99, X10–X39, X50–X59

The National Ambulatory Care Reporting System (NACRS) contains information about unscheduled emergency department visits. The data submitted by emergency departments is validated by the Canadian Institute for Health Information (CIHI) and released to public health units through IntelliHEALTH ONTARIO. NACRS can also be used to obtain information about inpatients that were admitted from the emergency room to critical care units/operating rooms, other units within a hospital or to another acute care facility. This information was used to capture emergency department visits and hospitalizations for neurotrauma based on the ICD-10-CA codes in Table 4 and emergency department visits and hospitalizations for injuries more broadly based on the ICD-10-CA codes in Table 5.

Table 4. ICD-10-CA codes used to categorize emergency department visits and hospitalizations for neurotrauma⁶

Description	ICD-10-CA codes
All neurotrauma injuries	F072, S020-S023, S027-S029, S06, S071, T902, T905, S140, S141, S240, S241, S340, S341, S343, T060, T061
Traumatic brain injuries	F072, S020-S023, S027-S029, S06, S071, T902, T905
Concussions	S060 (also counted in traumatic brain injuries)
Spinal cord injuries	S140, S141, S240, S241, S340, S341, S343, T060, T061

The ICD-10-CA codes in Table 4 are based on main cause diagnoses whereas the ICD-10-CA codes in Table 5 are based on external cause diagnoses. There can only be one main cause diagnosis per visit or hospital admission, but there can be more than one external cause. Therefore, there may be double counting between the injury categories in Table 5, but not within

them (e.g., emergency department visit for unintentional poisoning and transportation accidents).

Table 5. ICD-10-CA codes used to categorize emergency department visits and hospitalizations for injuries⁶

Description	ICD-10-CA codes
Transportation accidents	V01–V99
Assault	X85–X99, Y00–Y09, Y87.1
Caught or crushed between objects	W23
Cut or pierced by an object	W25–W29, W45–W46
Struck by or against an object	W20–W22, W50–W52
Bite by dog or another mammal	W54, W55
Exposure to smoke or fire or contact with heat or hot substances	X00–X19
Falls	W00–W19
Suicide and self-inflicted injuries	X60–X84, Y87.0
Foreign body in eye or orifice	W44
Near-drowning or submersion	W65–W74, V90, V92
Overexertion	X50
Suffocation	W75–W84
Unintentional poisoning	X40–X49

Population estimates (2013-2016) and projections (2017) were used as the denominator to calculate age-standardized rates and were obtained through IntelliHEALTH ONTARIO. Age-standardized rates were based on the 2011 Canadian standard population and were used to account for differences in the age structure of different populations (i.e., SWPH region compared to Ontario).²

Violence

The violence data is from the Uniform Crime Reporting Survey (UCRS), a mandatory survey that collects police-reported crime statistics using administrative files.⁴ The UCRS classifies incidents according to the most serious offence occurring in the incident (usually based on longest maximum sentence) and violent offences always take precedence over non-violent

offences. For example, an incident involving both a breaking and entering offence and an assault is counted as an incident of assault. Statistics Canada publicly shares the rate of people aged 12 years and older (per 100,000 population) charged for violent Criminal Code violations.⁴ These include: homicide, other violations causing death, attempted murder, sexual assault, sexual violations against children, assault, pointing or using a firearm, robbery, forcible confinement or kidnapping, abduction, extortion, criminal harassment, uttering threats, indecent/harassing communication, commodification of sexual activity violations (e.g., obtaining or advertising sexual services) and a grouping of other violations such as arson, forging or destroying documents with criminal intent and trafficking people.

References

1. Statistics Canada. Canadian Community Health Survey (CCHS) annual component: user guide 2016 microdata file. Ottawa, ON: Statistics Canada; 2017.
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Healthy Environments

The healthy environments section of the population health assessment report includes six main topic areas: Air quality Health Index, Smog and Air Health Advisories (SAHAs), pollutant concentrations, extreme weather advisories, vector surveillance and vector-borne diseases.

Air quality health index (AQHI), pollutant concentrations, smog and air health advisories (SAHAs)

Air quality data is stored in the Ontario Ministry of Environment, Conservation and Parks' Air Quality Information System (AQUIS) and is publicly available through the Air Quality Ontario web site. Data are obtained from the ministry's 39 automated air monitoring stations that collect real-time air pollution data on an hourly basis for the following parameters: oxides of nitrogen (NO/NO₂/NO₃), fine particulate matter (PM_{2.5}), ground-level ozone (O₃), sulphur dioxide (SO₂), carbon monoxide (CO) and total reduced sulphur (TRS) compounds.¹ These data are then used to calculate measurements for the AQHI, monitor pollutant concentrations and issue smog and air health advisories. For the purposes of this report, data from the Port Stanley Ambient Air Monitoring Site were used to report air quality indicators for the SWPH region.

On June 24, 2015, the AQHI replaced the Air Quality Index. Therefore, data is presented for 2016 onwards to ensure complete data and comparability across years. All years prior to 2015 used the Air Quality Index, which had a scale of 0-100+ and was calculated based on six pollutants (NO₂, PM_{2.5}, O₃, SO₂, CO and TRS compounds).

Historical pollutant concentration data from this site was obtained from the Air Quality Ontario website. Only those pollutants used to calculate the AQHI (i.e. NO₂, PM_{2.5}, O₃) were reported. Where possible, a 10-year trend of annual mean concentrations was shown. However, pollutant concentration data for NO₂ were only available for 2015 onwards.

Smog and Air Health Advisories (SAHAs) are jointly issued by Environment Canada and the Ontario Ministry of Environment, Conservation and Parks and are issued if a high-risk AQHI is forecast to be persistent (i.e. for a duration of at least 3 hours). Since SAHAs are based on the AQHI, advisories issued prior to 2016 were based on the Air Quality Index and are therefore, not comparable. As a result, only SAHAs issued for 2016 onwards were reported.

Extreme Weather Advisories

Extreme weather advisory data was obtained from internal databases used to track the number of heat and cold weather alerts issued within SWPH region. Due to variances in the time and duration of extreme weather advisories issued in Oxford county and Elgin St. Thomas, the two sites were presented separately.

Vector-Borne Diseases and Vector Surveillance

The Integrated Public Health Information System (iPHIS) is a provincial surveillance database used to track case information for all reportable diseases in Ontario. Data is collected by Southwestern Public Health staff as part of their routine activities and is entered into iPHIS, which is maintained by Public Health Ontario and the Ministry of Health and Long-Term Care (MOHLTC). Confirmed and probable cases of reportable disease are classified according to the MOHLTC case definitions. Provincial and local counts of confirmed enteric diseases were extracted from Public Health Ontario's Infectious Disease (ID) Query tool, which is an interactive platform that displays aggregated infectious disease data.² The diseases extracted from this tool include: Lyme Disease, Malaria, Rabies, West Nile Virus, Echinococcus Multilocularis Infection, Hantavirus Pulmonary Syndrome, Lassa Fever, Plague, Psittacosis/Ornithosis, Q Fever, Tularemia and Yellow Fever.

The data represents only cases reported to public health and recorded in iPHIS. Therefore, due to differences in medical seeking and reporting behaviours, there may be some degree of underreporting. In addition to this, only those cases that meet the provincial case classifications are included in the case counts. Provincial case counts of vector-borne diseases include only confirmed cases, with the exception of Lyme Disease and West Nile Virus, which include both confirmed and probable cases. For example, from 2009 onwards, the sum of confirmed and probable cases of Lyme Disease is comparable to confirmed cases of Lyme disease prior to 2009. As of May 1st, 2018, malaria and yellow fever were removed from the list of diseases of public health significance in Ontario.

Population estimates (2013-2016) and projections (2017) were used as the denominator to calculate age-standardized rates and were obtained through IntelliHEALTH ONTARIO. Age-standardized rates were based on the 2011 Canadian standard population and were used to

account for differences in the age structure of different populations (i.e., SWPH region compared to Ontario).³

Vector surveillance data was extracted from internal databases established to monitor West Nile Virus and Lyme disease. Due to variances in recording practices, data elements and the number of positive tests between Oxford county and Elgin St. Thomas, the two sites were reported separately.

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2. Public Health Ontario. Infectious disease query. Ontario Agency for Health Protection and Promotion (Public Health Ontario); 2018.
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Food Safety

The Food Safety section of the population health assessment report includes the status of enteric diseases in the SWPH region.

Enteric Diseases

The Integrated Public Health Information System (iPHIS) is a provincial surveillance database used to track case information for all reportable diseases in Ontario. Data is collected by Southwestern Public Health staff as part of their routine activities and is entered into iPHIS, which is maintained by Public Health Ontario and the Ministry of Health and Long-Term Care (MOHLTC). Confirmed and probable cases of reportable disease are classified according to the MOHLTC case definitions. Provincial and local counts of confirmed enteric diseases were extracted from Public Health Ontario's Infectious Disease (ID) Query tool, which is an interactive platform that displays aggregated infectious disease data.¹ The diseases extracted from this tool include: Botulism, Cholera, Food Poisoning, All Causes, Paralytic Shellfish Poisoning, Trichinosis, Paratyphoid Fever, Brucellosis, Typhoid Fever, Yersiniosis, Hepatitis A, Amebiasis, Cyclosporiasis, Listeriosis, Shigellosis, Verotoxin Producing E. Coli, Giardiasis, Cryptosporidiosis, Salmonellosis, and Campylobacter Enteritis.

The data represents only cases reported to public health and recorded in iPHIS. Therefore, due to differences in medical seeking and reporting behaviours, there may be some degree of underreporting. In addition to this, only those cases that meet the provincial case classifications are included in the case counts. Both symptomatic and asymptomatic individuals are included in confirmed case definition for amebiasis, Campylobacter enteritis, cholera, cryptosporidiosis, cyclosporiasis, salmonellosis, shigellosis, verotoxin-producing E. coli, and yersiniosis. Lastly, in December 2014, the confirmed case definition of paratyphoid fever was clarified to state that S. Paratyphi B variant Java must be excluded from case counts since these cases are reported as salmonellosis.

Population estimates (2013-2016) and projections (2017) were used as the denominator to calculate age-standardized rates and were obtained through IntelliHEALTH ONTARIO. Age-standardized rates were based on the 2011 Canadian standard population and were used to

account for differences in the age structure of different populations (i.e., SWPH region compared to Ontario).²

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Infectious Disease Prevention and Control

The infectious disease prevention and control chapter includes counts and rates of vaccine preventable diseases, other infectious diseases as well as measures of influenza vaccine uptake among the general population and select sub-populations.

Vaccine preventable diseases and other infectious diseases

The Integrated Public Health Information System (iPHIS) is a provincial surveillance database used to track case information for all reportable diseases in Ontario. Data is collected by Southwestern Public Health staff as part of their routine activities and is entered into iPHIS, which is maintained by Public Health Ontario and the Ministry of Health and Long-Term Care (MOHLTC). Confirmed and probable cases of reportable disease are classified according to the MOHLTC case definitions. Provincial and local counts of confirmed vaccine preventable diseases were extracted from Public Health Ontario's Infectious Disease (ID) Query tool, which is an interactive platform that displays aggregated infectious disease data.¹ The diseases extracted from this tool include: influenza, pertussis, streptococcus pneumoniae, invasive, group A streptococcal disease (iGAS), invasive, tuberculosis, encephalitis/meningitis, legionellosis, meningitis, invasive meningococcal disease, mumps, group B streptococcal disease (neonatal), measles, haemophilus influenzae disease, all types, invasive, blastomycosis, Creutzfeldt-Jakob disease, leprosy, acute flaccid paralysis, tetanus, rubella, rubella (congenital syndrome), severe acute respiratory syndrome (SARS), smallpox, anthrax, poliomyelitis, acute and diphtheria.

The data represents only cases reported to public health and recorded in iPHIS. Therefore, due to differences in medical seeking and reporting behaviours, there may be some degree of underreporting. In addition to this, only those cases that meet the provincial case classifications are included in the case counts. In December 2014, the probable case definition for iGAS was removed as well as pneumonia was removed from the case definition as a criterion for evidence of severity. In addition, the confirmed case definition was revised to include cases with laboratory evidence (GAS isolates) from non-sterile sites and evidence of severity, which may lead to an increase in confirmed cases.

Emergency department visits for varicella was obtained through the National Ambulatory Care Reporting System (NACRS), which contains information about unscheduled emergency department visits. The data is submitted by emergency departments, is validated by Canadian Institute for Health Information (CIHI) and accessed by public health units through IntelliHEALTH ONTARIO. The International Statistical Classification of Diseases and Related Health Problems (ICD-10-CA) codes that were used to obtain data is listed in Table 1.

Table 1. ICD-10-CA codes used to categorize emergency department visits for varicella²

Description	ICD-10-CA codes
Varicella meningitis	B010
Varicella meningitis	B011
Varicella pneumonia	B012
Varicella with other complications	B018
Varicella without complication	B019

Population estimates (2013-2016) and projections (2017) were used as the denominator to calculate age-standardized rates and were obtained through IntelliHEALTH ONTARIO. Age-standardized rates were based on the 2011 Canadian standard population and were used to account for differences in the age structure of different populations (i.e., SWPH region compared to Ontario).³

Influenza Immunization

Measures of influenza immunization were obtained from the Canadian Community Health Survey (CCHS), a national cross-sectional survey that collects information about the health of Canadians aged 12 years or older. Excluded from this survey are people living on reserves and other indigenous settlements, full-time members of the Canadian Forces and people living in institutions, children aged 12-17 that are living in foster care, and persons living in the Quebec health regions of Région du Nunavik and Région des Terres-Cries-de-la-Baie-James.

Altogether, these exclusions represent less than 3% of the Canadian population aged 12 and over.⁴ Data is self-reported and may be subject to recall bias and social desirability bias. The 2015-2016 survey interviewed 575 individuals from Oxford County and 623 individuals from Elgin St. Thomas. Data from 2015-2016 is not comparable to previous years due to substantial changes in the content and sampling methodology of the survey.

'Don't know', 'refused' and 'not stated' responses were removed from analysis when together they represented less than 10% of the unweighted sample. This assumes that data are missing at random, which is not always the case. Throughout the report, some numbers may be suppressed because they are unstable due to high variability, as measured by the coefficient of variation (CV). The CV indicates how precise an estimate is. Higher CVs indicate more variability, which often occurs when there is a small sample size. When the CV is greater than 15.0 and less than or equal to 35.0, the estimate should be interpreted with caution due to high variability. In tables, this is shown with an asterisk (*). Estimates with a CV of 35.1 or more are not reportable and the estimates are replaced with double asterisks (**). Estimates are also not reportable if there are less than 10 observations in the numerator and 20 in the denominator based on the unweighted sample.

In the graphs, the confidence interval (CI) is shown by an error bar. Each estimate is based on the survey sample, and a CI is a range of values that describes the uncertainty surrounding an estimate. The 95% CI shows a range of values that have a 95% chance of including the true estimate in the population if the survey was repeated. The wider a 95% CI, the more caution should be used when using the estimate. CIs that do not overlap show statistically significant differences between groups. Statistically significant results indicate the finding is unlikely to be due to chance alone.

References

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Sexual Health

The sexual health section of the report includes measures of sexual behaviours such as youth sexual activity and birth control use as well as rates of sexually transmitted infections (STIs) and blood-borne infections (BBIs).

Sexual Behaviours

Measures of sexual behaviours were all from the Canadian Community Health Survey (CCHS), a national cross-sectional telephone survey with in-person interviews that collects information about health from the Canadian population aged 12 years and older.¹ However, questions about sexual behaviours are only asked of individuals aged 15 to 64 years and excludes individuals who were responding to the survey via proxy. The CCHS also excludes people living on reserves and other Indigenous settlements, full-time members of the Canadian Forces and people living in institutions. Data is self-reported and may be subject to recall bias and social desirability bias, particularly for sensitive topics such as sexual health behaviours. The 2015-2016 survey interviewed 575 individuals from Oxford County and 623 individuals from Elgin St. Thomas. Data from 2015-2016 is not comparable to previous years due to substantial changes in the content and sampling methodology of the survey.

'Don't know', 'refused' and 'not stated' responses were removed from analysis when together they represented less than 10% of the unweighted sample. This assumes that data are missing at random, which is not always the case. Throughout the report, some numbers may be suppressed because they are unstable due to high variability, as measured by the coefficient of variation (CV). The CV indicates how precise an estimate is. Higher CVs indicate more variability, which often occurs when there is a small sample size. When the CV is greater than 15.0 and less than or equal to 35.0, the estimate should be interpreted with caution due to high variability. In tables, this is shown with an asterisk (*). Estimates with a CV of 35.1 or more are not reportable and the estimates are replaced with double asterisks (**). Estimates are also not reportable if there are less than 10 observations in the numerator and 20 in the denominator based on the unweighted sample.

In the graphs, the confidence interval (CI) is shown by an error bar. Each estimate is based on the survey sample, and a CI is a range of values that describes the uncertainty surrounding an estimate. The 95% CI shows a range of values that have a 95% chance of including the true estimate in the population if the survey was repeated. The wider a 95% CI, the more caution should be used when using the estimate. CIs that do not overlap show statistically significant differences between groups. Statistically significant results indicate the finding is unlikely to be due to chance alone.

Sexually Transmitted Infections (STIs) and Blood-borne Infections (BBIs)

In Ontario, the Integrated Public Health Information System (iPHIS) contains case information for reportable diseases based on the Health Protection and Promotion Act. Data is collected by Southwestern Public Health staff as part of their routine activities and is entered into iPHIS, which is maintained by Public Health Ontario and the Ministry of Health and Long-Term Care (MOHLTC). Confirmed and probable cases of reportable diseases are classified according to the MOHLTC case definitions. Provincial and local counts of confirmed STIs/BBIs were extracted from Public Health Ontario's Infectious Disease (ID) Query. These include chlamydia, gonorrhea, syphilis, HIV/AIDS, hepatitis B and hepatitis C.

Individuals that have not been tested for STIs/BBIs will not be included in this data. Therefore, the rates presented may be an underestimate of the true burden in the population. Additionally, some cases might not be new cases but rather newly reported cases, in particular for HIV/AIDS and hepatitis C. There may be duplicate counts for cases of HIV/AIDS due to anonymous testing and furthermore, an individual may be counted twice if they were found to test positive for HIV and were diagnosed with AIDS in the same year. Hepatitis C can include acute infections, spontaneously resolved acute infections, chronic infections and people who received effective anti-viral therapies leading to a cure which would show up as a sustained viral result.²

Population estimates (2013-2016) and projections (2017) were used as the denominator to calculate age-standardized rates and were obtained through IntelliHEALTH ONTARIO. Age-standardized rates were based on the 2011 Canadian standard population and were used to account for differences in the age structure of different populations (i.e., SWPH region compared to Ontario).³

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