Glossary

AGE-STANDARDIZED INCIDENCE RATE (ASIR)
The number of new cases of cancer per 100,000 people in a five-year age group (0–4, 5–9, …, 85+) diagnosed during a year divided by the total number of people in that age group that year. Age-standardized rates are weighted averages of these age-specific rates using a standard population. They give the rate that would occur if the population of interest had the same age distribution as a given standard population. In this report the standard population is the 2011 Canadian population.

AGE-STANDARDIZED MORTALITY RATE (ASMR)
The number of deaths from cancer per 100,000 people in a five-year age group (0–4, 5–9, …, 85+) that occurred during a year divided by the number of people in that age group that year. Age-standardized rates are weighted averages of these age-specific rates using a standard population. They give the rate that would occur if the population of interest had the same age distribution as a given standard population. In this report the standard population is the 2011 Canadian population.

ANNUAL PERCENT CHANGE (APC)
A measure to assess the rate of change over time of an incidence or mortality rate, calculated by fitting a linear model to the annual rates after applying a logarithmic transformation. The estimated slope is then transformed back to represent a percentage increase or decrease per year. The method allows for a series of straight line segments with different slopes to be fitted to long-term trend data.

AVERAGE ANNUAL PERCENT CHANGE (AAPC)
The weighted average of the APCs during a specified time period.

CANCER INCIDENCE
The number of new cancer cases diagnosed during a specific time period in a population.

CANCER MORTALITY
The number of deaths due to cancer during a specific time period in a population.

DEATH CERTIFICATE ONLY (DCO)
Cases for which the only data source is a death certificate. Such cases are excluded from survival analyses.

LOCAL HEALTH INTEGRATED NETWORK (LHIN)
The authority responsible for the regional provision of healthcare for the province of Ontario. There are 14 LHINs in Ontario.

MEDIAN AGE
The age at which exactly one half of the population of interest is older and the other half is younger.

POPULATION AGING
Refers to an increasing proportion of people 65 years of age or older in the population, as defined in demographic terms.

PUBLIC HEALTH UNIT (PHU)
An official health agency established by a group of urban and rural municipalities in Ontario to provide health promotion and disease prevention programs. There are 36 PHUs in Ontario.

RELATIVE SURVIVAL RATIO (RSR)
The proportion of people alive after a specific period of time after cancer diagnosis (e.g., five years) compared to the expected survival of similar people (based on age, sex and time period) in the general population.

POTENTIAL YEARS OF LIFE LOST (PYLL)
The number of years of life lost when a person dies prematurely (defined in this report as before the average life expectancy for the population).

Technical appendix

Data sources

CANCER DATA

Cancer data in this report come from the Ontario Cancer Registry (OCR), which is maintained by Cancer Care Ontario. The goal of the registry is to generate, analyze and disseminate timely and high-quality information describing cases of cancer diagnosed among Ontario residents.

The OCR is a dynamic database. Data are added to the OCR multiple times over the year, which means the data may change over time. Consequently, the results of analyses may vary based on the date that data are extracted from the OCR. The data used in this report were extracted from the OCR between August and November of 2015.

OCR records are created using data collected for purposes other than cancer registration. This information comes from various administrative databases, laboratory reports and clinical records. Four primary sources are used to generate case records in the OCR:

- pathology reports;
- activity-level reporting (ALR) from Regional Cancer Centres (RCCs) and non-RCC hospital records (see **Table TA.4** in this appendix for list of contributing hospitals and regional cancer centres);
- surgery and discharge data from the Canadian Institute for Health Information (CIHI); and
- death certificates from the Ontario Registrar General.

Safeguarding confidential information is a guiding principle for Cancer Care Ontario. All activities—from the initial registration of a new cancer case in the OCR, through to research and reporting—are governed by the *Personal Health Information Protection Act* (PHIPA), 2004.[1] This Ontario law governs the collection and use of data and the disclosure of personal health information. PHIPA designates Cancer Care Ontario as a prescribed entity and authorizes Cancer Care Ontario to collect, use and disclose personal health information for the purposes of managing and planning Ontario's health system.

POPULATION DATA

Except where noted otherwise, population data were from the Ontario Ministry of Finance (Fall 2014 release).[2] These population figures are based on the 2011 census, conducted by Statistics Canada. Population figures for Ontario and by LHIN are provided in **Table TA.2**.

Methods

DISEASE SITE GROUPING

The OCR uses disease site groupings based on the third edition of the International Classification of Diseases for Oncology (ICD-O-3).[3] These disease site groupings are recoded based on the Surveillance Epidemiology and End Results (SEER) Groups.

Cancer deaths are classified according to the 10th edition of the International Classification of Diseases and Related Health Problems (ICD-10).[4]

The primary cancer groupings used in this report are found in **Table TA.1**.

For children 0 to 14 years of age, cancers were classified and reported according to the International Classification of Childhood Cancer, Third Edition (ICCC-3). This system acknowledges the major differences between cancers that develop in childhood and those that develop in adulthood.

CANCER STAGE AT DIAGNOSIS

Cancer staging is viewed as an essential element for quality care. These data can assist with evaluation of the effectiveness of screening and treatment programs, analyses of prevalence and survival, research into new treatments and resource planning for healthcare management.

The tumour-node-metastasis (TNM) system is the most widely used classification system for stage at diagnosis and it is recognized as the international standard for describing the anatomic extent of various cancers. TNM definitions are maintained by the Union for International Cancer Control (UICC) and the American Joint Committee on Cancer (AJCC).[5]

Collaborative Staging (CS) is a staging approach used by central cancer registries. CS brings together the principles of the National Cancer Institute (NCI)/SEER Summary Stage, the TNM categories and stage groupings, and the SEER Extent of Disease coding structure. Most of the CS data items have traditionally been collected by some cancer registries, including tumour size, extension, lymph node status and metastatic status. Other data such as site/histology-specific factors (e.g., Gleason score and receptor status) are new. The data derive the "best stage" grouping consistent with the AJCC Cancer Staging Manual (currently in its seventh edition).[6]

CS values for invasive cancer range from stage I, which means the disease is in the early phase, to stage IV, which means the cancer has spread (or metastasized) to other organs or places in the body. An unknown stage is the result of limited stage work-up, limited documentation in the person's health record or both.

Starting with cases diagnosed in 2007, the OCR implemented various versions of CS in a phased approach by reporting hospital and by selected cancer type. More specifically, full implementation of CS for breast, lung, colorectal and prostate cancers occurred in 2010, for ovarian, uterus and cervical cancers and melanomas in 2011, and for thyroid cancer in 2013. Stage data included in the current report are for the diagnosis years 2010 to 2012.

CODING RULES FOR MULTIPLE PRIMARY CANCERS

Different rules exist to determine if a cancer is a new primary cancer or an extension of a previous cancer. Following a recent rebuild, the OCR adopted the Surveillance, Epidemiology and End Results (SEER) Program rules for counting multiple primaries and assigning histology,[7] similar to other North American cancer registries. In this report, the SEER rules for multiple primary cancers have been applied to cases in the OCR that were diagnosed on or after January 1, 2010. The SEER counting rules take into account histology, site, laterality and time since the initial diagnosis to identify multiple primary cancers. The SEER rules are more liberal in their consideration of what constitutes a new primary case.

Cases from the years prior to SEER adoption (i.e., 1964 to 2009) have been imported into the new OCR from the Ontario Cancer Registry Information System (OCRIS) to allow for continued analytic use. OCRIS applied a modified version of the International Agency for Research on Cancer/International Association of Cancer Registries (IARC/IACR) rules,[8] which are more conservative than the SEER rules. Under the IARC/IACR rules, only one tumour is registered for an organ, irrespective of time, unless there are histological differences. In this report, data were converted using the IARC/IACR rules for all trend analyses that span both OCR and OCRIS eras or whenever comparisons are made between data from the two registry systems. When data are presented only from 2010 onward, the SEER rules were applied.

The SEER rules are less conservative than the IARC/IACR rules, so applying the SEER rules results in an increase in the number of cases included in incidences counts. This is simply a result of using a different methodology and does not reflect an actual increase in the number of people being diagnosed with cancer. The impact of applying the SEER versus IARC/IACR rules on new cases differed by cancer type. For example, the largest increases in new cases due to the adoption of the SEER rules is observed for melanoma (15.9% higher based on SEER rules), breast cancer (14.0% higher) and testicular cancer (9.8% higher) for 2011 to 2012 data, whereas the smallest changes are for Hodgkin lymphoma (0.5%), pancreatic cancer (0.5%) and prostate cancer (0.8%).

PROBABILITY OF DEVELOPING OR DYING FROM CANCER

The probability of developing or dying from cancer refers to the probability of a newborn child developing or dying from cancer at some point during his or her lifetime. Lifetime risk calculations are based on current incidence and mortality rates and are therefore calculated under the assumption that the current rates, within each age group, will remain constant during the life of the newborn child.

The probability of developing or dying from cancer was calculated using DevCan software.[9] The DevCan software program uses life-table methods based on cross-sectional incidence, mortality and population data for 18 age groups to compute the lifetime and age-conditional probabilities of developing or dying from cancer.

NON-MELANOMA SKIN CANCER

Data presented in this document exclude cases of basal cell and squamous cell carcinoma of the skin, which are the most common types of non-melanoma skin cancer. Although approximately 30% of the malignant cancers diagnosed among Ontarians each year are basal cell and squamous cell carcinomas of the skin, these tumours are generally not life-threatening and are often treated in out-patient settings. As a result, they are too inconsistently reported to the OCR to allow meaningful analysis.

SIGNIFICANCE TESTING

Throughout this report, the word significant refers to statistical significance at an alpha level of 0.05 for changes in trend or when comparing differences in rates or ratios. Non-significant changes in trend are described in this report as "stable."

CANCER INCIDENCE AND MORTALITY

Counts

Incidence counts are the number of new cancer cases diagnosed in a population during a specific time period. In this report, this refers to the number of new cancer diagnoses in a calendar year in Ontario. Currently, complete death-cleared incidence data are available up to 2012.

Mortality counts describe the number of deaths attributed to cancer during a specific period of time in a specific population. In this report, mortality refers to the number of deaths due to cancer in a calendar year in Ontario. For consistency, this report uses data for the same range of years for incidence and mortality (i.e., 1981 to 2012).

Rates

Incidence and mortality rates are the number of new cancer cases or deaths per 100,000 people in a population during a specific time period. This is sometimes called the crude rate since it does not adjust for the age distribution of the population.

Age-standardized rates

Age-standardized rates are weighted averages of age-specific rates using a standard population. Age-standardized incidence rates (ASIR) and age-standardized mortality rates (ASMR) are adjusted for differences in the age structure of different populations, which permits comparisons of cancer incidence or mortality among populations that differ in size, structure, time period or all three factors. Age-standardized rates give the rate that would have occurred if the population of Ontario had the same age distribution as the standard population.

The standard population used in this report is the 2011 Canadian census population (**Table TA.3**). Previous surveillance reports published by Cancer Care Ontario used the 1991 Canadian census population. The 1991 standard population is no longer appropriate as the population has aged considerably since then. Using the 2011 standard population results in age-standardized rates that are closer to the crude rate (e.g., the 2012 ASIR for prostate cancer using the 1991 population was 47.8 per 100,000 compared to 63.1 per 100,000 using the 2011 standard population, while the crude rate was 63.4 per 100,000). Given the change in standard population, the age-standardized rates in this report should not be compared to previously published rates that used the 1991 population for standardization.

Time trends

Incidence and mortality trends were determined using annual percentage change (APC) and average annual percent change (AAPC), which were calculated using age-standardized rates. APCs and AAPCs were determined using Joinpoint regression software (version 4.2.0.2).[10] Joinpoint regression uses piecewise regression to model the change in rates on the log scale. A statistical algorithm finds the optimal number and location of places where a trend changes. The point (in time) where a trend changes is called a joinpoint.

In general, the model that Joinpoint found to be the best fit was used. However, for some types of cancer, models other than what the Joinpoint software suggested were used to best describe the trend of the data. A maximum of five joinpoints were allowed. If the Joinpoint regression software found a best-fit model with a joinpoint at three or less observations from the end of the data, the model was rerun using five as the minimum number of observations from a joinpoint to the end of the data.

Joinpoint models are based on yearly rates. As a result, there may be slight differences in the rates presented in the text (yearly rates) and the graphs (where ASIR and ASMR are shown as three-year moving averages).

Three-year moving averages are used to smooth out year-to-year fluctuations in graphs so the underlying trend may be more easily observed. They are calculated based on aggregating three years of data. This smoothing of trends is especially important when the number of cancer cases per year is relatively small and, therefore, year-to-year variability can be quite large.

Projections

Incidence and mortality projections for the years 2013 to 2016 were calculated using the Nordpred package in R software.[11]

For incidence projections, cases meeting the IARC/IACR multiple primary rules from 1983 to 2012 were grouped by five-year age groups and time periods. Population data were similarly aggregated (with the exception of bladder cancer where cases were grouped from 1993 to 2012 due to the classification changes since 1989). To obtain projections for all cancers combined, projections were calculated separately for female breast, prostate, colorectal, lung, thyroid and bladder cancers and for all other cancers by sex, and then summed.

Projections were performed using a Nordpred Power 5 age-period-cohort model (with the exception of prostate cancer incidence). Nordpred is based on an age-period-cohort Poisson regression model. It has enhancements that overcome difficulties in the standard Poisson model and improve projection accuracy.[12] Further details of Nordpred's background methods can be found elsewhere.[13] Projections were produced in five-year periods and linear interpolation was used to create annual counts. Finally an inflation factor was applied based on the age-specific increase in multiple primary cancers due to the application of the SEER counting rules in 2010 to 2012.

Due to the major drop in incidence rates in the past few years, the age-period-cohort models do not fit for prostate incidence. Instead, an age-only model based on DCO-corrected data from 2013 to 2014 was used. This method is more appropriate when there has been a recent change in the trend.

Mortality projections were also performed using a Nordpred Power 5 age-period-cohort model using cancer deaths from 1983 to 2012 divided into five-year age groups and time periods. To obtain mortality projections for all cancers combined, projections were calculated separately for female breast, prostate, colorectal and lung cancers and for all other cancers by sex, and then summed.

Potential years of life lost (PYLL)

Potential years of life lost is a measure of premature death based on sex-specific life expectancy. The most recent life expectancy estimates available (2007/2009) were used. The estimates produced by Statistics Canada were 79 years of age for males and 84 years of age for females.[14]

Geospatial analysis

In this report, geospatial analysis (e.g., maps) was performed by obtaining digital boundary files for the LHINs and PHUs from Statistics Canada.[15] Using the Geographic Information System (GIS) software (ArcGIS®), the age-standardized rates were linked to the geographic boundary files and mapped to display the rates for each LHIN and PHU.

SURVIVAL

Relative survival ratios (RSRs) are estimated by comparing the survival of people with cancer to the expected survival for the general population of Ontarians of the same age and sex during the same time period. Relative survival shows the extent to which a diagnosis of cancer shortens a life span. The relative survival ratio is usually expressed as a percentage (%), and the closer the value is to 100%, the more similar the survival pattern is to the general population.

Survival analyses were based on first primary cancers. RSRs are provided for cases diagnosed in people between 15 and 99 years of age. Cases in which the age of the person was unknown, that were diagnosed on the basis of an autopsy only or whose date of diagnosis and date of death are the same (i.e., death certificate only (DCO) cases — cases that were only diagnosed at or following death) were excluded from the survival analyses (see **Table DA.13** for details on DCO cases).

Analyses were done using a publicly available algorithm,[16] with some minor adaptations. Expected survival proportions were derived using the Ederer II approach,[17] from provincial life tables produced by Statistics Canada.

RSRs were estimated by the cohort method when complete follow-up data after diagnosis (e.g., at least five years of follow-up to estimate a five-year ratio) were available. For recently diagnosed cases whose complete follow-up data were not available, the estimates were computed using the period method. However, comparisons between cohort and period RSRs should be interpreted with caution because of the two different methods used to derive the respective ratios. RSRs were age-standardized by weighting with the International Cancer Survival Standard weights[18] (see **Table TA.5** for further details on weightings).

PREVALENCE

Prevalence analyses were performed using SEER*Stat software.[19] This report provides person-based prevalence; that is, the number of people diagnosed with malignant cancer over a specific time period (e.g., two years, five years or 10 years) who were still alive on the index date. The chosen index date was January 1, 2013.

Multiple primary cancers were treated as follows. Only the first primary was included in the prevalence count for all cancers combined. However, for individual cancer types, each individual could contribute a case for each cancer. For example, a person with a first primary of prostate cancer and a second primary of colorectal cancer would be included once in the prevalence count for all cancers, but twice in the individual cancer type counts (i.e., once in the prostate prevalence count and once in the colorectal prevalence count).

Population estimates for January 1, 2013, were derived by averaging the 2012 and 2013 mid-year population estimates for Ontario.

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Table TA.1 Cancer definitions by coding methodology

Cancer type: short form	Cancer type: full name	Incidence ICD-O-3† definition	Mortality ICD-10‡ definition
All cancers		C00.0–C80.9	C00–C97
Bladder	Urinary bladder and renal pelvis	C65.9, C67	C67
Brain	Brain and other nervous system	C70–C72	C70–C72
Breast (female)		C50	C50
Cervix	Cervix uteri	C53	C53
Colorectal	Colon and rectum	C18.0, C18.2–C20, C26.0	C18–C20, C26
Esophagus		C15	C15
Hodgkin lymphoma		All sites with histologies 9550–9667	C81
Kidney		C64.9	C64–C65
Larynx		C32	C32
Leukemia		C42.0, C42.1, C42.4 with histologies 9811–9818, 9837,9823. Histologies 9826, 9835–9836, 9820, 9832–9834, 9940, 9840, 9861, 9865–9867, 9869, 9871–9874, 9895–9897, 9898, 9910–9911, 9920, 9891, 9863, 9875–9876, 9945–9946, 9860, 9930, 9801, 9805–9809, 9931, 9733, 9742, 9800, 9831, 9870, 9948, 9963–9964, 9827	C90.1, C91.0–C91.5, C91.7, C91.9, C92.0–C92.1, C92.4–C92.5, C92.7, C92.9, C93.0–C93.2, C93.7, C93.9, C94.0–C94.2, C94.4–C94.5, C94.7, C95.0–C95.2, C95.7, C95.9
Liver	Liver and intrahepatic bile duct	C22.0, C22.1	C22.0, C22.2–C22.4, C22.7, C22.9
Lung	Lung and bronchus	C34	C34
Melanoma	Melanoma of skin	C44 with histologies 8720–8790	C43
Myeloma	Mutliple myeloma	Histologies 9731–9732, 9734	C90.0, C90.2
Non-Hodgkin lymphoma		Histologies 9590–9596, 9670–9671, 9673, 9675, 9678–9680, 9684, 9687, 9689–9691, 9695, 9698–9702, 9705, 9708–9709, 9714–9719, 9727–9729; All sites other than C42.0, C42.1, C42.4 with histologies 9823, 9827	C82–C85, C96.3
Oral cavity and pharynx		C00–C06, C07.9, C08.9, C09–C11, C12.9, C13, C14.0, C14.2, C14.8	C00–C14
Ovary		C56.9	C56
Pancreas		C25	C25
Prostate		C61.9	C61
Stomach		C16	C16
Testis		C62	C62
Thyroid		C73.9	C73
Uterus	Corpus and uterus NOS	C54, C55.9	C54–55

†ICD-O-3=*International Classification of Disease for Oncology, Third Edition*
‡ICD-10=*International Statistical Classification of Diseases and Related Health Problems, Tenth Revision*
Note: All cancer types exclude basal cell and squamous cell carcinoma of the skin
Histology types 9590-9989 (leukemias, lymphomas and hematopoietic diseases), 9050-9055 (mesothelioma) and 9140 (Kaposi sarcoma) are excluded from other specific organ sites

Table TA.2 Population estimates by sex and LHIN,[†] Ontario, 2012

LHIN	Both sexes	Males	Females
Ontario	*13,410,082*	*6,655,842*	*6,823,194*
Central	1,788,873	876,551	912,323
Central East	1,561,235	762,171	799,064
Central West	879,984	435,870	444,114
Champlain	1,283,268	630,577	652,691
Erie St. Clair	638,472	315,106	323,366
Hamilton Niagara Haldimand Brant	1,409,455	690,651	718,804
Mississauga Halton	1,169,466	575,177	594,289
North East	569,158	281,851	287,307
North Simcoe Muskoka	460,862	227,884	232,978
North West	236,936	118,043	118,893
South East	492,454	242,396	250,058
South West	956,888	470,975	485,913
Toronto Central	1,209,993	586,053	623,940
Waterloo Wellington	754,950	374,356	380,593

[†]LHIN=Local Health Integration Network
Data source: Population estimates, Ministry of Finance

Table TA.3 Canada 2011 reference population used for calculating age-standardized rates

Age group (years)	Population
0–4	1,899,064
5–9	1,810,433
10–14	1,918,164
15–19	2,238,952
20–24	2,354,354
25–29	2,369,841
30–34	2,327,955
35–39	2,273,087
40–44	2,385,918
45–49	2,719,909
50–54	2,691,260
55–59	2,353,090
60–64	2,050,443
65–69	1,532,940
70–74	1,153,822
75–79	919,338
80–84	701,140
85 and older	643,070

Notes: Postcensal estimates are based on the 2011 Census counts adjusted for census net undercoverage (CNU) (including adjustment for incompletely enumerated Indian reserves (IEIR)) and the components of demographic growth that occurred since that census. Intercensal estimates are produced using counts from two consecutive censuses adjusted for CNU including (IEIR) and postcensal estimates.
Data source: Statistics Canada. Table 051-0001 - Estimates of population, by age group and sex for July 1, Canada, provinces and territories, annual (persons unless otherwise noted)

Table TA.4 Contributors to activity level reporting (ALR), regional cancer centres and hospitals, Ontario

Regional Cancer Centres

- Grand River Regional Cancer Centre
- Juravinski Cancer Centre
- Cancer Centre of Southeastern Ontario
- R.S. McLaughin Durham Regional Cancer Centre
- London Regional Cancer Program
- Simcoe Muskoka Regional Cancer Centre
- Stronach Regional Cancer Centre at Southlake
- Hospital Regional de Sudbury Regional Hospital – Regional Cancer Program
- Odette Cancer Centre
- The Ottawa Hospital Regional Cancer Centre
- Regional Cancer Care North West – Northwest
- Carlo Fidani Peel Regional Cancer Centre
- Princess Margaret Hospital
- Windsor Regional Cancer Centre

Hospitals

- Grand River Hospital
- Hamilton Health Sciences
- Kingston General Hospital
- Lakeridge Health
- London Health Science Centre
- Royal Victoria Hospital
- Southlake Regional Health Centre
- Sudbury Regional Hospital
- Sunnybrook Health Sciences Centre
- The Ottawa Hospital
- Thunder Bay Regional Health Sciences Centre
- Trillium Health Partners
- University Health Network
- Windsor Regional Hospital
- Bluewater Health
- Cambridge Memorial Hospital
- Grey Bruce Health Services
- Headwaters Health Centre
- Humber River Regional Hospital
- Markham-Stouffville Hospital
- Mount Sinai Hospital
- North York General Hospital
- Quinte Healthcare Corporation
- Rouge Valley Health System
- Sault Area Hospital
- St. Joseph's Health Centre
- St. Michael's Hospital
- The Scarborough Hospital
- Toronto East General Hospital
- William Osler Health Centre
- Mackenzie Health (formerly York Central Hospital)

Table TA.5 International Cancer Survival Standards (ICSS) used for standardizing relative survival ratios, by age group and cancer type

Age groups (years)	Weightings	Cancer types
15–44, 45–54, 55–64, 65–74, 75–100	60, 10, 10, 10	Testis, Hodgkin lymphoma, acute lymphatic leukemia
15–44, 45–54, 55–64, 65–74, 75–100	28, 17, 21, 20,14	Nasopharynx, soft tissues, melanoma, cervix uteri, brain, thyroid gland, bone
15–44, 45–54, 55–64, 65–74, 75–100	7, 12, 23, 29	All other cancer types except prostate
15–54, 55–64, 65–74, 75–84, 85–100	19, 23, 29, 23, 6	Prostate

Data appendix

Table DA.1 Lifetime probability of developing cancer, by sex and age group, Ontario, 2009–2012

	Both sexes		Males		Females	
Age group (years)	%	1 in	%	1 in	%	1 in
0–14	0.3%	380.8	0.3%	370.3	0.3%	392.5
15–29	0.6%	162	0.6%	180.4	0.7%	147.4
30–39	1.2%	85.2	0.8%	129.8	1.6%	63.9
40–49	2.6%	37.9	1.9%	54.0	3.4%	29.2
50–59	5.9%	16.9	5.8%	17.4	6.1%	16.4
60–69	10.9%	9.2	12.5%	8.0	9.3%	10.7
70–79	13.0%	7.7	14.9%	6.7	11.2%	8.9
80+	13.1%	7.6	13.3%	7.5	13.0%	7.7

Analysis by: Surveillance, Analytics and Informatics, CCO
Data source: Ontario Cancer Registry (November 2015), CCO; Statistics Canada, Canadian Vital Statistics, Birth and Death Databases and population estimates, CANSIM table 102-0504; CCO SEER*Stat Package Release 10—OCR (August 2015); Statistics Canada, Estimates of population, by age group and sex for July 1, Canada, provinces and territories, annual, CANSIM table 051-0001

Table DA.2 Lifetime probability of dying from cancer, by sex and age group, Ontario, 2009–2012

	Both sexes		Males		Females	
Age group (years)	%	1 in	%	1 in	%	1 in
0–14	0.04%	2,737.9	0.04%	2,631.5	0.03%	2,860.6
15–29	0.07%	1,476.9	0.08%	1,309.2	0.06%	1,700.5
30–39	0.2%	677.4	0.1%	769.1	0.2%	606.8
40–49	0.5%	194.5	0.5%	219.9	0.6%	174.2
50–59	1.7%	60.5	1.7%	58.8	1.6%	62.2
60–69	4.0%	25.1	4.4%	22.5	3.5%	28.3
70–79	7.3%	13.8	8.3%	12.1	6.3%	15.9
80+	12.4%	8.1	13.3%	7.5	11.8%	8.5

Analysis by: Surveillance, Analytics and Informatics, CCO
Data source: Ontario Cancer Registry (November 2015), CCO; Statistics Canada, Canadian Vital Statistics, Birth and Death Databases and population estimates, CANSIM table 102-0504; CCO SEER*Stat Package Release 10—OCR (August 2015); Statistics Canada, Estimates of population, by age group and sex for July 1, Canada, provinces and territories, annual, CANSIM table 051-0001

Table DA.3 Median age at cancer diagnosis, cancer type and sex, Ontario, 2012

Cancer type	Age (years)		
	Both sexes	Males	Females
All cancers	**66**	**68**	**65**
Bladder	74	74	76
Brain	60	59	61
Breast (female)	—	—	62
Cervix	—	—	48
Colorectal	70	69	71
Esophagus	68	66	73
Hodgkin lymphoma	34	36	34
Kidney	64	64	64
Larynx	68	67	68
Leukemia	69	68	70
Liver	68	67	70
Lung	71	71	71
Melanoma	64	65	61
Myeloma	72	71	73
Non-Hodgkin lymphoma	67	66	68
Oral cavity and pharynx	64	63	68
Ovary	—	—	63
Pancreas	71	69	72
Prostate	—	67	—
Stomach	70	69	72
Testis	—	33	—
Thyroid	50	53	50
Uterus	—	—	63

Analysis by: Surveillance, Analytics and Informatics, CCO
Data source: CCO SEER*Stat Package Release 10—OCR (August 2015)

Table DA.4 Median age at cancer death, by cancer type and sex, Ontario, 2012

Cancer type	Age (years)		
	Both sexes	Males	Females
All cancers	**74**	**74**	**74**
Bladder	80	79	82
Brain	64	64	66
Breast (female)	—	—	70
Cervix	—	—	62
Colorectal	77	75	79
Esophagus	70	68	76
Hodgkin lymphoma	65	59	70.5
Kidney	73	71	77
Larynx	73	70	81.5
Leukemia	75	75	75
Liver	71	70	74
Lung	73	72	73
Melanoma	70	70	75
Myeloma	75	73	79
Non-Hodgkin lymphoma	75	74	77
Oral cavity and pharynx	70	69	74
Ovary	—	—	72
Pancreas	73	71	76
Prostate	—	81	—
Stomach	74	74	75
Testis	—	37.5	—
Thyroid	72	70	76
Uterus	—	—	70.5

Analysis by: Surveillance, Analytics and Informatics, CCO
Data source: CCO SEER*Stat Package Release 10—OCR (August 2015)

Table DA.5 Cancer incidence counts and rates, males, by LHIN,† Ontario, 2012

LHIN	New cases	Age-standardized incidence rate (per 100,000)
Central	4,383	584.1*
Central East	4,580	634.4
Central West	1,862	579.4*
Champlain	3,686	632.2
Erie St. Clair	2,233	688.8*
Hamilton Niagara Haldimand Brant	4,713	660.2
Mississauga Halton	2,804	606.4*
North East	2,345	736.5*
North Simcoe Muskoka	1,678	700.1*
North West	665	559.7*
South East	2,014	718.6*
South West	3,116	645.7
Toronto Central	3,057	580.4*
Waterloo Wellington	1,961	620.8

*Significantly different from the Ontario age-standardized rate
†LHIN=Local Health Integration Network
Notes: Excludes 240 (0.6%) cases with incomplete or unknown residence at time of diagnosis
Rates standardized to the 2011 Canadian population
Analysis by: Surveillance, Analytics and Informatics, CCO
Data source: CCO SEER*Stat Package Release 10—OCR (August 2015)

Table DA.6 Cancer incidence counts and rates, females, by LHIN,† Ontario, 2012

LHIN	New cases	Age-standardized incidence rate (per 100,000)
Central	4,628	513.6*
Central East	4,689	549.4
Central West	1,828	474.5*
Champlain	3,629	529.8
Erie St. Clair	2,007	548.5
Hamilton Niagara Haldimand Brant	4,508	544.4
Mississauga Halton	2,834	511.4*
North East	1,974	564.2
North Simcoe Muskoka	1,521	565.0
North West	672	518.6
South East	1,812	576.9*
South West	2,967	534.3
Toronto Central	3,278	512.9*
Waterloo Wellington	1,973	530.2

*Significantly different from the Ontario age-standardized rate
†LHIN=Local Health Integration Network
Notes: Excludes 284 (0.7%) cases with incomplete or unknown residence at time of diagnosis
Rates standardized to the 2011 Canadian population
Analysis by: Surveillance, Analytics and Informatics, CCO
Data source: CCO SEER*Stat Package Release 10—OCR (August 2015)

Table DA.7 Cancer incidence counts and rates, males, by PHU,† Ontario, 2012

PHU	New cases	Age-standardized incidence rate (per 100,000)
Algoma	595	811.7*
Brant County	460	686.7
Chatham-Kent	384	670.1
Durham Region	1,700	652.7
Eastern Ontario	749	680.8
Elgin-St. Thomas	275	617.9
Grey Bruce	697	678.2
Haldimand-Norfolk	413	659.0*
Haliburton, Kawartha, Pine Ridge District	848	708.0
Halton Region	1,398	630.1
Hamilton	1,712	666.0
Hastings and Prince Edward Counties	699	727.8*
Huron County	246	690.0
Kingston, Frontenac and Lennox & Addington	670	661.2
Lambton	462	618.8
Leeds, Grenville and Lanark District	711	700.8*
Middlesex-London	1,335	641.7
Niagara Region	1,610	656.7
North Bay Parry Sound District	530	695.1
Northwestern	159	421.2*
Ottawa	2,448	626.9
Oxford County	353	643.1
Peel	2,860	562.1*
Perth District	236	617.1
Peterborough County-City	498	614.6
Porcupine	308	701.9
Region of Waterloo	1,346	624.8
Renfrew County and District	365	623.7
Simcoe Muskoka District	1,874	699.2*
Sudbury and District	723	700.6*
Thunder Bay District	506	626.6
Timiskaming	183	870.2*
Toronto	7,107	598.6*
Wellington-Dufferin-Guelph	759	626.5
Windsor-Essex County	1,387	719.1*
York Region	2,491	557.4*

*Significantly different from the Ontario age-standardized rate
†PHU=Public Health Unit
Notes: Excludes 240 (0.6%) cases with incomplete or unknown residence at time of diagnosis
Rates standardized to the 2011 Canadian population

Analysis by: Surveillance, Analytics and Informatics, CCO
Data source: CCO SEER*Stat Package Release 10—OCR (August 2015)

Table DA.8 Cancer incidence counts and rates, females, by PHU,† Ontario, 2012

PHU	New cases	Age-standardized incidence rate (per 100,000)
Alogma	480	599.8*
Brant County	408	522.8
Chatham-Kent	364	561.7
Durham Region	1,808	577.5*
Eastern Ontario	708	594.4*
Elgin-St. Thomas	253	504.6
Grey Bruce	569	522.5
Haldimand-Norfolk	418	621.5*
Haliburton, Kawartha, Pine Ridge District	711	570.5
Halton Region	1,435	539.2
Hamilton	1,547	513.1
Hastings and Prince Edward Counties	593	554.0
Huron County	223	574.7
Kingston, Frontenac, and Lennox & Addington	654	562.0
Lambton	432	519.4
Leeds, Grenville and Lanark District	627	564.9
Middlesex-London	1,354	540.0
Niagara Region	1,596	571.7*
North Bay Parry Sound District	418	513.8
Northwestern	176	433.3*
Ottawa	2,491	526.9
Oxford County	355	570.2
Peel	2,880	474.8*
Perth District	227	506.9
Peterborough County-City	501	542.7
Porcupine	268	569.3
Region of Waterloo	1,384	543.2
Renfrew County and District	326	505.9
Simcoe Muskoka District	1,725	573.9*
Sudbury and District	646	548.7
Thunder Bay District	496	559.4
Timiskaming	150	674.1*
Toronto	7,516	515.7*
Wellington-Dufferin-Guelph	736	518.2
Windsor-Essex County	1,211	555.2
York Region	2,634	499.4*

*Significantly different from the Ontario age-standardized rate
†PHU=Public Health Unit
Notes: Excludes 284 (0.7%) cases with incomplete or unknown residence at time of diagnosis
Rates standardized to the 2011 Canadian population

Analysis by: Surveillance, Analytics and Informatics, CCO
Data source: CCO SEER*Stat Package Release 10—OCR (August 2015)

Table DA.9 Cancer mortality counts and rates, males, by LHIN,† Ontario, 2012

LHIN	Deaths	Age-standardized mortality rate (per 100,000)
Central	1,391	199.5*
Central East	1,592	228.2*
Central West	590	206.3*
Champlain	1,380	250.0
Erie St. Clair	874	277.1*
Hamilton Niagara Haldimand Brant	1,859	263.9*
Mississauga Halton	930	221.0*
North East	894	289.8*
North Simcoe Muskoka	620	267.3
North West	299	261.7
South East	800	295.0*
South West	1,267	271.8*
Toronto Central	1,088	211.7*
Waterloo Wellington	732	248.6

*Significantly different from the Ontario age-standardized rate
†LHIN=Local Health Integration Network
Notes: Excludes 363 (2.5%) cases with incomplete or unknown residence on mortality file
Rates standardized to the 2011 Canadian population
Analysis by: Surveillance, Analytics and Informatics, CCO
Data source: CCO SEER*Stat Package Release 10—OCR (August 2015)

Table DA.10 Cancer mortality counts and rates, females, by LHIN,† Ontario, 2012

LHIN	Deaths	Age-standardized mortality rate (per 100,000)
Central	1,299	142.0*
Central East	1,589	177.4
Central West	508	139.1*
Champlain	1,302	182.3
Erie St. Clair	754	190.8*
Hamilton Niagara Haldimand Brant	1,720	190.7*
Mississauga Halton	826	152.6*
North East	718	193.8*
North Simcoe Muskoka	539	189.1
North West	290	209.8*
South East	700	204.6*
South West	1,088	181.6
Toronto Central	1,029	151.4*
Waterloo Wellington	684	178.3

*Significantly different from the Ontario age-standardized rate
†LHIN=Local Health Integration Network
Notes: Excludes 340 (2.6%) cases with incomplete or unknown residence on mortality file
Rates standardized to the 2011 Canadian population
Analysis by: Surveillance, Analytics and Informatics, CCO
Data source: CCO SEER*Stat Package Release 10—OCR (August 2015)

Table DA.11 Cancer mortality counts and rates, males, by PHU,† Ontario, 2012

PHU	Deaths	Age-standardized mortality rate (per 100,000)
Algoma	191	265.8
Brant County	207	317.9*
Chatham-Kent	165	284.9
Durham Region	595	247.7
Eastern Ontario	290	281.3*
Elgin-St. Thomas	125	301.8*
Grey Bruce	262	270.0
Haldimand-Norfolk	145	238.1
Haliburton, Kawartha, Pine Ridge District	312	262.3
Halton Region	475	228.8
Hamilton	674	267.0*
Hastings and Prince Edward Counties	282	301.5*
Huron County	83	236.8
Kingston, Frontenac, and Lennox & Addington	280	285.9*
Lambton	205	282.1
Leeds, Grenville and Lanark District	276	283.5*
Middlesex-London	554	274.5*
Niagara Region	648	265.0
North Bay Parry Sound District	202	273.4
Northwestern	104	290.6
Ottawa	876	239.0
Oxford County	157	296.9*
Peel	917	204.5*
Perth District	92	243.1
Peterborough County-City	213	259.0
Porcupine	133	325.9*
Region of Waterloo	485	243.5
Renfrew County and District	152	262.7
Simcoe Muskoka District	689	268.0*
Sudbury and District	285	279.8
Thunder Bay District	196	250.4
Timiskaming	81	413.9*
Toronto	2,454	211.4*
Wellington-Dufferin-Guelph	299	262.3
Windsor-Essex County	504	272.4*
York Region	708	175.9*

*Significantly different from the Ontario age-standardized rate
†PHU=Public Health Unit
Notes: Excludes 363 (2.5%) cases with incomplete or unknown residence on mortality file
Rates standardized to the 2011 Canadian population

Analysis by: Surveillance, Analytics and Informatics, CCO
Data source: CCO SEER*Stat Package Release 10—OCR (August 2015)

Table DA.12 Cancer mortality counts and rates, females, by PHU,† Ontario, 2012

PHU	Deaths	Age-standardized mortality rate (per 100,000)
Algoma	167	196.1
Brant County	164	197.4
Chatham-Kent	138	192.6
Durham Region	615	196.4*
Eastern Ontario	261	206.6*
Elgin-St. Thomas	112	219.2*
Grey Bruce	225	189.1
Haldimand-Norfolk	132	185.2
Haliburton, Kawartha, Pine Ridge District	272	193.8
Halton Region	478	174.2
Hamilton	624	189.8*
Hastings and Prince Edward Counties	232	198.8
Huron County	81	194.2
Kingston, Frontenac, and Lennox & Addington	255	203.5*
Lambton	174	189.2
Leeds, Grenville and Lanark District	255	210.6*
Middlesex-London	460	171.6
Niagara Region	594	194.4*
North Bay Parry Sound District	165	184.3
Northwestern	96	227.8*
Ottawa	858	175.3
Oxford County	123	185.2
Peel	805	141.4*
Perth District	95	187.3
Peterborough County-City	182	177.1
Porcupine	98	202.8
Region of Waterloo	443	168.5
Renfrew County and District	123	174.3
Simcoe Muskoka District	597	188.3
Sudbury and District	229	187.2
Thunder Bay District	195	202.7
Timiskaming	55	216.5
Toronto	2,359	151.9*
Wellington-Dufferin-Guelph	270	185.3
Windsor-Essex County	442	190.0
York Region	672	132.4*

*Significantly different from the Ontario age-standardized rate
†PHU=Public Health Unit
Note: Excludes 340 (2.6%) cases with incomplete or unknown residence on mortality file
Rates standardized to the 2011 Canadian population

Analysis by: Surveillance, Analytics and Informatics, CCO
Data source: CCO SEER*Stat Package Release 10—OCR (August 2015)

Table DA.13 Death certificate only (DCO) cases, by cancer type, Ontario, 2012

Cancer type	DCO cases	Percent of cases
All cancers	**1,402**	**1.8%**
Bladder	32	1.4%
Brain	26	2.1%
Breast (female)	87	0.8%
Cervix	6	1.0%
Colorectal	204	2.2%
Esophagus	18	2.1%
Hodgkin lymphoma	0	0.0%
Kidney	46	2.0%
Larynx	9	2.2%
Leukemia	73	1.6%
Liver	78	6.8%
Lung	324	3.2%
Non-Hodgkin lymphoma	52	1.2%
Oral cavity and pharynx	33	2.4%
Ovary	36	3.1%
Pancreas	91	4.9%
Prostate	64	0.8%
Stomach	32	2.0%
Testis	1	0.2%
Thyroid	3	0.1%
Uterus	24	0.9%

Analysis by: Surveillance, Analytics and Informatics, CCO
Data source: Ontario Cancer Registry (November 2015), CCO