# OVERVIEW AND TECHNICAL NOTES

# ILLINOIS COUNTY CANCER STATISTICS REVIEW
# INCIDENCE, 2008 – 2012

## OVERVIEW

This report presents cancer incidence in Illinois' 102 counties for 2008 through 2012. The first two sections of the report include tables designed to facilitate county comparisons. County-specific tables with expanded cancer sites are included in Section III for all races. Cancer incidence data for whites and blacks are included in Section IV for 15 counties, including Champaign, Cook, DuPage, Kane, Kankakee, Lake, Macon, Madison, Peoria, Rock Island, Sangamon, St. Clair, Vermilion, Will and Winnebago; these counties have sufficiently large black populations to allow meaningful statistics for the race group. Cancer incidence for Hispanics (of any race) and non-Hispanics (of any race) are included in Section V for five counties (Cook, DuPage, Kane, Lake and Will) that have sufficiently large Hispanic populations to allow meaningful statistics for the ethnicity group. Details for each section follow.

**Section I.** Tables containing five-year aggregate incidence counts, average annual age-adjusted rates, and lower and upper 95 percent confidence intervals are presented for all sites combined; oral cavity and pharynx; colon and rectum; lung and bronchus; melanoma of the skin by sex, race and Hispanic ethnicity (selected counties); and for female breast invasive and *in situ*, cervix and prostate by race and Hispanic ethnicity (selected counties). These sites were chosen based on two considerations: 1) the need to facilitate evaluation of various cancer prevention and control programs, and 2) the sufficient number of cases to allow meaningful presentation of rates.

**Section II.** Stage at diagnosis of cancer for counties is expressed as percentage localized, regional, distant and unstaged for cancers of the oral cavity and pharynx (both sexes); colon and rectum (both sexes); melanoma and the skin (both sexes); and for invasive cervix and prostate. Female breast cancer incidence data are displayed with *in situ* stage in addition to localized, regional, distant and unstaged stage categories. Data by race and Hispanic ethnicity are available for the selected counties.

**Section III.** In separate tables for each of the state's counties, cancer incidence data are presented for all sites combined, the sites in Sections I-II, as well as additional cancer sites included in the county-level public data set for 2008 – 2012. Since the incidence for female breast cancer *in situ* is highly correlated with mammography screening usage, it also is reported in the section. All tables in the section contain five-year aggregate incidence counts, average annual age-adjusted rates, and lower and upper 95 percent confidence intervals for each cancer site by sex category for all races.

**Section IV.** For the 15 above-mentioned counties with sufficiently large black populations, tables in the same format as Section III are presented for whites and blacks.

**Section V.** For the five above-mentioned counties with sufficiently large Hispanic populations, tables in the same format as Section III are presented for Hispanics (of any race) and non-Hispanics (of any race).

## TECHNICAL NOTES

*Data Sources*

### Cancer Incidence

Cancer incidence data are from the Illinois Department of Public Health, Illinois State Cancer Registry (ISCR), the only source of population-based cancer incidence data for the state. Identification of cancer cases in the ISCR is dependent upon reporting by hospitals, free-standing clinics, radiation treatment facilities, laboratories and physician offices, as mandated by state law. All newly diagnosed cancer cases among Illinois residents are reported to ISCR by these reporting sources. In addition, ISCR has agreements with other central registries to send back Illinois cancer data that are identified outside of the state. These registries include Arkansas, California, Florida, Indiana, Iowa, Kentucky, Michigan, Mississippi (through August of 2004), Missouri, North Carolina, Washington, Wisconsin, Wyoming (through February 2008) and the Mayo Clinic in Minnesota (through October 2005).

Completeness of out-of-state reporting depends upon the years of operation of these other central registries, the extent of their identification of out-of-state residents and their standards of quality.[1] For data used in this publication, 6.2 percent of ISCR cases were reported from out-of-state agencies and organizations.

A death certificate clearance process has been employed since August 1993. The process involves follow back of cancer deaths in an effort to identify the cases not reported to ISCR. Between 2008 and 2012, 1.6 percent of reported cases were identified from death certificate clearance.

The preparation and release of data used for this report is dependent on the completion of annual reporting by Illinois facilities. Although case reporting is mandated within six months of diagnosis, it has been the ISCR policy to keep database files open for late reporting of cases and to allow for the two- to four-year lag in case identification of Illinois residents from other state central cancer registries. This practice is consistent with data published nationally. For this report, the database files reflect the status of ISCR as November 2014.

### Data Use Agreement

By using these data contained in this report, you signify your agreement to comply with the following statutorily based requirements.

The Illinois Health and Hazardous Substances Registry Act (410 ILCS 525/12) provides data collected by the Illinois State Cancer Registry be made available to the public; however, the identification or contact of individuals is prohibited.

In an effort to exclude identifying information on individual patients, the data (e.g., age, race, Hispanic ethnicity, year of diagnosis and type of cancer) have been reported in aggregate categories, the number of which depends on the size of the geographic area.

These data are provided as a public service for the purpose of statistical reporting and analysis only. There should be no attempt to learn the identity of any person included in these data. If the identity of any person is discovered inadvertently, no disclosure or other use of the identity will be made.

Uses of these data do not constitute an endorsement of the user's opinion or conclusions by the Department and none should be inferred.

**Population Estimates**

Age-, sex-, and race/ethnicity-specific population counts for Illinois and Illinois counties for each year were obtained from both the intercensal and Vintage 2013 bridged-race postcensal population estimates files. Population estimates by age, sex, race and Hispanic origin were produced by the United States Bureau of Census Population Estimates Program (http://www.census.gov/popest/index.html), in collaboration with the National Center for Health Statistics. The population estimates used in this report incorporate intercensal estimates (for 2008-2009) and Vintage 2013 bridged single-race estimates (for 2010-2012) are derived from the original multiple race categories in the 2000 Census (as specified in the 1997 Office of Management and Budget standards for the collection of data on race and ethnicity https://www.whitehouse.gov/omb/inforeg_statpolicy/). The bridged single-race estimates and a description of the methodology used to develop them appear on the National Center for Health Statistics website (http://www.cdc.gov/nchs/nvss/bridged_race.htm).

The intercensal estimates provide an adjustment of previous population estimates based on the actual 2010 census results (http://www.census.gov/popest/methodology/2000-2010_Intercensal_Estimates_Methodology.pdf).[2] Population estimates utilized prior to the availability of the 2010 census data were prone to increased error as the time from the actual 2000 census increased. At the national level, estimates using both the 2000 census and the 2010 census are not very different from the previous estimates. However, there are more significant differences at the state and county levels that may result in changes to cancer incidence rates when one compares this report to earlier versions. In addition, differences in incidence rates may not solely be the result of changes in population estimates. Changes in rates also could be attributable to the addition of cases reported late.

*Definitions*

**Cancer Incidence Sites**

All cases diagnosed during 2008 through 2012 were reported with *The International Classification of Diseases for Oncology* version 3 (ICD-O-3) codes.[3] Cancer sites in this report were grouped according to site group definitions established by the Surveillance Epidemiology and End Results (SEER) program of NCI[4] and also are used by the North American Association of Central Cancer Registries (NAACCR). These standardized classification schemes allow direct comparisons of Illinois data with international, national and state publications.[4-6] The ISCR cancer site groups used in the county tables are listed in Appendix B.

Beginning with the 1998-2002 report and continuing through this year's report, both Kaposi sarcoma and mesothelioma were classified as separate site groups. Compared to using the previous site grouping method, this change has a slight impact on cancer incidence rates for a few specific cancers. However, due to small numbers of cases at the county level, these two sites are not shown in this report.

When comparing this report to the ones published before the 2001-2005 county report, it should be noted that several cancers that previously were not coded as malignant in ICD-O-2 (used in diagnoses prior to 2001) are coded as malignant in ICD-O-3 (beginning with 2001 diagnoses). For example, myeolodysplastic syndrome (MDS) and chronic myeloproliferative disease (CMPD) are considered malignant cancer in ICD-O-3, so are papillary ependymomas and papillary meningiomas which, according to ICD-O-3, are included in the "brain and other nervous system" and "all sites" categories. Some endometrial tumors also are classified as malignant in ICD-O-3. Conversely, some low malignant potential tumors of the ovary and pilocytic astrocytomas are no longer coded as malignant in ICD-O-3. Overall, these changes would have a slight impact on incidence of a specific cancer site; however, it might result in a noticeable increase in cancer incidence rates for "all sites" or for "all other sites."

The ICD-O-3 recode with adjustment for WHO 2008 hematopoietic histologies was first used in the 2006-2010 report and continues to be used in subsequent reports. SEER-NCI recommends this site recode scheme (Site Recode ICD-O-3/WHO 2008) be used for any data containing cases diagnosed in 2010 or later years. In the interests of comparability to other national, state and registry specific data subsequent versions of this report containing cases diagnosed in 2010 or later will indeed use the SEER Site Recode ICD-O-3/WHO 2008.

Counts and rates were calculated only for invasive cancers with the exception of carcinoma *in situ* occurring in the urinary bladder. Counts and rates for carcinoma *in situ* of the breast are displayed separately in tables, but were not included in the calculation of counts or incidence rates for all sites combined.

**Incidence Rates**

Rates are expressed per 100,000 population and are age-adjusted by the direct method to the 2000 U.S. standard million population. The SEER*Stat® software package, developed by Information Management Services Inc. for the NCI, was used to calculate average annual age-adjusted cancer incidence rates for 2008 – 2012.[7] Rates are rounded to the nearest 10th and very small rates (e.g., 0.04) are shown as 0.0. Rates are presented with the lower and upper confidence intervals computed at the 95 percent level using Tiwari method.[8] The formulas for rate calculations are displayed in Appendix C.

**Race Categories**

The race-specific categories in this report are all races for Illinois and all 102 counties. Data for whites and blacks are presented for Illinois and 15 counties (Champaign, Cook, DuPage, Kane, Kankakee, Lake, Macon, Madison, Peoria, Rock Island, St. Clair, Sangamon, Vermilion, Will and Winnebago) with sufficient black population estimates and annual cancer incidence for blacks to allow meaningful statistics. Cases reported as "other" or "unknown" race are included in the "all races" category.

To improve the identification and surveillance of American Indians and Alaska Natives diagnosed with cancer and to be consistent with the national data, cancer incidence data since 1995 were linked to the Indian Health Service (IHS), which provides medical services to an estimated 55 percent of the American Indian/Alaska Native population.[9] If a race code in the ISCR database is white, black, other or unknown and the IHS link is positive, then the race code is re-categorized to American Indian/Alaskan Native, otherwise the race code stays unchanged. This practice has minimal impact on the incidence rates for whites or blacks due to the small number of cases affected.

**Hispanic Ethnicity Categories**

Through the use of the NAACCR Hispanic identification algorithm (NHIA) improvements have been made in classifying cases as Hispanic or Latino for diagnosis years 1990 through 2012.[10] NHIA is a generally reliable method to enhance the ethnic identification of the Latino population in the United States.[11] Cases that meet certain criteria around race and birthplace, and who are also identified as non-Hispanic, Hispanic not otherwise specified, Spanish surname only, and unknown ethnicity are examined. Through the use of race, birthplace, last name, first name and maiden name, NHIA assigns a more specific and sometimes different ethnicity to these cases.

The Hispanic ethnicity-specific categories are presented in this report for Illinois and five counties (Cook, DuPage, Kane, Lake and Will) with sufficient Hispanic population estimates and annual cancer incidence for Hispanics to allow meaningful statistics. To be consistent with national data, cases reported as "unknown" ethnicity are included in the non-Hispanic category.[4-6]

## Quality Control

Ongoing quality control procedures are integral components of ISCR operations that assure high quality cancer incidence data.[12] In 1997, NAACCR developed a certification process that reviews registry data for completeness, accuracy and timeliness of reporting (starting with cases diagnosed in 1995). ISCR has submitted data each year to the NAACCR for registry certification. Based on the certification criteria shown in the following table, ISCR has been awarded gold certification for diagnosis years 1996-2011. The table below shows the criteria used for silver and gold certification.

| Completeness (NAACCR Method) | Pass EDITS | DCO | Timeliness | Unresolved Duplicate | Missing Data Fields | | | | Certification Status |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Sex | Age | County | Race | |
| ≥ 90% | ≥ 97% | ≤ 5% | Within 23 months | ≤ 2/1000 | ≤ 3% | ≤ 3% | ≤ 3% | ≤ 5% | SILVER |
| ≥ 95% | 100% | ≤ 3% | Within 23 months | ≤ 1/1000 | ≤ 2% | ≤ 2% | ≤ 2% | ≤ 3% | GOLD |

Constantly updating registry data is a standard operation in ISCR. As of November 2014, ISCR quality control data for the diagnosis years considered in this report (2008 – 2012) are as follows:

| Year | Completeness (NAACCR Method- As of 11-14) | Pass EDITS | DCO | Unresolved Duplicate Per 1,000 | Missing Data Fields | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Sex | Age | County | Race |
| **2008** | 100% | 100% | 1.7% | 0.7 | 0.0% | 0.0% | 0.0% | 1.3% |
| **2009** | 100% | 100% | 1.6% | 0.3 | 0.0% | 0.0% | 0.0% | 1.5% |
| **2010** | 100% | 100% | 1.8% | 0.3 | 0.0% | 0.0% | 0.0% | 1.4% |
| **2011** | 100% | 100% | 1.8% | 0.0 | 0.0% | 0.0% | 0.0% | 1.8% |
| **2012** | 100% | 100% | 0.9% | 0.2 | 0.0% | 0.0% | 0.0% | 1.6% |

## Data Interpretation

Observed differences in cancer incidence among counties may be real, reflecting differences in risk factor modifications or consequences of screening and early detection programs within the county. However, county cancer incidence differences also could be the result of other factors. Any conclusions should be made only after carefully considering the following factors that influence the average annual age-adjusted cancer incidence rates:

- Aggregate cancer case counts for 2008 – 2012 produce more stable age-adjusted cancer incidence rates than those calculated for an individual year. Counties with smaller populations and smaller numbers of cancer incidence cases will still have less stable age-adjusted rates than larger counties or the entire state. Where the number of cases is less than or equal to 16, the relative standard error for the rate in these instances is equal to or exceeds 25 percent. At this level, interpretation of the rate is limited by excessive uncertainty and these rates should be evaluated cautiously.

- The 95 percent confidence intervals are included with reported rates to help put the rate in perspective and to facilitate county comparisons. Observed differences may not be statistically significant. The range between the lower confidence interval and the upper confidence interval defines with 95 percent probability where the "true" rate for the county or the state may fall. The comparison of two sets of confidence intervals is approximately equivalent to statistical significance tests for differences between two county rates and is more conservative than the standard significance test when the null hypothesis is true.[13]

- Population estimates used for denominators may lack precision. These data are estimates based on demographic characteristics of the population rather than actual counts. Incidence rates produced using these population estimates would be expected to exhibit more error than those calculated using 2000 or 2010 census population counts. Also, please keep in mind when comparing this report to earlier versions, the methods for developing the population estimates have changed and denominator data will lack comparability. Ensuring the same estimate methods (e.g., revised intercensal estimates and Vintage 2013) are used across the time period being examined accounts for this issue.

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