



State of Illinois
Department of Public Health

Illinois Cancer Mortality Review and Update 1986 - 2008

Epidemiologic Report Series 11:08

December 2011

Illinois Cancer Mortality Review and Update, 1986-2008



A publication of the
Illinois Department of Public Health
Division of Epidemiologic Studies
Illinois State Cancer Registry
Springfield, Illinois 62761

December 2011

Prepared by

Kyle Garner
Cancer Epidemiologist

Tiefu Shen, M.D., Ph.D.
Division Chief

Acknowledgements

This publication was supported by Cooperative Agreement Number U58/DP000805-05 from the U.S. Centers for Disease Control and Prevention (CDC) National Cancer Prevention and Control Program. The contents are solely the responsibility of the authors and do not necessarily represent the official views of CDC.

Suggested citation

Garner K, Shen T. Illinois Cancer Mortality Review and Update, 1986-2008. Epidemiologic Report Series 11:08. Springfield, Ill.: Illinois Department of Public Health, December 2011.

Copyright information

All material in this report is in the public domain and may be reproduced or copied without permission; citation as to source, however, is appreciated.

The Illinois Department of Public Health, Illinois State Cancer Registry, makes these data available as a public service. Use of these data does not constitute an endorsement of the user's opinion or conclusions by the Department and none should be inferred.

**ILLINOIS CANCER MORTALITY REVIEW AND UPDATE
1986-2008**

TABLE OF CONTENTS

Overview and Technical Notes2

SECTION I

Cancer Mortality by Race, Illinois, 1986-2008.....I-2

 All Sites Combined.....I-2

 Oral Cavity and PharynxI-5

 Digestive System.....I-8

 Respiratory System.....I-26

 Skin Excluding Basal and SquamousI-35

 BreastI-41

 Female Genital SystemI-44

 Male Genital System.....I-48

 Urinary SystemI-51

 Brain and Other Nervous System.....I-60

 Endocrine SystemI-63

 Lymphoma.....I-69

 MyelomaI-78

 Leukemias.....I-81

 Other, Ill-defined and Unknown Sites.....I-84

SECTION II

Cancer Mortality by Hispanic Ethnicity and Race, Illinois, 1990-2008 II-1

 All Sites Combined..... II-2

 Oral Cavity and Pharynx II-5

 Digestive System..... II-8

 Respiratory System..... II-26

 Skin Excluding Basal and Squamous II-36

 Breast II-41

 Female Genital System II-41

 Male Genital System..... II-48

 Urinary System II-51

 Brain and Other Nervous System..... II-60

 Endocrine System II-63

 Lymphomas II-69

 Myeloma II-78

 Leukemias..... II-81

 Other, Ill-defined and Unknown Sites..... II-84

Appendix A: Illinois Populations Used for Rate Calculations 1986-2008..... A-1

Appendix B: SEER Site Groups for Mortality Data Based on ICD-9 and ICD-10.....B-1

Appendix C: Formulas for Rates C-1

ILLINOIS CANCER MORTALITY REVIEW AND UPDATE

1986-2008

OVERVIEW

This is the mortality part of the 16th release of the annual Illinois cancer statistics. Previous reports included cancer statistics for both incidence and mortality. For this year's cancer statistics, however, since the Surveillance, Epidemiology and End Results program (SEER) of the National Cancer Institute (NCI), the Illinois Department of Public Health's source of information on cancer mortality, did not release mortality data for 2008 until late October 2011, the incidence part of the annual cancer statistics was compiled as a standalone report before the mortality data became available. Additionally, as the volume of combined cancer statistics report has grown substantially large over the years, it is sensible to separately publish the incidence and mortality data. This report presents Illinois' cancer mortality for 1986 through 2008 for all races combined, whites, blacks and Asian/other races and for 1990 through 2008 for Hispanics (any race), non-Hispanics (any race), non-Hispanic whites and non-Hispanic blacks. All rates in this report were age-adjusted to the 2000 U.S. standard million population.

Cancer group definitions for major and minor sites are those established by the SEER program of NCI and are used by the North American Association of Central Cancer Registries (NAACCR) and the United States Cancer Statistics (USCS) of the U.S. Centers for Disease Control and Prevention (CDC). These standardized classification schemes allow direct comparisons of Illinois cancer statistics with international, national and state publications.¹⁻⁶

We tabulated mortality data for each major or minor cancer site for four race groups and four ethnicity/race groups. Counts, age-adjusted rates, standard errors and 95 percent confidence intervals for rates are displayed for the combined 1986-2008 time period (1990-2008 time period for ethnicity/race groups) as well as for individual years. For cancers occurring in both genders, separate tables were presented for both sexes, and for males and females.

MORTALITY HIGHLIGHTS

- From 1986 through 2008, there were 561,926 Illinois residents who died from cancer. The race distribution for these deaths was 84.3 percent among whites, 14.7 percent in the black population and the remainder occurring among the Asian/other race population group (1.0 percent).
- From 1990 through 2008, there were 468,295 Illinois residents who died from cancer. The distribution for these deaths was 2.3 percent Hispanic (any race) and 97.7 percent non-Hispanics (any race). Among non-Hispanic deaths, 83.7 percent was non-Hispanic whites and 15.1 percent non-Hispanic blacks.
- Black males had the highest overall age-adjusted mortality rates from cancer during the 1986-2008 time period, about 48 percent higher than the rate for white males and more than three times the rate for males identified as Asian or other races. Similarly, Illinois'

cancer mortality rates for black females exceeded those for white females by about 29 percent and were nearly three times those observed among females identified as Asian or other races in Illinois. Non-Hispanics (any race) had mortality rates that were almost twice that of Hispanics (any race).

- Based on age-adjusted cancer mortality rates, lung cancer remains the leading cause of death from cancer for both Illinois males and females of all races and for Hispanic males. It is the second leading cause of cancer death for Hispanic females, followed by prostate cancer for males and breast cancer for females. The third leading cause of cancer death is from cancers of the colon and rectum for both males and females.
- From 1986 through 2008, among males of all races, nearly one-third of all cancer deaths were from cancer of the lung and bronchus (31.9 percent), 11.0 percent from prostate cancer, and 10.8 from cancer of the colon and rectum. These three cancers accounted for more than half of all cancer deaths (53.7 percent).
- From 1986 through 2008, 22.5 percent of all cancer deaths among females of all races were due to cancer of the lung and bronchus, 17.0 percent due to cancer of the breast, and 11.7 percent due to cancer of the colon and rectum; these three cancers contributed to more than 51.5 percent of all cancer deaths in females.

TECHNICAL NOTES

Mortality Data Sources

Mortality data for 1986 to 2008 by race and for 1990 to 2008 by ethnicity/race were obtained from the National Center for Health Statistics (NCHS) of CDC, as provided to the SEER program of NCI.

Population Estimates

Appendix A displays the population estimates of the sex- and race-specific as well as sex- and ethnicity/race-specific groups in five-year age categories that were used as denominators for rate calculations in this report. These population estimates of Illinois for all races, whites, blacks and Asian/other races from 1986 through 2008 and for Hispanic (any race), non-Hispanic (any race), non-Hispanic white and non-Hispanic black from 1990 through 2008 were obtained from the SEER program based on United States Bureau of Census population estimates for these years.⁷ The methodology for these estimates is available at the following website: www.seer.cancer.gov/popdata/methods.html.

The U.S. Census Bureau revised their population estimation methodology for Vintage 2009. The Vintage 2009 population estimates used in this report incorporate four improvements in methodology: 1) changes in the estimation of net internal migration, 2) changes in the estimation of the distribution of deaths to people aged 70 and older by age, sex, race, and Hispanic origin, 3) changes in the estimation of domestic migration of the population 65 years and older, and 4) changes in the estimation of the age distribution of migrations to and from

counties. These changes are in addition to changes made in Vintage 2008 and Vintage 2007.⁸ The net impact of these changes was a downward shift in the latest post-censal population estimates covering 2000 through 2009. In general, this shift caused a small upswing in rates.⁹

Illinois population estimates from Vintage 2008 data for 2003 through 2007 were compared to those produced using the Vintage 2009 data for the same time period. Use of new methods in the Vintage 2009 file resulted in a 0.2 percent decrease in Illinois' total population. The new Vintage 2009 methods put Illinois' cancer rate 0.8 percent higher than what was calculated previously using Vintage 2008. 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.⁹

Definitions

Cancer Site Coding for Mortality Data. Underlying cause of death was coded using the *International Classification of Diseases (ICD-9)*¹⁰ for all deaths for years 1986 through 1998 and the *International Classification of Diseases (ICD-10)*¹¹ for all deaths for year 1999 and later. In the present report, the SEER mortality recode scheme based on ICD-9 and ICD-10 was used to classify cancer deaths sites (Appendix B: SEER site groups for mortality data based on ICD-9 and ICD-10).

Cancer Mortality. Because of many changes in ICD-10 as compared to ICD-9, discontinuities in trends for many causes of death including cancer may arise. According to a study, compared to using ICD-9 coding, overall, approximately 0.7 percent more deaths are assigned to cancer when ICD-10 is used, leading to a higher mortality rate for all cancers combined.¹² But this pattern does not hold for specific cancer sites, whose rates may be higher or lower using ICD-10. These discontinuities are relatively small, and the changes in mortality rates across the years of the ICD-9/ICD-10 boundary are still interpretable, especially for major cancer sites.¹³

Cancer deaths among non-residents and deaths of unknown sex or age were omitted from all calculations.

Mortality Rates. Mortality rates were calculated using the SEER*Stat® software package,¹⁴ developed for NCI by the Information Management Services Inc. Rates are expressed per 100,000 population. Age-adjustment of rates was calculated by the direct method adjusting to the 2000 U.S. standard million population. Rates are rounded to the nearest tenth and very small rates (e.g., 0.04) are shown as 0.0. They are presented with the lower and upper confidence intervals computed at the 95 percent level using Tiwari method.¹⁵ Algorithms used for the calculation of standard errors and 95 percent confidence intervals are displayed in Appendix C.

Beginning with the release of the 1969-2008 mortality database (October 2011), data is suppressed if the number of deaths is fewer than 10. This change also was made to all the previously-released mortality databases available through SEER*Stat. The suppressed cases are, however, included in counts and rates for the aggregate time periods (1986-2008 or 1990-2008) as well as counts and rates for All Cancer Sites.

Race-specific Rates. The race-specific categories in this report are all races combined, whites, blacks and Asian/other races. Cases reported as unknown race were included in the "all races" category but not in any race-specific group.

Ethnicity/Race Rates. Hispanic ethnicity was used as defined in the database. Because there were a considerably large number of cancer deaths with unknown Hispanic ethnicity in the mortality database, the mortality rates calculated for Hispanics may be underestimated. To be consistent with all national reports, categories are reported as Hispanic (any race), non-Hispanic (any race), non-Hispanic whites and non-Hispanic blacks.

DATA INTERPRETATION

Observed variations and differences over years and across sex and race groups in cancer mortality may be real, reflecting changes in cancer incidence, or changes in early detection and treatment. Such changes or differences, however, may not be real but instead may be the result of random fluctuations and other factors related to the estimation process. Any conclusions should be made only after carefully considering the following factors that influence annual mortality rates.

- Random fluctuations in annual rates are usual and may be substantial, especially for rates based on small numbers of mortality counts (i.e., less than 16).
- Population estimates used for denominators may be inaccurate or lack precision. Population data for 1990 and 2000, the years of the U.S. decennial census, are the most accurate for all age-, race-, ethnicity- and sex-specific categories and would, therefore, produce the most accurate incidence and mortality rates. Those for other years are not based on actual population counts but rather on interpolation or extrapolation of estimates based on demographic characteristics of the population. Incidence rates based on these population estimates would be expected to be less accurate than those for 1990 or 2000.
- The 95 percent confidence intervals are included with reported rates to help put the rate in perspective and to facilitate rate comparisons over years and across sex, race and ethnicity/race groups. 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 may fall. The overlap of two sets of confidence intervals is approximately equivalent to being statistically insignificant for differences between two rates and is more conservative than the standard significance test when the null hypothesis is true.¹⁶

REFERENCES

1. Thornton M, (ed). *Standards for Cancer Registries Volume II: Data Standards and Data Dictionary, Record Layout Version 12.2*. Sixteenth Edition. Springfield, Ill.: North American Association of Central Cancer Registries, June 2011.
2. Hofferkamp J (Ed). *Standards for Cancer Registries Volume III: Standards for Completeness, Quality, Analysis, Management, Security and Confidentiality of Data*. Springfield (Ill.): North American Association of Central Cancer Registries, August 2008.
3. Copeland G, Lake A, Firth R, et al (eds). *Cancer in North America: 2004-2008. Volume One: Combined Cancer Incidence for the United States and Canada*. Springfield, Ill.: North American Association of Central Cancer Registries, Inc. May 2011.
4. Copeland G, Lake A, Firth R, et al (eds). *Cancer in North America: 2004-2008. Volume Two: Registry-specific Cancer Incidence in the United States and Canada*. Springfield, Ill.: North American Association of Central Cancer Registries, Inc. May 2011.
5. Copeland G, Lake A, Firth R, Wohler B, Wu XC, Stroup A, Russell C, Kimberley B, Niu X, Schymura M, Hofferkamp J, Kohler B (eds). *Cancer In North America, 2004-2008. Volume Three: Registry-specific Cancer Mortality in the United States and Canada*. Springfield, Ill.: North American Association of Central Cancer Registries, Inc. September 2011.
6. Howlander N, Noone AM, Krapcho M, et al (eds). *SEER Cancer Statistics Review, 1975-2008*, National Cancer Institute. Bethesda, Md., http://seer.cancer.gov/csr/1975_2008/, based on November 2010 SEER data submission, posted to the SEER website, 2011.
7. Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Populations - Total U.S. (1969-2008) <Single Ages to 85+, Katrina/Rita Adjustment> - Linked To County Attributes - Total U.S., 1969-2008 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Cancer Statistics Branch, released September 2011.
8. The Population Estimates Program, U.S. Census Bureau. *Release notes Vintage 2009*. U.S. Census Bureau . <http://www.census.gov/popest/topics/methodology/2009-est-relnotes.pdf>. Published March 23, 2010. Accessed November 7, 2011.
9. Surveillance Epidemiology and End Results, National Cancer Institute, U.S. National Institutes of Health. SEER – website. http://seer.cancer.gov/popdata/impact_rates_2009.html. Accessed November 7, 2011.
10. Percy C, Van Holten V, and Muir C (eds). *International Classification of Diseases for Oncology*. 2nd edition. Geneva: World Health Organization, 1990.
11. Fritz A, Percy C, Jack A, et al (eds). *International Classification of Diseases for Oncology*. Third edition. Geneva: World Health Organization, 2000.

12. Anderson RN, Minino AM, Hoyert DL, Rosenberg HM. Comparability of cause of death between ICD-9 and ICD-10: Preliminary estimates. *National Vital Statistics Reports* 2001;49:1-32.
13. Copeland G, Lake A, Firth R, Wohler B, Wu XC, Stroup A, Russell C, Kimberley B, Niu X, Schymura M, Hofferkamp J, Kohler B (eds). *Cancer In North America, 2004-2008. Volume Three: Registry-specific Cancer Mortality in the United States and Canada*. Springfield, Ill.: North American Association of Central Cancer Registries, Inc. September 2011.
14. Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) Version 7.0.5, September 2, 2011.
15. Tiwari RC, Clegg LX, Zou Z. Efficient interval estimation for age-adjusted cancer rates. *Stat Methods Med Res* 2006 Dec;15(6):547-69.
16. Schenke N and Gentleman JF On judging the significance of differences by examining the overlap between confidence intervals. *The American Statistician* 2001;55:182-186.