TECHNICAL NOTES

DATA USE AGREEMENT

By using these data, you signify your agreement to comply with the Illinois Health and Hazardous Substances Registry Act (410 ILCS 525/12). Data collected by the Illinois State Cancer Registry (ISCR) are made available to the public, however the identification or contact of individuals is prohibited.

In an effort to exclude identifying information on individual patients, these data (e.g., age, race, Hispanic ethnicity, year of diagnosis and type of cancer) have been aggregated into categories within individual records, 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 Illinois Department of Public Health and none should be inferred.

DATA SOURCES

Cancer Mortality Data: The Surveillance Epidemiology and End Results (SEER) program of the National Cancer Institute (NCI) was the source of information on cancer mortality for 1986 through 2019 by race and ethnicity. The underlying cause of death was provided by the National Center for Health Statistics (NCHS). Data presented were released in April of 2021.

Population Estimates: The population estimates of the sex- and race-specific, as well as sex- and ethnicity/race-specific groups in five-year age categories, were used as denominators in the formulation of rates. These population estimates of Illinois for all races, Whites, Blacks, and Asian/other races from 1986 through 2019, and for Hispanics, non-Hispanics, non-Hispanic White, and non-Hispanic Black for 1990 through 2019 were obtained from both the intercensal and Vintage 2020 bridged-race post censal population estimates files. Population estimates by age, sex, race, and Hispanic origin were produced by the United States Bureau of Census Population Estimates Program in collaboration with the National Center for Health Statistics, and with support from the National Cancer Institute (NCI) through an interagency agreement. The population estimates incorporate intercensal (for 2000-2009) and Vintage 2020 (for 2010-2019) bridged single-race estimates are derived from the original multiple race categories in the 2000 and 2010 Censuses (as specified in the 1997 Office of Management and Budget standards for the collection of data on race and ethnicity). The bridged single-race estimates and a description of the methodology used to develop them appear on the National Center for Health Statistics website.

The intercensal estimates provide an adjustment of previous population estimates based on the actual 2010 census results.[7,8] Previous 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 mortality rates when one compares this report to earlier versions.

DEFINITIONS

Cancer Site Coding for Mortality Data. Underlying cause of death was coded using the *International Classification of Diseases* (ICD-9)[4] for all deaths for years 1986 through 1998 and the *International Classification of Diseases* (ICD-10)[5] for all deaths for year 1999 and later. In the present data, the SEER mortality recode scheme based on ICD-9 and ICD-10 was used to classify cancer deaths sites.

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% more deaths are assigned to cancer when ICD-10 is used, leading to a higher mortality rate for all cancers combined.[6] 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.[7]

Cancer mortality rates are available by single year for Illinois only. Deaths among non-residents and deaths of unknown sex or age were omitted from all calculations. Due to NCHS policy, statistics were not calculated for cells containing less than 10 deaths.

Mortality Rates: The SEER*Stat® software package,[8] developed by the Information Management Services Inc. for NCI, was used to calculate mortality rates. 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 10th 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% level using Tiwari method.[9] Algorithms used for the calculation of standard errors and 95% confidence intervals are displayed in Appendix C of the state incidence report (see Illinois State Cancer Incidence and Mortality Review and Update). As mentioned above, due to NCHS policy, mortality statistics were not calculated for cells containing less than 10 deaths. This is not the case for incidence rate associated statistics.

Race-specific Rates: The race-specific categories in these data are “All Races” combined, “White,” “Black” 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 White" and "Non-Hispanic Black."

DATA INTERPRETATION

Observed variations and differences over years and across sex and race groups in cancer mortality may be real, reflecting modifications in the risk factor status of the population or the consequence of participation in screening and early detection programs. 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 counts (i.e., less than 16).

Population estimates used for denominators may be inaccurate or lack precision. The population data for 1990, 2000 and 2010, 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 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. Mortality rates based on these population estimates would be expected to be less accurate than those for 1990, 2000 or 2010.

The 95% 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% probability where the "true" rate may fall. The comparison of two sets of confidence intervals is approximately equivalent to statistical significance tests for differences between two rates and is more conservative than the standard significance test when the null hypothesis is true.[10]

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Suggested citation for Mortality Data

Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Mortality - All COD, Aggregated With County, Total U.S. (1969-2019) <Katrina/Rita Population Adjustment> -National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2021. Underlying mortality data provided by NCHS (www.cdc.gov/nchs).

If you have questions about these data, contact Kyle Garner, Illinois Department of Public Health, Division of Epidemiologic Studies, by phone at 217-785-7126 or e-mail kyle.garner@illinois.gov.

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