

## Advanced Stage Cancer

Advanced-stage cancer is categorized in this report as regional stage cancer or distant stage cancer. Regional stage cancer is defined as cancer that has spread beyond the primary (original) site to nearby lymph nodes, organs, or tissues. Distant stage cancer refers to cancer that has spread from the primary site to distant organs or distant lymph nodes. Hematopoietic diseases, such as leukemia and multiple myeloma, are considered distant stage cancers.

In situ cancers are tumors that fulfill all the microscopic criteria for malignancy except invasion through the basement membrane. In situ cancers are early cancers that have not spread to neighboring tissue. Classification of these tumors is not uniform across pathologists (Schottenfeld and Fraumeni, 1996, page 159), yielding less reliable reporting of in situ cancers than of later stage cancers. Therefore, cancer incidence in the Annual Report includes only local, regional, distant, and cancers of unknown stage and in situ bladder.

## Age-Adjusted Incidence Rates

Age is an important factor in cancer incidence and mortality. Since cancer occurs more often in the elderly, populations with a high proportion of older people will have more cancer cases and deaths than populations with a high proportion of younger people. Because age distributions differ greatly among Florida counties and races, the impact of age is standardized in this report in order to make valid comparisons of incidence and mortality. Age-adjustment is a process to correct for the differences in cancer cases and death counts caused by differing age composition among different populations and counties. The direct method of age-adjustment is used to calculate age-adjusted incidence and mortality rates in this report. The standard population used in this report is the 2000 U.S. standard population, in accordance with the 1998 U.S. Department of Health and Human Services recommendation. The age-adjusted rate ( $\Lambda$ ) is defined as:

$$\Lambda = \sum(\lambda_i w_i)$$

where  $i$  is the age group,  $\lambda_i$  is the age-specific rate for an age group, and  $w_i$  is the proportion of individuals in the 2000 U.S. standard population in that age group. The age adjusted incidence and mortality rates are per 100,000 population per year.

## Age-Specific Rates

The age-specific rate is the number of new cancer cases or deaths occurring in people in a given age group divided by the population in that age group in a given period expressed per 100,000 population per year, except for children aged less than 15 where the rates are expressed per 1,000,000 population per 5 years. For the rate calculations in this report, age groups are defined by each five-year interval of age: 0 to 4, 5 to 9, 10 to 14, .... 85+. The age-specific rate ( $\lambda_i$ ) is calculated as:

$$\lambda_i = n_i/p_i \times 100,000$$

where  $i$  is the age group,  $n_i$  is the number of new cancer cases or deaths in the age group in a given period, and  $p_i$  is the population at risk in the age group in the same period.

## Cancer Hospitalizations

The AHCA variable principal diagnosis was used to determine whether or not the AHCA data were cancer related. The principal diagnosis is the code representing the diagnosis established, after study, to be chiefly responsible for occasioning the admission. In the interest of maintaining consistency throughout the report, only invasive cancer and in-situ bladder data are included in the tabulations and rates in this section. The ICD-10-CM codes used can be found in Appendix C.

## Cancer Site Classification

The cancer sites for which incidence data are presented are classified according to the International Classification of Diseases for Oncology, Third Edition (ICD-O-3). The International Classification of Diseases, Tenth Revision (ICD-10), is used to code cancer deaths, and the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) is used for classification of diagnoses in hospitals. Cancer sites used in this report are coded based on the SEER Site Recode (1/27/2003) Definition for Incidence and the SEER Cause of Death Recode 1969+ (4/16/2012). The cancer sites and their corresponding The ICD-O-3 codes and ICD-10 codes can be found in Appendix B.

Rules for coding multiple tumors in one individual as a single cancer or as multiple primary cancers are specified in the Multiple Primary and Histology Coding Rules, Surveillance, Epidemiology and End Results (SEER) Program, National Institutes of Health, 2007. The site of origin, diagnosis dates, histology, and laterality are the major factors employed to determine if a group of tumors should be coded as single or multiple tumors. Special rules are used to define multiple primaries of the lymphatic and hematopoietic systems.

## Confidence Intervals

Confidence intervals (CIs) provide a measure of the stability of a calculated incidence rate, mortality rate, or prevalence. The report uses a 95% CI for all rates and prevalence calculations. A 95% confidence interval is the range within which the true rate or prevalence will be found 95% of the time. A narrower CI indicates greater accuracy of the rate. Calculation of the 95% CI follows the methods published in *Technical Appendix from Vital Statistics of United States: Mortality, National Center for Health Statistics, 1995*. The method used to compute the Confidence intervals in this report is that from Fay and Feuer(1997) "Confidence intervals for directly standardized rates: a method based on the gamma distribution"

## County

In this report, the geographical variable is the county of residence at diagnosis. For the purpose of brevity and clarity in section, figure and table titles, the county of residence at diagnosis is referred to as "county" throughout.

## Crude Rates

The crude rate is the total number of new cancer cases diagnosed, or cancer deaths, in a given period divided by the total population at risk in that period. Crude rates are expressed per 100,000 population per year. The calculation of the crude rate (**M**) can be written as:

$$M = N/P \times 100,000$$

where **N** is the total number of new cases or deaths in a period, and **P** is the population at risk in the same period.

## Deaths-to-Cases Ratios

The deaths-to-cases ratios in the mortality section are calculated by dividing the number of deaths with a particular cancer as the underlying cause in a given year by the number of new cancers of that type diagnosed in the same year. The deaths-to-cases ratio provides a simplified indication of the prognosis for patients with different types of cancer. A lower ratio indicates fewer deaths relative to the number of cases and suggests a better prognosis. A ratio approaching 1.0 indicates a poor prognosis. Ratios greater than 1.0 are possible when deaths due to cancers diagnosed in previous years cause the number of deaths to exceed the number of new cancers diagnosed in a particular year.

## **Incidence/New Cancer Cases**

Incidence is defined as the number of new cancers diagnosed in the population at risk in the reference year. The population considered at risk for cancer in this report is the entire resident population of Florida in the reference year. Specifying other population characteristics such as sex, race, age, or county of residence further subdivides the population at risk of developing cancer. Incidence cases and new cancer cases are used interchangeably in this report

## **Length of Stay**

Length of stay is computed using the length of stay variable and it represents the number of days elapsed from the admission date to the discharge date.

## **Median**

The median is the middle value of an ordered set of numbers: half the values are greater than the median and half are less than the median. The median is less sensitive to extreme values than the mean, and a better measure of central tendency for data with skewed distributions. Medians are used in the Cancer Burden section.

## **Mortality**

Mortality is defined as the number of deaths from cancer in the population at risk for the reference year. A cancer death is defined as a death for which cancer is determined to be the underlying cause of death based on the death certificate. The population considered at risk in this report is the entire resident population of Florida in the reference year. Mortality is examined based on sex, race, age, and county of residence.

## **Race**

The FCDS collects information on the racial background of each person diagnosed with cancer in Florida. In this report, comparisons are made between two racial groups, black and white. Both black and white races include people of various ethnic origins. Cancers in people of "Other" races are included in Florida total rates and counts, as well as in the totals by sex.

## Screening Prevalence

Cancer screening prevalence data and current cigarette use from the Florida BRFSS are presented in this report. Prevalence is defined as the percentage of people who have received cancer screening or who currently smoke cigarettes in Florida's population at the time of survey. The prevalence data are weighted to represent the entire adult population of the state. Weighting is a procedure that adjusts for the chance of an adult being selected to complete the survey and for discrepancies between adults who completed the survey and the overall population of Florida adults. The data were weighted to the respondent's probability of selection by county, as well as age, sex, marital status, race/ethnicity, education level, and housing type.

Weighting methodology was changed and the inclusion of cellular telephone responses began in 2011, data in 2011 and later may not be comparable to data collected before 2011. Since the Florida BRFSS survey is a random survey, sampling errors are inherent and a 95% confidence interval is calculated for each prevalence estimate.

## Smoking-Attributable Cancer Deaths

Smoking-attributable cancer deaths were calculated using the methodology developed by the CDC. The methods involve calculation of smoking-attributable fractions (SAFs) of deaths for smoking-related cancers using sex-specific smoking prevalence and relative risk (RR) of death data for current and former smokers age 35 and older. SAFs for each disease and sex are derived from the following formula:

$$\text{SAF} = [(p_0 + p_1(\text{RR}_1) + p_2(\text{RR}_2)) - 1] / [p_0 + p_1(\text{RR}_1) + p_2(\text{RR}_2)]$$

where  $p_0$  is the percentage of adults who never smoked,  $p_1$  is the percentage of adult current smokers,  $p_2$  is the percentage of adult former smokers,  $\text{RR}_1$  is the relative risk of death for adult current smokers relative to adults who never smoked, and  $\text{RR}_2$  is the relative risk of death for adult former smokers relative to adults who never smoked.

The smoking-attributable deaths (SAD) are then calculated by multiplying the age- and sex-specific SAFs and the number of deaths for each smoking-related cancer:

$$\text{SAD} = \text{Number of deaths} \times \text{SAF}$$

Summing across age categories provides the sex-specific estimate of SAD for each disease. Total SAD is the sum of the sex-specific SAD estimates.

The SAD estimates for each age category, stratified by sex and grouped by underlying disease category, are multiplied by the remaining life expectancy of people at the midpoint of each age range. The resulting numbers for all age categories are summed to obtain YPLL attributable to smoking. The total YPLL is the sum of the male and female YPLL within each disease category.

The details of the methodology, including the relative risks by sex and age group, can be found at the CDC web site:

<https://chronicdata.cdc.gov/Health-Consequences-and-Costs/Smoking-Attributable-Mortality-Morbidity-and-Econo/3kjg-j5dm>

## Suppression of Data - fewer than 10

In the tables and maps, counts in cells with fewer than ten cases, deaths or hospitalizations, and rates calculated from fewer than ten cases, deaths or hospitalizations, are suppressed. When the number of cases, deaths or hospitalizations is very small, the rates calculated are not stable. In addition, suppressing small numbers prevents possible identification of individuals, ensuring patient confidentiality.

## **Total Charges**

Total Charges in the cancer burden section are tabulated using the variable total gross charges, representing the total of undiscounted charges for services rendered by the hospital excluding professional fees.

## **Trend Interpretation (Incidence)**

To maintain consistency between this and the previous annual report, the incidence data used to prepare this report does not include the new cases for any diagnosis year received after final closing for each year. After the final closing for any year, more than 5,000 new unduplicated cancer incidence cases are submitted to FCDS. Therefore, all incidence trends should be carefully examined and the conclusions of any trend analyses critically evaluated from this perspective.

## **Years of Potential Life Lost**

Counts or rates of incidence and mortality represent part of the burden of cancer. There are indirect costs to society due to cancer, such as diminished quality of life and years of potential life lost (YPLL). YPLL is a measurement of life lost due to premature death from cancer. DOH publications, such as *Vital Statistics and Data Analysis*, use age 75 as the average life expectancy in the YPLL calculations. The same standard is used in this report. For each Florida resident who died at age 74 or younger, YPLL is calculated by subtracting age at death from 75. The individual YPLL numbers are then summed to generate the total YPLL.

## **Tobacco-Related Cancers**

The 2004 Surgeon General's Report, *Health Consequences of Smoking: A Report of the Surgeon General* at: [http://www.cdc.gov/tobacco/data\\_statistics/sgr/2004/index.htm](http://www.cdc.gov/tobacco/data_statistics/sgr/2004/index.htm), presents strong scientific evidence that many cancers are associated with tobacco use. These cancers are acute myeloid leukemia, cancers of the lip, pancreas, trachea, lung and bronchus, larynx, esophagus, cervix, bladder, kidney, stomach, oral cavity, and pharynx.

## **REPORTED CANCER SITES**

### **Selected Sites**

In this report, analysis is limited to the eight cancer sites with the highest number of incident cases, as well as cervical and ovarian cancer. The eight highest ranked sites – lung and bronchus, prostate, female breast, colorectal, bladder, head and neck, non-Hodgkin lymphoma, and melanoma – account for two thirds of the incident cancers in Florida. Cervical cancer was included as the ninth site because of the availability of a screening test and the potential to reduce advanced-stage occurrence and early deaths from this cancer. Ovarian cancer is one of the cancers addressed statewide by the Florida Comprehensive Cancer Control Program.

Data on melanoma in blacks are included only in Figures 1, 13, 23, 24, and 25, and as part of total counts and rates for Florida.

### **All Other Cancers**

The “All Other Cancers” category used in figures constitutes any cancer sites not listed in said figure. The ICD-O-3 codes and ICD-10 codes for these and other sites used in the report are based on the SEER Site Recode (1/27/2003) Definition for Incidence and the SEER Cause of Death Recode 1969+ (4/16/2012) ; refer to Appendix B.

**Of special note:**

*Comparison of Rates*

Age-adjusted incidence and mortality rates are compared for differences between sub-populations. In this report, one rate is significantly higher or lower than another when the 95% CI of the two rates do not overlap; however the converse is not necessarily true. Confidence intervals may overlap and yet there may be a statistically significant difference between the rates. The use of confidence intervals in determining significant differences should not be considered as a statistical test.

*Union County Rates*

In the county tables shown in this report Union County often has "the highest" age-adjusted incidence or mortality rate for all cancers combined or for many specific cancers. The Florida Department of Corrections (DOC) maintains a hospital at the correctional facility Reception and Medical Center (RMC) in Union County. That hospital provides inpatient medical care for the inmates of DOC facilities in the 51 counties comprising three of the four state prison systems. Inmates diagnosed with cancer at this hospital have an address in Union County and are counted as Union County cases. However, the total inmate population of the DOC facilities in those 51 counties is not included in the population at risk (e.g., current Union County population). Therefore, both incidence and mortality in Union County are inflated.