

**Cancer Incidence and Mortality
in Delaware,
2006–2010**

Delaware Division of Public Health

2014



*DELAWARE HEALTH
AND SOCIAL SERVICES*
Division of Public Health



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TABLE OF CONTENTS

1. EXECUTIVE SUMMARY	4
2. INTRODUCTION	9
3. ALL CANCER SITES (ALL SITE)	15
4. BREAST CANCER (FEMALE)	23
5. COLORECTAL CANCER	33
6. LIVER AND BILE DUCT CANCER	45
7. LUNG AND BRONCHUS CANCER	54
8. MELANOMA OF THE SKIN	66
9. PANCREATIC CANCER.....	73
10. PROSTATE CANCER	83
11. UTERINE CANCER	93
12. THE HUMAN PAPILLOMAVIRUS (HPV) AND CANCER.....	101
13. CANCER INCIDENCE BY CENSUS TRACT	112
Appendix A: Data Sources and Methodology	114
Appendix B: Primary Cancer Site Definitions	118
Appendix C: Cancer Incidence and Mortality among Persons of Hispanic Ethnicity	119
Appendix D: Delaware Population Estimates by Sex, Race, Years & Age Group, 1980–2010	122
Appendix E: Behavioral Risk Factors.....	131
Appendix F: Title 16 Chapter 292 of the Delaware Code	134
Appendix G: Cancer Incidence by Census Tract Methodology	135
Appendix H: Interpretation of Cancer Incidence Rates by Census Tract.....	138
Appendix I: Age-Adjusted All Site Cancer Incidence Rates by Census Tract; 2006–2010.....	141
Appendix J:.....	144
Maps of Delaware Census Tracts by 2006–2010 Cancer incidence Rate Quintiles.....	144
Appendix K:.....	153
Maps of Delaware Census Tracts, with High and Low Cancer Incidence Rates, 2006–2010	153

1. EXECUTIVE SUMMARY

This report includes cancer statistics for overall cancer as well as eight specific cancer types. These cancer statistics were updated to include incidence and mortality data for 2006–2010. We compare Delaware's incidence and mortality data for 2006–2010 with national data for 2006–2010 and assess trends over the past 10 five-year time periods.

Despite variations in all site (meaning all types of cancer grouped together) cancer incidence from 1996–2000 through 2006–2010 and significant progress in combating cancer mortality, Delaware's 2006–2010 all site cancer incidence rate was only 0.3 percent less than in 1996–2000 while the U.S. all site cancer incidence rate decreased 4.7 percent during the same time period. In Delaware, cancer incidence increased 0.1 percent among males and decreased 2.4 percent among females. African Americans in Delaware have shown greater improvement in all site cancer incidence with a 2.9 percent reduction among males and a 2.6 percent reduction among females. However, much work still needs to be done since Delaware's 2006–2010 overall cancer incidence rate (511.1 per 100,000) was 10.3 percent higher than the U.S. rate (463.0 per 100,000).

In the early 1990s, Delaware was ranked second highest in the country for cancer mortality; Delaware is now ranked 14th. Improvements in cancer mortality continue to be noteworthy. **From 1996–2000 through 2006–2010, Delaware's cancer death rate decreased 17.5 percent, an improvement that was 38 percent greater than the decline seen nationally (12.7 percent).** Male Delawareans experienced a greater rate of decline in cancer mortality than females (19.7 percent male vs. 17.5 percent female). The cancer death rate among African American Delawareans declined 29.3 percent, compared to 15.3 percent among Caucasian Delawareans.

Many factors contribute to the progress that Delaware has made in reducing our cancer burden:

Lung Cancer

- **An estimated 85 to 90 percent of all lung cancer cases are known to be caused by tobacco use.** Delaware has been reaping benefits of reductions in tobacco use that began decades ago, although these benefits were seen primarily in males. More work is needed among females.
- **Lung cancer continued to play an enormous role in Delaware's overall cancer burden.** In 2006–2010, lung cancer accounted for 14.7 percent of all newly-diagnosed cancer cases and 30.3 percent of all cancer deaths in the state. Up until January 2013, there had not been a screening recommendation from the American Cancer Society to detect lung cancer early. Also, treatment options are not nearly as effective as for some other forms of cancer.
- Lung cancer incidence continued to improve among Delaware males, with a 20.3 percent decline from 1996–2000 through 2006–2010, compared with a 13.3 percent decline among U.S. males. Incidence of lung cancer among females, however, has not improved. During the same time period, the lung cancer incidence rate among female Delawareans increased 5.0 percent in contrast with a 0.4 percent decline nationally.
- Although Delaware's lung cancer mortality rates remain higher than U.S. rates, the gap has narrowed. In 2006–2010, the lung cancer mortality rate among Delaware males was only 5.2 percent higher than the U.S. male rate, compared with 19.2 percent higher in 1980–1984. **The greatest improvement in the state's lung cancer mortality rate from 1996–2000 through 2006–2010 was among male African Americans, who experienced a 35.9 percent decline.**

- Only minimal progress has been made among female Delawareans, whose 2006–2010 lung cancer death rate was 19.4 percent higher than the U.S. rate. Between 1996–2000 and 2006–2010, lung cancer mortality decreased 25.8 percent among males but only 2.9 percent among females.
- **In fact, Delaware females ranked third highest in the nation in lung cancer mortality while Delaware males ranked 17th during 2006–2010.**

Colorectal Cancer

- From 1996–2000 through 2006–2010, Delaware's colorectal cancer incidence rate declined 26.4 percent, while the U.S. rate declined 18.9 percent. In Delaware, sex- and race-specific rates of decline ranged from 25.8 percent among Caucasian females to 27.8 percent among African American females.
- **Again in 2006–2010, colorectal cancer incidence was significantly lower among African Americans in Delaware than nationally, for both sexes combined and for females.**
- During 2006–2010, 54.6 percent of all colorectal cancer cases diagnosed in Delaware were detected in the regional or distant stages; i.e. after cancer had spread from its original location. This reflects a 14.4 percent decline since 1996–2000 when 63.7 percent of colorectal cancer cases were diagnosed in the regional or distant stages.
- From 1996–2000 through 2006–2010, Delaware's colorectal cancer mortality rate decreased 28.3 percent compared with 22.6 percent nationally. The decline in colorectal cancer mortality was most notable among African American females (51.8 percent).
- **Increases in early detection were responsible for some of the improvement seen in colorectal cancer mortality. Data from the 2012 Behavioral Risk Factor Surveillance (BRFS) survey showed that in 2012, Delaware ranked fourth highest in the U.S. in colorectal cancer screening; 75.1 percent of Delawareans age 50 and older reported ever having had a sigmoidoscopy or colonoscopy, compared to 67.3 percent nationally.**
- In recent years, colorectal cancer screening prevalence has increased dramatically among African American Delawareans. In 2012, 72.1 percent of African Americans reported ever having had a sigmoidoscopy or colonoscopy compared with 75.5 percent of Caucasians.

Female Breast Cancer

- The 2006–2010 female breast cancer incidence rate for Delaware (127.1 per 100,000) was higher than the U.S. rate (124.3 per 100,000), but the difference was not statistically significant. From 1996–2000 through 2006–2010, Delaware's decline in breast cancer incidence was limited to Caucasian females (9.0 percent decrease) while incidence among African American females increased 4.6 percent.
- Although Delaware's 2006–2010 female breast cancer mortality rate (22.5 per 100,000) was only slightly lower than the U.S. rate (23.0 per 100,000), African Americans in Delaware had a significantly lower mortality rate (22.6 per 100,000) than African Americans nationally (31.6 per 100,000).
- **Delaware's decline in female breast cancer mortality (29.0 percent) was 52.6 percent greater than the decline seen nationally (19.0 percent).**
- **From 1996–2000 through 2006–2010, in Delaware, African Americans showed a greater rate of decline than Caucasians (40.7 and 25.5 percent, respectively).**
- It is highly likely that improvement in early detection of breast cancer contributed to progress seen in breast cancer mortality. Data from the 2012 BRFS survey showed that Delaware women ranked third highest nationally in the prevalence of women ages 40 and over who have had a mammogram within the past two years (80.5 percent).

Prostate Cancer

- Over the past 10 five-year time periods, prostate cancer incidence in Delaware has increased 9.9 percent in contrast to a decline of 13.6 percent nationally. The trend observed in Delaware most likely reflects a greater prevalence of prostate cancer screening in Delaware compared with that seen nationally. Results for 2012 from the BRFSS survey show that Delaware ranks highest in the nation in the prevalence of men aged 40 and over who have had a PSA test within the past two years.
- The proportion of prostate cancer cases detected in the local stage has increased dramatically during the past 30 years in Delaware. During 2006–2010, 85.8 percent of prostate cancer cases diagnosed in Delaware were detected in the local stage compared to only 49.6 percent of cases diagnosed in 1980–1984 (an increase of 73.2 percent).
- **The prostate cancer burden continues to affect African Americans disproportionately in Delaware as well as nationally; Delaware’s 2006–2010 prostate cancer incidence rate was 76 percent higher among African Americans than among Caucasians.**
- There have been improvements, however, in mortality from prostate cancer. From 1996–2000 through 2006–2010, African Americans in Delaware experienced a substantial decline in mortality (46.3 percent) when compared with Caucasians in Delaware (34.4 percent) and with African Americans nationally (29.6 percent).

Trends in Cancer Incidence

Tables A and B summarize 2006–2010 age-adjusted incidence and mortality rates, respectively, for Delaware and the U.S. for all sites combined and each of the eight individual cancer sites included in this report. These cancer types are cancers of the female breast, colon/rectum, liver, lung, pancreas, prostate and uterus, and melanoma of the skin. Included in the tables for Delaware and the U.S. is the percent change in the rate from 1996–2000 through to 2006–2010.

In 2006–2010, Delaware’s overall cancer incidence was significantly higher than the U.S. rate and statistically significant excesses were also seen for cancers of the colon and rectum, lung, prostate and uterus, and melanoma of the skin (Table A).

Although Delaware’s all site cancer incidence rate was the same in 2006–2010 as in 1996–2000, incidence rates for several cancer sites have shown considerable changes over the past 10 five-year time periods. Cancer types with dramatic increases in incidence, both in Delaware and nationally, were cancer of the liver and melanoma of the skin. Colorectal cancer incidence declined 26.4 percent in Delaware.

Table A: Average Annual Age-Adjusted Cancer Incidence Rates with 95% Confidence Intervals; Delaware vs. U.S., 2006–2010

Cancer Site	DE Incidence Rate 2006–2010	U.S. Incidence Rate 2006–2010	DE % Change: 96-00 to 06-10	U.S. % Change: 96-00 to 06-10
All Site *	511.1 (504.7 , 517.4)	463.0 (462.3 , 463.6)	-0.3%	-4.7%
Female breast	127.3 (123.0 , 131.8)	123.8 (123.3 , 124.3)	-6.9%	-11.1%
Colorectal *	45.2 (43.4 , 47.2)	45.0 (44.8 , 45.2)	-26.4%	-18.9%
Liver and bile duct	7.1 (6.3 , 7.8)	7.7 (7.6 , 7.8)	86.8%	67.4%
Lung / bronchus *	74.6 (72.2 , 77.0)	61.4 (61.2 , 61.7)	-9.0%	-7.1%
Melanoma of the skin *	26.3 (24.8 , 27.7)	21.1 (21.0 , 21.3)	64.4%	17.2%
Pancreas	12.5 (11.5 , 13.5)	12.2 (12.1 , 12.4)	12.6%	7.0%
Prostate *	178.9 (173.5 , 184.5)	152.0 (151.4 , 152.5)	9.9%	-13.6%
Uterus *	27.4 (25.4 , 29.4)	24.3 (24.1 , 24.5)	10.0%	-2.4%

Rates are per 100,000 and age-adjusted to 2000 U.S. standard population.

* = Delaware incidence rate is significantly higher than the U.S. rate at the 95% confidence level.

SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013;

U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

Trends in Cancer Mortality

Although Delaware's 2006–2010 mortality rate for all cancer sites combined remained significantly higher than the U.S. rate, Delaware's cancer mortality has shown a greater rate of decline (17.5 percent) than the U.S. (12.7 percent) over the past 10 five-year time periods (Table B). A similar pattern was seen for lung cancer where Delaware's lung cancer mortality rate declined 15.3 percent compared with 12.7 percent nationally. Delaware's lung cancer mortality rate for 2006–2010, however, was still significantly higher than the U.S. rate.

In Delaware, three cancer sites have shown considerable improvements in mortality (i.e. 20 percent or more decrease) since 1996–2000: cancers of the prostate (37.4 percent), colon and rectum (28.3 percent) and female breast (28.1 percent). In fact, Delaware's decline in the mortality rate over the past 10 five-year time periods for each of these three cancer types was greater than that seen for the U.S.

Table B: Average Annual Age-Adjusted Cancer Mortality Rates with 95% Confidence Intervals; Delaware vs. U.S., 2006–2010

Cancer Site #	DE Mortality Rate 2006–2010	U.S. Mortality Rate 2006–2010	DE % Change: 96-00 to 06-10	U.S. % Change: 96-00 to 06-10
All Site *	182.9 (179.2 , 186.7)	176.4 (176.2 , 176.6)	-17.5%	-12.7%
Female breast	22.4 (20.7 , 24.3)	22.6 (22.5 , 22.7)	-28.1%	-18.4%
Colorectal	16.0 (14.9 , 17.2)	16.4 (16.3 , 16.4)	-28.3%	-22.6%
Liver and bile duct	5.5 (4.9 , 6.2)	5.6 (5.6 , 5.6)	44.7%	24.4%
Lung / bronchus *	55.3 (53.3 , 57.4)	49.5 (49.4 , 49.6)	-15.3%	-12.7%
Melanoma of the skin	2.7 (2.3 , 3.2)	2.7 (2.7 , 2.8)	-15.6%	0.0%
Pancreas	10.7 (9.8 , 11.7)	10.9 (10.8 , 10.9)	0.0%	3.8%
Prostate	22.4 (20.3 , 24.6)	23.0 (22.9 , 23.2)	-37.4%	-30.1%
Uterus	5.0 (4.2 , 5.9)	4.2 (4.1 , 4.2)	8.9%	4.9%

Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.

* = Delaware mortality rate is statistically significantly higher than the U.S. rate at the 95% confidence level.

SOURCES: Delaware: Delaware Health Statistics Center, 2013; U.S.: National Center for Health Statistics, 2013.

Census Tract Analyses

This report also includes cancer incidence rates for each of Delaware's census tracts as required by Title 16, Chapter 292 of the Delaware Code (Appendix F). Census tract analyses were conducted for 2006–2010. Census tracts were determined by the Census 2010 designations since they were in effect at the time of analysis. The Census 2010 subdivided Delaware into 214 census tracts rather than the 197 census tracts in the Census 2000.

Results for 2006–2010 show that:

- in 11 of Delaware's 214 census tracts, the overall cancer incidence rate was statistically significantly higher than Delaware's average 2006–2010 incidence rate (512.1 per 100,000)¹,
- in 11 census tracts, the overall cancer incidence rate was significantly lower than Delaware's average incidence rate (515.6 per 100,000) and
- incidence rates for the remaining 192 census tracts were not significantly different from the state's average rate.

¹ 512.1 is average 2006–2010 Delaware incidence rate calculated by Excel rather than SEER*Stat (511.1).

Age-adjusted five-year cancer incidence rates by census tract with 95 percent confidence intervals are presented in Appendix I for 2006–2010. Census tract maps that were color-coded by quintiles are in Appendix J and maps that indicate tracts with significantly high or significantly low incidence rates are in Appendix K.

There is an inherent instability in calculating cancer incidence rates at the census tract level. In a small group, such as a census tract, the snapshot changes considerably from year to year. If one case of cancer is diagnosed in a census tract one year, and three cases of cancer are diagnosed in the same census tract the next year, the cancer rate for that census tract will change dramatically from one year to the next. These large fluctuations do not typically occur in larger populations. If we compare the cancer rate for a census tract to the cancer rate for the whole state of Delaware for a given time period, it would not be unusual to find the comparison different (perhaps even reversed) in the following time period.

When assessing cancer incidence data by census tract, it should be kept in mind that the occurrence of cancer may differ across census tracts for a variety of reasons. For example, lifestyle behaviors may cluster in a homogeneous community. In addition, the presence or absence of exposure to environmental or occupational carcinogen(s) is often limited to a defined geographic area. In addition, residents in certain geographic areas may be more impoverished than other residents, which will affect their availability of health insurance coverage as well as their level of access to health care, particularly cancer screening services. Finally, chance or random variation can play a role, since approximately five percent of all comparisons would be significantly different due to chance alone.

2. INTRODUCTION

Delaware Cancer Registry

The Delaware Cancer Registry (DCR) is managed by Delaware's Division of Public Health (DPH) and serves as the state's central cancer information center. The DCR was founded in 1972 and legally established in 1980 under the Delaware Cancer Control Act². The act stipulated that all hospitals, clinical laboratories and cancer treatment centers in the state report all new cancer cases to the DCR. In 1996 the Delaware Cancer Control Act was amended to require any health care practitioner who diagnoses or provides treatment to report cancer cases to the DCR. Further enhancements of the Delaware Cancer Control Act took effect in 2002 with passage of Senate Bill 372 that requires physicians to provide additional information to the DCR, including patients' duration of residence in Delaware and their occupational history. Senate Bill 372 also extended the reporting deadline to 180 days from initial diagnosis or treatment.

Today, Delaware is one of 45 states whose central cancer registry is supported by the National Program of Cancer Registries (NPCR) of the Centers for Disease Control and Prevention (CDC).³ The DCR ensures accurate, timely and routine surveillance of cancer trends among Delawareans.

Reporting Facilities

Sixty physicians and 31 facilities currently submit data to the DCR. These facilities include seven hospitals, 10 diagnostic laboratories and 14 free-standing ambulatory surgery centers. Additionally, the DCR has reciprocal data exchange agreements with Alaska, Florida, Maryland, New Jersey, Pennsylvania, South Carolina, Texas, Washington, Wyoming and the District of Columbia. Interstate data exchange agreements assist in identifying Delaware residents whose cancer was diagnosed and/or treated in another state.

Data Confidentiality

The DCR maintains patient confidentiality using a combination of techniques. Reporting facilities submit cancer data using computerized data encryption techniques. Published reports and data releases are limited to aggregate data. DCR datasets are released only after removal of all personal identifiers. Researchers who use DCR data must comply with regulations stated in DPH data use agreements and obtain clearance from Delaware's Human Subjects Review Board.

Data Quality

Internal quality control procedures were implemented at the DCR to verify the consistency of cancer data. Data consistency standards are set by the North American Association of Central Cancer Registries (NAACCR). The DCR also conducts record consolidation using a computerized matching program to identify multiple reports on the same individual. This scenario often arises when a patient is diagnosed and treated in two or more facilities and each facility submits a cancer case reporting form to the DCR.

² <http://delcode.delaware.gov/title16/c032/index.shtml>

³ <http://www.cdc.gov/cancer/npcr>

NAACCR Certification and NPCR Standard Status

In 1997, the NAACCR instituted a program to independently and annually review data from member registries for their completeness, accuracy and timeliness. The registry certification metrics are pre-determined and established by NAACCR.⁴ Gold or Silver Standard certifications are awarded following an evaluation of data quality, completeness and timeliness of reporting. The DCR received Gold Standard certification for diagnosis years 1999, 2003, 2004, 2005, 2006, 2007, 2008, 2009 and 2010 (most recent year for which complete data are currently available). The DCR received Silver Standard certification in 1998 and 2002.

Additionally, the NPCR provides an annual Standard Status Report to state cancer registries supported by CDC. Delaware's data submissions for diagnosis years 2000 through 2010 surpassed all standard levels for quality, completeness and timeliness.

Uses of Data

DPH uses DCR data to support various programs and initiatives, including Screening for Life and the Delaware Cancer Treatment Program. DPH also uses DCR data to investigate citizen inquiries and provide up-to-date cancer statistics to Delaware residents, hospitals, health care providers, community organizations, federal agencies, research institutions and academic institutions. Committees associated with the Delaware Cancer Consortium rely heavily on DCR data to monitor cancer trends across the state, promote research and guide policy planning.

Organization of This Report

This report includes cancer statistics for overall cancer as well as for eight specific cancer sites. These cancer statistics were updated to include incidence and mortality data for 2006–2010. Delaware's incidence and mortality data for 2006–2010 were compared with national data for that time period and trends for the past 10 five-year time periods were assessed. Cancer statistics shown throughout this report include data on cancer incidence, stage at diagnosis, and mortality by sex, race (Caucasian and African American), county and age group (where data were available). In addition, Chapter 12 covers specific cancer sites associated with human papilloma viruses (HPV).

Limited data on cancer incidence and mortality rates by Hispanic ethnicity are presented in Appendix C. Relevant behavioral risk factor data are presented throughout the report and Appendix E summarizes additional behavioral risk factor data that are specific to adult Delawareans.

Delaware's 2006–2010 ranking in the U.S. is provided by cancer site for both incidence and mortality. State rankings for cancer incidence were available from the U.S. Cancer Statistics Working Group.⁵ State mortality rankings were from the Cancer Statistics Review (1975–2010) provided by the Surveillance, Epidemiology and End Results (SEER) program of the National Cancer Institute.⁶

⁴ <http://www.naacccr.org/Certification/Criteria.aspx>

⁵ U.S. Cancer Statistics Working Group. United States Cancer Statistics: 1999–2010 Incidence and Mortality Web-based Report. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2013. Available at: www.cdc.gov/uscs

⁶ Howlander N, Noone AM, Krapcho M, et al (eds). SEER Cancer Statistics Review, 1975–2010, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2010/, based on November 2012 SEER data submission, posted to the SEER web site, April 2013.

Supplemental Information in Appendices

Appendix A: Data sources and methodology

Appendix B: Primary Cancer Site Definitions

Appendix C: Cancer Incidence and Mortality among Persons of Hispanic Ethnicity

Appendix D: Delaware Population Estimates by Sex, Race, Five-Year Age Groups and Five-Year Time Periods.

Appendix E: Data on Behavioral Risk Factors

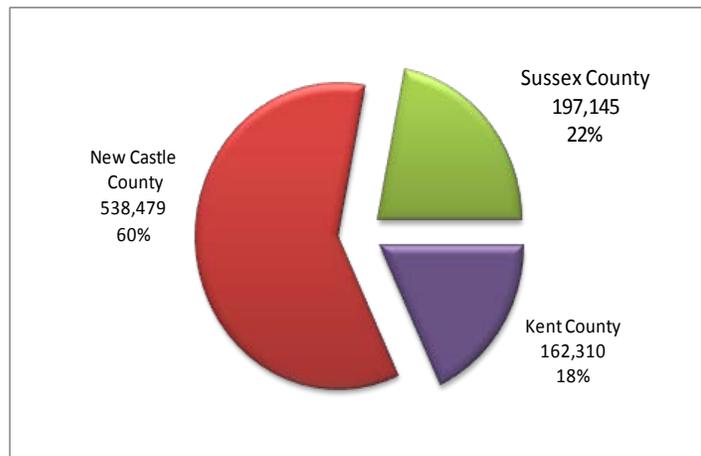
Appendix F through Appendix K are for the 2006–2010 census tract analysis:

- Appendix F: Title 16 Chapter 292 of the Delaware Code
- Appendix G: Census Tract Methodology
- Appendix H: Interpretation of Cancer Incidence Rates by Census Tract
- Appendix I: Age-Adjusted Cancer Incidence Rates and Confidence Intervals by Census Tract
- Appendix J: Maps of Delaware Census Tracts with Cancer Incidence Rate Quintiles
- Appendix K: Maps of Delaware Census Tracts with Significantly High and Low Cancer Incidence Rates

Population of Delaware

As of the 2010 Census, Delaware's population was 897,934, with 61 percent living in New Castle County, 21 percent in Sussex, and 18 percent in Kent County (Figure 1).

Figure 1. Distribution of Delaware Population by County, 2010

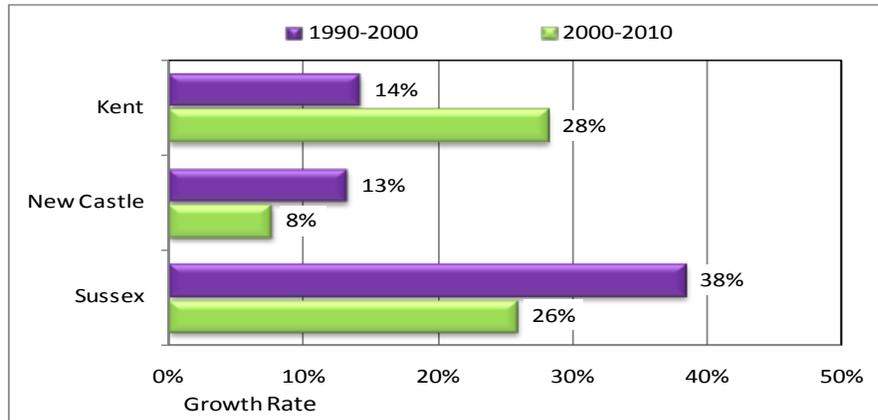


Source: U.S. Census Bureau, American FactFinder <http://factfinder2.census.gov/>

New Castle, the largest county with a 2010 population of 538,479, grew by the smallest percentage during both decades shown in Figure 2; 13.2 percent and 7.6 percent during 1990–2000 and 2000–2010, respectively. Sussex County, with a 2010 population of 197,145, experienced a 38.3 percent growth rate during 1990–2000 and a 25.9 percent growth rate during 2000–2010. Kent County, though smallest in population (162,310), had a 14.1 percent growth rate during 1990–2000 and the largest percentage growth during 2000–2010 (28.1 percent).

Overall, 68.9 percent of Delawareans were Caucasian, ranging from 79.0 percent in Sussex County to 67.8 percent and 65.5 percent in Kent and New Castle Counties, respectively (Table 1). African Americans comprised 21.4 percent of the population; from 12.7 percent in Sussex County to 23.7 percent and 24.0 percent in New Castle and Kent County, respectively. About three percent of Delawareans were Asian, with the highest proportion (4.3 percent) in New Castle County. Persons of Hispanic ethnicity, regardless of race, comprised 8.2 percent of the population (8.7, 8.6 and 5.8 percent in New Castle, Sussex and Kent Counties, respectively).

Figure 2. Growth Rate of Delaware’s Population by County and Decade, 1990–2000 and 2000–2010



Source: U.S. Census Bureau 2010, American FactFinder <http://factfinder2.census.gov/>

Table 1. Distribution of Delaware’s Population by Race/Ethnicity and County, 2010

Race	Delaware	Kent	New Castle	Sussex
Caucasian	68.9%	67.8%	65.5%	79.0%
African American	21.4%	24.0%	23.7%	12.7%
American Indian/ Alaska Native	0.5%	0.6%	0.3%	0.8%
Asian	3.2%	2.0%	4.3%	1.0%
Other or 2 or more races	6.1%	5.5%	6.1%	6.4%
Ethnicity – Hispanic	8.2%	5.8%	8.7%	8.6%

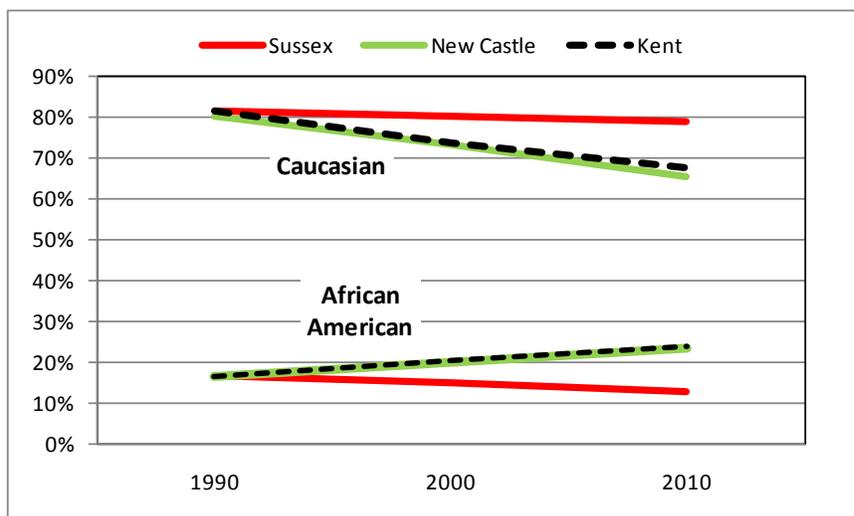
Source: U.S. Census Bureau 2010, American FactFinder <http://factfinder2.census.gov/>

The proportion of African American residents in 1990 was essentially the same across all three Delaware counties (16.5 percent to 16.8 percent), as was the proportion of Caucasian residents (80.3 percent to 81.6 percent). The proportion of Caucasians decreased to 74.6 percent of the population during 1990–2000 and then to 68.9 percent by 2010. The decrease in proportion of Caucasians in Delaware is accompanied by a growth in the African American population and a smaller increase in the Asian population, which grew from 1.3 percent of the state population in 1990 to 3.2 percent in 2010. There is also an increase in the proportion in the “other” race category during these two decades which includes: (1) “some other race” groups that were too small to enumerate separately, (2) unknown race and (3) mixed race; i.e. two or more races. The increase in the “other” category is largely due to revisions in data standards implemented in 1997 that change the way race is asked by the Census Bureau. Beginning in 2000, respondents have the option of selecting one or

more race categories to indicate racial identities. Because of this change, the 2000 Census data on race are not directly comparable with data from 1990 or earlier censuses.

Both Kent and New Castle Counties showed an increase in the proportion of African American residents and a concurrent decrease in the proportion of Caucasian residents from 1990 to 2010 (Figure 3). The opposite was seen in Sussex County, where the African American population decreased 24.1 percent from 1990 to 2010 (from 16.8 percent to 12.7 percent). During the same time period, the Caucasian population in Sussex County declined 3.2 percent (from 81.6 percent to 79.0 percent). The decline in both the percentage of African Americans and the percentage of Caucasians in Sussex County was accompanied by an 11.1 percent increase (from 0.5 percent to 6.4 percent) in the proportion of persons of other and unknown race (not shown in Figure 3).

Figure 3. Proportions of Caucasian and African American Residents in Delaware by County and Decade, 1990, 2000 and 2010



Source: U.S. Census Bureau 2010, American FactFinder <http://factfinder2.census.gov/>

Guidelines for Interpretation of Incidence and Mortality Rates

Incidence and mortality rates for Delaware were expressed per 100,000 Delawareans and rates for the U.S. were expressed per 100,000 U.S. residents. Due to Delaware's small population base, cancer rates were calculated using five-year calendar year groupings for both cancer incidence and mortality.

Cancer incidence and mortality rates were adjusted by age to enable comparisons between populations that may have different age distributions (e.g., Delaware vs. the U.S.). Thus, age-adjusted cancer rates can be compared without any concern about how differences in age distribution of the populations would affect cancer rates. The standard population used to adjust for age is the 2000 U.S. population.

Ninety-five percent confidence intervals were computed for each cancer rate. Confidence intervals represent the range of values in which the cancer rate could reasonably fall 95 percent of the time. They are used to determine whether the amount by which two cancer rates differ is statistically significant. If the confidence interval for one rate does not overlap with the confidence interval for another rate, the two rates are significantly different. When one rate is significantly different from another rate, we assume that the difference between the rates is larger than would be expected by chance alone. If the confidence interval for one rate

overlaps with the confidence interval for another rate, the two rates are not statistically significantly different and this is commonly referred to as “no meaningful difference” between rates.

For this report, cancer frequencies and rates were suppressed according to the Division of Public Health Policy Memorandum 49 (Data and Data Release Standards):

- Incidence and mortality frequencies of less than six were not shown to protect patient privacy and confidentiality. In some instances, additional cells were suppressed so that one cannot deduce the actual count in the initially-suppressed cell. Suppressing incidence and mortality statistics based on a small number of cancer cases or deaths helps protect patient privacy and confidentiality.^{7, 8}
- Age-adjusted incidence and mortality rates based on fewer than 25 cases or deaths were suppressed since they are inherently unstable and cannot be reliably interpreted.

⁷ Coughlin SS, Clutter GG, Hutton M. Ethics in Cancer Registries. *Journal of Cancer Registry Management*, 2: 5-10, 1999.

⁸ McLaughlin CC. Confidentiality protection in publicly released central registry data. *Journal of Cancer Registry Management*, 2: 84-88, 2002.

3. ALL CANCER SITES (ALL SITE)

All Site Cancer Incidence

During 2006–2010, Delaware’s all site cancer incidence rate was second highest in the U.S. (up from third in 2005-2009). Delaware males ranked third and females ranked 11th in overall cancer incidence.⁹ (During 2005-2009, males ranked second and females 10th.)

Cases of All Cancers Combined (Table 3-1)

- A total of 25,475 cases of cancer were diagnosed among Delawareans from 2006 through 2010, an average of 5,095 cases per year. 13,562 cases (53.2 percent) were male and 11,913 cases (46.8 percent) were female.
- Caucasians comprised 82.1 percent of cancer cases diagnosed from 2006 through 2010, African Americans comprised 16.1 percent and 1.8 percent were other or unknown race.
- More than half of cases were from New Castle County (54.2 percent or 13,815 cases), 28.0 percent (7,128 cases) from Sussex County and 17.8 percent (4,532 cases) from Kent County.

Table 3-1. Number of Cancer Cases by Race and Sex; Delaware and Counties, 2006–2010

	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
DELAWARE	25,475	13,562	11,913	20,910	11,123	9,787	4,100	2,209	1,891
Kent	4,532	2,441	2,091	3,632	1,931	1,701	827	476	351
New Castle	13,815	7,184	6,631	10,950	5,694	5,256	2,617	1,372	1,245
Sussex	7,128	3,937	3,191	6,328	3,498	2,830	656	361	295

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Incidence Rates for All Cancers Combined (Table 3-2)

- Delaware’s 2006–2010 all site cancer incidence rate of 511.1 per 100,000 was significantly higher than the U.S. rate of 463.0 per 100,000. This significant excess was observed for both Delaware males (599.8 per 100,000 vs. 535.9 per 100,000 U.S.) and females (443.5 per 100,000 vs. 411.2 per 100,000 U.S.).
- Within Delaware, the 2006–2010 all site cancer incidence rate among males (599.8 per 100,000) was significantly higher than among females (443.5 per 100,000). This difference persisted for both Caucasians and African Americans and within all three counties.
- Among male Delawareans, the all site cancer incidence rate was statistically significantly higher among African Americans (682.9 per 100,000) than among Caucasians (595.4 per 100,000).
- African Americans in Sussex County had the highest all site cancer incidence rate (834.7 per 100,000) and this rate was significantly higher than among Caucasians in Sussex County (562.6 per 100,000).
- Among females in Kent County, the all site cancer incidence rate among African Americans (421.7 per 100,000) was significantly lower than the rate observed for Caucasians (506.8 per 100,000).
- Nationally, the all site incidence rate for African American females was significantly lower than for Caucasians. The disparity observed among female Delawareans was reversed and not statistically significant (436.7 per 100,000 female African Americans vs. 453.2 per 100,000 female Caucasians).

⁹ U.S. Cancer Statistics Working Group. United States Cancer Statistics: 1999–2010 Incidence and Mortality Web-based Report. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2013. Available at: www.cdc.gov/uscs

Table 3-2. Five-Year Average Age-Adjusted All Site Cancer Incidence Rates* and 95% Confidence Intervals by Race and Sex; U.S., Delaware and Counties, 2006–2010

RACE AND REGION	All	Male	Female
ALL RACES			
United States	463.0 (462.3 , 463.6)	535.9 (534.8 , 536.9)	411.2 (410.4 , 412.0)
DELAWARE	511.1 (504.7 , 517.4)	599.8 (589.6 , 610.1)	443.5 (435.4 , 451.6)
Kent	561.5 (545.2 , 578.2)	680.4 (653.1 , 708.5)	471.8 (451.6 , 492.6)
New Castle	501.9 (493.5 , 510.4)	589.7 (575.9 , 603.8)	439.0 (428.4 , 449.8)
Sussex	503.5 (491.3 , 515.8)	579.5 (561.1 , 598.5)	440.3 (424.1 , 456.9)
CAUCASIAN			
United States	471.9 (471.1 , 472.6)	539.1 (537.9 , 540.3)	424.4 (423.4 , 425.4)
DELAWARE	514.5 (507.5 , 521.7)	595.4 (584.3 , 606.7)	453.2 (444.0 , 462.5)
Kent	586.4 (567.4 , 606.0)	694.7 (663.5 , 726.9)	506.8 (482.8 , 531.8)
New Castle	508.9 (499.3 , 518.7)	591.7 (576.2 , 607.5)	450.9 (438.5 , 463.5)
Sussex	492.7 (479.9 , 505.9)	562.6 (543.3 , 582.6)	433.3 (416.1 , 451.2)
AFRICAN AMERICAN			
United States	483.6 (481.4 , 485.8)	610.4 (606.4 , 614.3)	397.5 (394.9 , 400.1)
DELAWARE	540.5 (523.5 , 557.8)	682.9 (653.0 , 713.9)	436.7 (416.8 , 457.2)
Kent	554.4 (516.5 , 594.4)	714.7 (649.8 , 784.2)	421.7 (378.0 , 468.9)
New Castle	518.3 (497.7 , 539.4)	638.1 (601.9 , 675.8)	432.1 (407.7 , 457.5)
Sussex	623.0 (575.7 , 673.1)	834.7 (748.6 , 927.6)	484.1 (429.9 , 543.1)

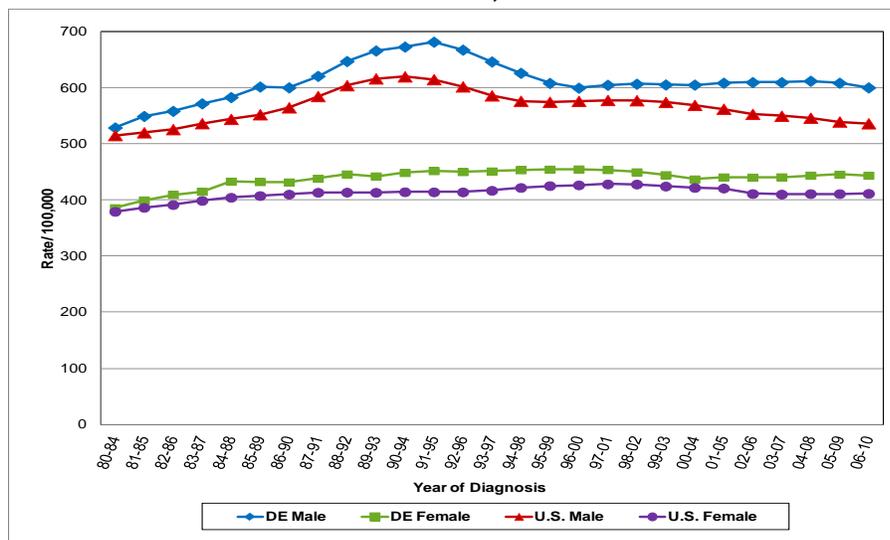
* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

Trends in Incidence Rates for All Cancers Combined (Figures 3-1 and 3-2)

- Delaware’s 2006–2010 all site cancer incidence rate decreased slightly (0.3 percent) from 1996–2000 with minor changes in between. Nationally, the all site cancer incidence rate decreased 4.7 percent.
- In Delaware, all site cancer incidence increased 0.1 percent among males and declined 2.4 percent among females from 1996–2000 through 2006–2010. Nationally, all site cancer incidence declined 6.9 percent among males and 3.5 percent among females.

Figure 3-1. Five-Year Average Age-Adjusted All Site Cancer Incidence Rates* by Sex; U.S. and Delaware, 1980–2010

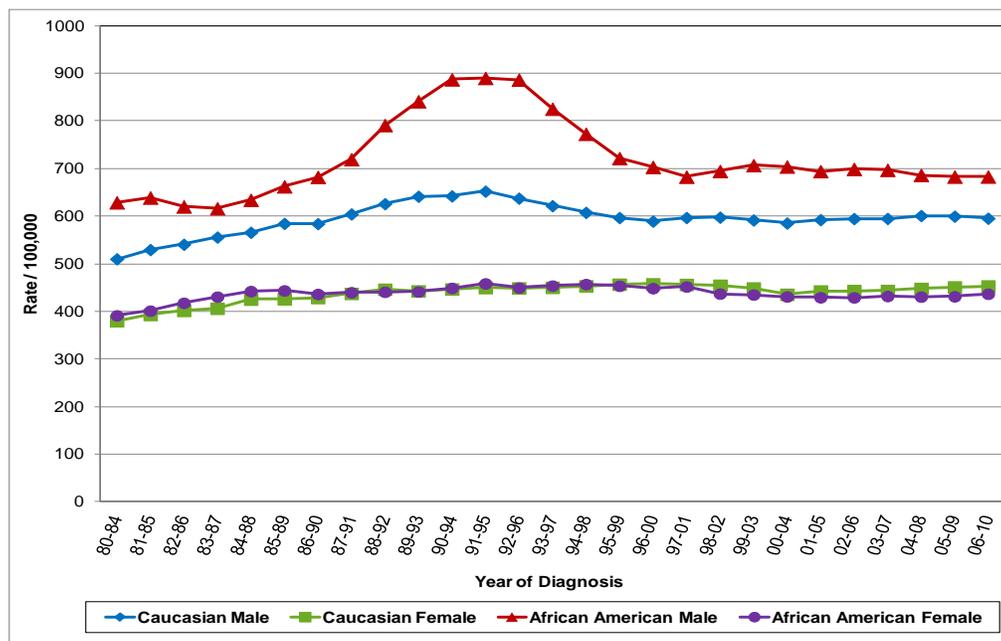


* = Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013

- In Delaware from 1996–2000 through 2006–2010, the all site cancer incidence rate increased by 1.0 percent among Caucasians and decreased by 2.1 percent among African Americans.
- African American males in Delaware had the greatest reduction in all site cancer incidence, falling 2.9 percent from 1996–2000 through 2006–2010.

Figure 3-2. Five-Year Average Age-Adjusted All Site Cancer Incidence Rates* by Race and Sex; Delaware, 1980–2010



* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.
SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Age-Specific All Site Cancer Incidence Rates (Table 3-3, Figures 3-3 and 3-4)

- Among Caucasians, the all site cancer incidence rate increased with age from birth through ages 75-84 and then declined among those ages 85 and older.
- Among African Americans, cancer incidence peaked during ages 65-74 and declined among those ages 75 and older.
- From ages 65-74 and on, the incidence of cancer was an average of 65 to 70 percent higher among males than among females.

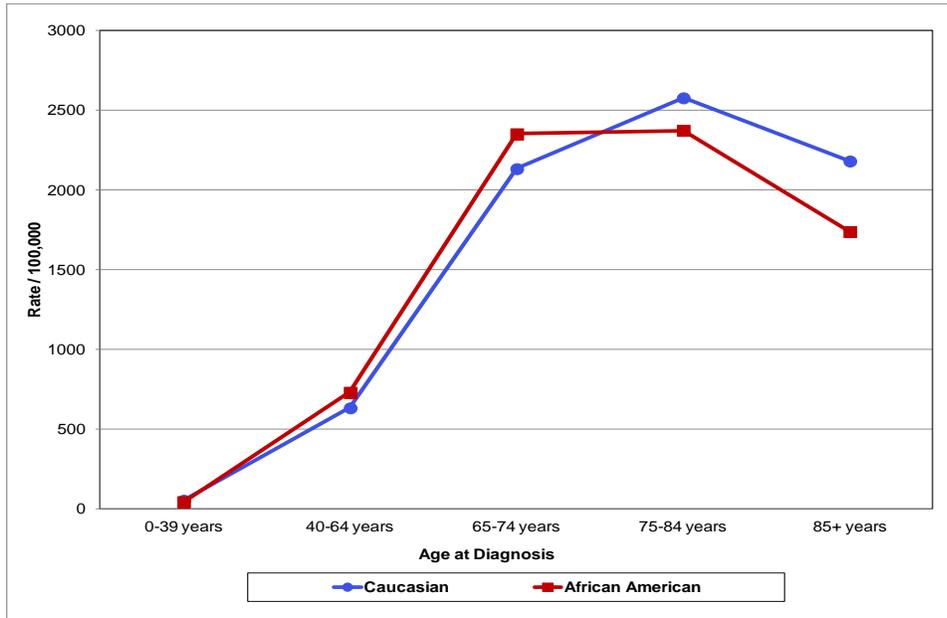
Table 3-3. Age-Specific All Site Cancer Incidence Rates* by Race and Sex; Delaware, 2006–2010

Age at Diagnosis	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
0-39	53.4	43.2	63.2	58.7	48.3	68.8	43.7	33.1	53.1
40-64	639.1	670.4	611.3	633.7	650.0	619.4	740.3	859.4	642.3
65-74	2169.0	2784.7	1636.9	2160.5	2714.3	1675.4	2403.9	3475.2	1544.9
75-84	2485.0	3204.6	1948.2	2534.5	3263.5	1977.8	2285.0	2934.3	1880.9
85+	2048.7	2827.2	1691.8	2078.7	2889.8	1701.2	1895.8	2694.7	1600.9

* = Rates are per 100,000 population.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

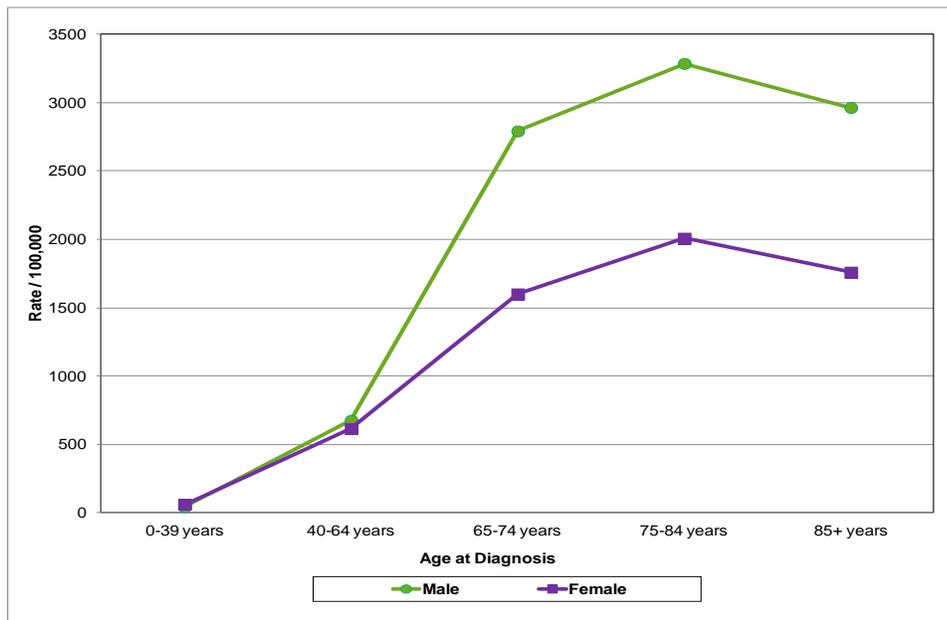
Figure 3-3. Age-Specific All Site Cancer Incidence Rates* by Race; Delaware, 2006–2010



* = Rates are per 100,000 population

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Figure 3-4. Age-Specific All Site Cancer Incidence Rates* by Sex; Delaware, 2006–2010



* = Rates are per 100,000 population

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

All Site Cancer Mortality

During 2006–2010, Delaware’s rank in mortality from all sites combined was 14th highest in the nation, the same as in 2005-2009. Males ranked 17th highest (18th in 2005-2009) and females 13th highest (6th in 2005-2009) in all site cancer mortality.¹⁰

Deaths from All Cancers Combined (Table 3-4)

- From 2006 through 2010, 9,197 Delawareans died from cancer; 4,818 (52.4 percent) were male and 4,379 (47.6 percent) female.
- During 2006–2010, 83.1 percent or 7,647 decedents were Caucasian, 15.5 percent (1,426) were African American and 1.3 percent (124) were other or unknown race.
- The majority of these cancer deaths (54.5 percent) were New Castle County residents, 27.8 percent were from Sussex County and 17.7 percent were Kent County residents.

Table 3-4. Number of All Site Cancer Deaths by Race and Sex; Delaware and Counties, 2006–2010

	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
DELAWARE	9,197	4,818	4,379	7,647	4,023	3,624	1,426	737	689
Kent	1,632	846	786	1,332	684	648	275	156	119
New Castle	5,010	2,609	2,401	4,040	2,120	1,920	902	452	450
Sussex	2,555	1,363	1,192	2,275	1,219	1,056	249	129	120

SOURCE: Delaware Health Statistics Center, 2013.

Mortality Rates for All Cancers Combined (Table 3-5)

- Delaware’s 2006–2010 overall cancer mortality rate of 182.9 per 100,000 was 3.7 percent higher than the U.S. rate of 176.4 per 100,000 and the difference was statistically significant. Although the all site cancer mortality rate for Delaware has historically been higher than the U.S. rate, the gap has narrowed over the last decade.
- Among females, Delaware’s all site cancer mortality rate was significantly higher than the U.S. rate (155.5 per 100,000 vs. 149.7 per 100,000, respectively). The difference among males, however, was no longer statistically significant.
- In Delaware, the 2006–2010 all site cancer mortality rate among males (221.6 per 100,000) was significantly higher than the female rate (155.5 per 100,000). This significant male to female difference occurred among both Caucasians and African Americans and within all three Delaware counties.
- At the national level, the all site cancer mortality rate among males was also significantly greater than among females (215.3 per 100,000 vs. 149.7 per 100,000, respectively).
- Among male Delawareans, the all site cancer mortality rate was significantly higher among African Americans (257.2 per 100,000) than among Caucasians (219.8 per 100,000).
- In Sussex County, the all site cancer mortality rate for African Americans was significantly higher than mortality rate for Caucasians among both males (315.3 per 100,000 for African Americans vs. 192.2 per 100,000 for Caucasians) and females (196.6 per 100,000 for African Americans vs. 141.2 per 100,000 for Caucasians).

¹⁰ Howlader N, Noone AM, Krapcho M, et al (eds). SEER Cancer Statistics Review, 1975–2010, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2010/, based on November 2012 SEER data submission, posted to the SEER web site, April 2013.

Table 3-5. Five-Year Average Age-Adjusted All Site Cancer Mortality Rates* and 95% Confidence Intervals by Race and Sex; U.S., Delaware and Counties, 2006–2010

RACE AND REGION	All	Male	Female
ALL RACES			
United States	176.4 (176.2 , 176.6)	215.3 (214.9 , 215.6)	149.7 (149.4 , 149.9)
DELAWARE	182.9 (179.2 , 186.7)	221.6 (215.3 , 228.1)	155.5 (150.9 , 160.2)
Kent	206.5 (196.6 , 216.9)	253.0 (235.8 , 271.1)	175.1 (163.0 , 187.9)
New Castle	183.8 (178.7 , 189.0)	227.3 (218.5 , 236.3)	154.8 (148.6 , 161.2)
Sussex	170.2 (163.5 , 177.1)	199.0 (188.4 , 210.2)	147.1 (138.6 , 156.2)
CAUCASIAN			
United States	175.8 (175.6 , 176.0)	213.1 (212.7 , 213.5)	149.8 (149.5 , 150.0)
DELAWARE	182.0 (177.9 , 186.2)	219.8 (213.0 , 226.8)	154.9 (149.8 , 160.2)
Kent	215.6 (204.1 , 227.6)	260.6 (241.1 , 281.3)	186.1 (171.9 , 201.2)
New Castle	184.3 (178.6 , 190.1)	228.3 (218.6 , 238.4)	154.7 (147.7 , 161.9)
Sussex	164.2 (157.3 , 171.4)	192.2 (181.2 , 203.7)	141.2 (132.4 , 150.6)
AFRICAN AMERICAN			
United States	210.3 (209.6 , 211.1)	276.6 (275.2 , 278.1)	171.2 (170.4 , 172.1)
DELAWARE	202.3 (191.6 , 213.5)	257.2 (237.6 , 277.8)	166.9 (154.4 , 180.1)
Kent	199.0 (175.7 , 224.3)	259.1 (218.4 , 304.7)	152.9 (126.3 , 183.2)
New Castle	194.9 (181.8 , 208.6)	241.9 (218.0 , 267.6)	165.7 (150.3 , 182.2)
Sussex	239.9 (210.8 , 271.9)	315.3 (261.9 , 375.6)	196.6 (162.7 , 235.4)

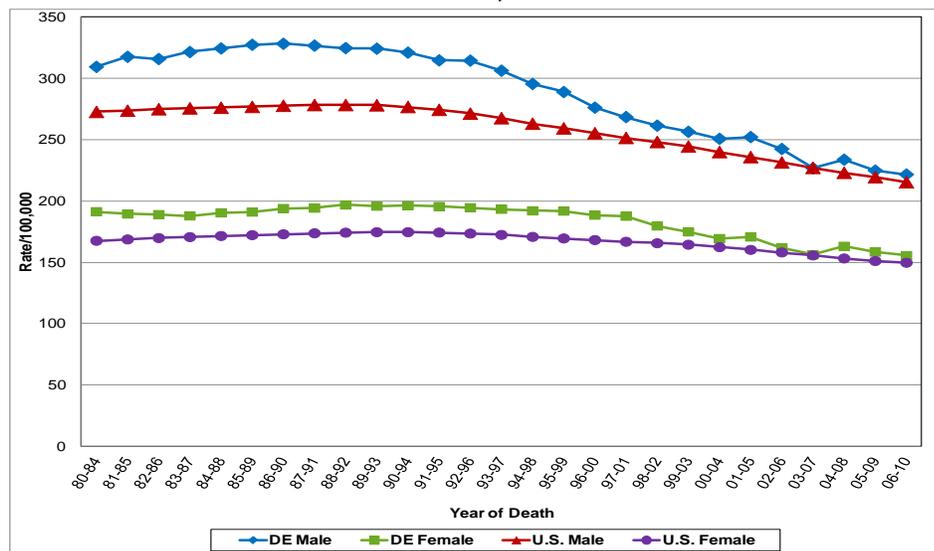
* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Health Statistics Center, 2013; U.S.: National Center for Health Statistics, 2013.

Trends in All Site Cancer Mortality (Figures 3-5 and 3-6)

- In Delaware from 1996–2000 through 2006–2010, the all site cancer mortality rate decreased 17.5 percent while nationally the all site cancer mortality rate decreased 12.7 percent.
- In Delaware, over the same time period, the all site cancer mortality rate for males and females declined 19.7 percent and 17.5 percent, respectively.
- Nationally, the all site cancer mortality rate for males and females decreased 15.6 percent and 11.0 percent, respectively.

Figure 3-5. Five-Year Average Age-Adjusted All Site Cancer Mortality Rates* by Sex; U.S. and Delaware, 1980–2010

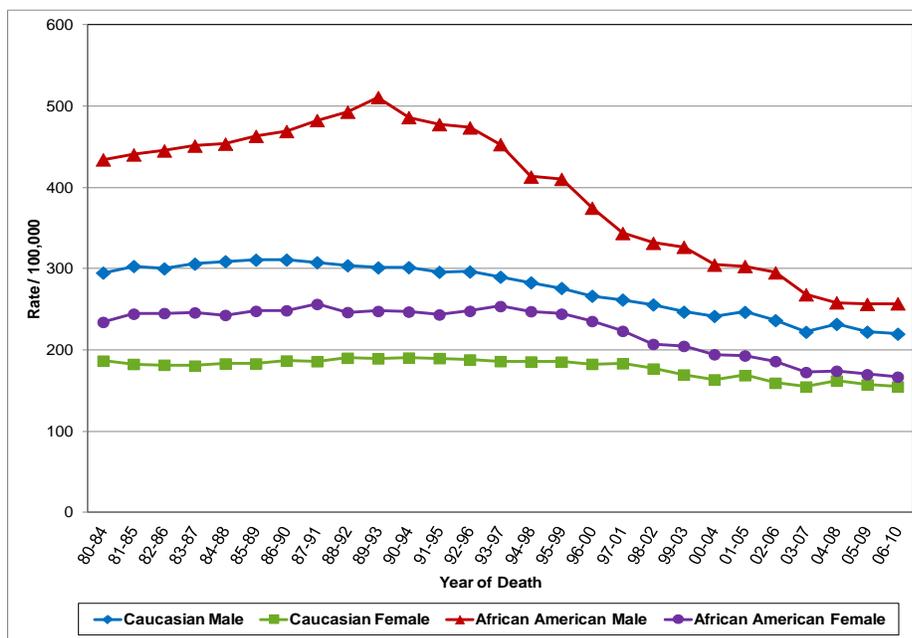


* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Health Statistics Center, 2013; U.S.: National Center for Health Statistics, 2013.

- Although African American males were the sex/race group with the highest all site cancer mortality rate (257.2 per 100,000) in Delaware, they had the greatest percentage decline in cancer mortality. From 1996–2000 through 2006–2010, the all site cancer mortality rate for African American males decreased 31.4 percent.
- From 1996–2000 through 2006–2010, Delaware’s all site cancer mortality rates declined by 17.5 percent, 15.2 percent, 31.4 percent and 29.1 percent for Caucasian males, Caucasian females, African American males and African American females, respectively.

Figure 3-6. Five-Year Average Age-Adjusted All Site Cancer Mortality Rates* by Race and Sex; Delaware, 1980–2010



* = Rates are age-adjusted to the 2000 U.S. standard population.

SOURCE: Delaware Health Statistics Center, 2013.

Age-Specific All Site Cancer Mortality Rates (Table 3-6, Figures 3-7 and 3-8)

- Age-specific mortality rates among African Americans were comparable to those seen among Caucasians with the exception of ages 85 and older, when the death rate among Caucasians was 14.9 percent higher than among African Americans.
- Among all Delawareans beginning with ages 65-74, males have a higher cancer mortality rate than females. By age 85 and over, the death rate was 76.9 percent higher among males than among females.

Table 3-6. Age-Specific All Site Cancer Mortality Rates* by Race and Sex; Delaware, 2006–2010

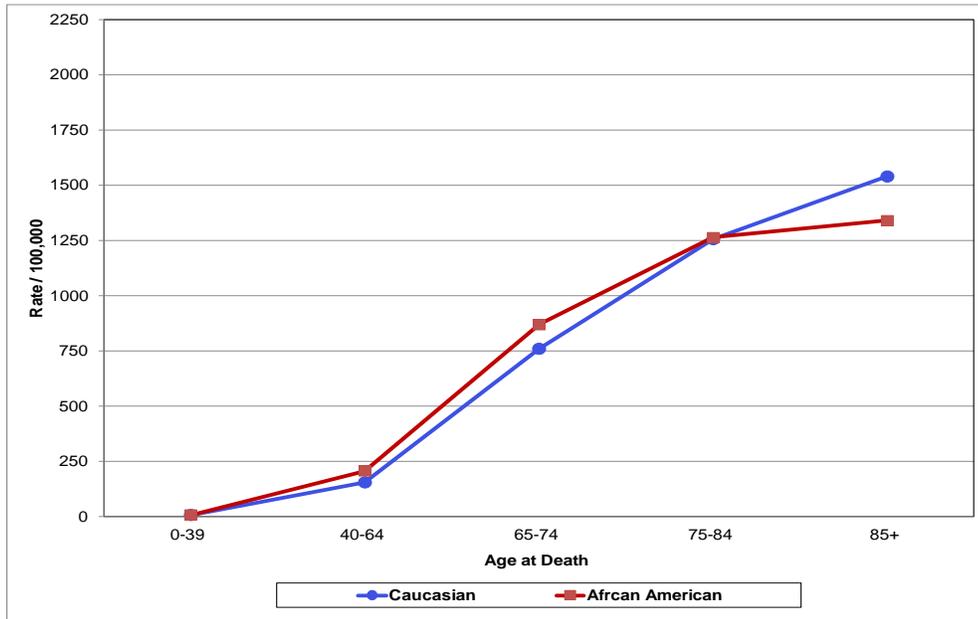
Age at Death	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
0-39	7.5	6.9	8.0	7.8	7.7	7.9	8.0	---	10.3
40-64	161.3	173.6	150.1	155.3	168.1	143.2	207.2	225.1	192.6
65-74	763.8	900.8	645.5	759.9	870.6	663.2	869.0	1203.5	601.0
75-84	1244.5	1608.0	977.5	1256.1	1624.7	978.0	1262.7	1654.6	1029.2
85+	1509.9	2150.8	1216.1	1539.7	2188.7	1237.6	1339.5	2063.2	1072.4

* = Rates are per 100,000 population.

--- = Rates based on fewer than 25 deaths are not shown.

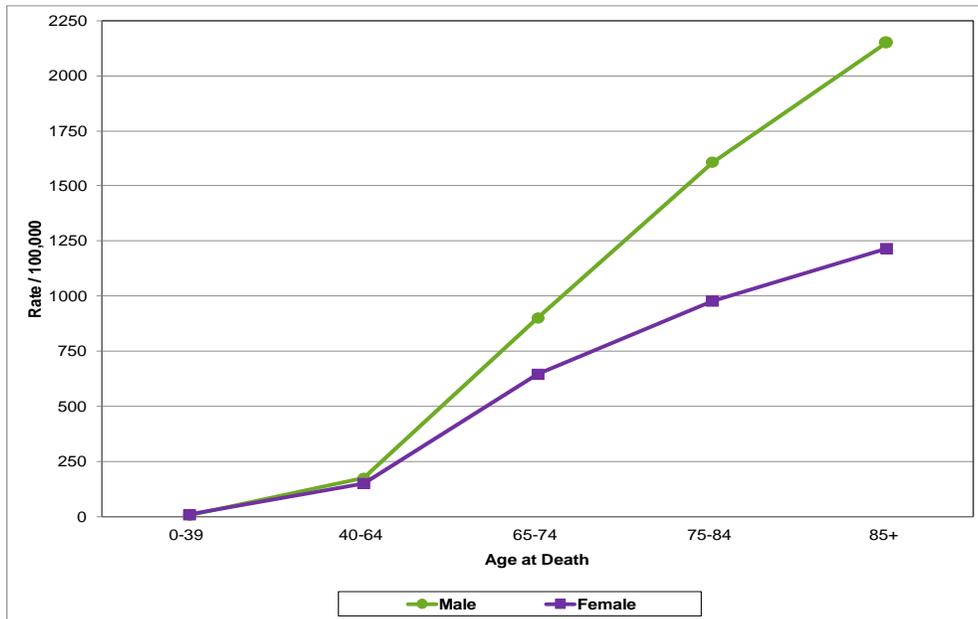
SOURCE: Delaware Health Statistics Center, 2013.

Figure 3-7. Age-Specific All Site Cancer Mortality Rates by Race; Delaware, 2006–2010



* = Rates are per 100,000 population.
SOURCE: Delaware Health Statistics Center, 2013.

Figure 3-8. Age-Specific All Site Cancer Mortality Rates* by Sex; Delaware, 2006–2010



* = Rates are per 100,000 population.
SOURCE: Delaware Health Statistics Center, 2013.

4. BREAST CANCER (FEMALE)

Risk Factors and Early Detection

Risk Factors for Female Breast Cancer:

Most women who have one or more breast cancer risk factors never develop the disease, while many women with breast cancer have no apparent risk factors other than being a woman and growing older. Even when a woman with risk factors develops breast cancer, it is difficult to know how much these factors might have contributed.

Lifestyle Risk Factors for Female Breast Cancer:

- alcohol – two to five alcoholic drinks daily
- obesity or overweight after menopause
- reproductive history – Risk increases among women who have not had children or who had their first child after age 30.
- high-fat diet, low intake of fruits and vegetables (suspected)
- smoking and secondhand smoke – Chemicals from the smoke reach breast tissue and are present in breast milk (suspected).

Environmental and Medically-Related Causes of Female Breast Cancer:

- birth control pills within the previous 10 years
- combined hormone therapy (both estrogen and progesterone) for two or more years after menopause; risk returns to normal five years after therapy ended
- history of high-dose radiation therapy to the chest area as a child or young adult
- diethylstilbestrol (DES) – given during pregnancy or having a mother who took DES during pregnancy

Breast Cancer Risk Factors that Cannot be Changed:

- gender – 100 times more common in women than men
- increasing age – About one of eight invasive breast cancers are in women younger than 45, and two of three invasive breast cancers occur in women age 55 and older.
- family history – Having one first-degree relative (mother, sister, or daughter) with breast cancer approximately doubles a woman's risk and two first-degree relatives increases risk three-fold. About 15 percent of women with breast cancer have a family history of the disease.
- gene defects or mutations – Five to 10 percent of breast cancer cases appear to result from gene defects or mutations inherited from a parent. The most common is an inherited mutation in the BRCA1 or BRCA2 genes, found most often in Jewish women of Eastern European origin.
- personal history of breast cancer – three- to four-fold risk of developing a new cancer in another part of the breast or in the other breast
- race – Caucasian women ages 45 and over are more likely to develop breast cancer than African-American women. African-American women, however, are more likely to be diagnosed with breast cancer at a younger age and are more likely to die from breast cancer.
- denser breast tissue increases risk of breast cancer and also makes it more difficult to spot potential problems on a mammogram
- personal history of certain benign breast conditions
- early age at menarche (before age 12) and/or a later age at menopause (after age 55)
- exposure to chemical compounds in the environment that have estrogen-like properties – including pesticides (e.g. DDE) and polychlorinated biphenyls (PCBs), as well as substances found in some plastics, certain cosmetics and personal care products

Factors Protective against Female Breast Cancer:

- History of regular breast cancer screenings is beneficial since a breast cancer diagnosed at an early stage can be treated more effectively.
- Drugs such as tamoxifen and EVISTA (raloxifene hydrochloride) have been shown to be beneficial for women at increased risk of breast cancer.
- Newer drugs (aromatase inhibitors), dietary supplements and herbs may help lower the risk of breast cancer.
- Breastfeeding for 1½ to two years may slightly lower the risk of breast cancer.
- Risk of female breast cancer can be lowered by managing lifestyle risk factors such as diet (high in fruits, vegetables and whole grains), tobacco use, alcohol use and physical activity.

Early Detection of Female Breast Cancer:

A screening mammogram (x-ray of the breast) is used to detect breast disease in women who appear to have no breast problems. For early breast cancer detection in women without breast symptoms, the American Cancer Society (ACS) recommends that women age 40 and older should have a mammogram every year and should continue to do so for as long as they are in good health. The Delaware Cancer Consortium also recommends this schedule for screening breast cancer.

Also, women should know how their breasts normally look and feel and report any breast change promptly to their health care provider. Breast self-exam is an option for women starting in their 20s.¹¹ Women at increased risk for breast cancer should discuss with their health care provider the benefits and limitations of beginning mammograms when they are younger, having additional tests and/or having more frequent exams.

Mammography Screening among Women in Delaware:

The Behavioral Risk Factor Survey (BRFS) has collected data on mammography use annually up to 2000 and biannually since then. The BRFS questionnaire uses two years as the threshold for a mammogram rather than the one year recommended by the American Cancer Society because minor variations in scheduling would cause some women to miss the one-year threshold; for example, an appointment that is 14 months after the previous appointment.

Data from the 2012 BRFS provide information on breast cancer screening among Delaware women:

- In 2012, 80.5 percent of Delaware women age 40 and older reported having a mammogram within the previous two years compared to 74.0 percent of U.S. women age 40 and older. Delaware women ranked third highest nationally for this response.
- In Delaware, the percentage of African American women age 40 and older who reported having a mammogram in the past two years was higher than among Caucasians, but the difference was not significantly different (84.0 percent vs. 79.5 percent, respectively).
- Women ages 40 and older in the two highest income categories had the highest percentages of mammography use (79.8 percent in \$35,000 – 49,999 and 86.3 percent in \$50,000 and over).
- Delaware women (age 40 and older) who were college graduates were more likely to have had a mammogram than those who didn't complete high school, and the difference was statistically significant.
- With the exception of ages 65 and over, the percentage of Delaware women who reported having a mammogram within the past two years increased with age.

¹¹ American Cancer Society recommendations for early breast cancer detection in women without breast symptoms. Accessed July 30, 2013. <http://www.cancer.org/Cancer/BreastCancer/MoreInformation/BreastCancerEarlyDetection/breast-cancer-early-detection-acs-recs>

Female Breast Cancer Incidence

Delaware was ranked 13th highest in the U.S for incidence of female breast cancer during 2006–2010.¹² This ranking was the same during 2005-2009.

Cases of Breast Cancer (Table 4-1)

- Breast cancer is the most frequently diagnosed cancer among females in Delaware and the U.S.
- During 2006–2010 in Delaware, 3,371 cases of female breast cancer were diagnosed that accounted for 28.3 percent of all new cancer cases among female Delawareans.
- Eighty percent (2,707) of breast cancer cases were Caucasian, 17.6 percent (593) African American and 2.1 percent (71) other or unknown race.
- Thirty-seven cases of breast cancer were diagnosed among male Delawareans during 2006–2010; 25 Caucasian, 10 African American and two other or unknown race. Cases among men are not included in the following statistics.

**Table 4-1. Number of Female Breast Cancer Cases by Race;
Delaware and Counties, 2006–2010**

	All Female	Caucasian	African American
DELAWARE	3,371	2,707	593
Kent	567	445	113
New Castle	1,935	1,492	402
Sussex	869	770	78

SOURCE: Delaware Cancer Registry,
Delaware Division of Public Health, 2013.

Incidence Rates for Female Breast Cancer (Table 4.2)

- The 2006–2010 female breast cancer incidence rate for Delaware (127.3 per 100,000) was 2.8 percent higher than the U.S. rate (123.8 per 100,000) and the difference was not statistically significant.
- The 2006–2010 breast cancer incidence rate for African Americans in Delaware (133.4 per 100,000) was higher than the comparable U.S. rate (121.4 per 100,000) but the difference was no longer statistically significant, as it was in recent time periods.
- Delaware's 2006–2010 breast cancer incidence rate among Caucasians (127.7 per 100,000) did not differ from the U.S. rate (127.4 per 100,000).
- At the national level, the 2006–2010 breast cancer incidence rate for African American females (121.4 per 100,000) was significantly lower than the rate for Caucasian females (127.4 per 100,000). For Delaware and within each county the opposite pattern was seen, with incidence among African Americans being higher than among Caucasians in each instance, although no observed difference was statistically significant.

¹² U.S. Cancer Statistics Working Group. United States Cancer Statistics: 1999–2010 Incidence and Mortality Web-based Report. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2013. Available at: www.cdc.gov/uscs

Table 4-2. Five-Year Average Age-Adjusted Female Breast Cancer Incidence Rates* and 95% Confidence Intervals by Race; U.S., Delaware and Counties, 2006–2010

	All Female	Caucasian	African American
United States	123.8 (123.3 , 124.3)	127.4 (126.9 , 127.9)	121.4 (120.0 , 122.8)
DELAWARE	127.3 (123.0 , 131.8)	127.7 (122.8 , 132.7)	133.4 (122.6 , 144.7)
Kent	127.6 (117.3 , 138.7)	133.0 (120.8 , 146.2)	133.1 (109.4 , 160.4)
New Castle	129.1 (123.4 , 135.1)	129.9 (123.2 , 136.8)	134.4 (121.2 , 148.5)
Sussex	125.9 (117.1 , 135.1)	123.3 (114.0 , 133.2)	129.9 (102.5 , 162.4)

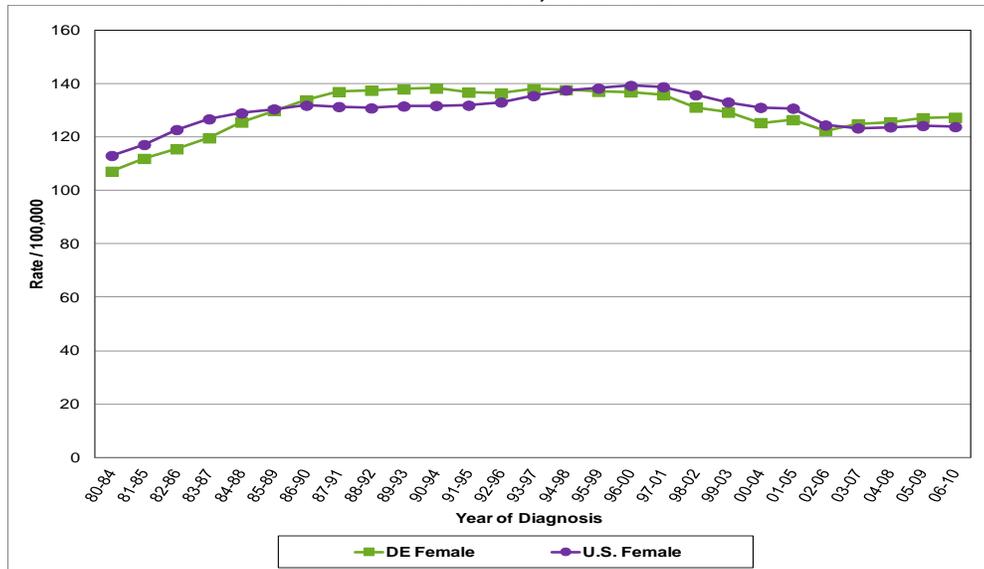
* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

Trends in Incidence of Female Breast Cancer (Figures 4.1 and 4.2)

- From 1996–2000 through 2006–2010, Delaware’s female breast cancer incidence rate decreased 6.9 percent while the U.S. incidence rate decreased 11.1 percent.

Figure 4-1. Five-Year Average Age-Adjusted Female Breast Cancer Incidence Rates*; U.S. and Delaware, 1980–2010

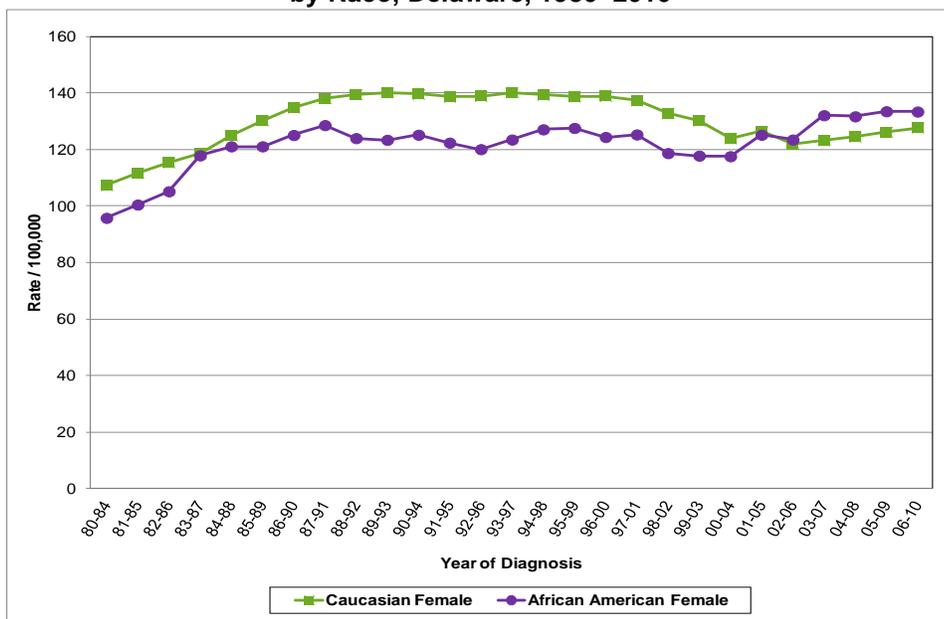


* = Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

- Delaware’s decline in female breast cancer incidence was limited to Caucasians (8.1 percent decline) while among African Americans, incidence increased 7.2 percent. Nationally, female breast cancer incidence declined 11.3 percent among Caucasians and 1.4 percent among African Americans (not shown in graphs).
- Delaware’s female breast cancer incidence had been higher among Caucasians than African Americans but as of 2002–2006, incidence among African Americans surpassed that of Caucasians.

Figure 4-2. Five-Year Average Age-Adjusted Female Breast Cancer Incidence Rates* by Race; Delaware, 1980–2010



* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.
SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Age-Specific Female Breast Cancer Incidence Rates (Table 4-3 and Figure 4-3)

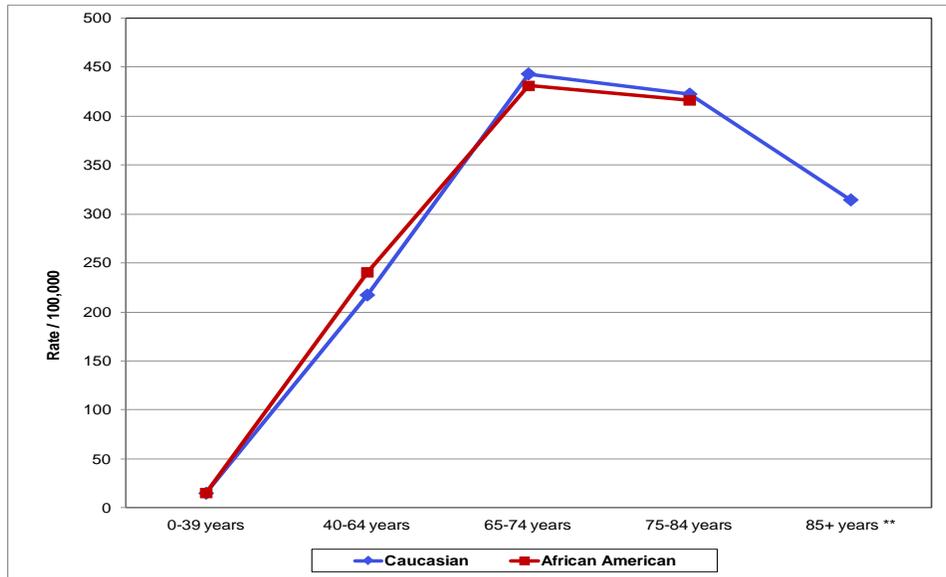
- Among Caucasians in Delaware, the incidence of female breast cancer increased with age, from birth to a peak during ages 65-74, followed by a slight decline during ages 75-84 and then a 26 percent drop among those ages 85 and older.
- Among African Americans, incidence also peaked at ages 65-74 with a similar decline in ages 75-84 (limited data in the oldest age group).

Table 4-3. Age-Specific Female Breast Cancer Incidence Rates* by Race; Delaware, 2006–2010

Age at Diagnosis	All Female	Caucasian Female	African American Female
0-39	14.9	15.0	15.2
40-64	218.9	217.3	240.4
65-74	435.9	443.0	430.7
75-84	417.4	422.4	415.9
85+	310.1	314.4	---

* = Rates are per 100,000 population.
 --- = Rates based on fewer than 25 cases are not shown.
SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Figure 4-3. Age-Specific Female Breast Cancer Incidence Rates* by Race; Delaware, 2006–2010



* = Rates are per 100,000 population.

** = Rates based on fewer than 25 cases are not shown.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Female Breast Cancer by Stage at Diagnosis (Table 4-4 and Figures 4-4 and 4-5)

- During 2006–2010, 1,114 cases (33.0 percent of all female breast cancers) were late-stage diagnoses (i.e., either regional or distant). The percentage of late-stage diagnoses was higher among African Americans (37.0 percent) than among Caucasians (32.1 percent).

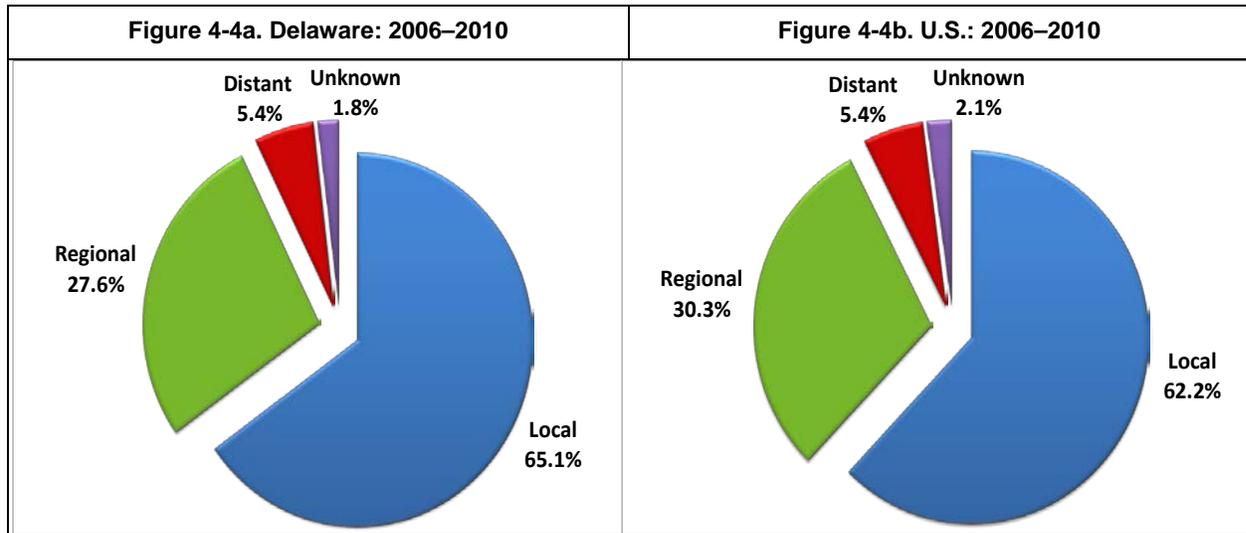
Table 4-4. Number and Percent of Female Breast Cancer Cases by Stage at Diagnosis and Race; Delaware, 2006–2010

Stage at Diagnosis	Number			Percent		
	All Female	Caucasian	African American	All Female	Caucasian	African American
Local	2,195	1,792	362	65.1	66.2	61.1
Regional	931	730	179	27.6	27.0	30.2
Distant	183	137	40	5.4	5.1	6.8
Unknown	62	48	12	1.8	1.8	2.0
Total	3,371	2,707	593	100.0	100.0	100.0

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

- For 2006–2010, 65.1 percent, 27.6 percent and 5.4 percent of female breast cancer cases in Delaware were diagnosed at the local, regional and distant stages, respectively. Comparable national rates were slightly less favorable; 62.2 percent local, 30.3 percent regional and 5.4 distant.

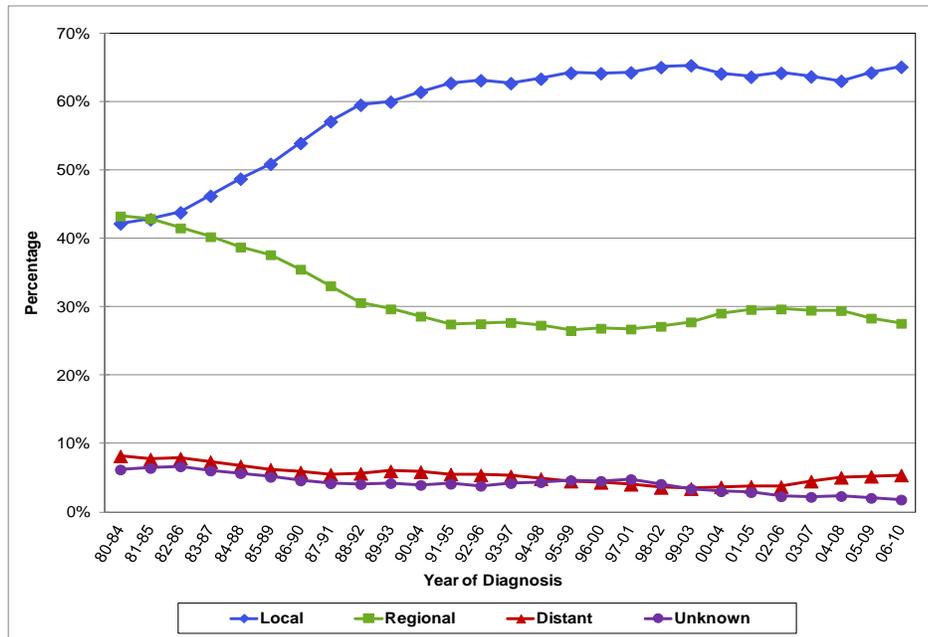
Figure 4-4. Percent of Female Breast Cancer Cases by Stage at Diagnosis and Race; U.S. and Delaware, 2006–2010



SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

- Since 1980–1984 in Delaware, the proportion of breast cancers diagnosed at the local stage improved from 42.2 percent to 65.2 percent. Over the same time period, the proportion of regional stage breast cancers decreased from 43.3 percent to 27.6 percent and the proportion of distant stage breast cancers decreased from 8.2 percent to 5.4 percent.
- The proportion of breast cancers with unknown stage at diagnosis declined from 6.2 percent in 1980–1984 to 1.8 percent in 2006–2010.

Figure 4-5. Percent of Female Breast Cancer Cases by Stage at Diagnosis; Delaware, 1980–2010



SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Female Breast Cancer Mortality

Delaware females ranked 23rd highest in breast cancer mortality during 2006–2010, (same as in 2005-2009).¹³

Deaths due to Breast Cancer (Table 4-5)

- Breast cancer is the second leading cause of cancer death among females after lung cancer.
- During 2006–2010, breast cancer accounted for 14.1 percent of all cancer deaths among female Delawareans.
- There were 619 breast cancer deaths among female Delawareans during 2006–2010: 509 deaths (82.2 percent) were Caucasian, 106 deaths (17.1 percent) were African American and four deaths were other or unknown race.
- Seven deaths from breast cancer occurred among male Delawareans during 2006–2010; six were Caucasian and one African American. These deaths are not included in the following statistics.

Table 4-5. Number of Female Breast Cancer Deaths by Race; Delaware and Counties, 2006–2010

	All Female	Caucasian	African American
DELAWARE	619	509	106
Kent	123	103	19
New Castle	326	257	67
Sussex	170	149	20

SOURCE: Delaware Health Statistics Center, 2013.

Female Breast Cancer Mortality Rates (Table 4-6)

- Delaware's 2006–2010 female breast cancer mortality rate was almost identical to the U.S. rate (22.4 per 100,000 Delaware vs. 22.6 per 100,000 U.S.).
- African Americans in Delaware had a significantly lower breast cancer mortality rate than nationally (24.4 per 100,000 Delaware vs. 30.8 per 100,000 U.S.)
- The U.S. 2006–2010 breast cancer mortality rate for African American females was significantly higher than for Caucasians (30.8 per 100,000 vs. 22.1 per 100,000, respectively) but in Delaware, mortality rates for both race categories were comparable (24.4 per 100,000 African American vs. 22.4 per 100,000 Caucasian).
- Kent County had the highest breast cancer mortality rate of the three counties (27.7 per 100,000).

¹³ Howlander N, Noone AM, Krapcho M, et al (eds). SEER Cancer Statistics Review, 1975–2010, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2010/, based on November 2012 SEER data submission, posted to the SEER web site, April 2013.

Table 4.6. Five-Year Average Age-Adjusted Female Breast Cancer Mortality Rates* and 95% Confidence Intervals by Race; U.S., Delaware and Counties, 2006–2010

Region	All Female	Caucasian	African American
United States	22.6 (22.5 , 22.7)	22.1 (22.0 , 22.2)	30.8 (30.5 , 31.2)
DELAWARE	22.4 (20.7 , 24.3)	22.4 (20.5 , 24.6)	24.4 (19.9 , 29.6)
Kent	27.7 (23.0 , 33.1)	30.1 (24.5 , 36.6)	---
New Castle	20.9 (18.6 , 23.3)	20.8 (18.3 , 23.6)	22.9 (17.6 , 29.2)
Sussex	23.0 (19.5 , 27.1)	21.5 (17.9 , 25.7)	---

* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

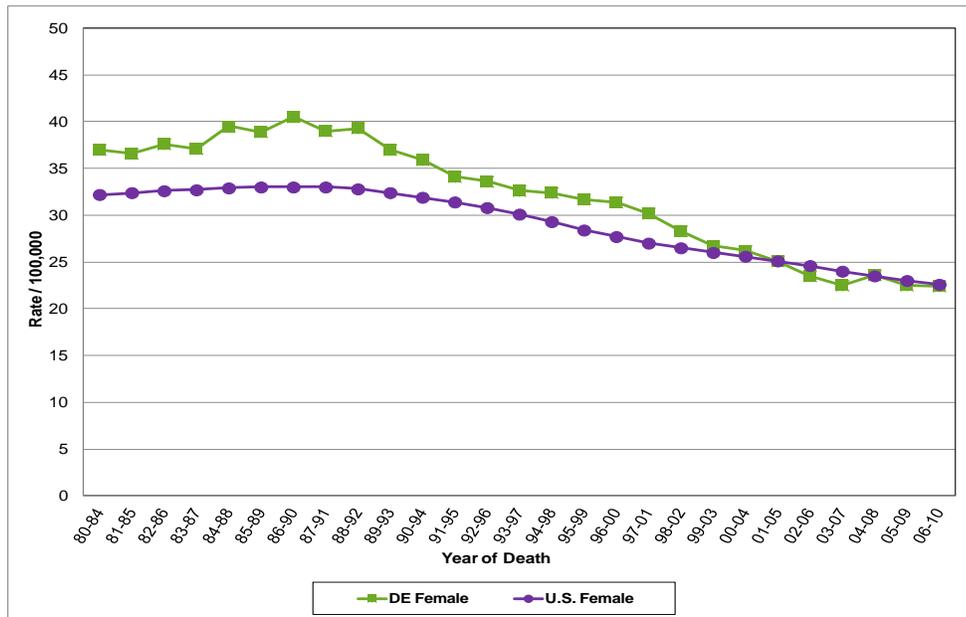
--- = Rates based on fewer than 25 deaths are not shown.

SOURCES: Delaware: Delaware Health Statistics Center, 2013; U.S.: National Center for Health Statistics, 2013.

Trends in Female Breast Cancer Mortality (Figures 4-6 and 4-7)

- Although Delaware’s female breast cancer mortality rates had been higher than the U.S. rate, since 1999–2003 Delaware’s mortality rate has been comparable or lower than the U.S. rate.
- From 1996–2000 through 2006–2010, Delaware’s female breast cancer mortality rate decreased 28.7 percent while the U.S. rate fell 18.4 percent.

Figure 4-6. Five-Year Average Age-Adjusted Female Breast Cancer Mortality Rates*; U.S. and Delaware, 1980–2010

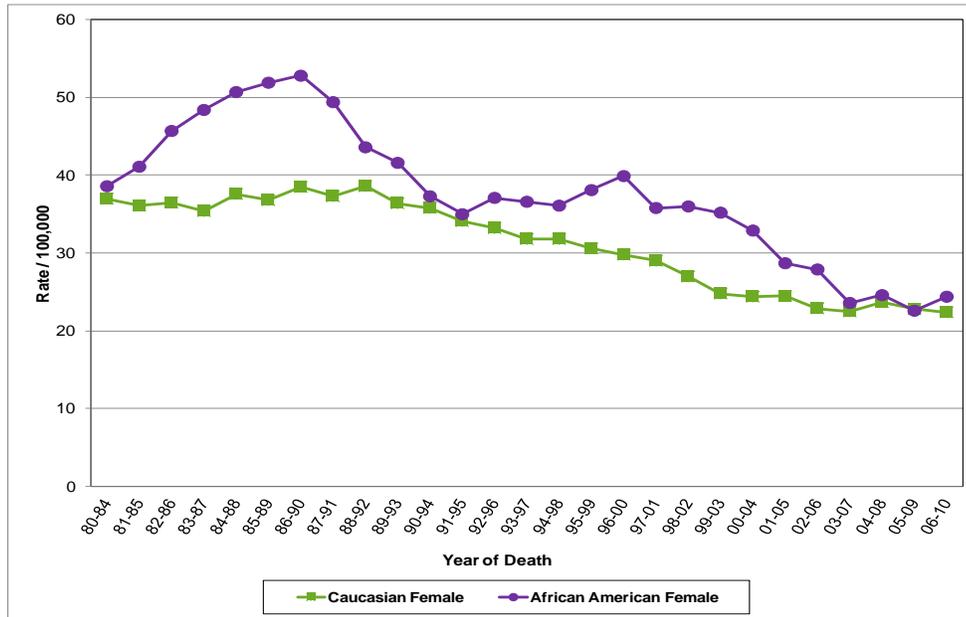


* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Health Statistics Center, 2013; U.S.: National Center for Health Statistics, 2013.

- From 1996–2000 through 2006–2010, Delaware’s female breast cancer mortality rate decreased 38.8 percent among African Americans and 24.8 percent among Caucasians. Nationally (not shown), breast cancer mortality declined 14.2 percent among African Americans and 18.5 percent among Caucasians.

Figure 4-7. Five-Year Average Age-Adjusted Female Breast Cancer Mortality Rates* by Race; Delaware, 1980–2010



* = Rates are age-adjusted to the 2000 U.S. standard population.

SOURCE: Delaware Health Statistics Center, 2013.

Age-Specific Female Breast Cancer Mortality Rates (Table 4-7)

- Among Caucasians in Delaware, breast cancer mortality increased with age, from 30.5 deaths per 100,000 among women ages 40-64 to 151.2 per 100,000 among ages 85 and older.
- The number of female breast cancer deaths was too small to examine age-specific mortality rates by race.

Table 4-7. Age-Specific Female Breast Cancer Mortality Rates* by Race; Delaware, 2006–2010

Age at Death	All Female	Caucasian	African American
0-39	---	---	---
40-64	31.3	30.5	39.5
65-74	74.4	76.6	---
75-84	108.5	109.5	---
85+	142.9	151.2	---

* = Rates are per 100,000 population.

--- = Rates based on fewer than 25 deaths are not shown.

SOURCE: Delaware Health Statistics Center, 2013.

5. COLORECTAL CANCER

Risk Factors and Early Detection

Colorectal cancer is cancer that originates either in the colon or the rectum. Since they have many characteristics in common, cancers of the colon and rectum are grouped together in this document.

Lifestyle Risk Factors for Colorectal Cancer:

- diet high in red meat and processed meats
- lack of physical activity
- obesity – link appears to be stronger in men than women
- long-term tobacco use
- heavy use of alcohol
- type 2 diabetes – even after accounting for lifestyle risk factors

Environmental and Medically-Related Causes of Colorectal Cancer:

- personal history of testicular cancer – probably because of treatment
- history of radiation therapy for prostate cancer
- women who work a night shift at least three nights a month for at least 15 years – based on limited data

Risk Factors for Colorectal Cancer that Cannot be Changed:

- age – although younger adults develop colorectal cancer, risk increases markedly after age 50.
- race – African American
- ethnicity – Jewish men and women of Eastern European descent
- personal history of colorectal adenomatous polyps
- personal history of colorectal cancer
- Long history of an inflammatory bowel disease such as ulcerative colitis or Crohn's disease can lead to dysplasia in the lining of the colon and rectum. These abnormal cells can develop into cancer over time.
- familial adenomatous polyposis (FAP) – responsible for about one percent of colorectal cancers
- hereditary non-polyposis colorectal cancer (HNPCC) – linked to 3 to 5 percent of colorectal cancers
- family history of colorectal cancer or adenomatous polyps in one or more first-degree relatives

Factors Protective against Colorectal Cancer:

- Regular screening is the most effective way to prevent colorectal cancer since removal of colorectal polyps can prevent colorectal cancer from developing.
- Risk of colorectal cancer can be lowered by managing lifestyle risk factors such as diet (high in fruits, vegetables and whole grains), alcohol use and physical activity.
- Some studies have shown favorable results from taking multi-vitamins containing folic acid, vitamin D and/or magnesium but more research is needed.
- People who use aspirin and other anti-inflammatory drugs such as ibuprofen show a lower risk of getting colorectal cancer but there is concern because of the potential for serious side effects associated with prolonged use.
- Combined hormone replacement therapy, which includes both estrogen and progesterone, may reduce a woman's risk of postmenopausal colorectal cancer.

Early Detection of Colorectal Cancer:

The American Cancer Society's colorectal cancer screening guidelines are as follows:¹⁴

Beginning at age 50, both men and women at average risk of developing colorectal cancer should use one of the screening options below:

(1) Tests that find polyps and cancer:

- flexible sigmoidoscopy every five years[§]
- colonoscopy every 10 years
- double-contrast barium enema every five years[§]
- CT colonography (virtual colonoscopy) [§]

(2) Tests that find mainly cancer:

- fecal occult blood test (FOBT) every year[§]
- fecal immunochemical test (FIT) every year[§]

§ – colonoscopy should be done if test results are positive

Suggested screening guidelines for people at higher risk of developing colorectal cancer are specified by risk factor in the ACS screening guidelines referenced above.

Colorectal Cancer Screening among Delawareans:

Data from the Behavioral Risk Factor Surveillance (BRFS) survey for 2012 provide information on colorectal cancer screening patterns among Delawareans:

- In 2012, Delaware ranked fourth highest in the prevalence (75.1 percent) of adults age 50 and older who reported that they had ever had a sigmoidoscopy or a colonoscopy. The national prevalence was 67.3 percent.
- The percentage of Delawareans who have had a colonoscopy or sigmoidoscopy increased with age. Significantly more Delawareans ages 60-64 and 65+ (83.4 percent and 82.3 percent, respectively) reported ever having had a colonoscopy or sigmoidoscopy compared to those ages 50-59 (63.3 percent).
- In 2012, Caucasians age 50 and older in Delaware were slightly more likely to have ever had a colonoscopy or sigmoidoscopy than African Americans (75.5 percent vs. 72.1 percent, respectively).
- In Delaware, the prevalence of adults ages 50 and over who had ever had a colonoscopy or sigmoidoscopy increased by level of education.
- Seventy-three percent of Delawareans in the lowest income category had ever had colorectal cancer screening compared with only 53.8 percent nationally.
- In 2012, 12.9 percent of Delawareans age 50 and older report having used an at-home blood stool test within the past two years compared with 14.2% percent nationally. There was no difference in use by race or sex. Use of the test increased with age and there was no association with income or education.

¹⁴ Detailed screening guidelines for colorectal cancer:

<http://www.cancer.org/Cancer/ColonandRectumCancer/MoreInformation/ColonandRectumCancerEarlyDetection/colorectal-cancer-early-detection-acs-recommendations>

Colorectal Cancer Incidence

During 2006–2010, Delaware ranked 24th highest in the U.S. for colorectal cancer incidence, down from a ranking of 19th in 2005-2009. Males ranked 21st (down from 16th in 2005-2009) and females ranked 24th (down from 20th in 2005-2009).¹⁵

Cases of Colorectal Cancer (Table 5-1)

- Colorectal cancer is the third most commonly-diagnosed cancer among males and females in Delaware as well as nationally.
- A total of 2,262 cases of colorectal cancer were diagnosed among Delawareans during 2006–2010, accounting for 8.9 percent of all cancer cases diagnosed during this time period.
- Males were slightly more prevalent among newly-diagnosed cases: 1,166 cases (51.4 percent) were male and 1,096 cases (48.5 percent) female.
- In 2006-2010, Caucasians comprised 81.7 percent (1,847 cases) of colorectal cancer cases, African Americans comprised 16.6 percent (375 cases) and 1.8 percent (40 cases) were other or unknown race.

Table 5-1. Number of Colorectal Cancer Cases by Race and Sex; Delaware and Counties, 2006–2010

	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
DELAWARE	2,262	1,166	1,096	1,847	956	891	375	192	183
Kent	390	193	197	312	157	155	71	34	37
New Castle	1,237	632	605	980	504	476	235	117	118
Sussex	635	341	294	555	295	260	69	41	28

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Incidence Rates for Colorectal Cancer (Table 5-2)

- Delaware's 2006–2010 colorectal cancer incidence rate (45.2 per 100,000) was almost identical to the U.S. rate (45.0 per 100,000).
- Colorectal cancer incidence among African Americans in Delaware was lower than nationally (50.2 per 100,000 vs. 55.3 per 100,000) but the difference is not statistically significant.
- As seen nationally, Delaware's colorectal cancer incidence rate was significantly higher among males than females for both Caucasians (52.0 per 100,000 vs. 38.6 per 100,000) and African Americans (60.2 per 100,000 vs. 43.1 per 100,000).
- Although U.S. colorectal cancer incidence rates for 2006–2010 were significantly higher among African Americans than Caucasians for both males and females, the racial disparity observed among Delawareans was no longer statistically significant, with the exception of Sussex County.

¹⁵ U.S. Cancer Statistics Working Group. United States Cancer Statistics: 1999–2010 Incidence and Mortality Web-based Report. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2013. Available at: www.cdc.gov/uscs

Table 5-2. Five-Year Average Age-Adjusted Colorectal Cancer Incidence Rates* and 95% Confidence Intervals by Race and Sex; U.S., Delaware and Counties, 2006–2010

RACE AND REGION	All	Male	Female
ALL RACES			
United States	45.0 (44.8 , 45.2)	52.2 (51.8 , 52.5)	39.3 (39.0 , 39.5)
DELAWARE	45.2 (43.4 , 47.2)	52.4 (49.4 , 55.6)	39.0 (36.7 , 41.5)
Kent	48.7 (44.0 , 53.8)	54.7 (47.1 , 63.1)	43.3 (37.5 , 49.9)
New Castle	45.2 (42.7 , 47.9)	52.6 (48.5 , 57.0)	39.1 (36.0 , 42.4)
Sussex	43.9 (40.4 , 47.6)	51.7 (46.2 , 57.8)	36.6 (32.4 , 41.3)
CAUCASIAN			
United States	44.2 (44.0 , 44.4)	51.3 (51.0 , 51.7)	38.4 (38.1 , 38.7)
DELAWARE	44.9 (42.8 , 47.0)	52.0 (48.8 , 55.5)	38.6 (36.0 , 41.3)
Kent	50.3 (44.8 , 56.2)	57.5 (48.7 , 67.4)	44.2 (37.5 , 51.8)
New Castle	45.5 (42.6 , 48.5)	53.2 (48.6 , 58.2)	39.0 (35.5 , 42.8)
Sussex	41.8 (38.2 , 45.6)	48.7 (43.0 , 55.0)	35.1 (30.8 , 40.0)
AFRICAN AMERICAN			
United States	55.3 (54.6 , 56.1)	64.3 (63.0 , 65.6)	49.2 (48.3 , 50.1)
DELAWARE	50.2 (45.1 , 55.8)	60.2 (51.4 , 70.0)	43.1 (37.0 , 50.0)
Kent	47.8 (37.1 , 60.6)	49.1 (33.7 , 69.2)	44.5 (31.2 , 61.6)
New Castle	47.7 (41.6 , 54.5)	55.0 (44.7 , 66.8)	42.2 (34.7 , 50.7)
Sussex	65.1 (50.5 , 82.5)	95.0 (67.3 , 129.6)	46.6 (30.8 , 67.4)

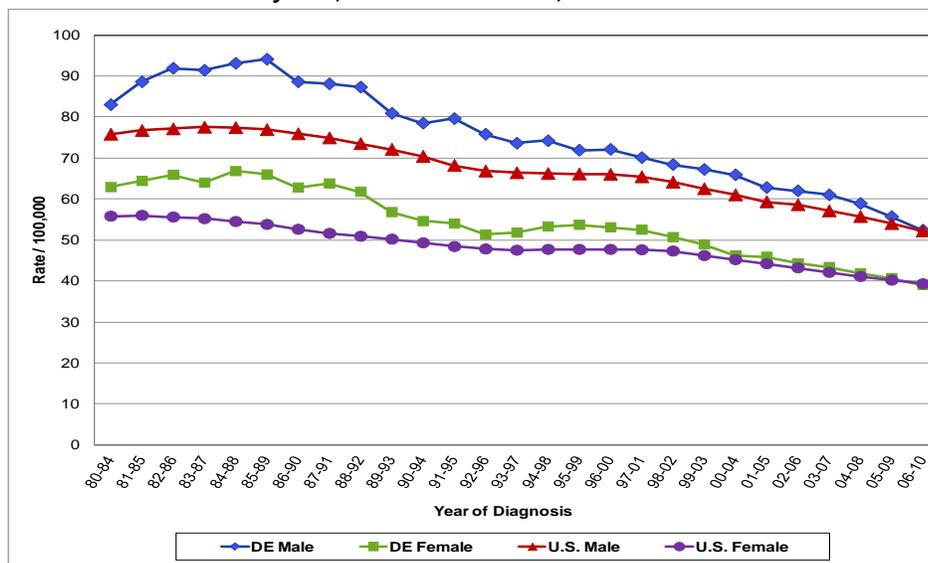
* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

Trends in Colorectal Cancer Incidence (Figures 5-1 and 5-2)

- From 1996–2000 through 2006–2010, Delaware’s colorectal cancer incidence rate decreased 26.4 percent while the national rate decreased 18.9 percent.
- Delaware’s colorectal incidence rates showed steeper declines than nationally among both males and females. Delaware’s incidence rate declined 27.3 percent among males and 26.6 percent among females while nationally, the incidence rate declined 20.9 percent among males and 17.6 percent among females.

Figure 5-1. Five-Year Average Age-Adjusted Colorectal Cancer Incidence Rates* by Sex; U.S. and Delaware, 1980–2010

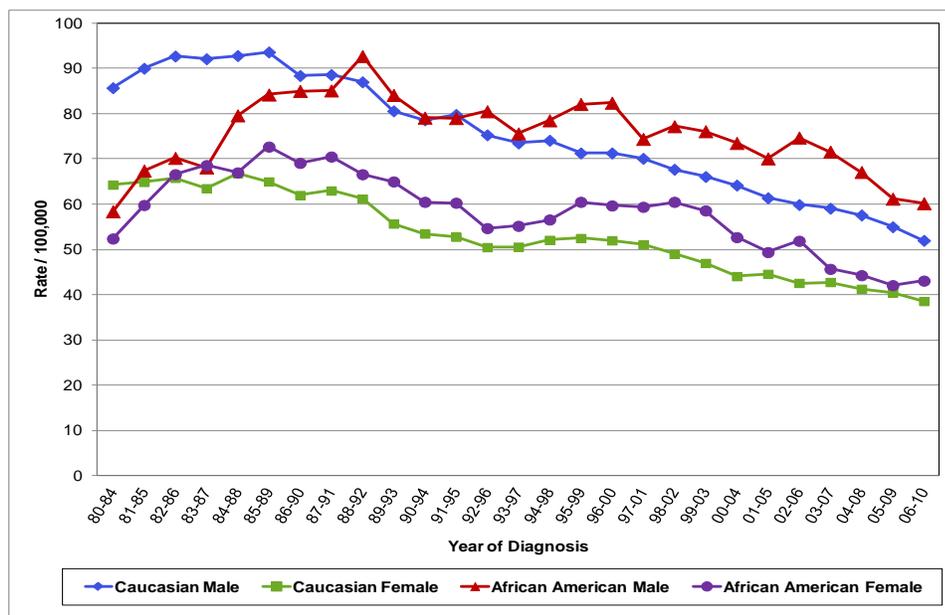


* = Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

- From 1996–2000 through 2006–2010, Delaware’s colorectal cancer incidence rate decreased 27.1 percent and 25.8 percent among male and female Caucasians, respectively. The improvement was similar among African Americans where there was a 26.9 percent decline among males and a 27.8 percent decline among females.

Figure 5-2. Five-Year Average Age-Adjusted Colorectal Cancer Incidence Rates* by Race and Sex; Delaware, 1980–2010



* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Age-Specific Colorectal Cancer Incidence Rates (Table 5-3, Figures 5-3 and 5-4)

- During 2006-2010, colorectal cancer incidence increased with increasing age among Caucasian Delawareans. The colorectal cancer incidence rate among African Americans showed an inconsistent pattern but was similar to that among Caucasians in ages 40-64 and in the oldest age group.
- Incidence increased with age among both males and females, but rates among males were, on average, about 30 percent higher than among females.

Table 5-3. Age-Specific Colorectal Cancer Incidence Rates* by Race and Sex; Delaware, 2006–2010

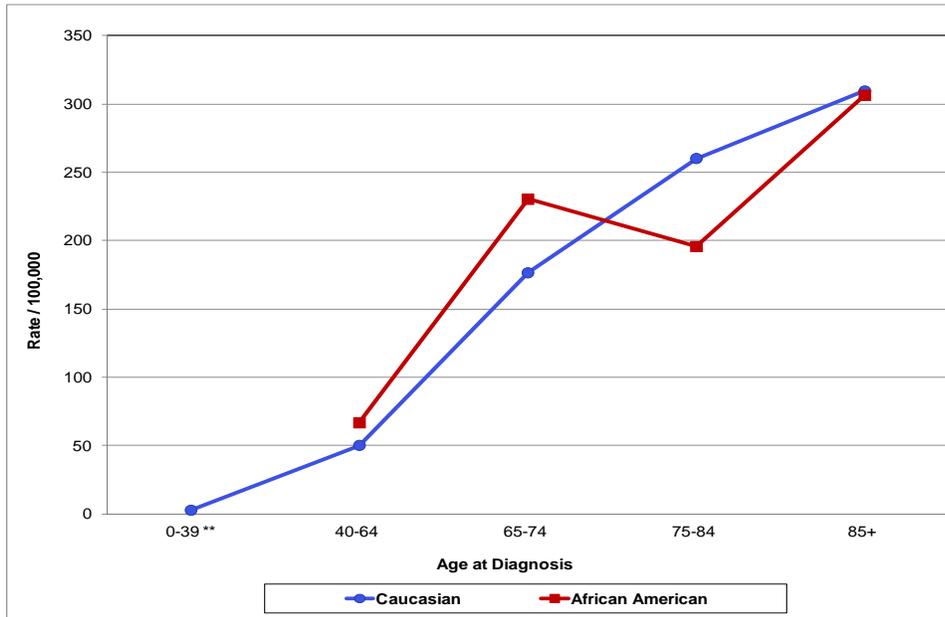
Age at Diagnosis	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
0-39	2.4	3.4	---	2.7	3.8	---	---	---	---
40-64	52.4	60.4	45.0	50.2	58.2	42.6	66.7	76.9	58.2
65-74	180.3	219.4	146.5	176.5	215.1	142.7	230.3	276.2	192.8
75-84	251.5	277.5	230.4	260.2	284.2	240.0	195.7	231.3	173.2
85+	308.2	338.2	294.4	309.6	337.7	296.5	306.5	---	---

* = Rates are per 100,000 population.

--- = Rates based on fewer than 25 cases are not shown.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Figure 5-3. Age-Specific Colorectal Cancer Incidence Rates* by Race; Delaware, 2006–2010

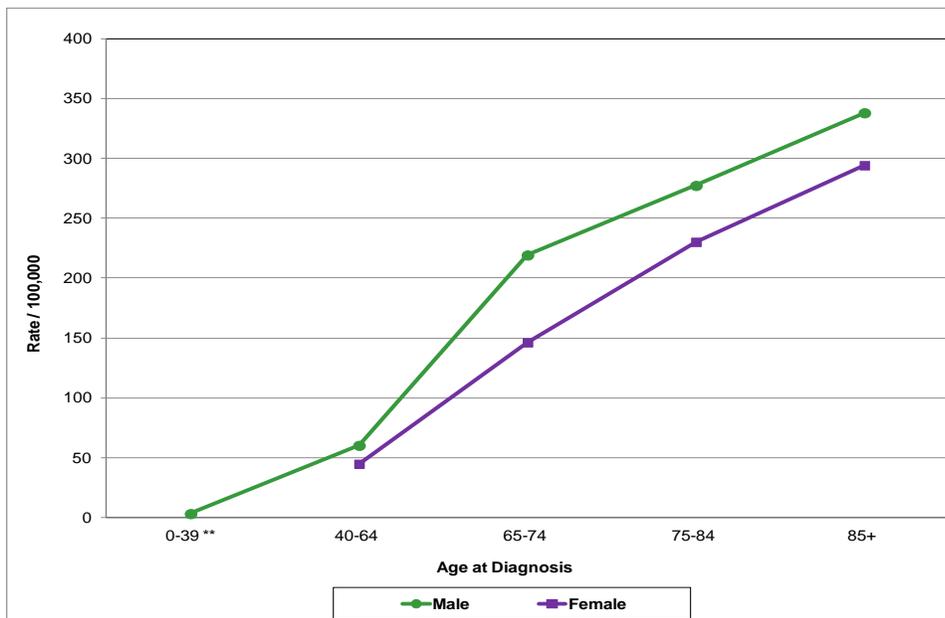


* = Rates are per 100,000 population.

** = Rates based on fewer than 25 cases are not shown.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Figure 5-4. Age-Specific Colorectal Cancer Incidence Rates* by Sex; Delaware, 2006–2010



* = Rates are per 100,000 population.

** = Rates based on fewer than 25 cases are not shown.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Colorectal Cancer by Stage at Diagnosis (Tables 5-4 and 5-5, Figures 5-5 and 5-6)

- In Delaware during 2006–2010, 1,234 colorectal cancer cases (54.6 percent) were diagnosed in the late stages (i.e., regional or distant stage).
- African Americans were nearly as likely as Caucasians to have had their cancer diagnosed in the local stage (39.2 percent vs. 39.5 percent, respectively).

Table 5-4. Number of Colorectal Cancer Cases by Stage at Diagnosis, Race and Sex; Delaware, 2006–2010

Stage at Diagnosis	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
Local	895	473	422	730	382	348	147	82	65
Regional	796	400	396	651	330	321	132	65	67
Distant	438	225	213	359	191	168	72	32	40
Unknown	133	68	65	107	53	54	24	13	11
Total	2,262	1,166	1,096	1,847	956	891	375	192	183

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

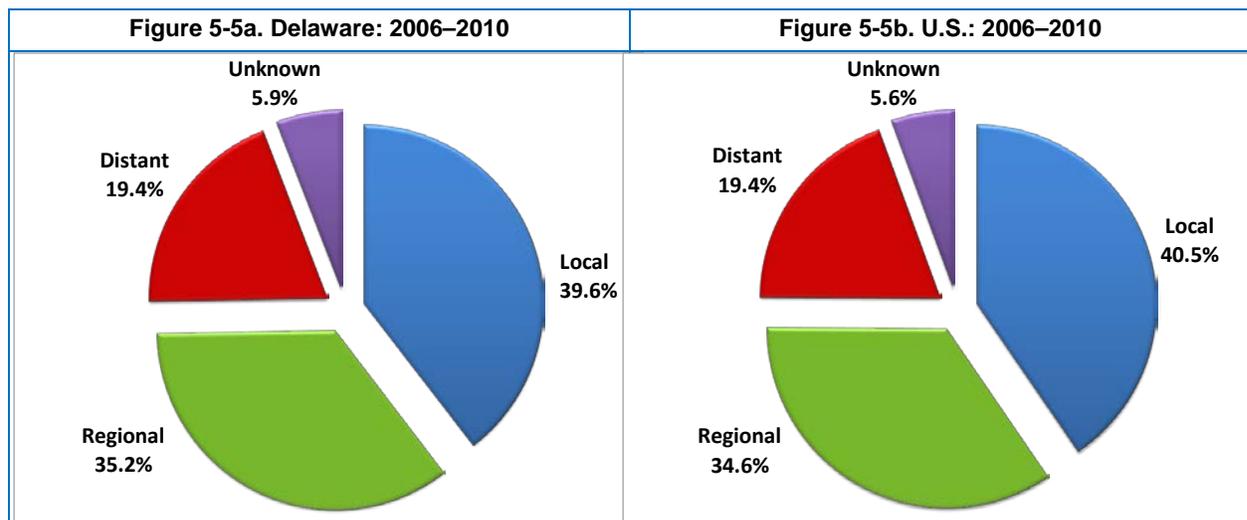
Table 5-5. Percent of Colorectal Cancer Cases by Stage at Diagnosis, Race and Sex; Delaware, 2006–2010

Stage at Diagnosis	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
Local	39.6	40.6	38.5	39.5	40.0	39.1	39.2	42.7	35.5
Regional	35.2	34.3	36.1	35.3	34.5	36.0	35.2	33.9	36.6
Distant	19.4	19.3	19.4	19.4	20.0	18.9	19.2	16.7	21.9
Unknown	5.9	5.8	5.9	5.8	5.5	6.1	6.4	6.8	6.0
Total	100.0	100.0	100.0						

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

- During 2006–2010 in Delaware, the percentage of colorectal cancers detected at the local, regional and distant stages were 39.6, 35.2 and 19.4 percent, respectively. The distribution of cases was similar nationally with 40.5 percent, 34.6 percent and 19.4 percent, respectively.

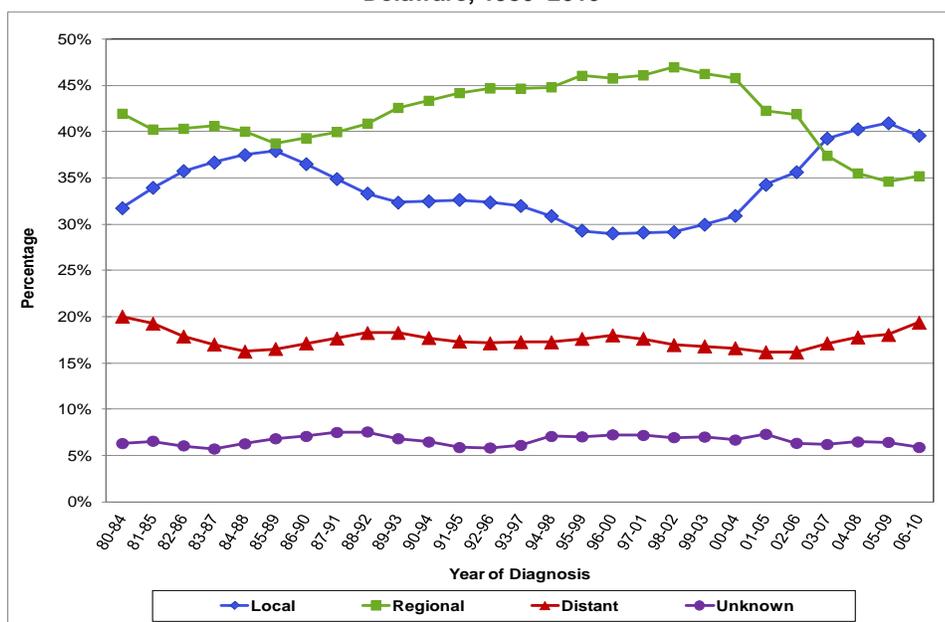
Figure 5-5. Percent of Colorectal Cancer Cases by Stage at Diagnosis; Delaware and U.S., 2006–2010



SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

- In Delaware, the percentage of colorectal cancer cases diagnosed in the local stage increased from 31.7 percent in 1980–1984 to 39.6 percent in 2006–2010. Consequently, there was a decline in cases diagnosed in the regional stage, from 41.9 percent in 1980–1984 to 35.2 percent in 2006–2010, as well as a slight decline in the percentage of distant stage diagnoses, from 20.0 percent in 1980–1984 to 19.4 percent in 2006–2010.

Figure 5-6. Percent of Colorectal Cancer Cases by Stage at Diagnosis; Delaware, 1980–2010



SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Colorectal Cancer Mortality

During 2006–2010, Delaware’s rank in colorectal cancer mortality was 24th in the nation, down from 21st in 2005–2009. Delaware males ranked 21st (up from 24th in 2005–2009) and females ranked 33rd highest (improved from 24th in 2005–2009) in colorectal cancer mortality.¹⁶

Deaths from Colorectal Cancer (Table 5-6)

- In Delaware and nationally, colorectal cancer is the third most common cause of cancer deaths among males and females.
- The 807 deaths from colorectal cancer accounted for 8.8 percent of all cancer deaths in Delaware during 2006–2010.
- Of the Delaware residents who died from colorectal cancer, 53.4 percent were male and 46.6 percent female. By race, 4.3 percent were Caucasian, 14.6 percent were African American and 1.1 percent were other or unknown race.

¹⁶ Howlader N, Noone AM, Krapcho M, et al (eds). SEER Cancer Statistics Review, 1975–2010, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2010/, based on November 2012 SEER data submission, posted to the SEER web site, April 2013.

Table 5-6. Number of Colorectal Cancer Deaths by Race and Sex; Delaware and Counties, 2006–2010

	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
DELAWARE	807	431	376	680	368	312	118	58	60
Kent	142	82	60	116	67	49	26	15	11
New Castle	424	218	206	342	181	161	76	34	42
Sussex	241	131	110	222	120	102	16	9	7

SOURCE: Delaware Health Statistics Center, 2013.

Colorectal Cancer Mortality Rates (Table 5-7)

- Although Delaware’s colorectal cancer mortality rate was higher than the U.S. rate, Delaware’s 2006–2010 colorectal cancer mortality rate (16.0 per 100,000) was slightly lower than nationally (16.4 per 100,000).
- During 2006–2010, colorectal cancer mortality rates were significantly higher among males than females at both the state and national levels. Within Delaware, the colorectal cancer mortality rate was significantly higher among males than females in each county both for all races combined.
- Among females in Delaware, colorectal cancer mortality was higher (non-significantly) among African Americans than among Caucasians but little difference was seen among males. Nationally, colorectal cancer mortality among African Americans was significantly higher than among Caucasians for both males and females.

Table 5-7. Five-Year Average Age-Adjusted Colorectal Cancer Mortality Rates* and 95% Confidence Intervals by Race and Sex; U.S., Delaware and Counties, 2006–2010

RACE AND REGION	All	Male	Female
ALL RACES			
United States	16.4 (16.3 , 16.4)	19.6 (19.5 , 19.8)	13.9 (13.8 , 13.9)
DELAWARE	16.0 (14.9 , 17.2)	19.9 (18.0 , 21.8)	12.8 (11.5 , 14.2)
Kent	18.2 (15.3 , 21.4)	24.4 (19.3 , 30.4)	13.1 (10.0 , 16.9)
New Castle	15.6 (14.1 , 17.2)	19.0 (16.6 , 21.8)	12.9 (11.2 , 14.8)
Sussex	15.9 (13.9 , 18.1)	19.4 (16.1 , 23.1)	12.5 (10.3 , 15.3)
CAUCASIAN			
United States	15.9 (15.8 , 16.0)	19.1 (18.9 , 19.2)	13.4 (13.3 , 13.5)
DELAWARE	16.1 (14.9 , 17.4)	20.2 (18.2 , 22.4)	12.5 (11.1 , 14.0)
Kent	18.9 (15.6 , 22.7)	25.6 (19.7 , 32.7)	13.5 (10.0 , 18.0)
New Castle	15.6 (13.9 , 17.3)	19.6 (16.8 , 22.7)	12.3 (10.4 , 14.4)
Sussex	16.0 (13.9 , 18.4)	19.3 (15.9 , 23.3)	12.8 (10.3 , 15.8)
AFRICAN AMERICAN			
United States	22.8 (22.6 , 23.1)	28.7 (28.2 , 29.1)	19.0 (18.7 , 19.3)
DELAWARE	17.1 (14.0 , 20.5)	19.7 (14.7 , 25.9)	15.0 (11.4 , 19.4)
Kent	18.6 (12.0 , 27.4)	---	---
New Castle	16.6 (13.0 , 21.0)	17.7 (11.8 , 25.4)	15.8 (11.3 , 21.5)
Sussex	---	---	---

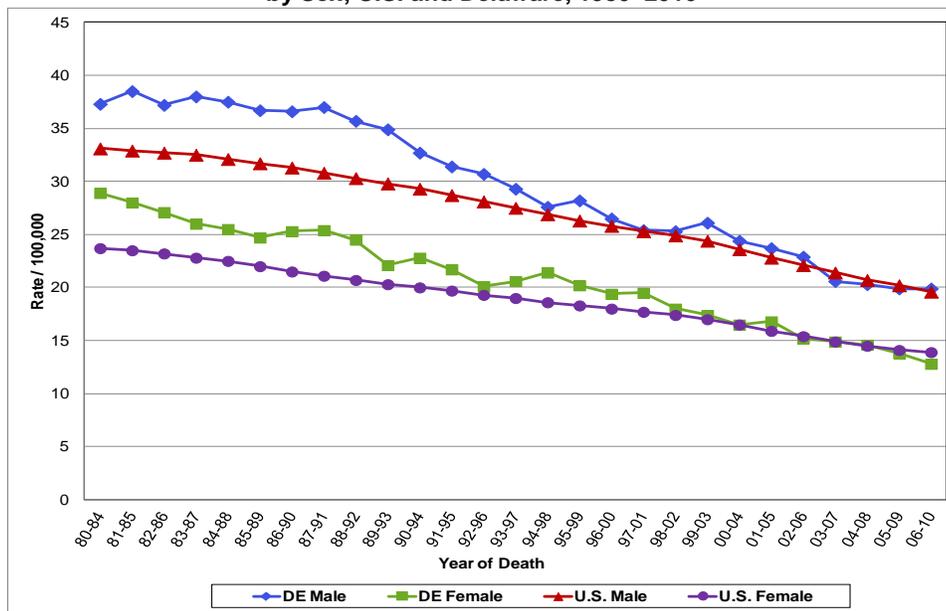
Rates based on fewer than 25 deaths are not shown.

SOURCES: Delaware: Delaware Health Statistics Center, 2013;
U.S.: National Center for Health Statistics, 2013.

Trends in Colorectal Cancer Mortality (Figures 5-7 and 5-8)

- From 1996–2000 to 2006–2010, Delaware’s colorectal cancer mortality rate decreased 28.3 percent while the national rate decreased 22.6 percent.
- Delaware’s colorectal cancer mortality rate dropped 24.9 percent for males and 34.0 percent for females, while the U.S. rate dropped 24.0 percent among males and far less (22.8 percent) among females.
- Among female Delawareans, the rate of decline in colorectal cancer mortality was nearly 50 percent greater than seen among U.S. females.

Figure 5-7. Five-Year Average Age-Adjusted Colorectal Cancer Mortality Rates* by Sex; U.S. and Delaware, 1980–2010

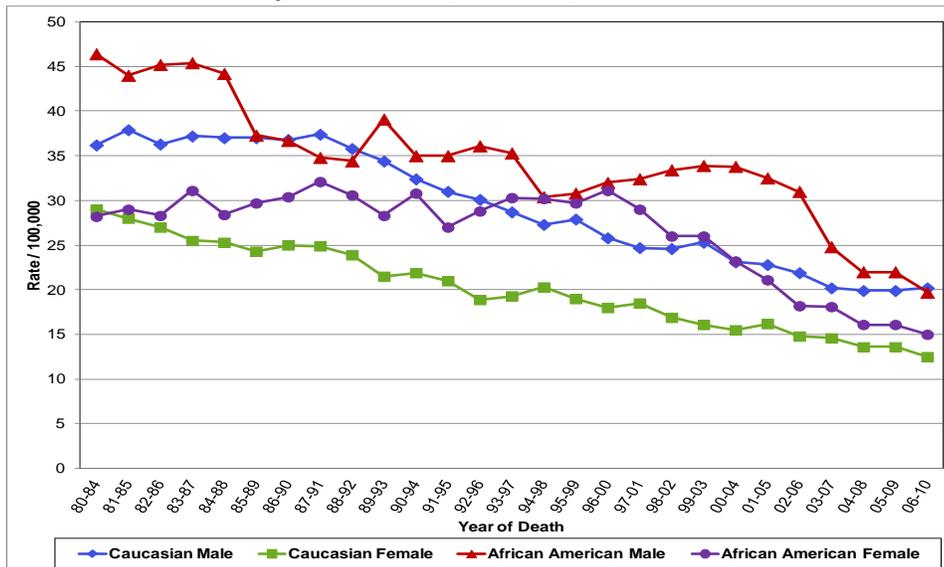


* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Health Statistics Center, 2013; U.S.: National Center for Health Statistics, 2013.

- For the first time since 1988–1992 in Delaware, the colorectal cancer mortality rate among African American males was lower than the rate among Caucasian males (19.7 per 100,000 vs. 20.2 per 100,000, respectively).
- Since 1996–2000, colorectal cancer mortality declined 38.4 percent among African American males compared with only 21.7 percent among Caucasian males.
- Delaware’s 2006–2010 colorectal cancer mortality rate among African American females was less than half their rate in 1996–2000. Since 1996–2000, colorectal cancer mortality declined 51.8 percent among African American females compared with a 30.6 percent decline among Caucasian females.

Figure 5-8. Five-Year Average Age-Adjusted Colorectal Cancer Mortality Rates* by Race and Sex; Delaware, 1980–2010



* = Rates are age-adjusted to the 2000 U.S. standard population.

SOURCE: Delaware Health Statistics Center, 2013.

Age-Specific Colorectal Cancer Mortality Rates (Table 5-8 and Figure 5-9)

- Colorectal cancer mortality increased with age, with males experiencing higher mortality within each age group than females.
- The number of colorectal cancer deaths was too small to examine age-specific mortality patterns by race.

Table 5-8. Age-Specific Colorectal Cancer Mortality Rates* by Race and Sex; Delaware, 2006–2010

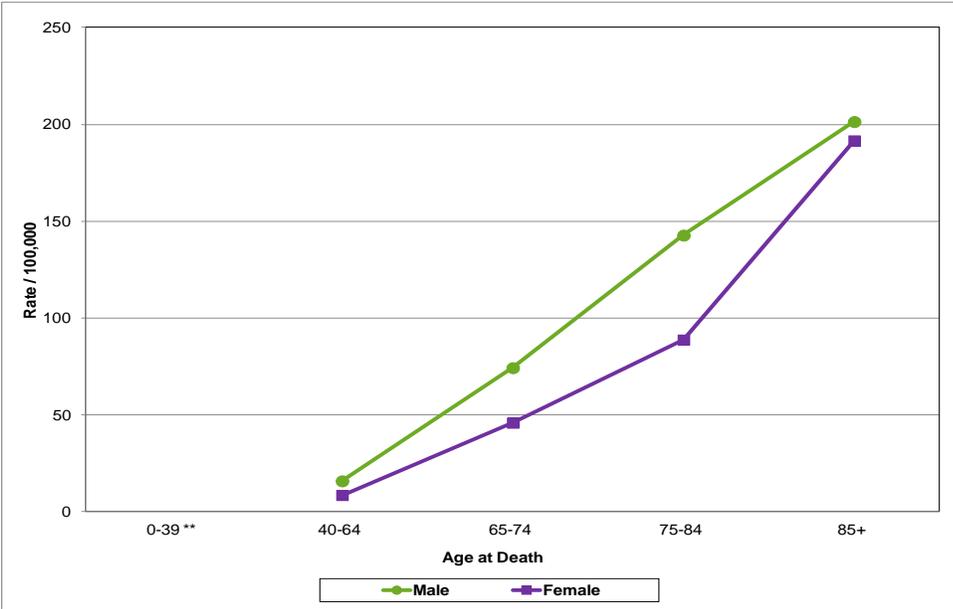
Age at Death	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
0-39	---	---	---	---	---	---	---	---	---
40-64	12.2	16.0	8.7	11.4	15.6	7.4	17.0	19.0	---
65-74	59.2	74.4	46.0	61.2	73.7	50.2	---	---	---
75-84	112.4	142.8	88.9	113.0	149.3	84.1	126.2	---	---
85+	194.7	201.4	191.7	202.3	205.2	201.0	---	---	---

* = Rates are per 100,000 population.

--- = Rates based on fewer than 25 deaths are not shown.

SOURCE: Delaware Health Statistics Center, 2013.

Figure 5-9. Age-Specific Colorectal Cancer Mortality Rates* by Sex; Delaware, 2006–2010



* = Rates are per 100,000 population.
 ** = Rates based on fewer than 25 deaths are not shown.
SOURCE: Delaware Health Statistics Center, 2013.

6. LIVER AND BILE DUCT CANCER¹⁷

Risk Factors and Early Detection

Lifestyle Risk Factors for Liver Cancer:

- alcohol abuse
- cirrhosis of the liver
- obesity
- type 2 diabetes
- long-term exposure to aflatoxins from peanuts, wheat, soybeans, ground nuts, corn and rice
- tobacco use, particularly among people who abuse alcohol or have viral hepatitis (suspected)

Environmental and Medically-Related Causes of Liver Cancer:

- occupational exposure to vinyl chloride
- long-term use of anabolic steroids
- exposure to arsenic through drinking water from wells

Risk Factors for Liver Cancer that Cannot be Changed:

- male gender
- race – Asian American and Pacific Islander
- long-term infection with hepatitis B and hepatitis C viruses
- certain metabolic disorders; e.g. hemochromatosis (excess accumulation of iron in the liver)

Factors Protective against Liver Cancer:

- vaccination for hepatitis B (no vaccination for hepatitis C)
- drug treatment for hepatitis C and possibly hepatitis B
- management of lifestyle risk factors such as diet (high in fruits, vegetables and whole grains), alcohol abuse, use of tobacco and physical activity
- proper storage of certain grains, particularly in warm climates

Early Detection of Liver Cancer:

- Screening tests can be done for people at increased risk of liver cancer; i.e. those with cirrhosis and those with chronic hepatitis B infection.

¹⁷ "Liver cancer" is used instead of "liver and bile duct" throughout this chapter.

Liver Cancer Incidence

During 2006–2010, Delaware’s liver cancer incidence rate was 12th highest in the U.S, up from 18th in 2005-2009. Males ranked ninth (same as in 2005-2009) and females ranked 35th (up from 48th in 2005-2009) in liver cancer incidence.¹⁸

Cases of Liver Cancer (Table 6-1)

- A total of 359 cases of liver cancer were diagnosed in Delaware during 2006–2010 that accounted for 1.4 percent of all cancer cases.
- In Delaware, more than three out of four liver cancer cases (277 cases or 77.2 percent) were male.

Table 6-1. Number of Liver Cancer Cases by Race and Sex; Delaware and Counties, 2006–2010

	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
DELAWARE	359	277	82	257	200	57	88	67	21
Kent	56	43	13	36	28	8	15	---	---
New Castle	204	163	41	138	110	28	59	47	12
Sussex	99	71	28	83	62	21	14	---	---

--- = Cell counts less than six are not shown to protect patient confidentiality.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Liver Cancer Incidence Rates (Table 6-2)

- Delaware’s 2006–2010 liver cancer incidence rate (7.1 per 100,000) was lower than the U.S. rate (7.7 per 100,000) but the difference was not statistically significant. A significantly lower rate was seen among females when compared with national data (2.9 per 100,000 Delaware vs. 4.0 per 100,000 U.S.).
- The liver cancer incidence rate among Delaware males, which in 2005-2009 was significantly lower than the U.S. rate (10.0 per 100,000 Delaware vs. 11.6 per 100,000 U.S.), is now almost identical to the U.S. rate (11.8 per 100,000 Delaware vs. 11.9 per 100,000 U.S.).
- In Delaware as well as nationally, males have a significantly higher liver cancer incidence rate than females.
- Among Caucasian Delawareans, liver cancer incidence was significantly higher among males (10.5 per 100,000) than among females (2.5 per 100,000). The number of African Americans cases was too small for comparison.
- For males and for both sexes combined in Delaware, the 2006–2010 liver cancer incidence rate for African Americans was significantly higher than for Caucasians. Insufficient data were available for female African Americans in Delaware.

¹⁸ U.S. Cancer Statistics Working Group. United States Cancer Statistics: 1999–2010 Incidence and Mortality Web-based Report. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2013. Available at: www.cdc.gov/uscs

Table 6-2. Five-Year Average Age-Adjusted Liver Cancer Incidence Rates* and 95% Confidence Intervals by Race and Sex; U.S., Delaware and Counties, 2006–2010

RACE AND REGION	All	Male	Female
ALL RACES			
United States	7.7 (7.6 , 7.8)	11.9 (11.8 , 12.1)	4.0 (3.9 , 4.1)
DELAWARE	7.1 (6.3 , 7.8)	11.8 (10.5 , 13.3)	2.9 (2.3 , 3.7)
Kent	6.8 (5.1 , 8.9)	11.4 (8.2 , 15.4)	---
New Castle	7.2 (6.2 , 8.2)	12.6 (10.7 , 14.7)	2.6 (1.9 , 3.6)
Sussex	6.9 (5.5 , 8.4)	10.6 (8.2 , 13.5)	3.4 (2.2 , 5.1)
CAUCASIAN			
United States	6.7 (6.6 , 6.8)	10.4 (10.3 , 10.6)	3.5 (3.4 , 3.6)
DELAWARE	6.3 (5.5 , 7.1)	10.5 (9.1 , 12.1)	2.5 (1.9 , 3.2)
Kent	5.8 (4.1 , 8.1)	9.9 (6.6 , 14.4)	---
New Castle	6.3 (5.3 , 7.5)	11.0 (9.0 , 13.3)	2.3 (1.5 , 3.4)
Sussex	6.4 (5.1 , 8.1)	10.3 (7.8 , 13.5)	---
AFRICAN AMERICAN			
United States	9.1 (8.8 , 9.4)	15.1 (14.6 , 15.7)	4.5 (4.2 , 4.7)
DELAWARE	10.9 (8.7 , 13.5)	18.6 (14.2 , 24.0)	---
Kent	---	---	---
New Castle	10.7 (8.1 , 14.0)	19.7 (14.1 , 26.7)	---
Sussex	---	---	---

* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

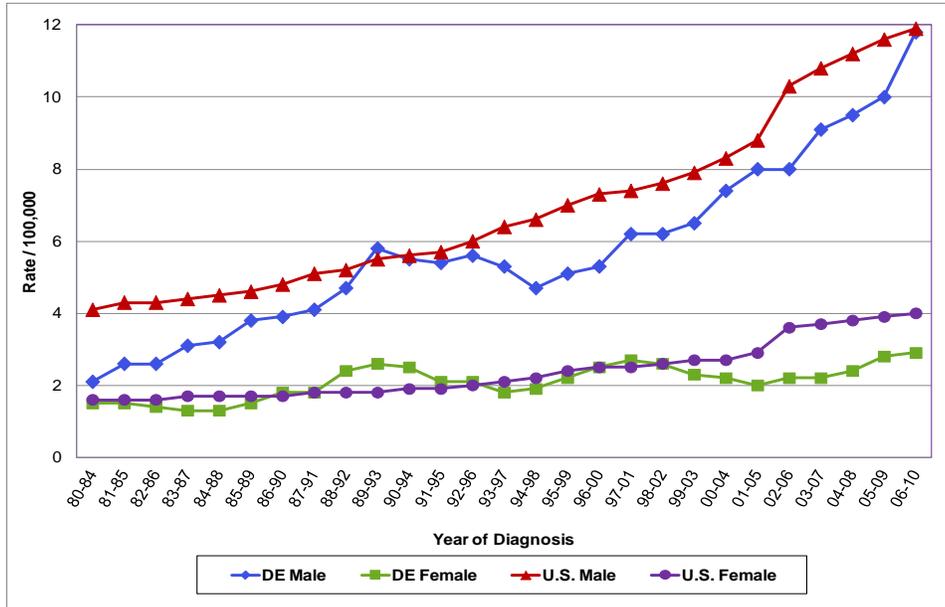
--- = Rates based on fewer than 25 cases are not shown.

SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013;
U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

Trends in Liver Cancer Incidence Rates (Figures 6-1 and 6-2)

- From 1996–2000 through 2006–2010, liver cancer incidence increased 86.8 percent in Delaware compared with 67.4 percent nationally.
- Delaware’s liver cancer incidence rate more than doubled (122.6 percent increase) among males and increased 16.0 percent among females from 1996–2000 through 2006–2010. During the same time period, the U.S. liver cancer incidence rate increased 63.0 percent among males and 60.0 percent among females.

Figure 6-1. Five-Year Average Age-Adjusted Liver Cancer Incidence Rates* by Sex; U.S. and Delaware, 1980–2010

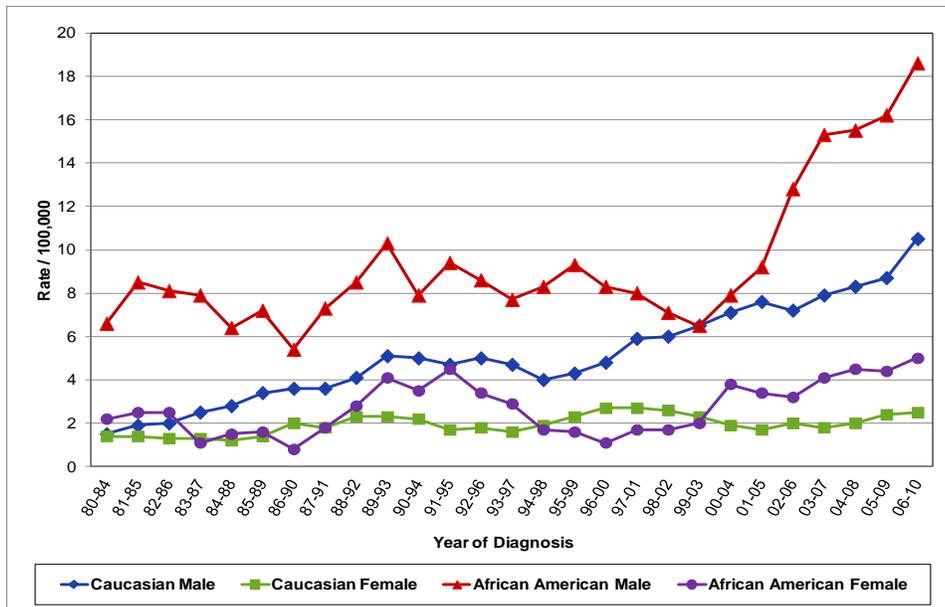


* = Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

- From 1996–2000 through 2006–2010, Delaware’s liver cancer incidence rate increased 75.0 percent among Caucasians (118.8 percent increase for males and 7.4 percent decline for females).
- Among African Americans, liver cancer incidence increased 147.7 percent (124.1 percent for males and 354.5 percent for females) from 1996–2000 through 2006–2010. The increase of more than three-fold among African American females is based on a rate change from 1.1 per 100,000 (based on three cases in 1996-2000) to 5.0 per 100,000 (based on 21 cases during 2006-2010).

Figure 6-2. Five-Year Average Age-Adjusted Liver Cancer Incidence Rates* by Race and Sex; Delaware, 1980–2010



* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Age-Specific Liver Cancer Incidence Rates (Table 6-3)

- The number of liver cancer cases was too small to examine age-specific liver cancer incidence rates by race or gender.

Table 6-3. Age-Specific Liver Cancer Incidence Rates* by Race and Sex; Delaware, 2006–2010

Age at Diagnosis	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
0-39	---	---	---	---	---	---	---	---	---
40-64	10.5	18.3	3.2	8.7	15.1	18.5	33.9	---	---
65-74	24.0	34.6	14.9	21.5	31.5	---	---	---	---
75-84	23.0	35.3	---	21.9	34.7	---	---	---	---
85+	---	---	---	---	---	---	---	---	---

* = Rates are per 100,000 population.

--- = Rates based on fewer than 25 cases are not shown.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Liver Cancer by Stage at Diagnosis (Tables 6-4 and 6-5, Figures 6-3 and 6-4)

- Caucasians were more likely than African Americans to have their liver cancer diagnosed in the local stage (43.2 percent vs. 35.2 percent, respectively).
- Males were more likely than females to have their cancer diagnosed in the local stage (43.7 percent vs. 36.6 percent, respectively).

Table 6-4. Number of Liver Cancer Cases by Stage at Diagnosis, Race and Sex; Delaware, 2006–2010

Stage at Diagnosis	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
Local	151	121	30	111	---	---	31	---	---
Regional	92	68	24	69	---	---	20	---	---
Distant	65	50	15	40	---	---	24	---	---
Unknown	51	38	13	37	---	---	13	---	---
Total	151	121	30	111	---	---	88	---	---

--- = Cell counts less than six are not shown to protect patient confidentiality.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Table 6-5. Percent of Liver Cancer Cases by Stage at Diagnosis, Race and Sex; Delaware, 2006–2010

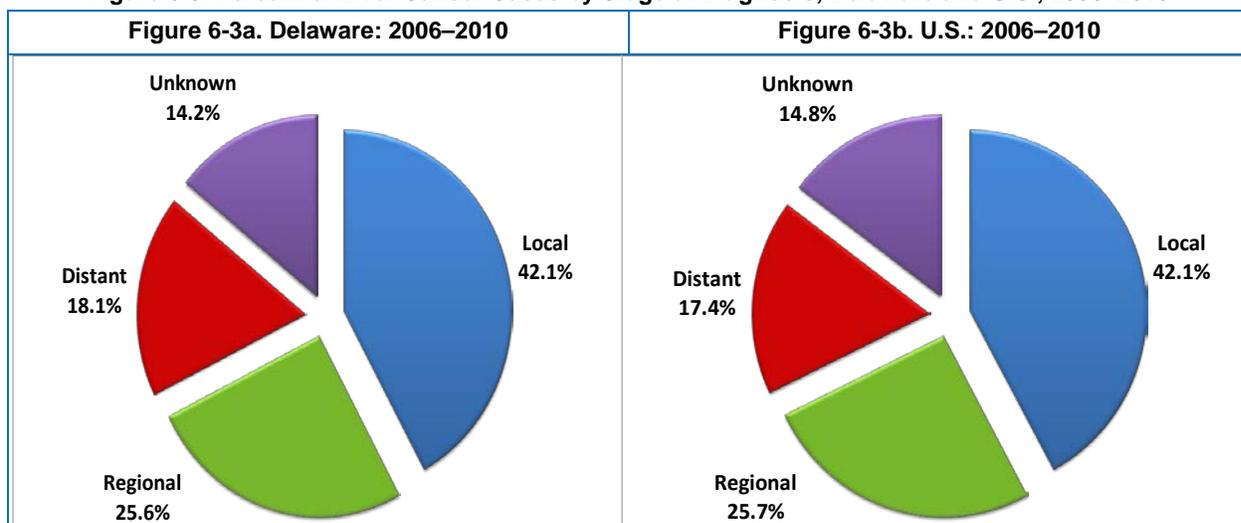
Stage at Diagnosis	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
Local	42.1	43.7	36.6	43.2	---	---	35.2	---	---
Regional	25.6	24.6	29.3	26.9	---	---	22.7	---	---
Distant	18.1	18.1	18.3	15.6	---	---	27.3	---	---
Unknown	14.2	13.7	15.9	14.4	---	---	14.8	---	---
Total	100.0	100.0	100.0	100.0	---	---	100.0	---	---

--- = Percentages based on cell counts less than six are not shown to protect patient confidentiality.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

- For 2006–2010 in Delaware, 42.1 percent, 25.6 percent and 18.1 percent of liver cancers were detected at the local, regional and distant stages, respectively. Comparable percentages for the U.S. were 42.1 percent, 25.7 percent and 17.4 percent, respectively.
- In Delaware, 157 liver cancer cases (43.7 percent) were diagnosed in the late stages (i.e., regional or distant) during 2006–2010 compared with 43.1 percent nationally.

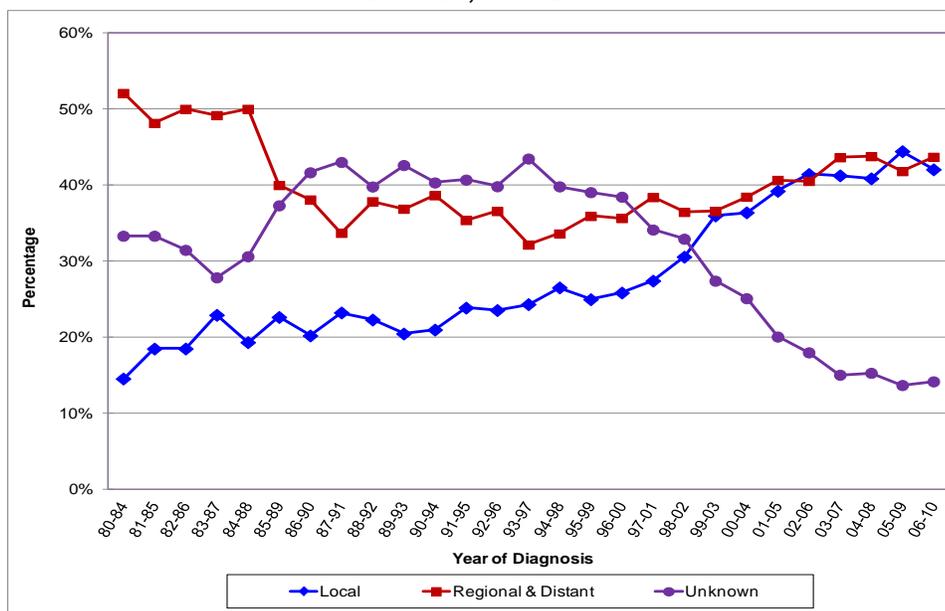
Figure 6-3. Percent of Liver Cancer Cases by Stage at Diagnosis; Delaware and U.S., 2006–2010



SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

- In Delaware, the percentage of liver cancer cases diagnosed in the local stage increased from 14.6 percent in 1980–1984 to 42.1 percent in 2006–2010. Accordingly, there was a decline in cases with unknown stage at diagnosis, from 33.3 percent in 1980–1984 to 14.2 percent in 2006–2010.

Figure 6-4. Percent of Liver Cancer Cases by Stage at Diagnosis; Delaware, 1980–2010



SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Liver Cancer Mortality

During 2006–2010, Delaware ranked 15th highest nationally in mortality from liver cancer, up from 16th in 2005-2009. Males ranked 9th (same as in 2005-2009) and females ranked 44th (up from 48th in 2005-2009).¹⁹

Deaths from Liver Cancer (Table 6-6)

- There were 283 deaths from liver cancer in Delaware that accounted for 3.1 percent of all cancer deaths during 2006–2010.
- Of Delawareans who died from liver cancer, 72.8 percent (206 deaths) were male and 27.2 percent (77 deaths) were female.
- More than three-quarters of the decedents were Caucasian (215 deaths or 76.0 percent), 56 deaths were African American (19.8 percent) and 12 deaths were other or unknown race.

Table 6-6. Number of Liver Cancer Deaths by Race and Sex; Delaware and Counties, 2006–2010

	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
DELAWARE	283	206	77	215	155	60	56	43	13
Kent	54	38	16	38	---	---	12	---	---
New Castle	154	118	36	111	84	27	37	29	8
Sussex	75	50	25	66	---	---	7	---	---

--- = Cell counts less than six are not shown to protect patient confidentiality.

SOURCE: Delaware Health Statistics Center, 2013.

- In 2006–2010, Delaware's liver cancer mortality rate did not differ from the U.S. rate (5.5 per 100,000 vs. 5.6 per 100,000, respectively).
- At both the state and national levels, liver cancer mortality was significantly higher among males than females.

¹⁹ Howlander N, Noone AM, Krapcho M, et al (eds). SEER Cancer Statistics Review, 1975–2010, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2010/, based on November 2012 SEER data submission, posted to the SEER web site, April 2013.

Liver Cancer Mortality Rates (Table 6-7)

Table 6-7. Five-Year Average Age-Adjusted Liver Cancer Mortality Rates* and 95% Confidence Intervals by Race and Sex; U.S., Delaware and Counties, 2006–2010

RACE AND REGION	All	Male	Female
ALL RACES			
United States	5.6 (5.6 , 5.6)	8.3 (8.2 , 8.3)	3.4 (3.3 , 3.4)
DELAWARE	5.5 (4.9 , 6.2)	8.9 (7.7 , 10.2)	2.7 (2.2 , 3.4)
Kent	6.7 (5.0 , 8.7)	10.1 (7.1 , 14.0)	---
New Castle	5.4 (4.6 , 6.4)	9.3 (7.6 , 11.1)	2.3 (1.6 , 3.2)
Sussex	5.1 (4.0 , 6.5)	7.3 (5.4 , 9.8)	3.0 (1.9 , 4.7)
CAUCASIAN			
United States	5.2 (5.1 , 5.2)	7.6 (7.5 , 7.6)	3.2 (3.1 , 3.2)
DELAWARE	5.1 (4.5 , 5.9)	8.1 (6.9 , 9.5)	2.6 (2.0 , 3.4)
Kent	6.1 (4.3 , 8.4)	9.0 (5.9 , 13.3)	---
New Castle	5.0 (4.1 , 6.1)	8.5 (6.7 , 10.5)	2.2 (1.5 , 3.3)
Sussex	4.9 (3.8 , 6.4)	7.2 (5.2 , 9.9)	---
AFRICAN AMERICAN			
United States	7.4 (7.3 , 7.5)	11.8 (11.5 , 12.0)	4.1 (3.9 , 4.2)
DELAWARE	6.9 (5.2 , 9.1)	11.4 (8.2 , 15.6)	---
Kent	---	---	---
New Castle	6.7 (4.7 , 9.4)	11.7 (7.6 , 17.2)	---
Sussex	---	---	---

* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

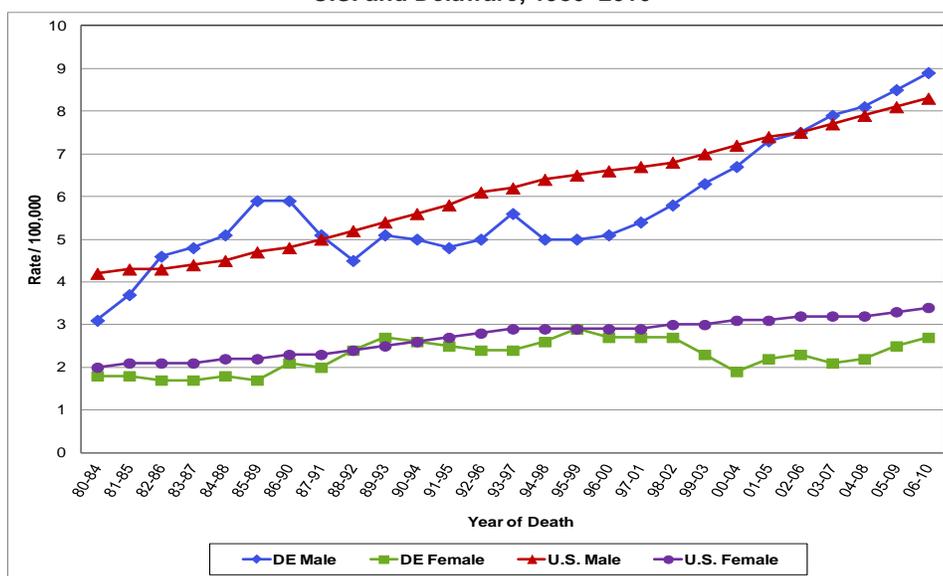
--- = Rates based on fewer than 25 deaths are not shown.

SOURCES: Delaware: Delaware Health Statistics Center, 2013; U.S.: National Center for Health Statistics, 2013.

Trends in Liver Cancer Mortality (Figures 6-5 and 6-6)

- Between 1996–2000 and 2006–2010, Delaware’s liver cancer mortality rate increased 44.7 percent while the U.S. rate increased 24.4 percent.
- While Delaware’s liver cancer mortality rate increased 74.5 percent among males, the rate among females remained the same.

Figure 6-5. Five-Year Average Age-Adjusted Liver Cancer Mortality Rates* by Sex; U.S. and Delaware, 1980–2010

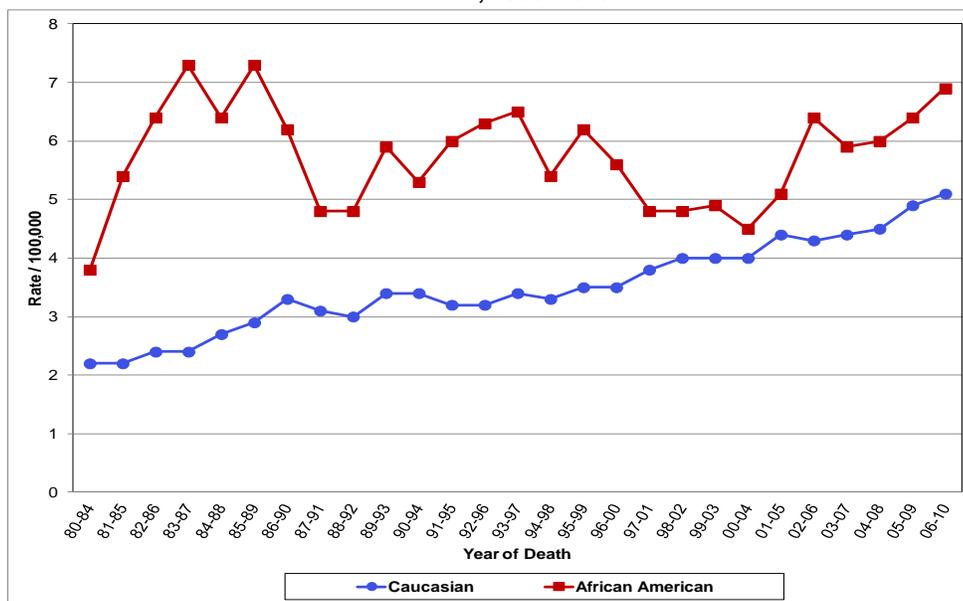


* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Health Statistics Center, 2013; U.S.: National Center for Health Statistics, 2013.

- Over the past four five-year time periods in Delaware, liver cancer mortality has been 31-35 percent higher among African Americans than among Caucasians.
- Among Delaware males, liver cancer mortality increased 75.4 percent among African Americans and increased 72.3 percent among Caucasians from 1996-2000 through 2006-2010.
- Among Delaware females, however, liver cancer mortality declined 25.6 percent among African Americans and remained the same among Caucasians during the same time period.

Figure 6-6. Five-Year Average Age-Adjusted Liver Cancer Mortality Rates* by Race; Delaware, 1980–2010



* = Rates are age-adjusted to the 2000 U.S. standard population.

SOURCE: Delaware Health Statistics Center, 2013.

Age-Specific Liver Cancer Mortality Rates (Table 6-8)

- The number of liver cancer deaths was too small to examine age-specific liver cancer mortality rates by race or gender.

Table 6-7. Age-Specific Liver Cancer Mortality Rates* by Race and Sex; Delaware, 2006–2010

Age at Death	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
0-39	---	---	---	---	---	---	---	---	---
40-64	7.2	12.6	---	6.0	10.6	---	12.4	22.8	---
65-74	21.8	31.2	---	20.4	28.1	---	---	---	---
75-84	30.7	49.0	---	32.1	53.0	---	---	---	---
85+	---	---	---	---	---	---	---	---	---

* = Rates are per 100,000 population. - = Rates based on fewer than 25 deaths are not shown.

SOURCE: Delaware Health Statistics Center, 2013.

Risk Factors and Early Detection

Lifestyle Risk Factors for Lung Cancer:

- tobacco use; an estimated 80 percent of lung cancers are caused by smoking cigarettes, cigars or pipes
- exposure to secondhand smoke
- diet low in fruits and vegetables
- diet high in cholesterol (suspected)
- heavy alcohol use (suspected)
- smoking marijuana (suspected)

Environmental and Medically-Related Causes of Lung Cancer:

- occupational exposure to:
 - asbestos
 - mustard gas
 - radioactive ores
 - certain metals such as chromium, cadmium and arsenic
 - certain organic chemicals
 - paint
- environmental exposure to:
 - radon gas released from soil or building materials
 - asbestos, particularly among smokers
 - exposure to air pollution
 - high levels of arsenic in drinking water (suspected)
- radiation therapy to the chest, especially for people who smoke

Risk Factors for Lung Cancer that Cannot be Changed:

- family history of lung cancer
- personal history of tuberculosis

Factors Protective against Lung Cancer:

- avoid use of tobacco
- avoid secondhand exposure to smoke from tobacco products
- have a diet rich in fruits and vegetables
- engage in recommended levels of physical activity
- maintain a healthy weight

²⁰ “Lung cancer” is used instead of “lung and bronchus cancer” throughout this chapter.

Early Detection of Lung Cancer:

In January 2013 the American Cancer Society published new Lung Cancer Screening Guidelines²¹ that recommend that doctors discuss lung cancer screening with patients who meet certain criteria that put them at high risk for developing the disease. These high-risk patients must be:

- aged 55 to 74 years and in fairly good health,
- have a smoking history equivalent to a pack a day for 30 years, and
- currently smoke or have quit within the past 15 years.

If an individual decides to be screened, the recommendation specifies that testing should be done with a low dose computed tomography (CT) scan and take place at a facility with experience in lung cancer screening. The guidelines emphasize that screening is not a substitute for quitting smoking.

Current Trends in Smoking in Delaware:

The Behavioral Risk Factor Survey (BRFS) collects data annually on tobacco use. Current smoking trends may be predictive of cancer rates in the 2030s. In the 1980s (i.e., the time period relevant to current lung cancer rates), Delaware's smoking prevalence rates were among the highest in the country. Historical BRFS data show that in 1982, 30 percent of adult Delawareans smoked cigarettes. By the 1990s, Delaware's smoking rate among adults had declined to approximately 25 percent.

Based on data from 2012, 19.7 percent of adult Delawareans smoke cigarettes. This current smoking prevalence estimate cannot, however, be compared with earlier estimates since the survey methodology has improved and the trend line has been broken.

- In 2012, the prevalence of cigarette smoking in Delaware (19.7 percent) was comparable to the U.S. prevalence rate (19.6 percent).
- The smoking prevalence among Delaware males (20.7 percent) was higher than among Delaware females (18.9 percent) but the difference was not statistically significant. A similar pattern was seen nationally.
- In Delaware in 2012, Caucasians were more likely to be smokers (20.9 percent) than either African Americans (19.7 percent) or Hispanics (15.0 percent).
- The highest prevalence of current smokers was among Delawareans ages 25-34 where 27.9 percent smoke. Their prevalence rate was significantly greater than the prevalence among individuals ages 55 and over.
- Delaware college graduates were significantly less likely to be current smokers (8.8 percent) than Delawareans who did not complete their high school education (32.8 percent), those with a high school diploma or equivalent (23.4 percent) and those with some post-high school education (19.5 percent).
- The highest prevalence of current smokers (30.7 percent) was among those earning \$15,000 – 24,999 and the lowest percentage was among those earning \$50,000 or more (14.9 percent). The latter percentage (14.9 percent) was significantly lower than all income levels with the exception of those earning \$25,000– 34,999 (21.4 percent).

²¹ Wender R, et al. American Cancer Society Lung Cancer Screening Guidelines. Published early online January 11, 2013 in *CA: A Cancer Journal for Clinicians*.

Lung Cancer Incidence

During 2006–2010, Delaware ranked 11th highest in the U.S. for incidence of lung cancer, down from 10th in 2005-2009. Females ranked fourth (down from third) and males ranked 15th (up from 16th).²²

Cases of Lung Cancer (Table 7-1)

- In Delaware, as well as nationally, lung cancer is the most frequently diagnosed cancer overall and second-most common cancer in males and females separately.
- The total 3,747 lung cancer cases diagnosed in Delaware during 2006–2010 accounted for 14.7 percent (14.2 percent of male and 15.3 percent of female) of all cancer cases diagnosed during 2006–2010 in Delaware.
- During 2006–2010, lung cancer diagnoses were more prevalent among males than among females (51.3 percent vs. 48.7 percent, respectively).
- Caucasians comprised 85.1 percent of cases (3,189), African Americans comprised 13.7 percent (512 cases) and 46 cases were other or unknown race.

Table 7-1. Number of Lung Cancer Cases by Race and Sex; Delaware and Counties, 2006–2010

	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
DELAWARE	3,747	1,924	1,823	3,189	1,632	1,557	512	270	242
Kent	685	370	315	577	304	273	99	63	36
New Castle	1,930	956	974	1,577	778	799	332	165	167
Sussex	1,132	598	534	1,035	550	485	81	42	39

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Lung Cancer Incidence Rates (Table 7-2)

- Delaware’s lung cancer incidence rate was significantly higher than the U.S. rate (74.6 per 100,000 Delaware vs. 61.4 per 100,000 U.S.). This significant excess was limited to Caucasians (76.2 per 100,000 Delaware vs. 63.1 per 100,000 U.S.).
- Delaware’s significantly high lung cancer incidence rate was seen in males (86.5 per 100,000 Delaware vs. 74.3 per 100,000 U.S.) and in females (65.7 per 100,000 Delaware vs. 51.9 per 100,000 U.S.).
- Among African Americans in Delaware, lung cancer incidence was lower than nationally in males (88.2 per 100,000 Delaware vs. 95.8 per 100,000 U.S.). In contrast, Delaware’s lung cancer incidence rate was higher than nationally in females (58.6 per 100,000 Delaware vs. 52.2 per 100,000 U.S.). Neither of these differences was statistically significant.
- In Delaware and nationally, the 2006–2010 lung cancer incidence rate for males was significantly higher than the rate for females among both Caucasians and African Americans.
- Among Caucasians in Delaware, lung cancer incidence was significantly higher among males than females within each county.
- Among African Americans in Kent County, lung cancer incidence was significantly higher among males than females.

²² U.S. Cancer Statistics Working Group. United States Cancer Statistics: 1999–2010 Incidence and Mortality Web-based Report. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2013. Available at: www.cdc.gov/uscs

- Nationally, African American males had a significantly higher incidence rate than Caucasian males. Among females, however, Caucasians had a significantly higher incidence rate than African Americans.
- In Delaware, male African Americans had a slightly higher incidence rate than Caucasian males. Among females, however, Caucasians had a higher incidence rate than African Americans. Neither difference was statistically significant.

Table 7-2. Five-Year Average Age-Adjusted Lung Cancer Incidence Rates* and 95% Confidence Intervals by Race and Sex; U.S., Delaware and Counties, 2006–2010

RACE AND REGION	All	Male	Female
ALL RACES			
United States	61.4 (61.2 , 61.7)	74.3 (73.9 , 74.7)	51.9 (51.6 , 52.2)
DELAWARE	74.6 (72.2 , 77.0)	86.5 (82.6 , 90.5)	65.7 (62.7 , 68.8)
Kent	85.6 (79.3 , 92.3)	106.7 (95.9 , 118.4)	70.1 (62.5 , 78.3)
New Castle	71.3 (68.1 , 74.6)	81.5 (76.3 , 87.0)	64.0 (60.0 , 68.2)
Sussex	74.8 (70.4 , 79.4)	85.4 (78.6 , 92.7)	66.5 (60.8 , 72.6)
CAUCASIAN			
United States	63.1 (62.8 , 63.3)	74.5 (74.1 , 75.0)	54.6 (54.2 , 54.9)
DELAWARE	76.2 (73.5 , 78.9)	87.3 (83.0 , 91.6)	67.9 (64.6 , 71.4)
Kent	92.8 (85.3 , 100.7)	112.1 (99.6 , 125.6)	78.5 (69.4 , 88.5)
New Castle	72.8 (69.2 , 76.5)	82.4 (76.7 , 88.5)	66.0 (61.4 , 70.8)
Sussex	74.3 (69.7 , 79.1)	84.5 (77.4 , 92.1)	66.3 (60.4 , 72.9)
AFRICAN AMERICAN			
United States	69.7 (68.8 , 70.5)	95.8 (94.2 , 97.4)	52.2 (51.2 , 53.2)
DELAWARE	70.9 (64.7 , 77.6)	88.2 (77.4 , 100.1)	58.6 (51.3 , 66.7)
Kent	67.7 (54.7 , 82.7)	99.3 (75.3 , 128.1)	44.0 (30.6 , 61.2)
New Castle	70.8 (63.1 , 79.2)	83.3 (70.0 , 98.2)	62.1 (52.8 , 72.5)
Sussex	78.1 (61.8 , 97.2)	98.2 (70.1 , 133.1)	63.9 (45.3 , 87.4)

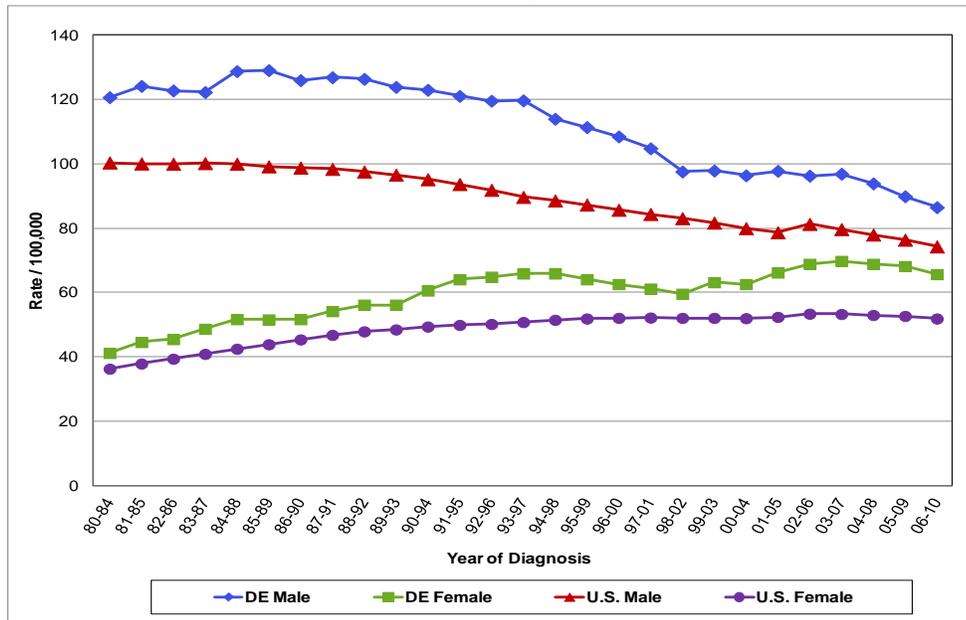
* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013;
U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

Trends in Lung Cancer Incidence (Figures 7-1 and 7-2)

- From 1996–2000 through 2006–2010, Delaware’s lung cancer incidence rate decreased 9.0 percent while the national incidence rate declined 7.1 percent.
- During this time period, Delaware’s lung cancer incidence rate decreased 20.3 percent among males but increased 5.0 percent among females. The U.S. declined 13.3 percent among males and 0.4 percent among females.

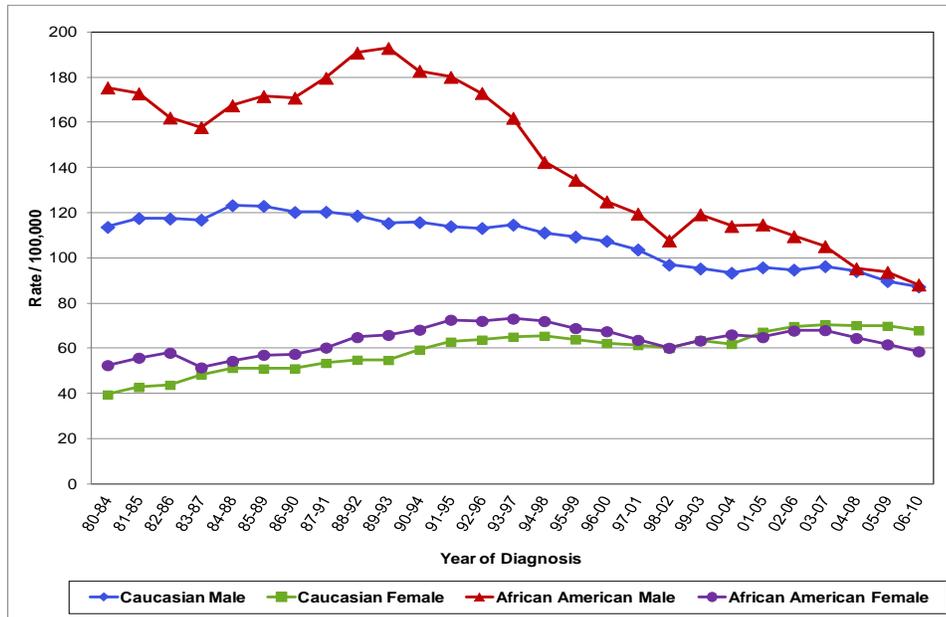
Figure 7-1. Five-Year Average Age-Adjusted Lung Cancer Incidence Rates* by Sex; U.S. and Delaware, 1980–2010



* = Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.
SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013;
 U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

- Among Caucasians in Delaware, lung cancer incidence decreased 18.8 percent among males and increased 9.0 percent among females.
- Among African Americans in Delaware, lung cancer incidence decreased 29.4 percent among males and 13.2 percent among females.

Figure 7-2. Five-Year Average Age-Adjusted Lung Cancer Incidence Rates* by Race and Sex; Delaware, 1980–2010



* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.
SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Age-Specific Lung Cancer Incidence Rates (Table 7-3 and Figure 7-3)

- During 2006–2010, age-specific lung cancer incidence increased from ages 40-64 through ages 75-84, but decreased among those ages 85 and older.
- For ages 40-64, lung cancer incidence was only slightly higher among males than among females. By ages 75-84, incidence among males was 50 percent higher than among females and 75 percent higher for ages 85 and older.
- Limited data on African Americans showed an increase in incidence from the ages 40-64 to ages 75-84 among both males and females.

Table 7-3. Age-Specific Lung Cancer Incidence Rates* by Race and Sex; Delaware, 2006–2010

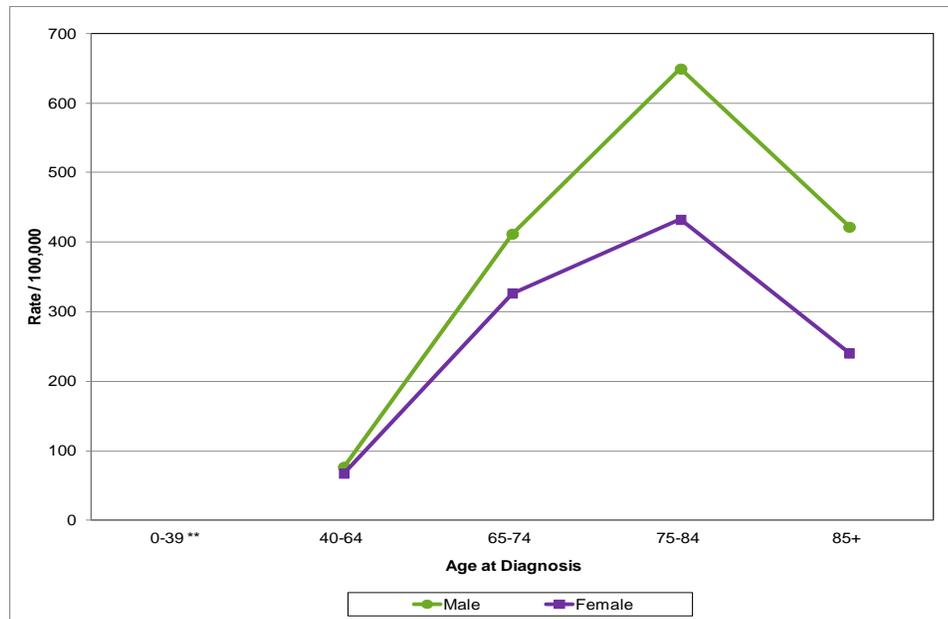
Age at Diagnosis	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
0-39	---	---	---	---	---	---	---	---	---
40-64	72.1	76.8	67.7	71.6	74.9	68.4	86.6	100.9	74.8
65-74	366.0	411.9	326.7	378.4	414.6	346.9	320.8	424.1	238.6
75-84	524.6	649.2	432.5	539.3	669.6	441.2	457.2	552.7	397.1
85+	297.4	421.8	240.4	313.6	436.0	256.7	---	---	---

* = Rates are per 100,000 population.

--- = Rates based on fewer than 25 cases are not shown.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Figure 7-3. Age-Specific Lung Cancer Incidence Rates* by Sex; Delaware, 2006–2010



* = Rates are per 100,000 population.

** = Rates based on fewer than 25 cases are not shown.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Lung Cancer by Stage at Diagnosis (Tables 7-4 and 7-5, Figures 7-4 and 7-5)

- In Delaware during 2006–2010, 2,787 lung cancer cases (74.4 percent) were diagnosed in the late stages (i.e., regional or distant stage).
- African Americans were less likely than Caucasians to be diagnosed with lung cancer in the local stage (15.2 percent vs. 19.5 percent, respectively). The disparity was primarily among African American females where 16.1 percent of cases were diagnosed in the local stage compared with 22.4 percent among Caucasian females.
- African Americans were more likely than Caucasians to be diagnosed at the regional and distant stages (79.1 percent vs. 73.8 percent Caucasian). The disparity was also primarily among African American females where 80.6 percent of cases were diagnosed in the late stages compared with 70.8 percent among Caucasian females.

Table 7-4. Number of Lung Cancer Cases by Stage at Diagnosis, Race and Sex; Delaware, 2006–2010

Stage at Diagnosis	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
Local	712	315	397	621	272	349	78	39	39
Regional	895	469	426	755	393	362	131	71	60
Distant	1,892	1,009	883	1,598	858	740	274	139	135
Unknown	248	131	117	215	109	106	29	21	8
Total	3,747	1,924	1,823	3,189	1,632	1,557	512	270	242

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

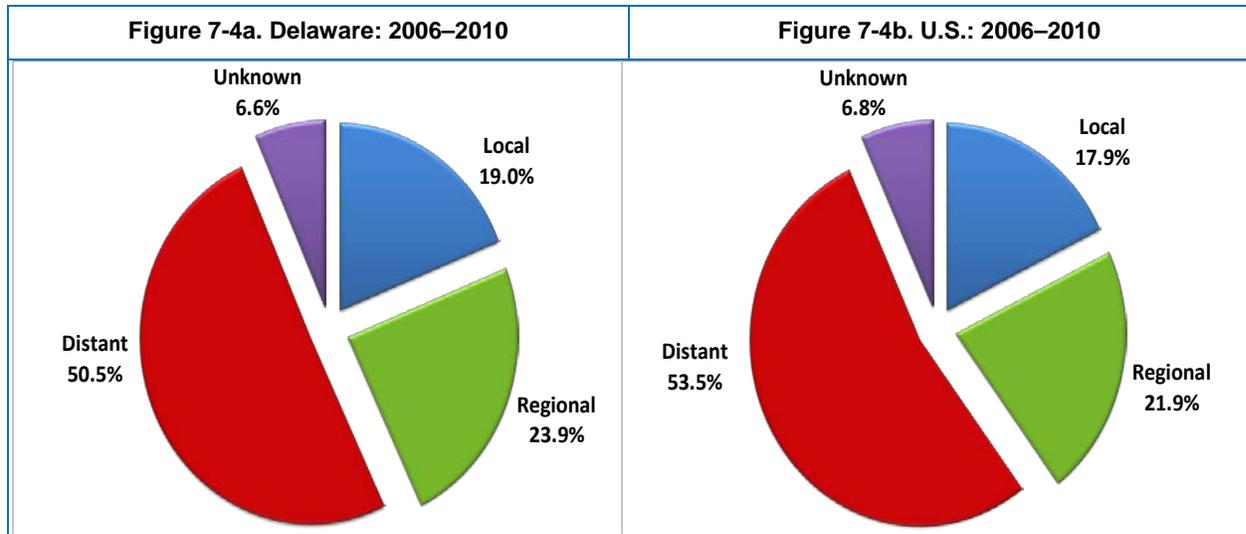
Table 7-5. Percent of Lung Cancer Cases by Stage at Diagnosis, Race and Sex; Delaware, 2006–2010

Stage at Diagnosis	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
Local	19.0	16.4	21.8	19.5	16.7	22.4	15.2	14.4	16.1
Regional	23.9	24.4	23.4	23.7	24.1	23.3	25.6	26.3	24.8
Distant	50.5	52.4	48.4	50.1	52.6	47.5	53.5	51.5	55.8
Unknown	6.6	6.8	6.4	6.7	6.7	6.8	5.7	7.8	3.3
Total	100.0	100.0	100.0						

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

- For 2006–2010, 19.0 percent, 23.9 percent and 50.5 percent of lung cancers diagnosed in Delaware were detected at the local, regional and distant stages, respectively. Nationally, proportionally more cases were diagnosed in the distant stage (53.5 percent vs. 50.5 percent in Delaware).

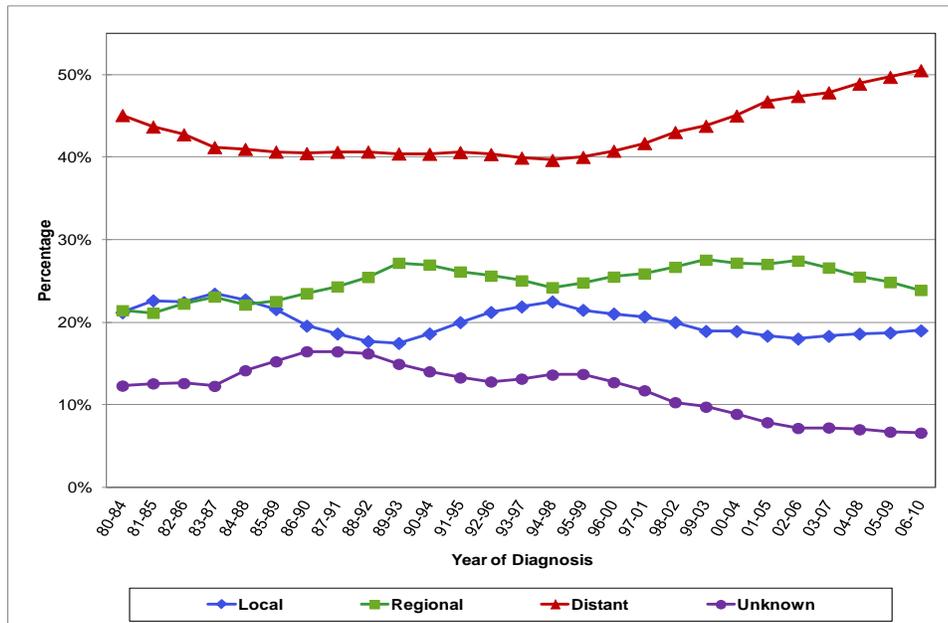
Figure 7-4. Percent of Lung Cancer Cases by Stage at Diagnosis; Delaware and U.S., 2006–2010



SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

- In Delaware, the percentage of lung cancer cases diagnosed in the local stage decreased from 21.2 percent in 1980–1984 to 19.0 percent in 2006–2010. Accordingly, there was a small increase in the percentage of cases diagnosed in the regional stage (from 21.4 percent in 1980–1984 to 23.9 percent in 2006–2010).
- There was also an increase in the proportion of distant stage cancers, from 45.1 percent in 1980–1984 to 50.5 percent in 2006–2010.

Figure 7-5. Percent of Lung Cancer Cases by Stage at Diagnosis; Delaware, 1980–2010



SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Lung Cancer Mortality

In 2006–2010, Delaware ranked 12th highest in the nation for mortality from lung cancer, up from 13th in 2005-2009. Delaware males ranked 17th (up from 19th in 2005-2009) and females ranked third (up from fourth in 2005-2009) in lung cancer mortality.²³

Deaths due to Lung Cancer (Table 7-6)

- In Delaware as well as nationally, lung cancer is the most common cause of deaths from cancer.
- During 2006-2010 in Delaware, there were 2,786 deaths from lung cancer that accounted for 30.3 percent of all cancer deaths; 30.6 percent of deaths were male and 30.0 percent were female.
- Of Delaware residents who died from lung cancer, 52.9 percent were male and 47.1 percent female.
- By race category, 85.2 percent were Caucasian (2,374 deaths), 13.5 percent African American (377 deaths) and 1.3 percent (35 deaths) were other or unknown race.

Table 7-6. Number of Lung Cancer Deaths by Race and Sex; Delaware and Counties, 2006–2010

	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
DELAWARE	2,786	1,473	1,313	2,374	1,251	1,123	377	206	171
Kent	502	277	225	424	231	193	70	46	24
New Castle	1,454	746	708	1,188	604	584	247	131	116
Sussex	830	450	380	762	416	346	60	29	31

SOURCE: Delaware Health Statistics Center, 2013.

Lung Cancer Mortality Rates (Table 7-7)

- Delaware's 2006–2010 lung cancer mortality rate was significantly higher than the U.S. rate, both overall (55.3 per 100,000 Delaware vs. 49.5 per 100,000 U.S.), among all Caucasians combined (56.3 per 100,000 Delaware vs. 50.2 per 100,000 U.S.) and among females combined (46.8 per 100,000 Delaware vs. 39.2 per 100,000 U.S.).
- At both the state and national levels, lung cancer mortality was significantly higher among males than females. This significant male / female excess was seen both among Caucasians and African Americans. Also, the mortality rate among males was significantly higher than among females in each county.

²³ Howlader N, Noone AM, Krapcho M, et al (eds). SEER Cancer Statistics Review, 1975–2010, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2010/, based on November 2012 SEER data submission, posted to the SEER web site, April 2013.

Table 7-7. Five-Year Average Age-Adjusted Lung Cancer Mortality Rates* and 95% Confidence Intervals by Race and Sex; U.S., Delaware and Counties, 2006–2010

RACE AND REGION	All	Male	Female
ALL RACES			
United States	49.5 (49.4 , 49.6)	63.5 (63.3 , 63.7)	39.2 (39.0 , 39.3)
DELAWARE	55.3 (53.3 , 57.4)	66.8 (63.4 , 70.3)	46.8 (44.3 , 49.4)
Kent	63.3 (57.8 , 69.1)	81.5 (72.0 , 91.9)	50.2 (43.8 , 57.2)
New Castle	53.8 (51.0 , 56.7)	64.5 (59.8 , 69.3)	46.2 (42.8 , 49.8)
Sussex	54.0 (50.3 , 57.8)	64.0 (58.1 , 70.3)	45.8 (41.2 , 50.8)
CAUCASIAN			
United States	50.2 (50.1 , 50.3)	63.2 (63.0 , 63.5)	40.4 (40.3 , 40.6)
DELAWARE	56.3 (54.0 , 58.6)	67.1 (63.4 , 71.0)	48.1 (45.3 , 51.1)
Kent	68.5 (62.1 , 75.3)	86.1 (75.2 , 98.1)	55.6 (48.0 , 64.2)
New Castle	54.5 (51.4 , 57.8)	64.4 (59.3 , 69.8)	47.6 (43.8 , 51.7)
Sussex	53.6 (49.8 , 57.7)	63.5 (57.5 , 70.1)	45.4 (40.6 , 50.7)
AFRICAN AMERICAN			
United States	53.5 (53.1 , 53.9)	78.5 (77.7 , 79.2)	37.2 (36.8 , 37.6)
DELAWARE	53.9 (48.5 , 59.8)	70.4 (60.6 , 81.3)	42.1 (35.9 , 49.0)
Kent	50.5 (39.1 , 64.0)	77.9 (56.1 , 104.9)	---
New Castle	54.8 (47.9 , 62.4)	69.5 (57.2 , 83.5)	44.0 (36.1 , 52.9)
Sussex	58.3 (44.3 , 75.1)	67.0 (44.4 , 96.5)	52.1 (35.3 , 74.0)

* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

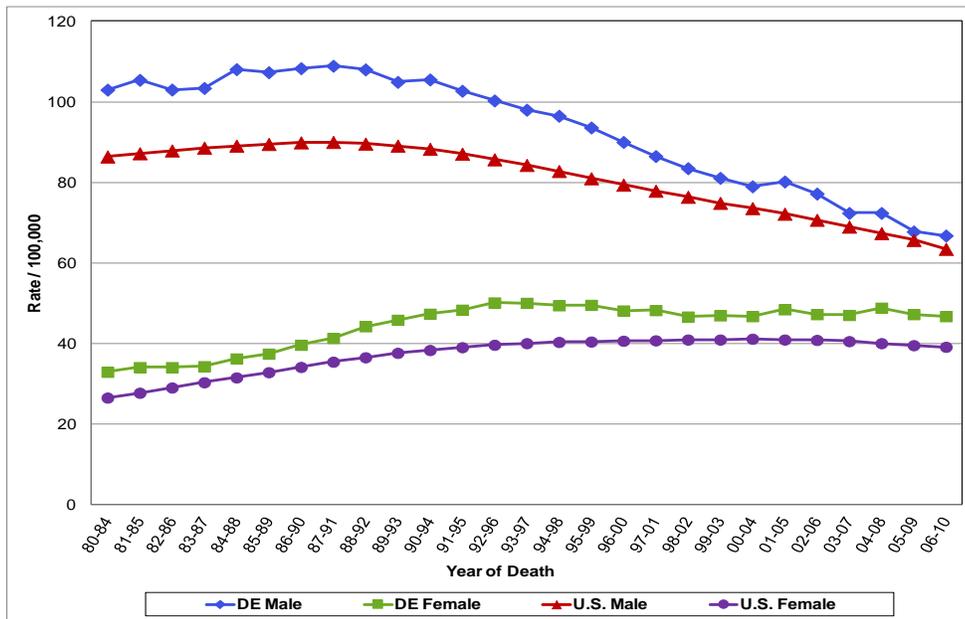
--- = Rates based on fewer than 25 deaths are not shown.

SOURCES: Delaware: Delaware Health Statistics Center, 2013;
U.S.: National Center for Health Statistics, 2013.

Trends in Lung Cancer Mortality (Figures 7-6 and 7-7)

- Although Delaware's lung cancer mortality rates have been higher than U.S. rates, the gap has narrowed among males. The 2006–2010 mortality rate among Delaware males was 5.2 percent higher than the U.S. male rate, compared with 19.2 percent higher in 1980–1984. The gap has narrowed to a lesser extent among Delaware females (24.1 percent excess in 1980–1984 vs. a 19.4 percent excess in 2006–2010).
- Between 1996–2000 and 2006–2010, Delaware's lung cancer mortality rate dropped 15.3 percent while the U.S. rate dropped 12.7 percent.
- Delaware's lung cancer death rate dropped 25.8 percent for males and 2.9 percent for females, while the U.S. rate dropped 20.0 percent for males and 3.7 percent for females.

Figure 7-6. Five-Year Average Age-Adjusted Lung Cancer Mortality Rates* by Sex; U.S. and Delaware, 1980–2010



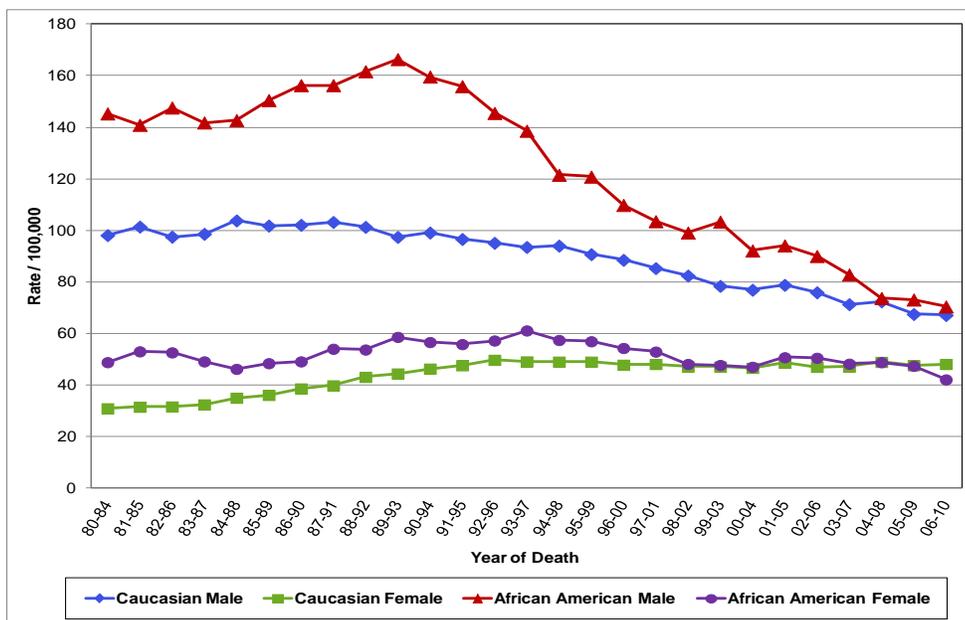
* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Health Statistics Center, 2013;

U.S.: National Center for Health Statistics, 2013.

- Delaware’s lung cancer mortality rate decreased 24.2 percent among male Caucasians and increased 0.6 percent among female Caucasians. Among African Americans, lung cancer mortality declined by 35.9 percent among males and 22.5 percent among females.

Figure 7-7. Five-Year Average Age-Adjusted Lung Cancer Mortality Rates* by Race and Sex; Delaware, 1980–2010



* = Rates are age-adjusted to the 2000 U.S. standard population.

SOURCE: Delaware Health Statistics Center, 2013.

Age-Specific Lung Cancer Mortality Rates (Table 7-8 and Figure 7-8)

- Lung cancer mortality increased from ages 40-64 through ages 75-84 and then declined among those ages 85 and over.
- During ages 40-64, incidence among males was comparable to that of females, but the rates diverged through to ages 85+ where the rate was 73 percent higher among males than among females.
- Based on data limited to the three intermediate age groups, lung cancer mortality rates increase with age among both African American males and females.

Table 7-8. Age-Specific Lung Cancer Mortality Rates* by Race and Sex; Delaware, 2006–2010

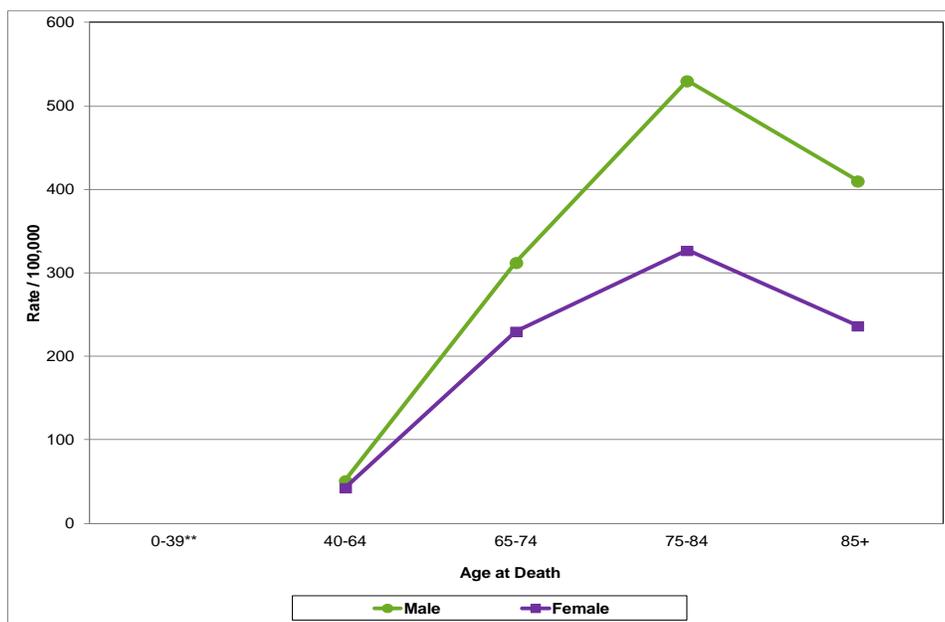
Age at Diagnosis	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
0-39	---	---	---	---	---	---	---	---	---
40-64	47.1	51.5	43.1	47.3	51.4	43.4	53.6	62.0	46.8
65-74	268.6	312.8	230.4	272.2	307.4	241.3	275.9	387.4	186.1
75-84	413.7	530.4	327.3	425.4	542.4	336.8	352.5	473.7	278.4
85+	291.5	410.4	237.0	297.3	418.9	240.7	---	---	---

* = Rates are per 100,000 population.

--- = Rates based on fewer than 25 deaths are not shown.

SOURCE: Delaware Health Statistics Center, 2013.

Figure 7-8. Age-Specific Lung Cancer Mortality Rates* by Sex; Delaware, 2006–2010



* = Rates are per 100,000 population.

** = Rates based on fewer than 25 deaths are not shown.

SOURCE: Delaware Health Statistics Center, 2013.

8. MELANOMA OF THE SKIN

Risk Factors and Early Detection

Lifestyle Risk Factors for Melanoma of the Skin:

- excessive ultraviolet (UV) light from the sun, tanning lamps or tanning beds
- history of frequent sunburns, especially before age 20

Environmental and Medically-Related Causes of Melanoma of the Skin:

- weakened immune system; e.g. organ transplant patients

Risk Factors for Melanoma of the Skin that Cannot be Changed:

- having many moles, especially abnormal moles
- light-colored skin, freckles, light hair and/or blue/green eyes
- Caucasian race – 10 times more likely to have melanoma of the skin than African Americans
- family history of melanoma
- personal history of melanoma
- increasing age
- gender – women have higher risk before age 40 and men have higher risk after age 40
- xeroderma pigmentosum – a rare, inherited condition

Factors Protective against Melanoma of the Skin:

- removal of abnormal moles
- limiting exposure to the sun
- avoiding tanning beds and sun lamps
- protecting children from exposure to the sun

Early Detection of Melanoma of the Skin:

- self-examination of skin monthly
- for high-risk individuals, thorough examination of skin by a healthcare professional

Incidence of Melanoma of the Skin

Delawareans ranked fourth highest in the U.S. for incidence of melanoma of the skin during 2006–2010, up from fifth in 2005-2009. Delaware males ranked second (up from fourth in 2005-2009) and females ranked sixth (up from 10th in 2005-2009).²⁴

Cases of Melanoma of the Skin (Table 8-1)

- A total of 1,281 cases of melanoma of the skin were diagnosed in Delaware during 2006–2010 which accounted for 5.0 percent of all cancer cases during this time period.
- Newly-diagnosed cases were more common among males (59.3 percent) than among females (40.7 percent). Almost all cases were Caucasian (1,246 cases or 97.3 percent), 13 cases were African American (0.7 percent) and 22 cases (1.7 percent) were other or unknown race.

**Table 8-1. Number of Melanoma of the Skin Cases by Sex;
Delaware and Counties, 2006–2010**

	All Races*		
	All	Male	Female
DELAWARE	1,281	760	521
Kent	172	99	73
New Castle	706	410	296
Sussex	403	251	152

* = Case counts are not shown by race to protect patient confidentiality.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Melanoma of the Skin Incidence Rates (Table 8-2)

- Delaware's 2006–2010 melanoma of the skin incidence rate (26.3 per 100,000) was significantly higher than the U.S. rate (26.3 per 100,000 vs. 21.1 per 100,000, respectively) and this significant excess was seen among both males (33.9 vs. 27.4 per 100,000) and females (20.4 vs. 16.7 per 100,000).
- Although incidence rates were not available for African Americans in Delaware, incidence rates among Caucasians were higher than rates for all races combined among both males and females. The same pattern was also seen nationally.
- Among Caucasians, incidence rates for males were significantly higher than for females for Delaware and in both New Castle and Sussex Counties.

²⁴ U.S. Cancer Statistics Working Group. United States Cancer Statistics: 1999–2010 Incidence and Mortality Web-based Report. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2013. Available at: www.cdc.gov/uscs

Table 8-2. Five-Year Average Age-Adjusted Melanoma of the Skin Incidence Rates* and 95% Confidence Intervals by Sex; U.S., Delaware and Counties, 2006–2010

RACE AND REGION	All	Male	Female
ALL RACES			
United States	21.1 (21.0 , 21.3)	27.4 (27.1 , 27.6)	16.7 (16.5 , 16.8)
DELAWARE	26.3 (24.8 , 27.7)	33.9 (31.5 , 36.5)	20.4 (18.7 , 22.3)
Kent	21.5 (18.4 , 25.0)	27.8 (22.5 , 34.0)	16.8 (13.1 , 21.1)
New Castle	25.7 (23.8 , 27.7)	33.4 (30.2 , 36.9)	20.0 (17.8 , 22.5)
Sussex	30.4 (27.3 , 33.7)	38.0 (33.3 , 43.2)	24.3 (20.3 , 28.9)
CAUCASIAN			
United States	25.0 (24.8 , 25.1)	31.9 (31.6 , 32.2)	20.0 (19.8 , 20.2)
DELAWARE	32.1 (30.3 , 34.0)	40.4 (37.5 , 43.5)	25.8 (23.5 , 28.3)
Kent	28.2 (24.1 , 32.9)	35.6 (28.8 , 43.6)	22.8 (17.7 , 28.8)
New Castle	32.5 (30.0 , 35.0)	41.3 (37.3 , 45.6)	26.0 (23.0 , 29.3)
Sussex	33.6 (30.1 , 37.5)	41.0 (35.7 , 46.9)	27.6 (22.8 , 33.1)
AFRICAN AMERICAN**			
United States	1.0 (0.9 , 1.1)	1.1 (0.9 , 1.2)	1.0 (0.8 , 1.1)

* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

** = Rates are not shown for African Americans in Delaware due to the small numbers of cases.

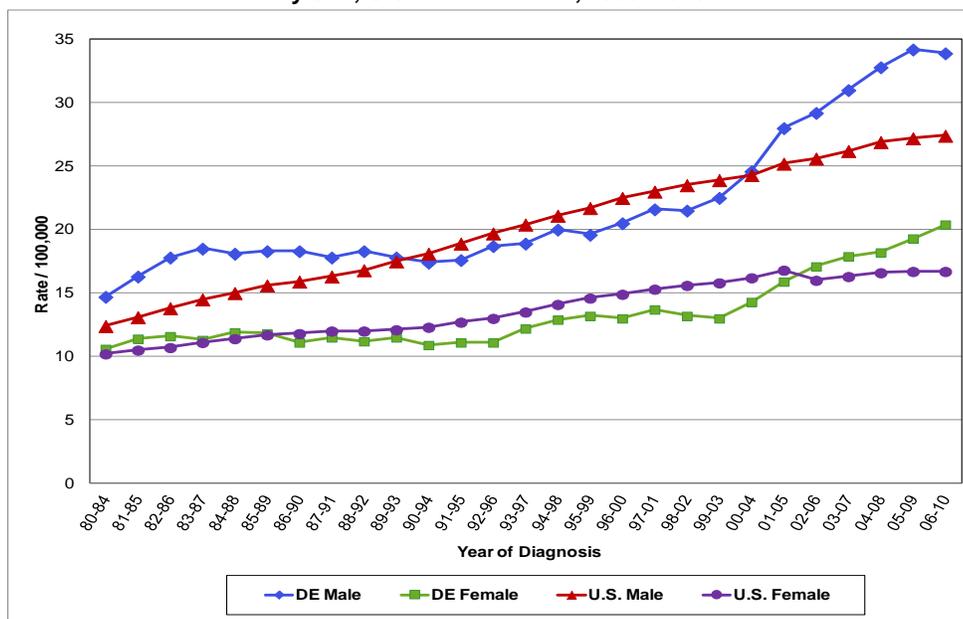
SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013;

U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

Trends in Incidence of Melanoma of the Skin (Figure 8-1)

- From 1996–2000 through 2006–2010, Delaware’s incidence rate for melanoma of the skin increased at a rate that was 3.7 times greater than the rate seen nationally (64.4 percent for Delaware vs. 17.2 percent for U.S.).
- The rate of increase in incidence for melanoma of the skin was greater for males than females both in Delaware (65.4 percent for males vs. 56.9 percent for females) and the U.S. (21.8 percent for males vs. 12.1 percent for females).

Figure 8-1. Five-Year Average Age-Adjusted Melanoma of the Skin Incidence Rates* by Sex; U.S. and Delaware, 1980–2010



* = Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013;

U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

Age-Specific Melanoma Incidence Rates (Table 8-3 and Figure 8-2)

- The 2006–2010 melanoma of the skin incidence rate increased from 5.9 per 100,000 for ages 0-39 to 127.5 per 100,000 for ages 75-84 and then declined to 64.5 per 100,000 in ages 85 and over.
- The melanoma incidence rate peaked at ages 75-84 but the incidence rate among males in this age group was 3.4 times higher than among females (214.8 male vs. 63.2 per 100,000 female).

Table 8-3. Age-Specific Melanoma of the Skin Incidence Rates* by Sex; All Races and Caucasians, Delaware, 2006–2010

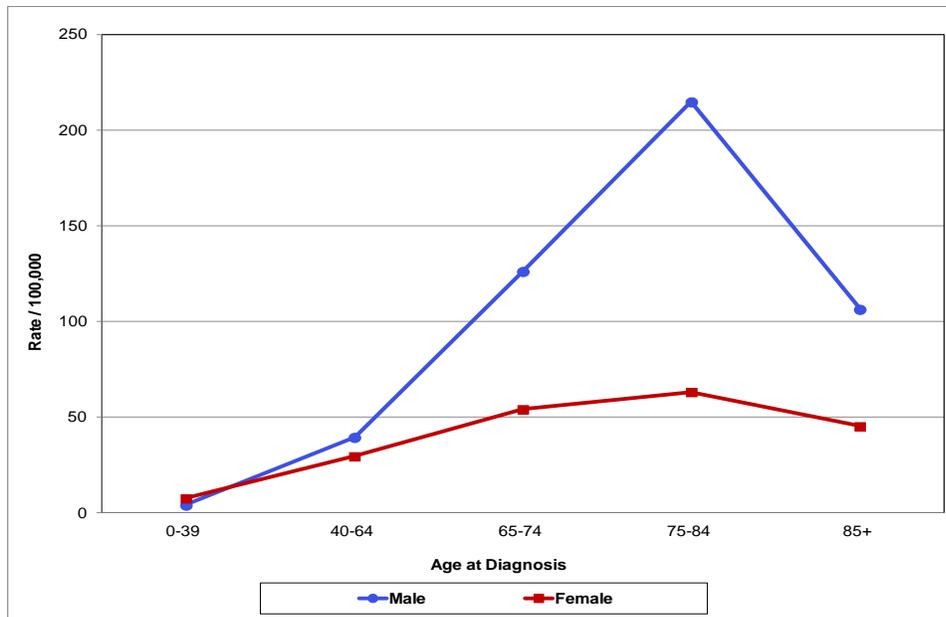
Age at Diagnosis	All Races			Caucasian		
	All	Male	Female	All	Male	Female
0-39	5.9	4.1	7.6	8.4	5.8	10.8
40-64	34.3	39.5	29.6	43.0	48.9	37.5
65-74	87.4	126.2	54.2	102.0	145.8	63.9
75-84	127.5	214.8	63.2	145.2	240.7	73.3
85+	64.5	106.4	45.3	69.2	119.7	45.8

* = Rates are per 100,000 population.

--- = Rates are not shown for African Americans due to the small numbers of cases.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Figure 8-2. Age-Specific Melanoma of the Skin Incidence Rates* by Sex; Delaware, 2006–2010



* = Rates are per 100,000 population.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Melanoma of the Skin by Stage at Diagnosis (Table 8-4, Figures 8-3 and 8-4)

- The majority of melanoma of the skin cases were diagnosed in the local stage; 81.6 percent among males and 82.9 percent among females.

Table 8-4. Number and Percent of Melanoma of the Skin Cases by Stage at Diagnosis and Sex; Delaware, 2006–2010*

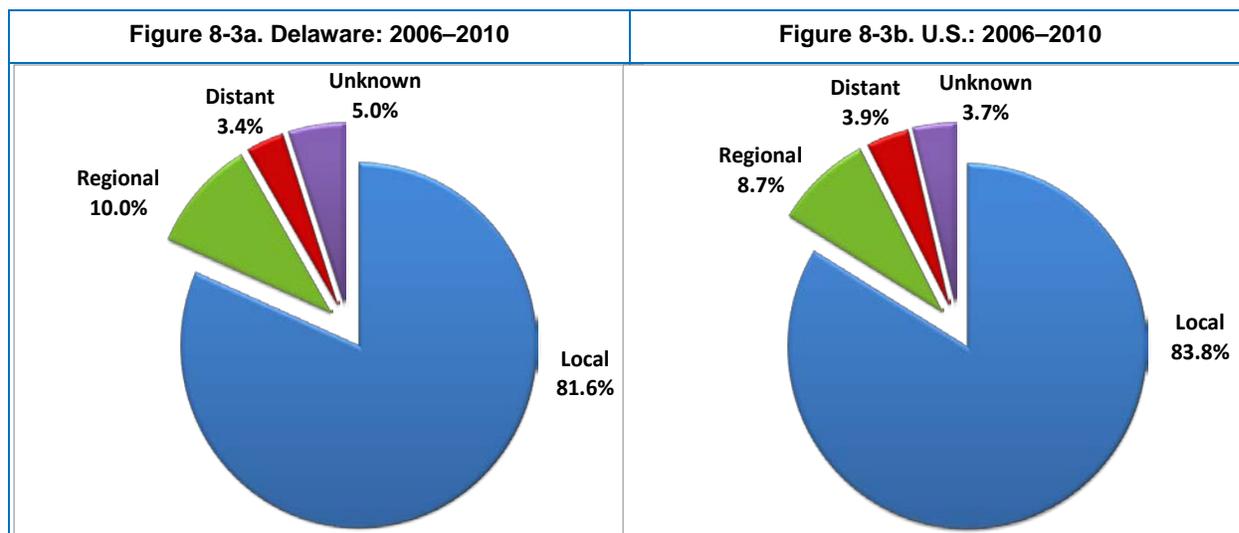
Stage at Diagnosis	Number			Percent		
	All	Male	Female	All	Male	Female
Local	1,045	614	431	81.6	80.8	82.7
Regional	128	82	46	10.0	10.8	8.8
Distant	44	25	19	3.4	3.3	3.7
Unknown	64	39	25	5.0	5.1	4.8
Total	1,281	760	521	100.0	100.0	100.0

* = Cell counts are not shown by race due to patient confidentiality.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

- For 2006–2010, 81.6 percent, 10.0 percent and 3.4 percent of melanoma of the skin cases were detected at the local, regional and distant stages, respectively. Comparable percentages nationally were 83.8 percent, 8.7 percent and 3.9 percent, respectively.

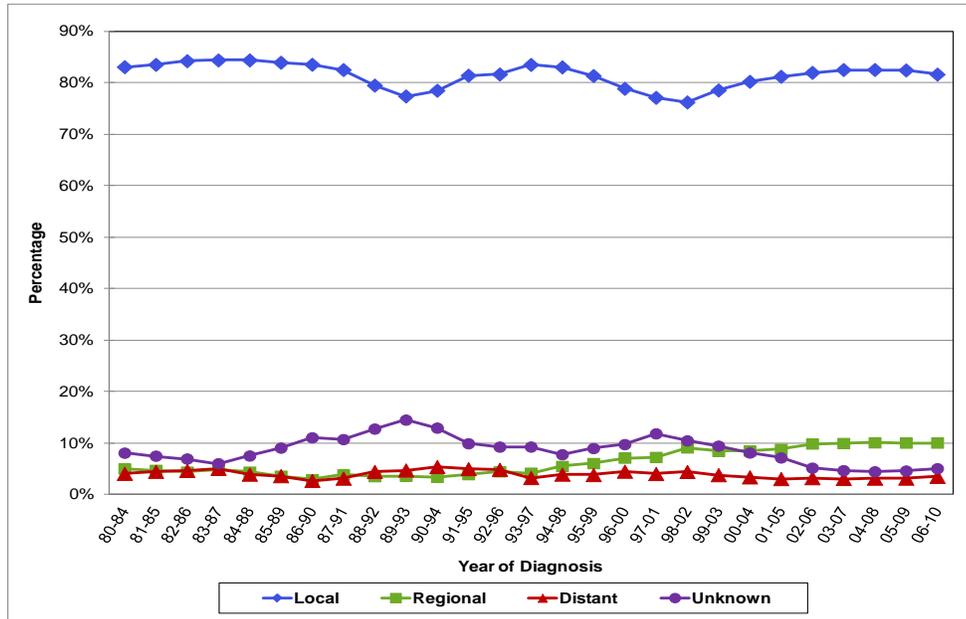
Figure 8-3. Percent of Melanoma of the Skin Cases by Stage at Diagnosis; Delaware and U.S., 2006–2010



SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

- In Delaware, the percentage of melanoma of the skin cases diagnosed in the local stage remained relatively stable from 1980–1984 through 2006–2010, with an average of 81.4 percent.
- The proportion of cases of melanoma of the skin diagnosed in the regional stage, however, more than doubled from 1980–1984 (4.9 percent) to 2006–2010 (10.0 percent). Over the same time period, the percentage of melanoma cases with an unknown stage at diagnosis declined 37.7 percent.
- The proportion of cases diagnosed in the distant stage decreased from 4.0 percent in 1980–1984 to 3.4 percent in 2006–2010.

Figure 8-4. Percent of Melanoma of the Skin Cases by Stage at Diagnosis; Delaware, 1980–2010



SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Melanoma of the Skin Mortality

During 2006–2010, Delaware ranked 28th highest in the nation for mortality from melanoma of the skin, down from 24th in 2005–2009. Delaware males ranked 20th (down from ninth in 2005–2009) and females ranked 39th (down from 37th in 2005–2009).²⁵

Deaths due to Melanoma of the Skin (Table 8-5)

- In Delaware during 2006–2010, there were 135 deaths from melanoma of the skin that accounted for 1.5 percent of all cancer deaths. All but two of the deaths were Caucasian.
- Sixty-eight percent of deaths due to melanoma of the skin were male and 31.9 percent female.

Table 8-5. Number of Melanoma of the Skin Deaths by Sex; Delaware and Counties, 2006–2010

	All Races		
	All	Male	Female
DELAWARE	135	92	43
Kent	13	---	---
New Castle	84	57	27
Sussex	38	---	---

--- = Cell counts less than six and counts by race are not shown to protect patient confidentiality.

SOURCE: Delaware Health Statistics Center, 2013.

²⁵ Howlander N, Noone AM, Krapcho M, et al (eds). SEER Cancer Statistics Review, 1975–2010, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2010/, based on November 2012 SEER data submission, posted to the SEER web site, April 2013.

Melanoma of the Skin Mortality Rates (Table 8-6)

- Delaware's 2006–2010 melanoma of the skin mortality rate was the same as the U.S. rate (2.7 per 100,000).
- During 2006–2010, at both the state and national levels, the mortality rate for melanoma of the skin was significantly higher among males than among females.

Table 8-6. Five-Year Average Age-Adjusted Melanoma of the Skin Mortality Rates* and 95% Confidence Intervals by Sex; U.S., Delaware and Counties, 2006–2010

REGION	All	Male	Female
United States	2.7 (2.7, 2.8)	4.1 (4.0, 4.1)	1.7 (1.7, 1.7)
DELAWARE	2.7 (2.3, 3.2)	4.2 (3.4, 5.2)	1.6 (1.1, 2.1)
Kent	---	---	---
New Castle	3.0 (2.4, 3.7)	4.8 (3.6, 6.3)	1.8 (1.1, 2.6)
Sussex	2.5 (1.7, 3.4)	3.9 (2.5, 5.7)	---

* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

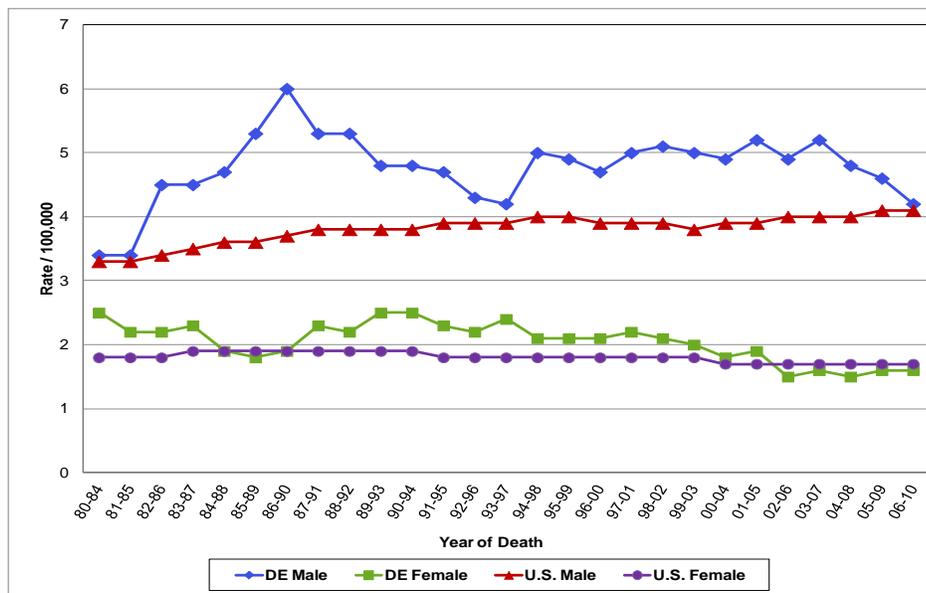
--- = Rates based on fewer than 25 deaths are not shown.

SOURCES: Delaware: Delaware Health Statistics Center, 2013; U.S.: National Center for Health Statistics, 2013.

- Before 2006–2010, Delaware's melanoma of the skin mortality rate among Caucasian males was an average of 29.7 percent higher than the national rate among Caucasian males. In 2006–2010, however, Delaware's Caucasian male mortality rate was only 8.7 percent higher than the comparable U.S. rate.
- From 1996–2000 through 2006–2010, Delaware's melanoma of the skin mortality rate dropped 15.6 percent while the U.S. mortality rate remained the same.
- Delaware's mortality rate dropped 10.6 percent for males and 23.8 percent for females from 1996–2000 through 2006–2010. The national rate increased 5.1 percent among males and decreased 5.6 percent among females.

Trends in Melanoma of the Skin Mortality (Figure 8-5)

Figure 8-5. Five-Year Average Age-Adjusted Melanoma of the Skin Mortality Rates* by Sex; U.S. and Delaware, 1980–2010



* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Health Statistics Center, 2013; U.S.: National Center for Health Statistics, 2013.

Age-Specific Melanoma Mortality Rates - The number of deaths from melanoma of the skin was too small to examine patterns for age-specific mortality rates.

9. PANCREATIC CANCER

Risk Factors and Early Detection

Lifestyle Risk Factors for Pancreatic Cancer:

- cigarette smoking – risk is two to three times higher among smokers
- obesity
- lack of physical activity
- type 2 diabetes
- diet high in fat and meat and/or low in fruits and vegetables (suspected)
- heavy alcohol use (suspected)
- cirrhosis of the liver (suspected)

Environmental and Medically-Related Causes of Pancreatic Cancer:

- heavy occupational exposure to petroleum and certain chemicals, pesticides and dyes
- stomach problems; e.g., *Helicobacter pylori* infection, excess stomach acid (suspected)

Pancreatic Cancer Risk Factors that Cannot be Changed:

- increasing age – almost all patients are older than 45
- male gender
- race – African American
- family history
- chronic pancreatitis, particularly in smokers
- certain hereditary conditions, such as hereditary pancreatitis, hereditary breast and ovarian cancer syndrome, multiple endocrine neoplasia type 1 syndrome, etc. (suspected)

Factors Protective against Pancreatic Cancer:

- Currently, there is no sure way to prevent pancreatic cancer.
- Risk of pancreatic cancer can be lowered by managing lifestyle risk factors such as diet (high in fruits, vegetables and whole grains), tobacco use and physical activity.
- weight management

Early Detection of Pancreatic Cancer:

- There is currently no recommended test for screening for pancreatic cancer in the general population.
- People with a strong family history of pancreatic cancer may want to consider genetic screening.

Pancreatic Cancer Incidence

Delawareans ranked 11th highest overall for incidence of pancreatic cancer during 2006–2010, down from a ranking of eighth in 2005-2009. Delaware males ranked fifth (down from third in 2005-2009) and females ranked 19th (up from 21st in 2005-2009).²⁶

Cases of Cancer of the Pancreas (Table 9-1)

- A total of 630 cases of pancreatic cancer were diagnosed in Delaware during 2006–2010 that accounted for 2.5 percent of all cancer cases diagnosed during 2006–2010.
- Males were slightly more prevalent among pancreatic cancer cases (332 cases or 52.7 percent) than were females (298 cases or 47.3 percent).
- By race, 81.1 percent (511 cases) were Caucasian, 17.5 percent (110 cases) were African American and 1.4 percent (nine cases) were other or unknown race.

Table 9-1. Number of Pancreatic Cancer Cases by Race and Sex; Delaware and Counties, 2006–2010

	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
DELAWARE	630	332	298	511	276	235	110	53	57
Kent	118	57	61	87	41	46	28	16	12
New Castle	328	174	154	265	147	118	61	27	34
Sussex	184	101	83	159	88	71	21	10	11

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Pancreatic Cancer Incidence Rates (Table 9-2)

- Delaware’s 2006–2010 pancreatic cancer incidence rate (12.5 per 100,000) did not differ statistically from the U.S. rate (12.2 per 100,000).
- For 2006–2010 in the U.S., Delaware and New Castle County, the pancreatic cancer incidence rate for males was significantly higher than the rate for females.
- Among Caucasians in Delaware, the incidence rate for males was significantly higher than for females for the entire state (14.8 per 100,000 male vs. 10.1 per 100,000 female) and for New Castle County.
- Among African Americans, the pancreatic cancer incidence rate for males was higher than for females for the entire state (17.5 per 100,000 male vs. 14.4 per 100,000 female) but the difference was not statistically significant.
- For the U.S. and in Delaware, the 2006–2010 pancreatic cancer incidence rate for African Americans was higher than for Caucasians. The difference was statistically significant for the U.S. only.

²⁶ U.S. Cancer Statistics Working Group. United States Cancer Statistics: 1999–2010 Incidence and Mortality Web-based Report. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2013. Available at: www.cdc.gov/uscs

Table 9-2. Five-Year Average Age-Adjusted Pancreatic Cancer Incidence Rates* and 95% Confidence Intervals by Race and Sex; U.S., Delaware and Counties, 2006–2010

RACE AND REGION	All	Male	Female
ALL RACES			
United States	12.2 (12.1, 12.4)	13.9 (13.7, 14.0)	10.9 (10.8, 11.0)
DELAWARE	12.5 (11.5, 13.5)	14.9 (13.3, 16.6)	10.6 (9.4, 11.9)
Kent	14.8 (12.2, 17.7)	16.4 (12.4, 21.4)	13.6 (10.3, 17.5)
New Castle	12.0 (10.8, 13.4)	14.9 (12.7, 17.3)	10.0 (8.5, 11.8)
Sussex	12.1 (10.4, 14.1)	14.2 (11.6, 17.4)	10.2 (8.0, 12.8)
CAUCASIAN			
United States	12.1 (12.0, 12.2)	13.8 (13.6, 14.0)	10.7 (10.5, 10.8)
DELAWARE	12.1 (11.1, 13.3)	14.8 (13.1, 16.7)	10.1 (8.8, 11.5)
Kent	14.1 (11.2, 17.4)	15.2 (10.8, 20.8)	13.3 (9.7, 17.9)
New Castle	12.1 (10.7, 13.7)	15.6 (13.2, 18.4)	9.5 (7.8, 11.4)
Sussex	11.3 (9.5, 13.3)	13.4 (10.7, 16.7)	9.3 (7.3, 12.0)
AFRICAN AMERICAN			
United States	15.8 (15.4, 16.2)	17.6 (16.9, 18.3)	14.3 (13.8, 14.8)
DELAWARE	15.9 (13.0, 19.2)	17.5 (12.9, 23.2)	14.4 (10.8, 18.6)
Kent	19.9 (13.1, 28.9)	---	---
New Castle	13.7 (10.3, 17.6)	13.7 (8.7, 20.4)	13.6 (9.3, 19.0)
Sussex	---	---	---

* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

--- = Rates based on fewer than 25 cases are not shown.

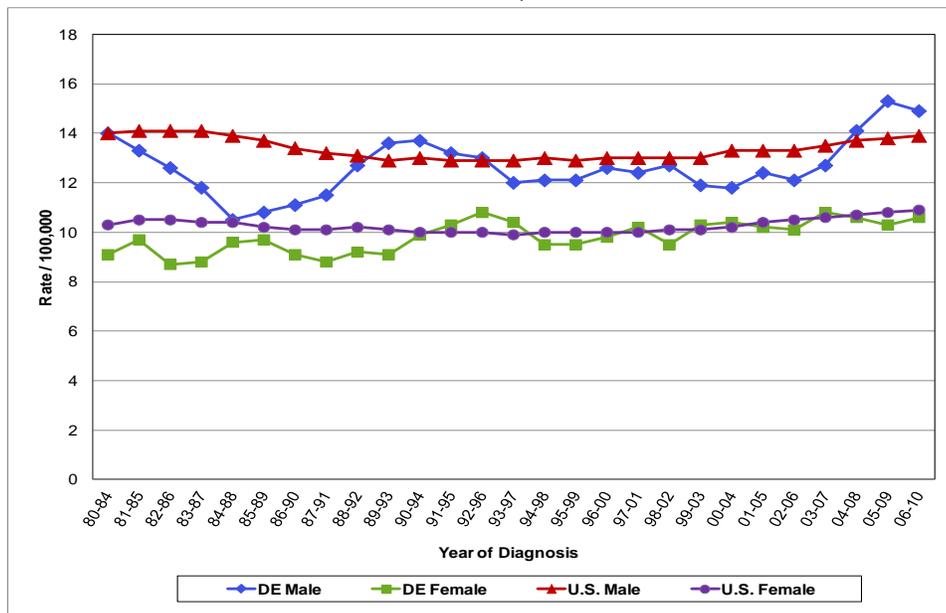
SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013;

U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

Trends in Pancreatic Cancer Incidence (Figures 9-1 and 9-2)

- From 1996–2000 through 2006–2010, Delaware’s pancreatic cancer incidence rate increased 12.6 percent (18.3 percent among males and 8.2 percent among females).
- Nationally, the pancreatic cancer incidence rate increased 7.0 percent (6.9 percent among males and 9.0 percent among females).

Figure 9-1. Five-Year Average Age-Adjusted Pancreatic Cancer Incidence Rates* by Sex; U.S. and Delaware, 1980–2010



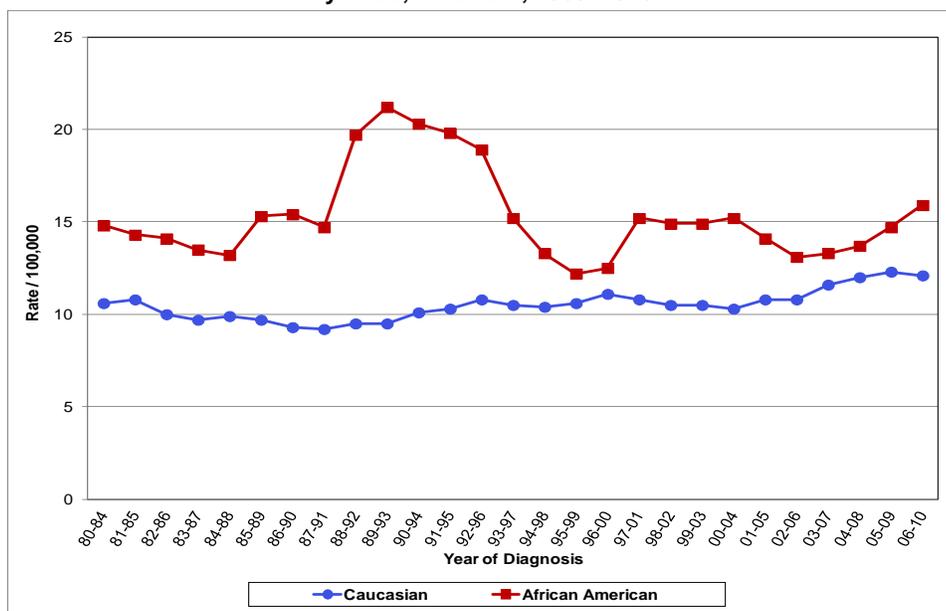
* = Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013;

U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

- From 1980–1984 through 2006–2010 in Delaware, the pancreatic cancer incidence rate for African Americans was, on average, nearly 50 percent (47.7 percent) higher than the incidence rate for Caucasians. As of 2006–2010, however, the gap between the two groups had narrowed to 31.4 percent.
- From 1996–2000 through 2006–2010, Delaware’s pancreatic cancer incidence rates increased 17.5 and 5.2 percent for male and female Caucasians, respectively. Among African Americans, incidence increased 31.6 percent for males and 24.1 percent for females.

Figure 9-2. Five-Year Average Age-Adjusted Pancreatic Cancer Incidence Rates* by Race; Delaware, 1980–2010



* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.
SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Age-Specific Pancreatic Cancer Incidence Rates (Table 9-3 and Figure 9-3)

- Pancreatic cancer incidence peaked at ages 75-84 and declined slightly in ages 85 and older. Age-specific incidence increased at a greater rate among males than females. From ages 65-74 and older, incidence among males was on average 49 percent higher among males than females.
- The number of pancreatic cancer cases among African Americans was too small to examine age-specific incidence rates by race.

Table 9-3. Age-Specific Pancreatic Cancer Incidence Rates* by Race and Sex; Delaware, 2006–2010

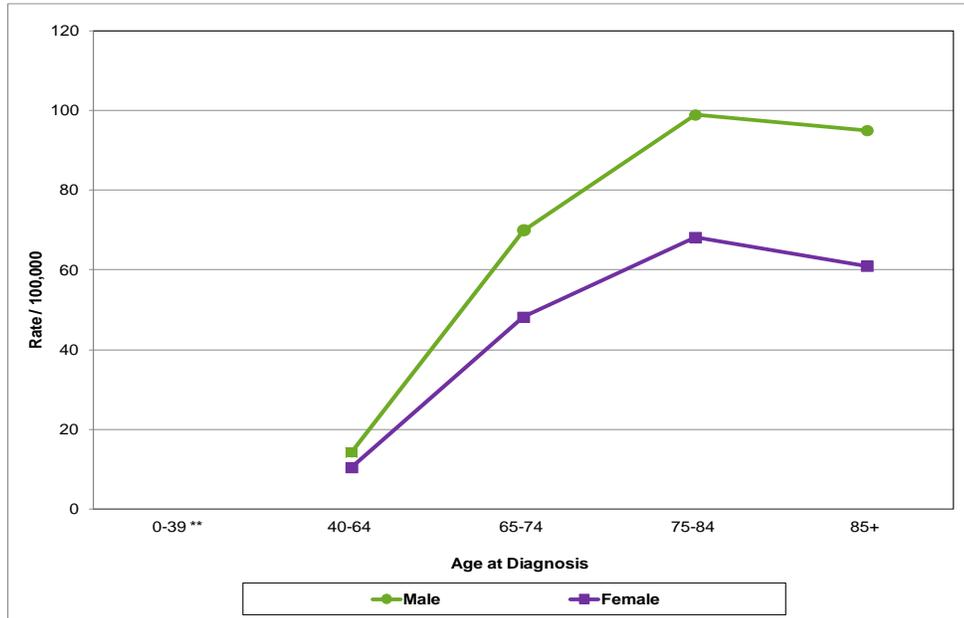
Age at Diagnosis	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
0-39	---	---	---	---	---	---	---	---	---
40-64	12.3	14.2	10.5	12.0	14.0	10.0	15.0	17.6	12.8
65-74	58.3	69.9	48.2	55.3	67.2	44.7	85.7	103.4	71.4
75-84	81.2	98.9	68.2	80.2	99.3	65.7	---	---	---
85+	71.7	95.0	61.0	72.0	---	57.7	---	---	---

* = Rates are per 100,000 population.

--- = Rates based on fewer than 25 cases are not shown.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Figure 9-3. Age-Specific Pancreatic Cancer Incidence Rates by Sex; Delaware, 2006–2010



** = Rates based on fewer than 25 cases are not shown.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Pancreatic Cancer by Stage at Diagnosis (Tables 9-4 and 9-5, Figures 9-4 and 9-5)

- Among African Americans, females were more likely than males to be diagnosed with pancreatic cancer in the distant stage (63.2 percent females vs. 43.4 percent males).

Table 9-4. Number of Pancreatic Cancer Cases by Stage at Diagnosis, Race and Sex; Delaware, 2006–2010

Stage at Diagnosis	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
Local	46	23	23	38	---	---	8	---	---
Regional	180	99	81	145	79	66	30	19	11
Distant	332	176	156	270	151	119	59	23	36
Unknown	72	34	38	58	---	---	13	---	---
Total	630	332	298	511	276	235	110	53	57

--- = Cell counts less than six are not shown to protect patient confidentiality.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Table 9-5. Percent of Pancreatic Cancer Cases by Stage at Diagnosis, Race and Sex; Delaware, 2006–2010

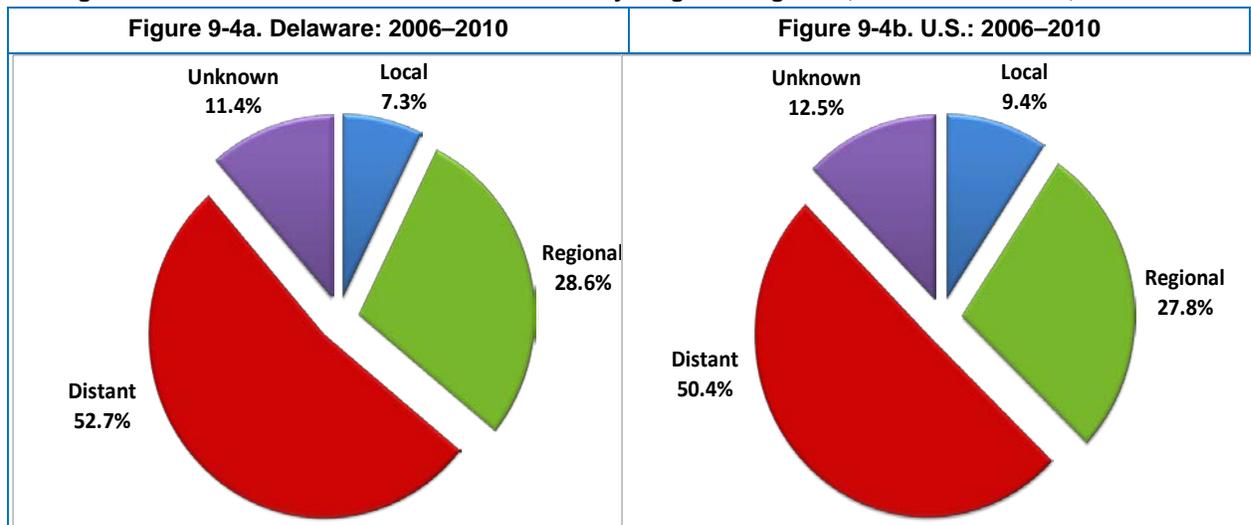
Stage at Diagnosis	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
Local	7.3	6.9	7.7	7.4	---	---	7.3	---	---
Regional	28.6	29.8	27.2	28.4	28.6	28.1	27.3	35.9	19.3
Distant	52.7	53.0	52.4	52.8	54.7	50.6	53.6	43.4	63.2
Unknown	11.4	10.2	12.8	11.4	---	---	11.8	---	---
Total	100.0	100.0	100.0						

--- = Percentages based on cell counts less than six are not shown to protect patient confidentiality.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

- In Delaware during 2006–2010, four of every five cases of pancreatic cancer (512 cases or 81.3 percent) were diagnosed in the late stages (i.e., regional or distant stage). Nationally, the percentage of late stage diagnoses of cancer of the pancreas was 78.2 percent.
- During 2006–2010, 7.3 percent, 28.6 percent and 52.7 percent of pancreatic cancers diagnosed in Delaware were detected at the local, regional and distant stages, respectively. Comparable percentages for the U.S. were 9.4 percent, 27.8 percent and 50.4 percent, respectively.

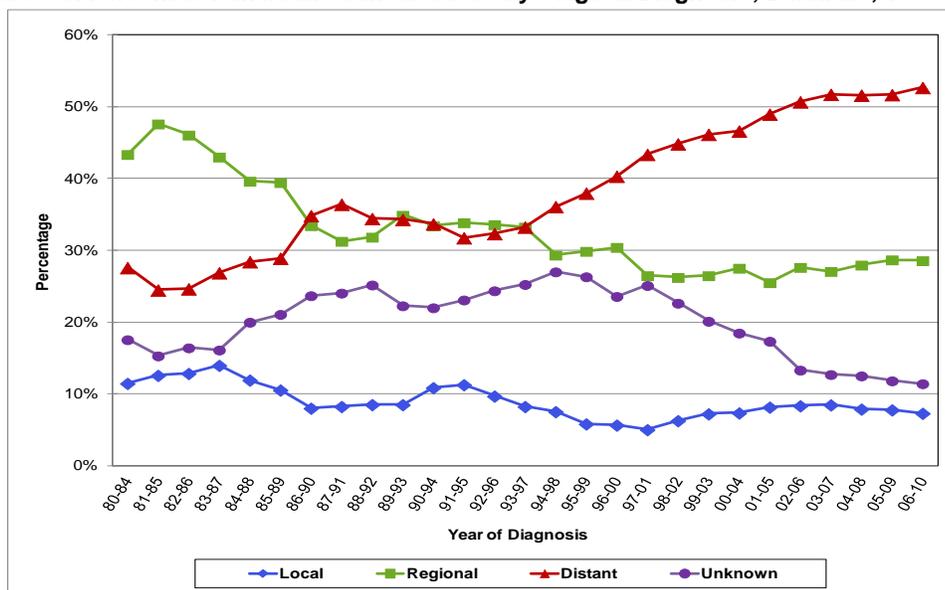
Figure 9-4. Percent of Pancreatic Cancer Cases by Stage at Diagnosis; Delaware and U.S., 2006–2010



SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

- In Delaware, the percentage of pancreatic cancer cases diagnosed in the local stage declined from 11.5 percent in 1980–1984 to 7.3 percent in 2006–2010. There was also a decline in the percentage of cases diagnosed in the regional stage, from 43.4 percent in 1980–1984 to 28.6 percent in 2006–2010.
- Accordingly, the proportion of cases diagnosed in the distant stage nearly doubled: from 27.6 percent in 1980–1984 to 52.7 percent in 2006–2010.

Figure 9-5. Percent of Pancreatic Cancer Cases by Stage at Diagnosis; Delaware, 1980–2010



SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Pancreatic Cancer Mortality

During 2006–2010, Delaware ranked 25th highest overall for mortality from pancreatic cancer, up from a ranking of 29th in 2005–2009. Delaware males ranked 13th (up from 33rd in 2005–2009) and Delaware females ranked 29th (down from 22nd in 2005–2009).²⁷

Deaths due to Cancer of the Pancreas (Table 9-6)

- Pancreatic cancer is the fourth most common cause of cancer-related death in Delaware and the U.S.
- The 541 deaths from pancreatic cancer accounted for 5.9 percent of all cancer deaths in Delaware during 2006–2010.
- Of Delaware residents who died from pancreatic cancer, 51.4 percent were male and 48.6 percent female.
- By race category, 81.7 percent of pancreatic cancer cases were Caucasian (442 deaths), 17.9 percent were African American (97 deaths) and two decedents were of other or unknown race.

Table 9-6. Number of Pancreatic Cancer Deaths by Race and Sex; Delaware and Counties, 2006–2010

	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
DELAWARE	541	278	263	442	235	207	97	43	54
Kent	90	43	47	63	29	34	25	14	11
New Castle	294	153	141	238	131	107	56	22	34
Sussex	157	82	75	141	75	66	16	7	9

--- = Cell counts less than six are not shown to protect patient confidentiality

SOURCE: Delaware Health Statistics Center, 2013.

Pancreatic Cancer Mortality Rates (Table 9-7)

- Delaware's 2006–2010 pancreatic cancer mortality rate (10.7 per 100,000) did not differ from the U.S. rate (10.9 per 100,000).
- Historically, Delaware's pancreatic cancer mortality rate has been similar to the U.S. rate.
- For 2006–2010, the pancreatic cancer mortality rate was significantly higher for males than for females at both the state (12.6 per 100,000 male vs. 9.3 per 100,000 female) and national levels (12.5 per 100,000 male vs. 9.6 per 100,000 female).
- This male-to-female significant excess was also seen among Caucasians in Delaware (12.7 per 100,000 male vs. 8.7 per 100,000 female) and among Caucasians nationally (12.5 per 100,000 male vs. 9.4 per 100,000 female).
- Also, nationally among African Americans, pancreatic cancer mortality was significantly higher among males than among females (15.3 per 100,000 vs. 12.5 per 100,000, respectively).

²⁷ Howlander N, Noone AM, Krapcho M, et al (eds). SEER Cancer Statistics Review, 1975–2010, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2010/, based on November 2012 SEER data submission, posted to the SEER web site, April 2013.

Table 9-7. Five-Year Average Age-Adjusted Pancreatic Cancer Mortality Rates* and 95% Confidence Intervals by Race and Sex; U.S., Delaware and Counties, 2006–2010

RACE AND REGION	All	Male	Female
ALL RACES			
United States	10.9 (10.8 , 10.9)	12.5 (12.4 , 12.6)	9.6 (9.5 , 9.6)
DELAWARE	10.7 (9.8 , 11.7)	12.6 (11.2 , 14.2)	9.3 (8.2 , 10.5)
Kent	11.3 (9.1 , 13.9)	12.6 (9.0 , 17.0)	10.5 (7.7 , 14.0)
New Castle	10.8 (9.6 , 12.1)	13.1 (11.1 , 15.4)	9.2 (7.7 , 10.8)
Sussex	10.2 (8.6 , 11.9)	11.7 (9.2 , 14.6)	8.9 (6.9 , 11.3)
CAUCASIAN			
United States	10.8 (10.7 , 10.8)	12.5 (12.4 , 12.5)	9.4 (9.3 , 9.4)
DELAWARE	10.4 (9.5 , 11.4)	12.7 (11.1 , 14.4)	8.7 (7.5 , 10.0)
Kent	10.2 (7.8 , 13.1)	10.9 (7.2 , 15.8)	9.9 (6.8 , 14.0)
New Castle	10.8 (9.5 , 12.3)	13.9 (11.6 , 16.5)	8.5 (6.9 , 10.3)
Sussex	9.9 (8.3 , 11.8)	11.5 (9.0 , 14.7)	8.5 (6.5 , 11.0)
AFRICAN AMERICAN			
United States	13.7 (13.5 , 13.9)	15.3 (14.9 , 15.6)	12.5 (12.2 , 12.7)
DELAWARE	14.3 (11.5 , 17.5)	14.5 (10.3 , 19.8)	13.9 (10.4 , 18.1)
Kent	18.1 (11.6 , 26.7)	---	---
New Castle	12.7 (9.5 , 16.6)	---	13.8 (9.5 , 19.3)
Sussex	16.2 (9.2 , 26.2)	---	---

* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

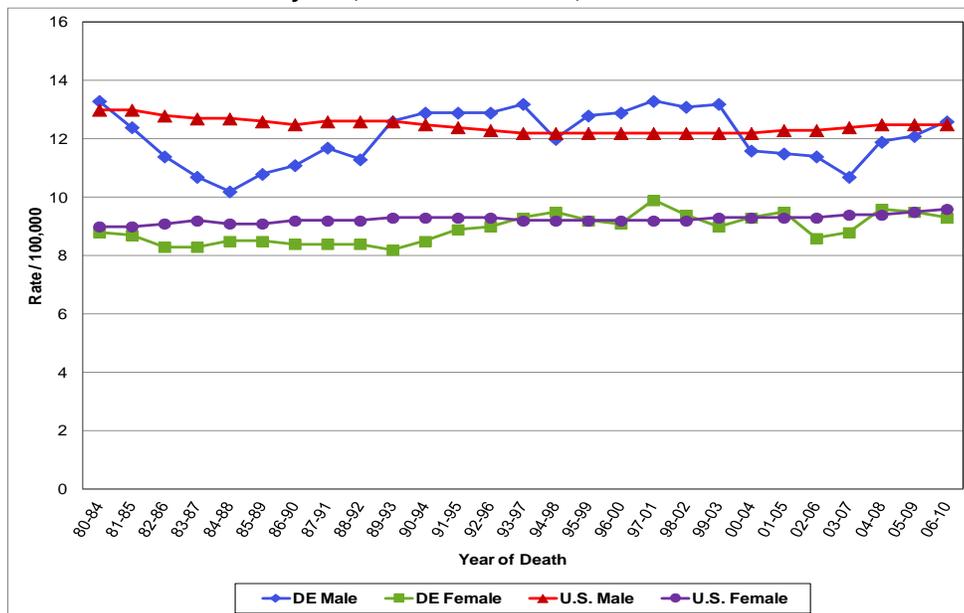
--- = Rates based on fewer than 25 cases are not shown.

SOURCES: Delaware: Delaware Health Statistics Center, 2013; U.S.: National Center for Health Statistics, 2013.

Trends in Pancreatic Cancer Mortality (Figures 9-6 and 9-7)

- Delaware’s pancreatic cancer mortality rate was the same in 2006–2010 as in 1996–2000, with increases and decreases in between. The national rate increased 3.8 percent during this time.
- Delaware’s pancreatic cancer mortality rate dropped 2.3 percent among males and increased 2.2 percent among females. During this time period, the U.S. rate increased 2.5 percent among males and 4.3 percent among females.

Figure 9-6. Five-Year Average Age-Adjusted Pancreatic Cancer Mortality Rates* by Sex; U.S. and Delaware, 1980–2010

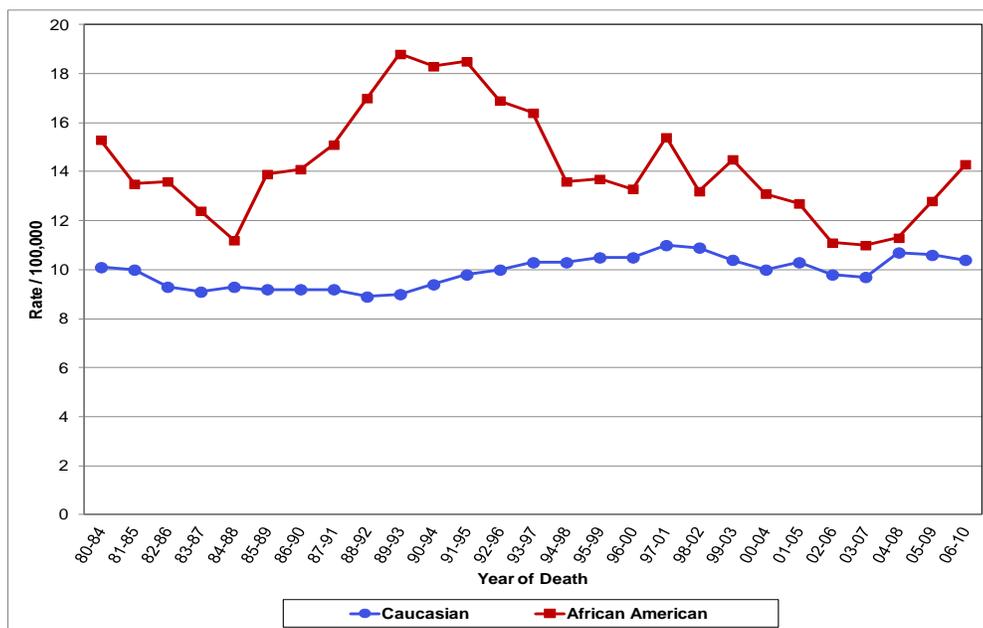


* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Health Statistics Center, 2013; U.S.: National Center for Health Statistics, 2013.

- From 1996–2000 through 2006–2010, Delaware’s pancreatic cancer mortality rate decreased 20.3 percent among African American males and increased by 28.7 percent among African American females.
- Pancreatic cancer mortality increased 0.8 percent among Caucasian males and decreased by 1.1 percent among Caucasian females.

**Figure 9-7. Five-Year Average Age-Adjusted Pancreatic Cancer Mortality Rates*;
by Race; Delaware, 1980–2010**



* = Rates are age-adjusted to the 2000 U.S. standard population.

SOURCE: Delaware Health Statistics Center, 2013.

Age-Specific Pancreatic Cancer Mortality Rates (Table 9-8 and Figure 9-8)

- In each age- and sex-specific category where data were available, age-specific mortality rates for pancreatic cancer in Delaware increased with age. The mortality rate was 54.2 percent higher among males than among females in ages 40-64 and 56.7 percent higher among males than females in ages 85 and older.
- The number of deaths from pancreatic cancer among African Americans was too small to examine trends in age-specific mortality rates.

Table 9-8. Age-Specific Pancreatic Cancer Mortality Rates* by Race and Sex; Delaware, 2006–2010

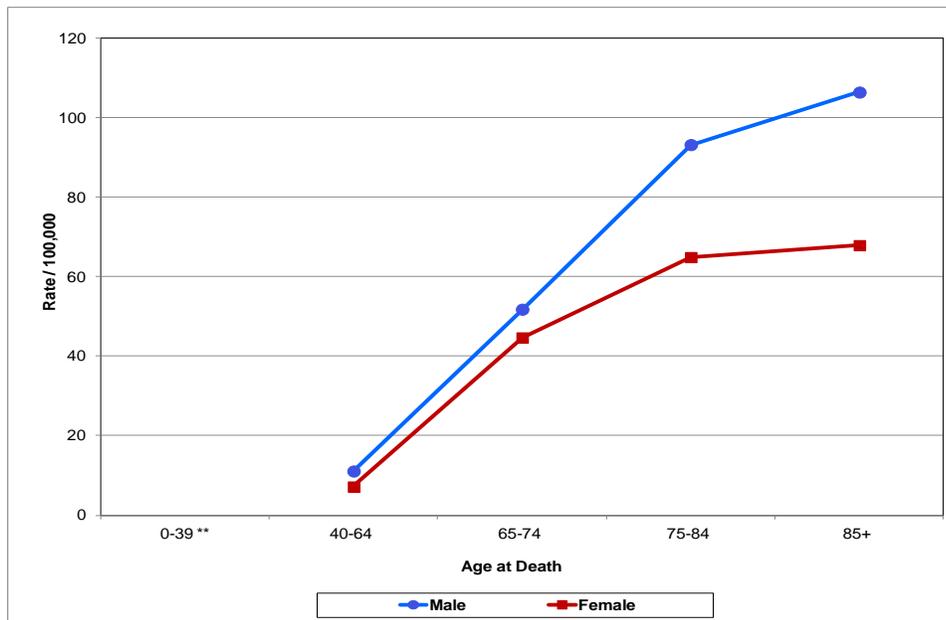
Age at Death	All Races			Caucasian			African American		
	All	Male	Female	All	Male	Female	All	Male	Female
0-39	---	---	---	---	---	---	---	---	---
40-64	9.0	11.1	7.2	9.1	11.5	6.8	10.4	---	---
65-74	48.1	51.8	44.7	43.6	46.9	40.6	86.3	---	---
75-84	77.0	93.2	64.9	76.3	95.4	61.6	---	---	---
85+	80.0	106.4	67.9	81.5	115.4	65.7	---	---	---

* = Rates are per 100,000 population.

--- = Rates based on fewer than 25 cases are not shown.

SOURCE: Delaware Health Statistics Center, 2013.

Figure 9-8. Age-Specific Pancreatic Cancer Mortality Rates* by Sex; Delaware, 2006–2010



* = Rates are per 100,000 population.

** = Rates based on fewer than 25 cases are not shown.

SOURCE: Delaware Health Statistics Center, 2013.

10. PROSTATE CANCER

Risk Factors and Early Detection

Lifestyle Risk Factors for Prostate Cancer:

- diet high in red meat or high fat dairy products
- diet low in fruits and vegetables
- diet high in calcium and dairy foods
- obesity (suspected)
- tobacco usage (suspected)
- heavy alcohol use (suspected)

Environmental and Medically-Related Causes of Prostate Cancer:

- employment in certain industries (all suspected)
 - welders
 - battery manufacturers
 - rubber workers
 - workers exposed to cadmium

Risk Factors for Prostate Cancer that Cannot be Changed:

- increasing age – risk rises rapidly after age 50.
- race – African American
- ethnicity – non-Hispanic
- nationality – North American, northwestern European
- family history of prostate cancer
- inherited DNA changes; e.g. HPC1 (hereditary prostate cancer gene 1)
- gene mutations that occur during a man's life
- higher levels of certain male hormones such as testosterone (suspected)
- infection and inflammation of the prostate gland (prostatitis) (suspected)
- certain genes, such as the BRCA 1 and BRCA 2 genes (suspected)

Factors Protective against Prostate Cancer:

- maintain a healthy weight
- diet high in fruits, vegetables and whole grains
- physical activity
- limit calcium intake

Early Detection of Prostate Cancer:

The American Cancer Society recommends that men have a chance to make an informed decision with their health care provider about whether to be screened for prostate cancer. They should first get information about what is known and what is not known about the risks and possible benefits of prostate cancer screening. Men should not be screened unless they have received this information.²⁸

The Delaware Cancer Consortium recommends the following prostate cancer screening guidelines:

- No mass screening.
- Promote education for informed decision-making.
- Screening men older than 75 years is less desirable but can be individualized.
- Screening not recommended for men with life expectancy less than 10 years.
- Offer average-risk individuals screening at age 50 and older with informed decision process.
- High-risk individuals should be encouraged to be screened starting at the following:
 - 40 years of age (with risk factor = several 1st degree relatives);
 - 40 years of age (with risk factor = African American, 1st degree relative, family or personal history of BRCA1 and BRCA2 gene and/or
 - younger than 65 years of age.
- Prostate specific antigen (PSA) test with or without digital rectal exam (DRE) and screening at one- to two-year intervals are acceptable.

Prostate Cancer Screening among Delawareans:

Data from the 2012 Behavioral Risk Factor Surveillance (BRFS) Survey provide information on the prevalence of prostate cancer screening among Delaware men:

- In 2012, 52.7 percent of Delaware men ages 40 and older reported having had a PSA blood test in the past two years, compared to 47.3 percent at the national level. This difference did not reach statistical significance.
- The proportion of men who received a PSA test within the past two years increased with age: 27.3 percent of men ages 40-49 were tested as compared to 72.2 percent of men ages 65 and older.
- Caucasian men were more likely to have had a PSA test than African American men (56.6 percent vs. 46.2 percent, respectively) but the difference was not statistically significant.
- As level of education increased the proportion of men who had had a PSA test increased, from 40.8 percent among men with less than a high school education to 57.7 percent among college graduates.
- The percentages of Delaware men who reported having had a PSA blood test in the past two years did not show a pattern with respect to income level.

²⁸ American Cancer Society; Prostate Cancer: Early Detection.
<http://www.cancer.org/cancer/prostatecancer/moreinformation/prostatecancerearlydetection/prostate-cancer-early-detection-acs-recommendations>

Prostate Cancer Incidence

Delaware ranked second highest in the U.S. for prostate cancer incidence during 2006-2010, the same ranking as in 2005-2009.²⁹

Cases of Prostate Cancer (Table 10-1)

- Prostate cancer is the most frequently diagnosed cancer among men in Delaware and in the U.S.
- From 2006 through 2010, 4,221 new cases of prostate cancer were diagnosed in Delaware, accounting for 31.1 percent of all newly-diagnosed cancer cases among males.
- Caucasians comprised 75.9 percent of prostate cancer cases (3,204), 22.4 percent were African American (944 cases) and 1.7 percent (73 cases) were other or unknown race.
- More than half of the prostate cancer cases (53.8 percent) were residents of New Castle County, 26.6 percent were from Sussex County and 19.5 percent were from Kent County.

Table 10-1. Number of Prostate Cancer Cases by Race; Delaware and Counties, 2006–2010

	All Male	Caucasian	African American
DELAWARE	4,221	3,204	944
Kent	824	589	224
New Castle	2,273	1,655	585
Sussex	1,124	960	135

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Prostate Cancer Incidence Rates (Table 10-2)

- Delaware's 2006–2010 prostate cancer incidence rate was significantly higher than the U.S. rate among both African Americans (286.8 per 100,000 Delaware vs. 228.5 per 100,000 U.S.) and Caucasians (163.2 per 100,000 Delaware vs. 144.9 per 100,000 U.S.).
- The 2006–2010 prostate cancer incidence rate for African Americans was significantly higher than the rate for Caucasians, both in Delaware and nationally.
- Also, prostate cancer incidence was significantly higher among African Americans than among Caucasians within each county.

Table 10-2. Five-Year Average Age-Adjusted Prostate Cancer Incidence Rates* and 95% Confidence Intervals by Race; U.S., Delaware and Counties, 2006–2010

	All Male	Caucasian	African American
United States	152.0 (151.4 , 152.5)	144.9 (144.2 , 145.5)	228.5 (226.1 , 230.8)
DELAWARE	178.9 (173.5 , 184.5)	163.2 (157.5 , 169.0)	286.8 (267.9 , 306.7)
Kent	218.7 (203.8 , 234.4)	200.8 (184.7 , 218.0)	328.3 (285.6 , 375.4)
New Castle	180.2 (172.7 , 187.9)	165.6 (157.6 , 173.9)	268.9 (246.0 , 293.3)
Sussex	154.7 (145.7 , 164.2)	141.9 (132.9 , 151.4)	309.0 (257.9 , 366.8)

* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

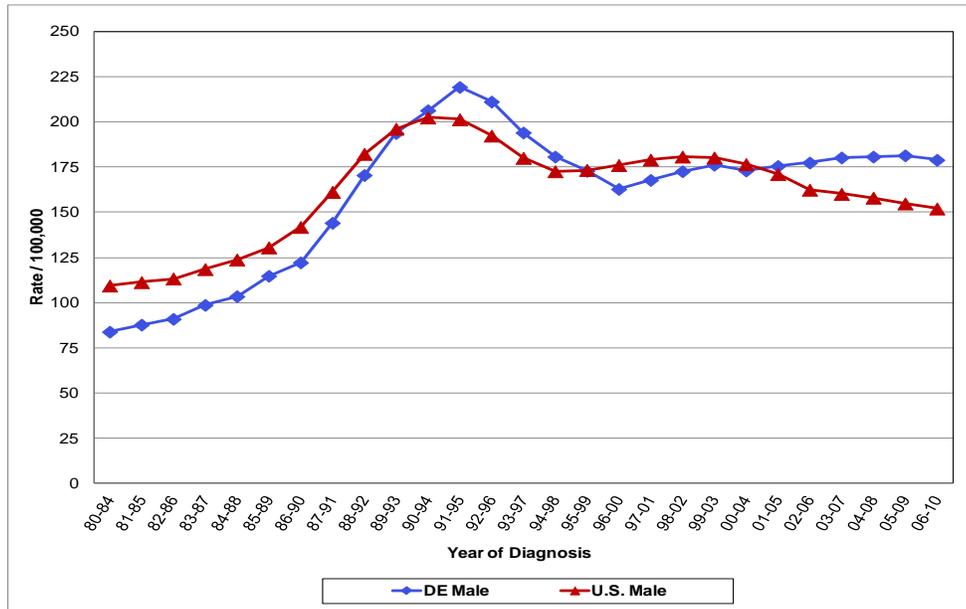
SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

²⁹ U.S. Cancer Statistics Working Group. United States Cancer Statistics: 1999–2010 Incidence and Mortality Web-based Report. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2013. Available at: www.cdc.gov/uscs

Trends in Prostate Cancer Incidence (Figures 10-1 and 10-2)

- Prostate cancer incidence peaked during the early 1990s with the introduction of the prostate-specific antigen (PSA) blood test. Prostate cancer incidence reached a peak of 202.1 per 100,000 nationally during 1990–1994. In 1991-1995, incidence reached a peak of 219.2 per 100,000 in Delaware.
- Delaware's prostate cancer incidence rate increased 9.9 percent from 1996–2000 through 2006–2010. In contrast, the U.S. prostate cancer incidence rate decreased 13.6 percent during that time period.

**Figure 10-1. Five-Year Average Age-Adjusted Prostate Cancer Incidence Rates*;
U.S. and Delaware, 1980–2010**



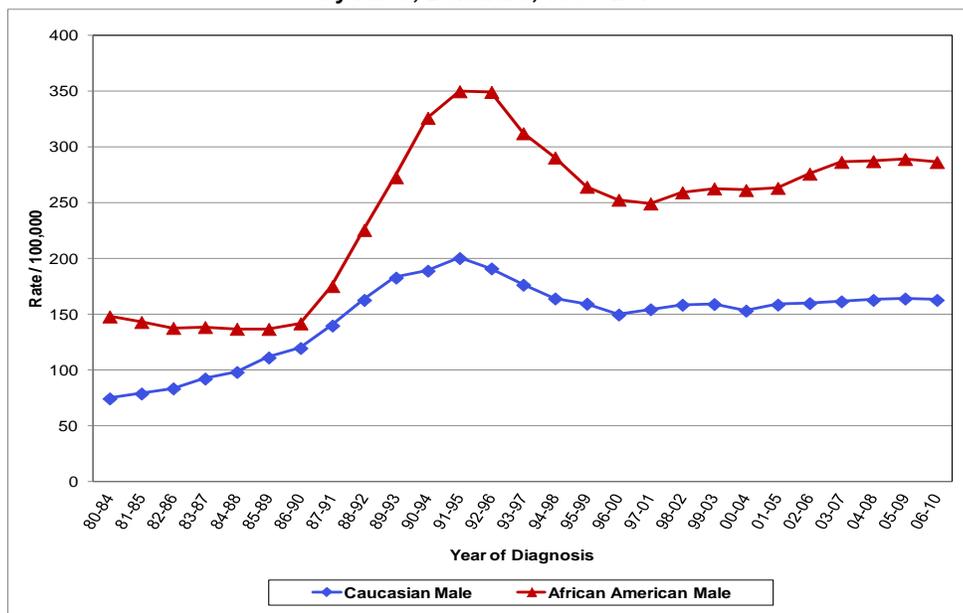
* = Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013;

U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

- From 1996–2000 through 2006–2010, Delaware's prostate cancer incidence rate increased 8.7 percent among Caucasians and 13.4 percent among African Americans.

Figure 10-2. Five-Year Average Age-Adjusted Prostate Cancer Incidence Rates* by Race; Delaware, 1980–2010



* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.
SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Age-Specific Prostate Cancer Incidence Rates (Table 10-3 and Figure 10-3)

- In Delaware, the incidence of prostate cancer peaked at ages 65-74.

Table 10-3. Age-Specific Prostate Cancer Incidence Rates* by Race; Delaware, 2006–2010

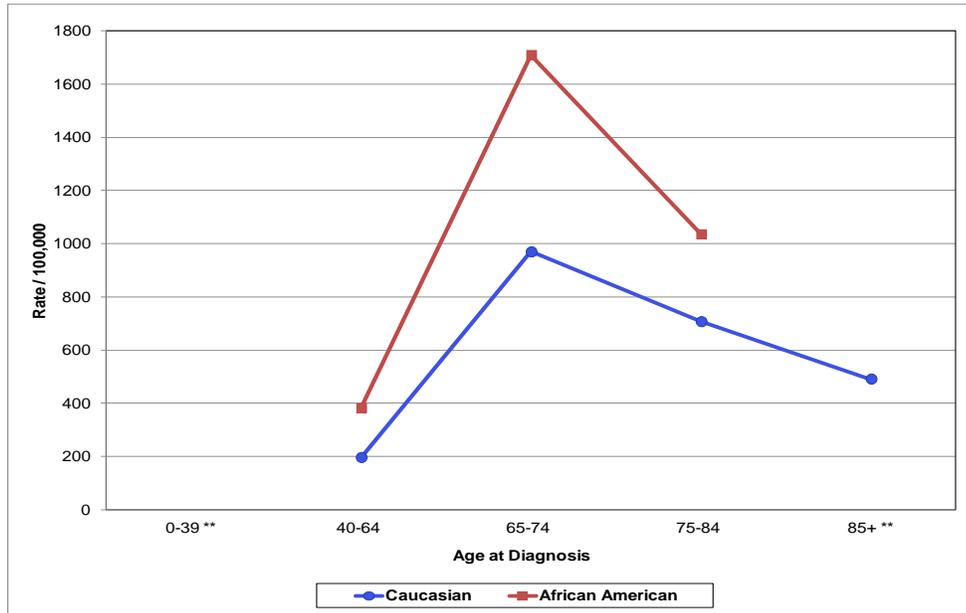
Age at Diagnosis	All Male	Caucasian	African American
0-39	---	---	---
40-64	224.1	196.8	382.2
65-74	1058.8	969.6	1709.4
75-84	737.8	707.3	1035.4
85+	501.6	491.6	---

* = Rates are per 100,000 population.

--- = Rates based on fewer than 25 cases are not shown.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Figure 10-3. Age-Specific Prostate Cancer Incidence Rates* by Race; Delaware, 2006–2010



* = Rates are per 100,000 population.

--- = Rates based on fewer than 25 cases are not shown.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Prostate Cancer by Stage at Diagnosis (Table 10-4, Figures 10-4 and 10-5)

- During 2006–2010, the proportion of late stage diagnoses (i.e., either regional or distant) was slightly higher among Caucasian (12.0 percent) than among African American men (10.5 percent).

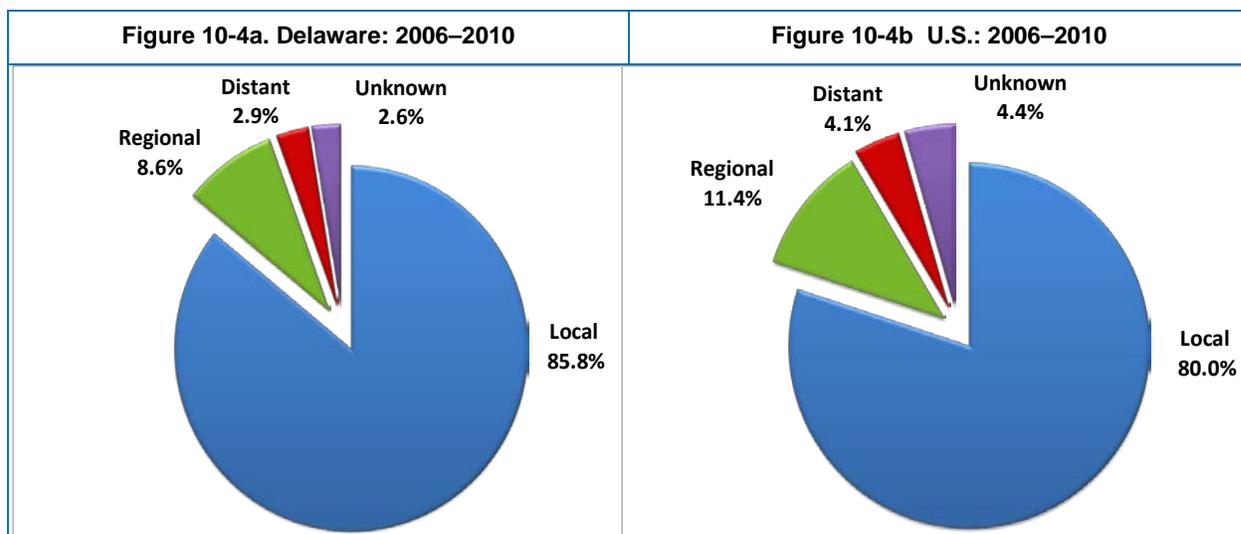
Table 10-4. Number and Percent of Prostate Cancer Cases by Stage at Diagnosis and Race; Delaware, 2006–2010

Stage at Diagnosis	Number			Percent		
	All Male	Caucasian	African American	All Male	Caucasian	African American
Local	3,623	2,741	819	85.8	85.5	86.8
Regional	365	290	69	8.6	9.1	7.3
Distant	124	94	30	2.9	2.9	3.2
Unknown	109	79	26	2.6	2.5	2.8
Total	4,221	3,204	944	100.0	100.0	100.0

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

- In 2006–2010, 85.8 percent, 8.6 percent and 2.9 percent of prostate cancer cases in Delaware were diagnosed at the local, regional and distant stages, respectively. Nationally, comparable percentages were 80.4 percent, 11.4 percent and 4.1 percent.

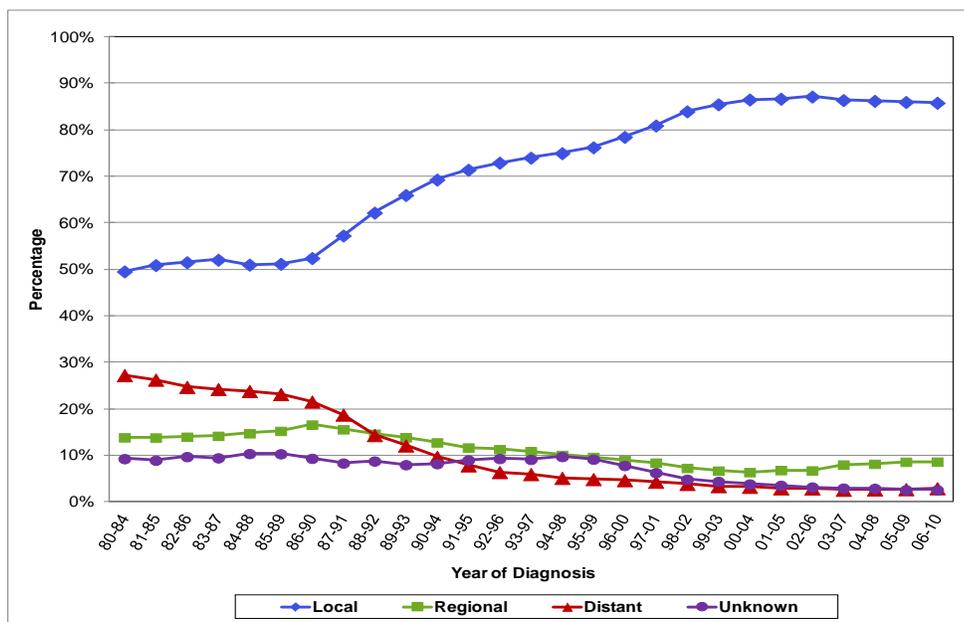
Figure 10-4. Percent of Prostate Cancer Cases by Stage at Diagnosis and Race; U.S. and Delaware, 2006–2010



SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

- In Delaware since 1980–1984, the proportion of prostate cancers diagnosed at the local stage increased dramatically, from 49.6 percent to 85.8 percent (an increase of 73.2 percent).
- During the same time period, the proportion of distant stage prostate cancers decreased from 27.3 percent in 1980–1984 to 2.9 percent in 2006–2010 (decline of 89.2 percent) and the proportion of regional stage prostate cancers decreased from 13.9 percent to 8.7 percent (decline of 37.7 percent).

Figure 10-5. Percent of Prostate Cancer Cases by Stage at Diagnosis; Delaware, 1980–2010



SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Prostate Cancer Mortality

During 2006–2010, Delaware ranked 24th highest (down from 20th during 2005–2009) in the nation for mortality from prostate cancer.³⁰

Deaths due to Prostate Cancer (Table 10-5)

- Prostate cancer is the second leading cause of cancer death among males.
- The 448 deaths from prostate cancer accounted for 9.3 percent of cancer deaths among Delaware males during 2006–2010.
- Of the 448 decedents, 76.3 percent (342 deaths) were Caucasian, 22.5 percent (101 deaths) were African American and five deaths were other or unknown race.

Table 10-5. Number of Prostate Cancer Deaths by Race; Delaware and Counties, 2006–2010

	All Male	Caucasian	African American
DELAWARE	448	342	101
Kent	69	48	20
New Castle	264	202	60
Sussex	115	92	21

SOURCE: Delaware Health Statistics Center, 2013.

Prostate Cancer Mortality Rates (Table 10-6)

- In contrast to incidence, mortality from prostate cancer was slightly lower in Delaware (22.4 per 100,000) than nationally (23.0 per 100,000).
- The 2006–2010 prostate cancer mortality rate for African Americans was significantly higher than for Caucasians both in Delaware (46.0 per 100,000 African American vs. 19.8 per 100,000 Caucasian) and nationally (50.9 per 100,000 African American vs. 21.2 per 100,000 Caucasian). This pattern was seen in New Castle County but there were too few deaths to be able to compare by race in both Kent and Sussex Counties.

Table 10-6. Five-Year Average Age-Adjusted Prostate Cancer Mortality Rates* and 95% Confidence Intervals by Race; U.S., Delaware and Counties, 2006–2010

Region	All Male	Caucasian	African American
United States	23.0 (22.9 , 23.2)	21.2 (21.1 , 21.4)	50.9 (50.3 , 51.6)
DELAWARE	22.4 (20.3 , 24.6)	19.8 (17.7 , 22.0)	46.0 (37.1 , 56.2)
Kent	23.5 (18.1 , 29.8)	20.4 (14.9 , 27.2)	---
New Castle	25.6 (22.6 , 28.9)	23.3 (20.2 , 26.8)	43.7 (32.8 , 56.7)
Sussex	17.2 (14.1 , 20.7)	14.5 (11.7 , 18.0)	---

* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

--- = Rates based on fewer than 25 deaths are not shown

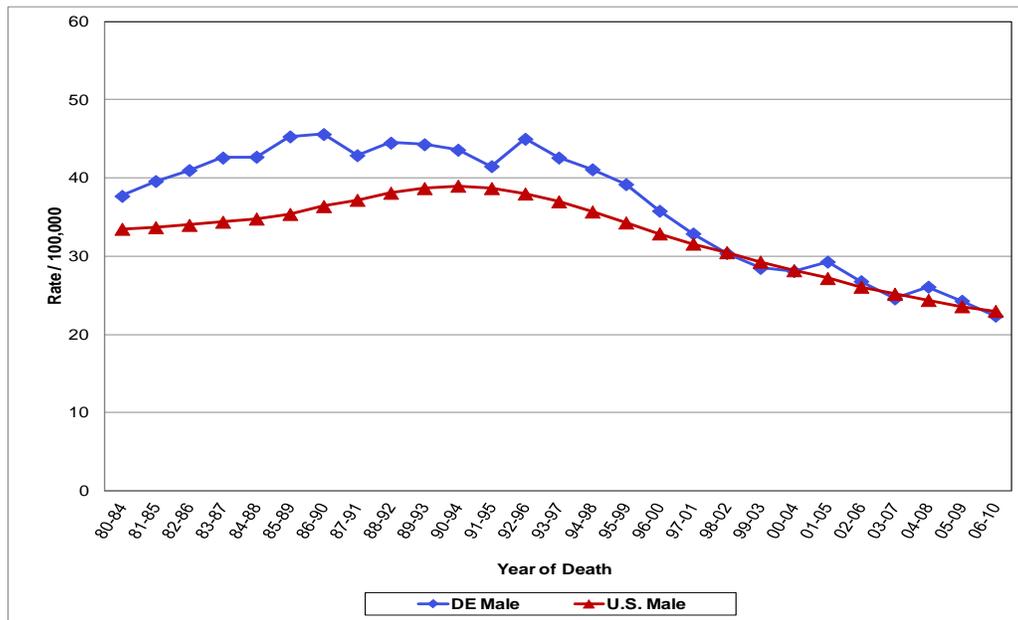
SOURCES: Delaware: Delaware Health Statistics Center, 2013; U.S.: National Center for Health Statistics, 2013.

³⁰ Howlader N, Noone AM, Krapcho M, et al (eds). SEER Cancer Statistics Review, 1975–2010, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2010/, based on November 2012 SEER data submission, posted to the SEER web site, April 2013.

Trends in Prostate Cancer Mortality (Figures 10-6 and 10-7)

- From 1996–2000 through 2006–2010, Delaware’s prostate cancer mortality rate decreased 37.4 percent, while the U.S. rate decreased 30.1 percent.

**Figure 10-6. Five-Year Average Age-Adjusted Prostate Cancer Mortality Rates*;
U.S. and Delaware, 1980–2010**

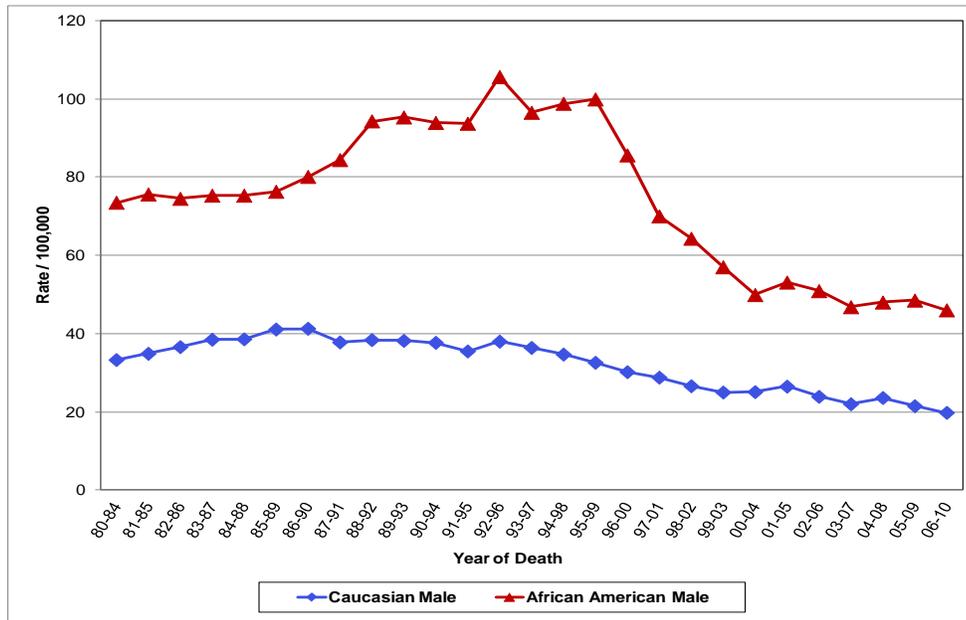


* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Health Statistics Center, 2013; U.S.: National Center for Health Statistics, 2013.

- From 1996–2000 through 2006–2010, Delaware’s prostate cancer mortality rate decreased 34.4 percent among Caucasians and decreased 46.3 percent among African Americans.
- From 1987–1991 and through 1993–1997, Delaware’s prostate cancer mortality rate among African Americans was more than double the rate among Caucasians. Beginning in 2000–2004, however, the racial gap began to narrow.

Figure 10-7. Five-Year Average Age-Adjusted Prostate Cancer Mortality Rates* by Race; Delaware, 1980–2010



* = Rates are age-adjusted to the 2000 U.S. standard population.
SOURCE: Delaware Health Statistics Center, 2013.

Age-Specific Prostate Cancer Mortality Rates (Table 10-7)

- Prostate cancer mortality is known to increase with increasing age, but the number of deaths among African Americans was too small to examine trends in Delaware.

Table 10-7. Age-Specific Prostate Cancer Mortality Rates* by Race; Delaware, 2006–2010

Age at Death	All Male	Caucasian	African American
0-39	---	---	---
40-64	6.1	4.9	---
65-74	67.4	56.4	144.7
75-84	176.3	147.8	474.5
85+	528.2	513.0	---

* = Rates are per 100,000 population.
 --- = Rates based on fewer than 25 deaths are not shown.
SOURCE: Delaware Health Statistics Center, 2013.

11. UTERINE CANCER

Risk Factors and Early Detection

Lifestyle Risk Factors for Uterine Cancer:

- obesity
- diet high in animal fat

Environmental and Medically-Related Causes of Uterine Cancer:

- treatment with the drug Tamoxifen
- never having children, especially if due to infertility issues
- high levels of estrogen, via natural occurrence or hormone therapy
- prior radiation therapy to the pelvic region (suspected)

Risk Factors for Uterine Cancer that Cannot be Changed:

- increasing age
- personal history of any of the following:
 - diabetes
 - breast cancer
 - ovarian cancer
 - benign ovarian tumors
 - granulosa-theca cell ovarian tumors
 - polycystic ovarian syndrome (PCOS)
 - atypical endometrial hyperplasia
- family history of endometrial and colorectal cancers (Lynch syndrome or hereditary nonpolyposis colorectal cancer)
- having a higher number of menstrual cycles throughout a woman's life

Factors Protective against Uterine Cancer:

- multiple pregnancies
- use of oral contraceptives
- use of an intrauterine device that does not contain hormones
- use of combination hormone therapy (addition of progesterone)
- Women who have had a complete hysterectomy will not develop uterine cancer.

Early Detection of Uterine Cancer:

- There is currently no recommended screening test for uterine cancer.

Uterine Cancer Incidence

Delaware ranked 18th highest in the U.S. for incidence of uterine cancer during 2006–2010, down from a ranking of 13th during 2005-2009.³¹

Cases of Cancer of the Uterus (Table 11-1)

- From 2006 through 2010, 743 cases of uterine cancer were diagnosed in Delaware, accounting for 6.2 percent of all cancer cases diagnosed among females.
- Caucasians comprised 83.2 percent (618 cases) of uterine cancer cases, 15.1 percent (112 cases) were African American and 1.7 percent (13 cases) were other or unknown race.

Table 11-1. Number of Uterine Cancer Cases by Race; Delaware and Counties, 2006–2010

	All Female	Caucasian	African American
DELAWARE	743	618	112
Kent	163	133	29
New Castle	390	315	65
Sussex	190	170	18

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Uterine Cancer Incidence Rates (Table 11-2)

- Delaware's 2006–2010 uterine cancer incidence rate was 6.7 percent higher among Caucasians than among African Americans (28.5 per 100,000 vs. 26.7 per 100,000, respectively) and the difference was not statistically significant.
- Delaware's uterine cancer incidence rate was significantly higher than the U.S. rate (27.4 per 100,000 vs. 24.3 per 100,000, respectively). Delaware's incidence rate was also significantly higher than the national rate among Caucasians (28.5 per 100,000 Delaware vs. 25.1 per 100,000 U.S.).

Table 11-2. Five-Year Average Age-Adjusted Uterine Cancer Incidence Rates* and 95% Confidence Intervals by Race; U.S., Delaware and Counties, 2006–2010

	All Female	Caucasian	African American
United States	24.3 (24.1 , 24.5)	25.1 (24.9 , 25.3)	22.2 (21.6 , 22.8)
DELAWARE	27.4 (25.4 , 29.4)	28.5 (26.3 , 30.9)	26.7 (21.9 , 32.2)
Kent	36.7 (31.2 , 42.8)	40.0 (33.4 , 47.5)	35.6 (23.7 , 51.3)
New Castle	25.2 (22.8 , 27.9)	26.5 (23.6 , 29.6)	23.4 (17.9 , 30.0)
Sussex	26.4 (22.5 , 30.7)	26.3 (22.2 , 31.1)	---

* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

--- = Rates based on fewer than 25 cases are not shown.

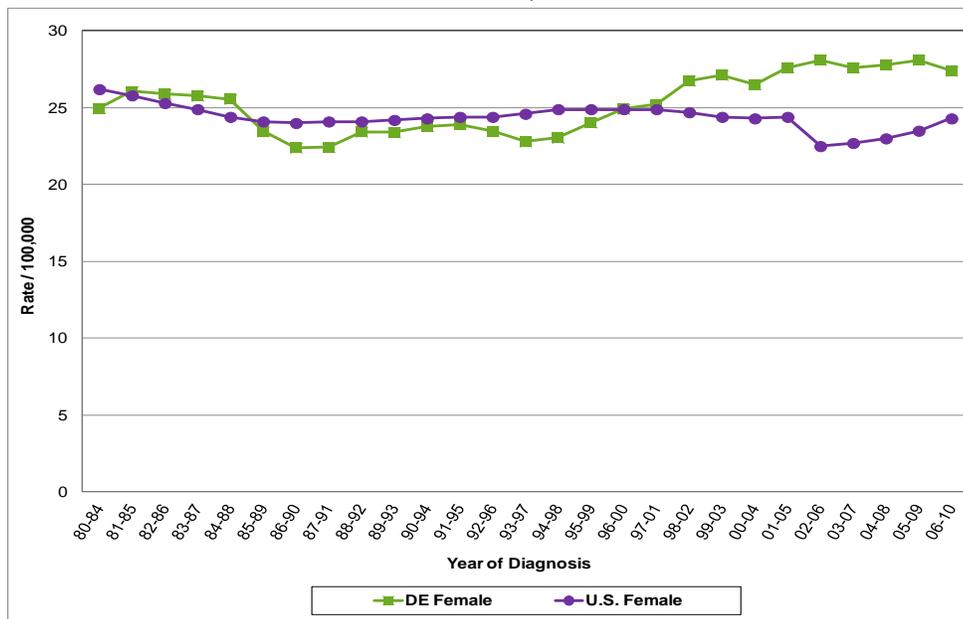
SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

Trends in Uterine Cancer Mortality (Figures 11-1 and 11-2)

- Delaware's uterine cancer incidence rate increased 10.0 percent from 1996–2000 through 2006–2010 while the U.S. rate decreased 2.4 percent.

³¹ U.S. Cancer Statistics Working Group. United States Cancer Statistics: 1999–2010 Incidence and Mortality Web-based Report. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2013. Available at: www.cdc.gov/uscs

Figure 11-1. Five-Year Average Age-Adjusted Uterine Cancer Incidence Rates*; U.S. and Delaware, 1980–2010

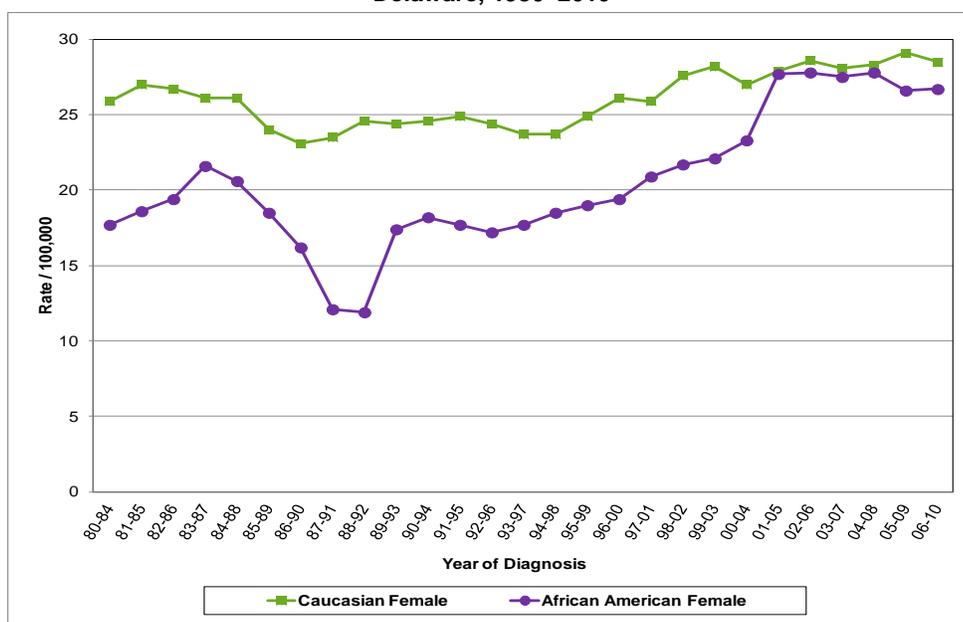


* = Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

- From 1996–2000 through 2006–2010, Delaware’s uterine cancer incidence rate increased 9.2 percent among Caucasians but increased 37.6 percent among African Americans.

Figure 11-2. Five-Year Average Age-Adjusted Uterine Cancer Incidence Rates* by Race; Delaware, 1980–2010



* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Age-Specific Uterine Cancer Incidence Rates (Table 11-3)

- In Delaware, incidence of uterine cancer peaked during ages 65-74 (108.0 per 100,000) and declined to 55.8 per 100,000 among those ages 85 and older.
- Age-specific uterine cancer incidence rates are not displayed graphically by race because of the small number of cases among African Americans.

Table 11-3. Age-Specific Uterine Cancer Incidence Rates* by Race; Delaware, 2006–2010

Age at Diagnosis	All Female	Caucasian	African American
0-39	---	---	---
40-64	46.9	50.8	34.8
65-74	108.0	110.9	109.5
75-84	81.9	74.7	---
85+	55.8	51.7	---

* = Rates are per 100,000 population.

--- = Rates based on fewer than 25 cases are not shown.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Uterine Cancer by Stage at Diagnosis (Table 11-4 and Figures 11-3 and 11-4)

- During 2006–2010, 210 cases of uterine cancer (28.3 percent) were late stage diagnoses (i.e., either regional or distant cancer). The percentage of late stage diagnoses was higher among African Americans (33.0 percent) than among Caucasians (28.0 percent).

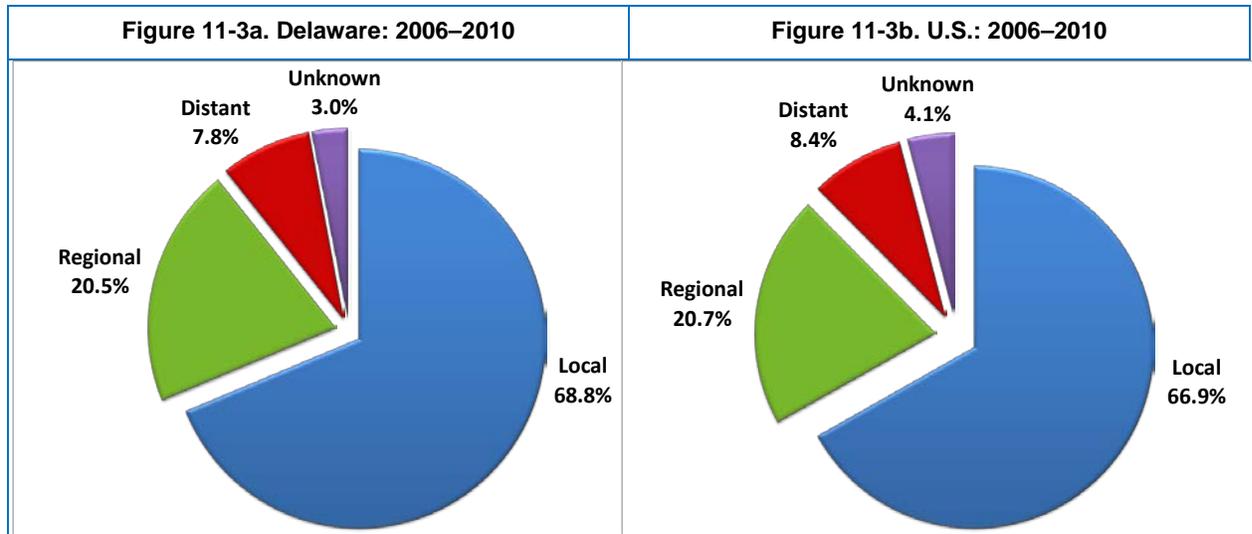
Table 11-4. Number and Percentage of Uterine Cancer Cases by Stage at Diagnosis and Race; Delaware, 2006–2010

Stage at Diagnosis	Number			Percent		
	All Female	Caucasian	African American	All Female	Caucasian	African American
Local	511	427	72	68.8	69.1	64.3
Regional	152	126	26	20.5	20.4	23.2
Distant	58	47	11	7.8	7.6	9.8
Unknown	22	18	3	3.0	2.9	2.7
Total	743	618	112	100.0	100.0	100.0

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

- In Delaware, 68.8 percent, 20.5 percent and 7.8 percent of uterine cancer cases were diagnosed at the local, regional and distant stages, respectively. Nationally, comparable percentages were 66.9 percent, 20.7 percent and 8.4 percent, respectively.

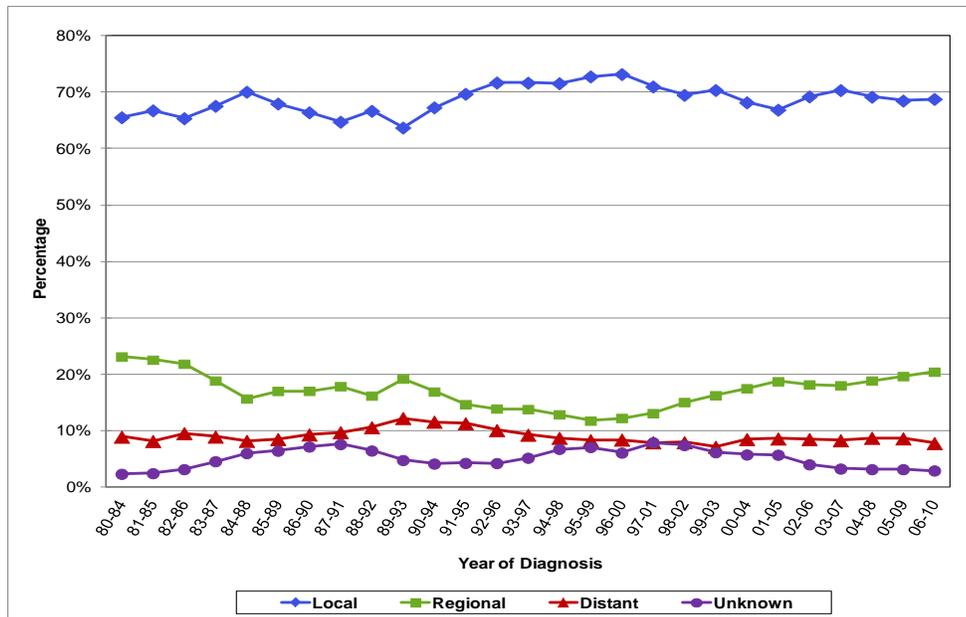
Figure 11-3. Percent of Uterine Cancer Cases by Stage at Diagnosis; U.S. and Delaware, 2006–2010



SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

- In Delaware since 1980–1984, the proportions of uterine cancers diagnosed by stage have remained relatively constant.

Figure 11-4. Percent of Uterine Cancer Cases by Stage at Diagnosis; Delaware, 1980–2010



SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Uterine Cancer Mortality

During 2006–2010, Delaware’s mortality rate for cancer of the corpus uteris was the fourth highest (down from third in 2005–2009) in the nation.³²

Deaths due to Uterine Cancer (Table 11-5)

- During 2006–2010, the 139 deaths from uterine cancer in Delaware accounted for 3.2 percent of cancer deaths among Delaware females.
- Caucasians comprised 74.8 percent (104) of uterine cancer deaths, 24.5 percent (34) were African American and one death was of other or unknown race.

Table 11-5. Number of Uterine Cancer Deaths by Race; Delaware and Counties, 2006–2010

	All Female	Caucasian	African American
DELAWARE	139	104	34
Kent	23	13	10
New Castle	75	56	18
Sussex	41	35	6

SOURCE: Delaware Health Statistics Center, 2013.

Uterine Cancer Mortality Rates (Table 11-6)

- Delaware’s 2006–2010 uterine cancer mortality rate (4.9 per 100,000) was higher than the U.S. rate (4.3 per 100,000) but the difference between the two rates was not statistically significant.
- The uterine cancer mortality rate for African Americans was significantly higher than for Caucasians both in Delaware (8.5 per 100,000 African American vs. 4.4 per 100,000 Caucasian) and the U.S. (7.4 per 100,000 African American vs. 3.9 per 100,000 Caucasian).

Table 11-6. Five-Year Average Age-Adjusted Uterine Cancer Mortality Rates* and 95% Confidence Intervals by Race; U.S., Delaware and Counties, 2006–2010

Region	All Female	Caucasian	African American
United States	4.3 (4.2, 4.3)	4.0 (3.9, 4.0)	7.4 (7.2, 7.6)
DELAWARE	4.9 (4.1, 5.8)	4.4 (3.6, 5.4)	8.5 (5.8, 11.8)
Kent	5.3 (3.3, 7.9)	---	---
New Castle	4.8 (3.7, 6.0)	4.5 (3.4, 5.9)	---
Sussex	5.0 (3.6, 7.0)	4.7 (3.2, 6.9)	---

* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

--- = Rates based on fewer than 25 deaths are not shown.

SOURCES: Delaware: Delaware Health Statistics Center, 2013;

U.S.: National Center for Health Statistics, 2013.

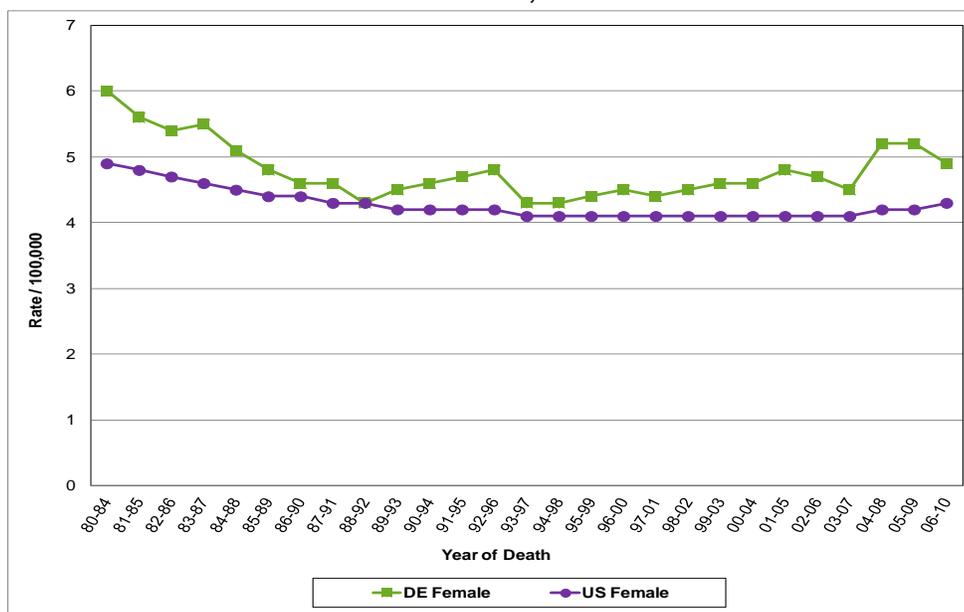
Trends in Uterine Cancer Mortality (Figures 11-5 and 11-6)

- Since 1980–1984, Delaware’s uterine cancer mortality rate has averaged 11.9 percent higher than the U.S. rate.

³² Howlander N, Noone AM, Krapcho M, et al (eds). SEER Cancer Statistics Review, 1975–2010, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2010/, based on November 2012 SEER data submission, posted to the SEER web site, April 2013.

- From 1996–2000 through 2006–2010, Delaware’s uterine cancer mortality rate increased 8.9 percent while the U.S. rate increased 4.9 percent.

Figure 11-5. Five-Year Average Age-Adjusted Uterine Cancer Mortality Rates*; U.S. and Delaware, 1980–2010

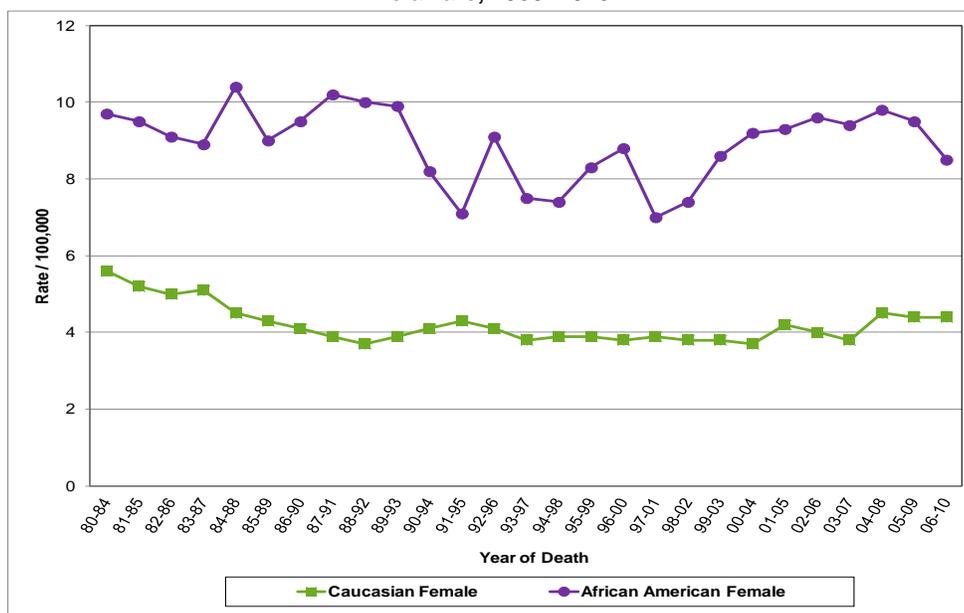


* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Health Statistics Center, 2013; U.S.: National Center for Health Statistics, 2013.

- Among Caucasians in Delaware, the uterine cancer mortality rate increased 15.8 percent while the rate among African Americans declined 3.4 percent.

Figure 11-6. Five-Year Average Age-Adjusted Uterine Cancer Mortality Rates* by Race; Delaware, 1980–2010



* = Rates are age-adjusted to the 2000 U.S. standard population.

SOURCE: Delaware Health Statistics Center, 2013.

Age-Specific Uterine Cancer Mortality Rates (Table 11-7)

- Based on data limited to only three of five age categories, Delaware's uterine cancer mortality rate increased with age.
- Age-specific uterine cancer mortality rates are not displayed by race because of the small number of deaths among African Americans.

**Table 11-7. Age-Specific Uterine Cancer Mortality Rates* by Race;
Delaware, 2006–2010**

Age at Death	All Female	Caucasian	African American
0-39	---	---	---
40-64	4.6	3.9	---
65-74	22.6	19.9	---
75-84	32.7	29.8	---
85+	---	---	---

* = Rates are per 100,000 population.

--- = Rates based on fewer than 25 deaths are not shown.

SOURCE: Delaware Health Statistics Center, 2013.

12. THE HUMAN PAPILOMAVIRUS (HPV) AND CANCER

The human papillomavirus (HPV) is a group of more than 100 related viruses. Although most HPV infections clear within two years, those that persist can advance to precancer or cancer. HPV 16 is known to be the most powerful carcinogen of all HPV types and HPV 18 also plays an important role, particularly for adenocarcinoma. These two types and additional HPV types are classified as Group 1: *carcinogenic to humans* by the World Health Organization.³³

Population-based cancer registries are important surveillance tools to measure the impact of public health interventions such as vaccination and screening on cancer rates.³⁴ The Centers for Disease Control and Prevention used cancer registry data³⁵ from 50 states and the District of Columbia to estimate that during 2004-2008, an average of 33,369 HPV-associated cancers³⁶ were diagnosed annually (rate: 10.8 per 100,000 population), including 12,080 among males (8.1 per 100,000) and 21,290 among females (13.2 per 100,000). Multiplying the counts for HPV-associated cancers by percentages attributable to HPV, CDC estimated that approximately 26,000 new cancers attributable to HPV occurred each year, including 18,000 among women and 8,000 among men.³⁷

To characterize the burden of HPV-associated cancers in Delaware, DPH analyzed data on cancers diagnosed in Delaware during 2006-2010. The number of HPV-associated cases was determined by anatomic site and cell type according to criteria established by expert consensus.³⁸ We also estimated the numbers of cancers attributable to HPV over this time period. Data on HPV-associated cancer cases in Delaware are described by sex, race, ethnicity, and age, with details on anatomic site, cell type and stage at diagnosis. Where feasible, age-adjusted incidence rates were calculated per 100,000 population.

Background

Almost all cervical cancers are caused by chronic HPV infection. About 60 percent of cancers that develop at certain anatomic sites within the oropharynx (base of tongue, tonsils, and 'other' oropharynx) are known to be associated with HPV infection. Approximately 90 percent of anal cancers as well as 40 percent of cancers of the penis, vagina and vulva are associated with HPV infection.

Use of two prophylactic vaccines to prevent against infections from some types of HPV was implemented in 2006. Cervarix®, a bivalent vaccine, protects against HPV types 16 and 18, which cause about 70 percent of cervical cancers. Gardasil®, a quadrivalent vaccine, protects against HPV types 6 and 11, which cause about 90 percent of genital warts, and protects against HPV types 16 and 18. Both vaccines are licensed for use in females ages 9-26 and the quadrivalent vaccine, which protects against cancers of the anus in addition

³³ International Agency for Research on Cancer (IARC), World Health Organization. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans: Volume 90 - Human Papillomaviruses. Lyon, France: World Health Organization Press (2007).

³⁴ Centers for Disease Control and Prevention., Human Papillomavirus–Associated Cancers–United States, 2004-2008. MMWR. Morbidity and Mortality Weekly Report 61:258-261(2012).

³⁵ SEER (Surveillance, Epidemiology and End Results) program of the National Cancer Institute and the NPCR (National Program of Cancer Registries) from the Centers for Disease Control and Prevention.

³⁶ Cancers **associated** with HPV Infection are identified based on anatomic site and cell type.

³⁷ Centers for Disease Control and Prevention., Human Papillomavirus–Associated Cancers–United States, 2004-2008. MMWR. Morbidity and Mortality Weekly Report 61:258-261(2012).

³⁸ Saraiya M, Ahmed F, White M, Lawson H, Unger ER, Ehemann C. Toward Using National Cancer Surveillance Data for Preventing and Controlling Cervical and Other Human Papillomavirus-associated Cancers in the US. In: Assessing the Burden of HPV-Associated Cancers in the United States. Cancer 113 (Suppl 10) 2837–2840 (2008).

to cancers of the cervix, vagina and vulva, is also licensed for use in males. Both vaccines will prevent most cases of cervical cancer if they are administered before exposure to the virus. Use of condoms also provides some protection against HPV infection.

Table 12-1 below contains results from the National Immunization Survey-Teen (NIS-TEEN).on vaccination coverage for Delaware and the U.S. Adolescents in the 2011 NIS-Teen were born from January 1993 through February 1999. Vaccination coverage estimates include only adolescents who had adequately completed provider-reported immunization records.

Among female adolescents in Delaware, vaccination coverage of three or more doses of HPV vaccine was higher among African Americans than Caucasians (49.6 percent vs. 44.7 percent, respectively). In comparison with national data, female adolescents in Delaware had significantly higher vaccination coverage than female adolescents nationally. Delaware’s vaccination rates were higher than the U.S. both among Caucasians and African American females. Insufficient data were available for Hispanics in Delaware. Nationally, among female and male adolescents, coverage of three or more HPV doses was higher for Hispanics compared to Caucasians. Among female adolescents, completion of the HPV series among those who had started it was lower for African Americans than for Caucasians in the U.S.

Table 12-1. Estimated Vaccination Coverage* with ≥3 Doses of HPV Vaccine[§] among Adolescents Aged 13-17 Years by Race/Ethnicity; Delaware and U.S, 2011

	Female				Male			
	Total Percentage (95% CI)	Caucasian non- Hispanic Percentage (95% CI)	African American non- Hispanic Percentage (95% CI)	Hispanic Percentage (95% CI)	Total Percentage (95% CI)	Caucasian non- Hispanic Percentage (95% CI)	African American non- Hispanic Percentage (95% CI)	Hispanic Percentage (95% CI)
Delaware	46.8 (±8.8)	44.7 (±10.0)	49.6 (±21.0)	NA	NA	NA	NA	NA
U.S.	34.8 (±1.6)	33.0 (±1.8)	31.7 (±4.6)	41.6 (±4.5)	1.3 (±0.3)	0.8 (±0.2)	NA	2.7 (±1.3)

* Estimate presented as point estimate (%) ± 95% confidence interval (CI).
 NA – Estimate not available. if the unweighted sample size for the denominator was <30 or (CI half width)/Estimate > 0.588.
 § = ≥3 doses of human papillomavirus vaccine, either quadrivalent or bivalent.
SOURCE: National Immunization Survey-Teen, United States, 2011.³⁹

Cancer Burden Due to HPV in Delaware

Cancer cases diagnosed from 2001 through the present are coded using the International Classification of Diseases for Oncology, Third Edition (ICD-O-3).⁴⁰ Relevant codes for this report are in Appendix B. HPV-associated cancer cases were identified using criteria based on anatomic site and cell type, as determined by expert consensus.⁴¹ HPV-associated cases can be grouped into two anatomic site categories:

(1) anogenital malignancies: anus, cervix, penis, vagina and vulva, and (2) head and neck malignancies: base of tongue and lingual tonsil, tonsils including Waldeyer ring and “other oropharynx”. The latter category

³⁹ http://www.cdc.gov/vaccines/stats-surv/nisteen/data/tables_2011.htm#overall Accessed August 28, 2013.

⁴⁰ Fritz A, Jack A, Parkin DM, Percy C, Shanmugarathan, Sobin L, Whelan S (eds). International Classification of Diseases for Oncology, Third Edition (ICD-O-3). World Health Organization, Geneva.

⁴¹ Saraiya M, Ahmed F, White M, Lawson H, Unger ER, Ehemann C. Toward Using National Cancer Surveillance Data for Preventing and Controlling Cervical and Other Human Papillomavirus-associated Cancers in the US. In: Assessing the Burden of HPV-Associated Cancers in the United States. Cancer 113 (Suppl 10) 2837–2840 (2008).

includes specific locations within the oropharynx where HPV is most likely to be found. HPV DNA is found in almost all cervical cancers and in squamous cell tumors for the other sites.

HPV-Associated Cancers⁴²

Using anatomic site and cell type as criteria, a total of 638 cases of cancer were identified from the Delaware Cancer Registry as being associated with HPV infection during 2006-2010; 229 men and 409 women. These cases account for 1.0 percent of all cancer cases among males and 3.4 percent of all cancers among females during 2006-2010. More than one-third of cases were oropharynx (233 or 36.5 percent), 33.4 percent were cervix (213 cases), 13.6 percent (87 cases) were anal, and the remainder was: 76 (11.9 percent) vulva, 19 (3.0 percent) vagina and 10 (1.6 percent) penis (Table 12-2). Included in this table, as a comparison, are national percentages among cases diagnosed in 2009 that were identified from a database compiled from SEER and NPCR databases.

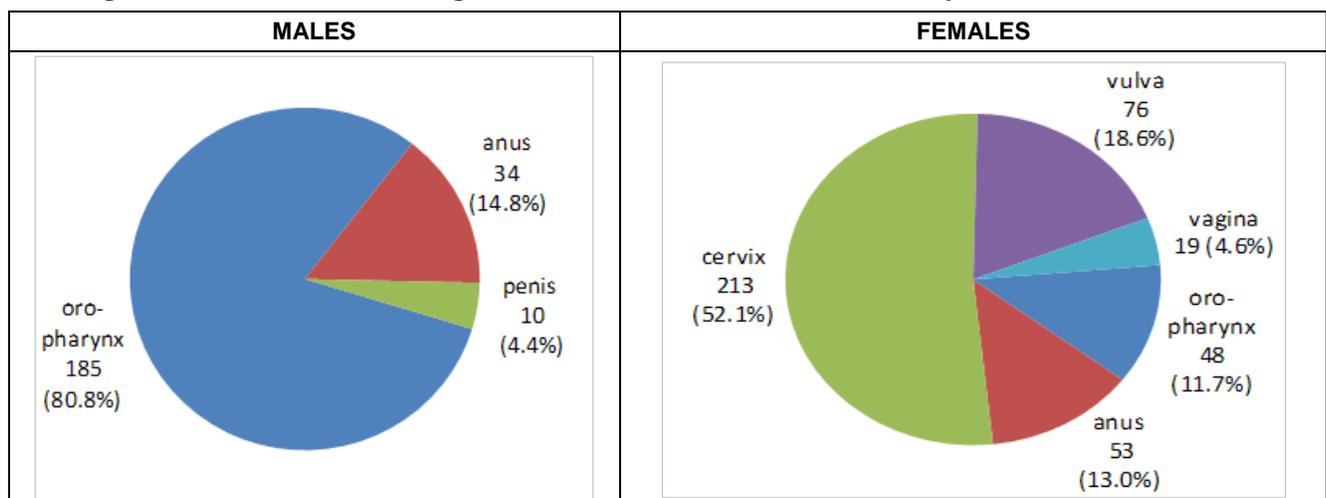
Table 12-2. Estimated Cancers Associated with HPV Infection, by Anatomic Site- Both Sexes Combined; Delaware 2006-2010 and U.S. 2009⁴³

Anatomic Site	No. of Cases in Delaware	Delaware Percentage	U.S. Percentage
oropharynx	233	36.5%	37.3%
anal	87	13.6%	15.6%
cervix	213	33.4%	32.7%
vulva	76	11.9%	9.3%
vagina	19	3.0%	2.1%
penis	10	1.6%	2.9%
Total	638		

SOURCE: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Figure 12-1 shows the site-specific distribution of HPV-associated cancers by site by sex. Oropharyngeal cancer, which accounts for 36.5 percent of all HPV-associated cancers, accounts for 80.8 percent of HPV-associated cancers among men and 11.7 percent of HPV-associated cancers among women. Cancer of the cervix represents more than half (52.1 percent) of all HPV-associated cases among women. Anal cancer accounts for 14.8 percent of cases among men and 13.0 percent among women.

Figure 12-1. Anatomic Site among Cancers Associated with HPV Infection, by Sex; Delaware, 2006-2010



SOURCE: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

⁴² HPV-Associated Cancers – based on anatomic site and cell type.

Estimate of Cases Attributable to HPV⁴³

Cancer cases identified solely by anatomic site and cell type will include some cases that cannot be attributed to HPV. The Delaware Cancer Registry does not collect information on HPV infection status, as is true with most population-based cancer registries. To compensate for this limitation, published site-specific estimates, shown in Table 12-3 below, were used to estimate the number of cases in Delaware that would be attributable to HPV.⁴⁴ Proportion estimates ranged from 36 percent of penile cancers to 96 percent of cervical cancers.

Table 12-3. Estimated Proportions of Cancer Cases Attributable to HPV, by Anatomic Site

Anatomic Site	Estimated Proportion Attributable to HPV
oropharynx	0.63 (0.50 , 0.75)
anus	0.93 (0.86 , 0.97)
cervix	0.96 (0.95 , 0.97)
vulva	0.51 (0.37 , 0.65)
vagina	0.64 (0.43 , 0.82)
penis	0.36 (0.26 , 0.47)

SOURCE: Gillison, Chaturvedi, Lowy (2008)

Applying these proportions to the numbers of Delaware cases associated with HPV results in 97 cancer cases per year that are estimated to be attributable to HPV infection: 30 men and 67 women (Table 12-4). Twenty-nine of these cases would be oropharyngeal (23 men and six women), 16 anal (six men and 10 women) and 41 cervical. Other cases comprise 8 cancers of the vulva, two cancers of the vagina and one cancer of the penis. The following sections contain site-specific information.

Table 12-4. Estimated Cancers Attributable to HPV Annually by Sex and Anatomic Site; Delaware, 2006-2010

Sex and Anatomic Site	Number of Cases 2006-2010	Average Number of Cases / Year	Estimated Annual Cases Attributable to HPV	Range of Case Estimate
Male	229	47.2	30.3	
oropharynx	185	38.4	23.3	(18.5-27.8)
anal	34	6.8	6.3	(5.8-6.6)
penis	10	2.0	0.7	(0.5-0.9)
Female	407	81.8	67.0	
oropharynx	48	9.6	6.0	(4.8-7.2)
anal	53	10.6	9.9	(9.1-10.3)
cervix	213	42.6	40.9	(40.5-41.3)
vulva	76	15.2	7.8	(5.6-9.9)
vagina	19	3.8	2.4	(1.6-3.1)
Total	636	129.0	97.3	

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Cervical Cancer

As mentioned in the previous section, chronic HPV infection causes almost all cervical cancers. Infection with HPV 16 or HPV 18 is responsible for about two-thirds of these cancers. In addition to vaccination against HPV, risk of developing cancer of the cervix can be reduced through modification of known lifestyle risk

⁴³ Cancer cases **attributable** to HPV = the subset of all cases associated with HPV that would progress to a malignancy.

⁴⁴ Gillison ML, Chaturvedi AK, Lowy DR. HPV Prophylactic Vaccines and the Potential Prevention of Noncervical Cancers in Both Men and Women. In: Assessing the Burden of HPV-Associated Cancers in the United States. Cancer 113 (Suppl 10): 3036-3046 (2008).

factors that include cigarette smoking, diet low in fruits and vegetables, being obese or overweight (adenocarcinoma of cervix), human immunodeficiency virus (places women at higher risk for HPV infection), Chlamydia infection, high-risk sexual practices, and reproductive history. Use of condoms also provides some protection against HPV infection. Other cervical cancer risk factors that cannot be changed are family history, African American or American Indian race, and Hispanic ethnicity.

The Pap test detects changes in cells in the cervix that are caused by HPV infection. HPV tests look for HPV infections by finding genes from HPV in the cervical cells. In March 2012, the American Cancer Society, the American Society for Colposcopy and Cervical Pathology, and the American Society for Clinical Pathology jointly released new cervical cancer screening guidelines that extend the time interval between screening tests for most women.⁴⁵ The Delaware Cancer Consortium also endorses these guidelines.

The Behavioral Risk Factor Survey (BRFS) has collected data on cervical cancer screening in Delaware annually from 1995 to 2000 and biannually since then. Results for Delaware from the 2012 BRFS survey are in Appendix E: Behavioral Risk Factors.

During 2006–2010, 214 cases of cervical cancer were diagnosed in Delaware and one of these cases was excluded because of cell type (carcinosarcoma). Cervical cancer accounted for 1.8 percent of all new cancer cases diagnosed among females during 2006-2010. Most women were Caucasian (154 or 72.3 percent), 24.9 percent were African American (53 cases) and six women were other or unknown race.

Coding for anatomic site and histology for cancers diagnosed from 2001 through the present are from the International Classification of Diseases for Oncology, Third Edition (ICD-O-3).⁴⁶ For this chapter, relevant anatomic site codes with applicable histology codes are in Appendix B. Cancers of the cervix, for example, are assigned to one of four anatomic sites (C53.0, C53.1, C53.8 and C53.9).

Carcinoma *in situ* of the cervix - Since 1996, the Delaware Cancer Registry has not collected data on cases of cancer *in situ* of the cervix. The North American Association of Central Cancer Registries and National Program of Cancer Registries recommended that 'population-based registries discontinue routine collection of data on these pre-invasive cervical cancers unless there is strong local need and interest, and sufficient resources are available.'⁴⁷

Invasive cancers of the cervix were categorized into four groups based on cell type: (1) squamous cell, (2) adenocarcinoma, (3) adenosquamous and (4) other and unspecified. Demographic characteristics by cell type are shown in Table 12-5 for cervical cancers diagnosed during 2006-2010. The majority of cases were squamous and transitional cell (134 or 62.9 percent), 50 were adenocarcinoma (23.5 percent), 10 were adenosquamous (4.7 percent) and the remainder (19 or 8.9 percent) were other cell types.

Overall, the median age at diagnosis of cervical cancer cases was 50 and both major cell types had similar age distributions (median ages of 50 and 51). The 10 cases classified as adenosquamous had a median age at diagnosis of 38. Caucasians comprised one-third (66.4 percent) of squamous and transitional cell cases, 60.0 percent of adenosquamous cases and 90.0 percent of adenocarcinoma cases. Ten percent of adenosquamous cases were Hispanic compared to only 2.0 percent of adenocarcinoma cases.

During 2006–2010, about half of all cervical cancer cases were diagnosed in the local stage (Table 12-6). A greater proportion of adenocarcinoma cases were diagnosed in the local stage (68.0 percent) compared with squamous and transitional cell (44.8 percent local).

⁴⁵ Saslow D, Solomon D, Lawson HW, et al. American Cancer Society, American Society for Colposcopy and Cervical Pathology, and American Society for Clinical Pathology screening guidelines for the prevention and early detection of cervical cancer. [Am J Clin Pathol.](#) 2012 Apr;137(4):516-42.

⁴⁶ Percy C, Fritz A, Jack A, Shanmugarathan S, Sobin L, Parkin DM, Whelan S (eds). International Classification of Diseases for Oncology, Third Edition (ICD-O-3). World Health Organization, Geneva, 2000.

⁴⁷ <http://www.naacr.org/Applications/ContentReader/Default.aspx?c=3>

Table 12-5. Demographics of Cervical Cancer Cases by Cell Type; Delaware, 2006–2010

Characteristic	All Cervical Cancers	Squamous and Transitional	Adenocarcinoma	Adenosquamous	Other and Unknown
Number of cases	213	134 (62.9%)	50 (23.5%)	10 (4.7%)	19 (8.9%)
Median age	50	51	50	38	54
Race					
Caucasian	72.3%	66.4%	90.0%	60.0%	73.7%
African American	24.9%	29.9%	8.0%	40.0%	26.3%
Other	2.8%	3.7%	2.0%	0.0%	0.0%
Ethnicity					
Hispanic	6.6%	9.0%	2.0%	10.0%	5.3%
Non-Hispanic	93.4%	91.0%	98.0%	90.0%	94.7%

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

**Table 12-6. Stage at Diagnosis and Cell Type among Cervical Cancer Cases*;
Delaware, 2006–2010**

Stage at Diagnosis	All Cervical Cancers	Squamous and Transitional	Adenocarcinoma
Local	50.5%	44.8%	68.0%
Regional	30.8%	41.0%	14.0%
Distant	13.6%	11.9%	16.0%
Unknown	5.1%	2.2%	2.0%

* = Too few cases of adenosquamous cell cancers to calculate stage at diagnosis.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Cervical Cancer Incidence

Cervical cancer incidence rates for Delaware and the U.S. are shown in the Table 12-7 by race and by county in Delaware. Delaware's 2006-2010 cervical cancer incidence rate was higher than the U.S. but the difference was not statistically significant. Although nationally, cervical cancer incidence was significantly higher among African Americans than among Caucasians, in Delaware the difference was not statistically significant.

Table 12-7. Five-Year Average Age-Adjusted Cervical Cancer Incidence Rates* and 95% Confidence Intervals by Race; U.S., Delaware and Counties, 2006–2010

	All Female	Caucasian	African American
United States	7.9 (7.8 , 8.1)	7.9 (7.8 , 8.0)	9.6 (9.2 , 10.0)
Delaware	8.9 (7.8 , 10.2)	8.8 (7.4 , 10.3)	11.5 (8.6 , 15.1)
Kent	8.2 (5.6 , 11.6)	---	---
New Castle	9.6 (8.0 , 11.3)	9.3 (7.5 , 11.4)	12.2 (8.5 , 16.9)
Sussex	8.1 (5.7 , 11.2)	8.3 (5.6 , 12.0)	---

* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

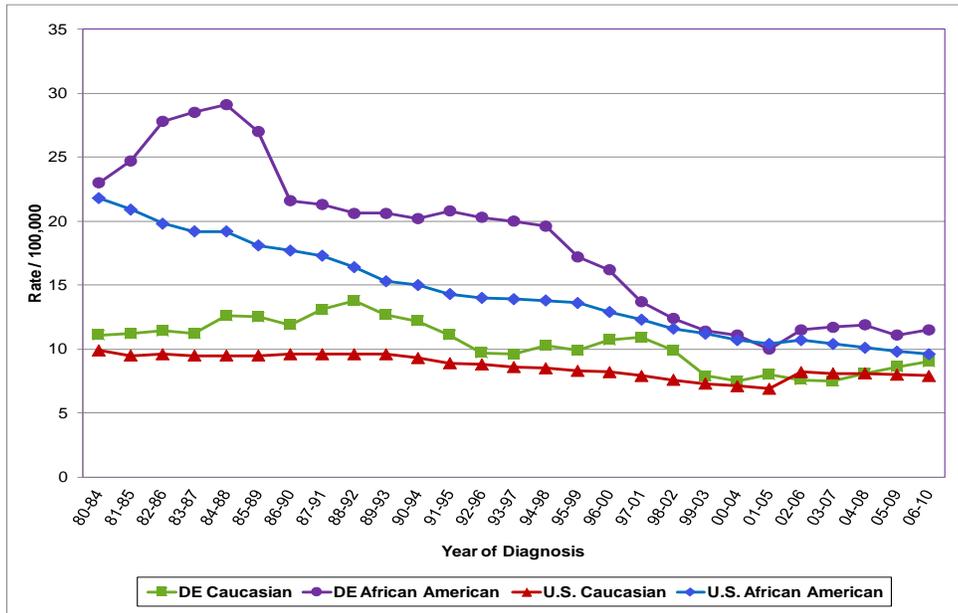
--- = Rates based on fewer than 25 cases are not shown.

SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013;

U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

In Figure 12-2 are trends in cervical cancer incidence rates for Delaware and the U.S. From 1996–2000 through 2006–2010, Delaware's cervical cancer incidence rate decreased 22.6 percent while the U.S. rate decreased 10.2 percent. In Delaware, incidence declined 29.0 percent and 15.9 percent among African Americans and Caucasians, respectively.

Figure 12-2. Five-Year Average Age-Adjusted Cervical Cancer Incidence Rates* by Race; U.S. and Delaware, 1980–2010

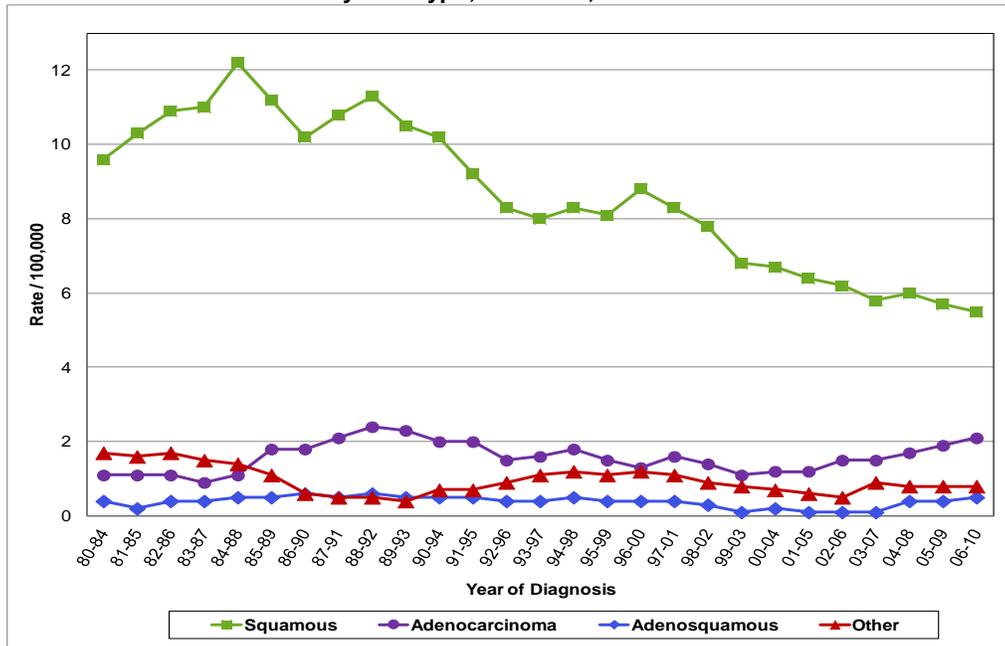


* = Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.

SOURCES: Delaware: Delaware Cancer Registry, Delaware Division of Public Health, 2013; U.S.: Surveillance, Epidemiology and End Results Program (SEER 18), National Cancer Institute, 2013.

Time trends for cervical cancer incidence by cell type are in Figure 12-3. Incidence of squamous and transitional, the cell type with the highest incidence rate at 5.5 per 100,000, has declined 37.5 percent since 1996-2000. The incidence of adenocarcinoma cases, currently 2.1 per 100,000, has increased 61.0 percent since 1996-2000. There are too few cases of adenosquamous cell cancers to compare trends.

Figure 12-3. Five-Year Average Age-Adjusted Cervical Cancer Incidence Rates* by Cell Type; Delaware, 1980–2010



* = Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Oropharyngeal Cancers

In addition to HPV infection, lifestyle risk factors for cancers of the oral cavity and pharynx (oropharynx) include smoking (cigarettes, cigars or pipes), use of snuff or chewing tobacco, alcohol abuse and a diet low in fruits and vegetables. In fact, a combination of alcohol abuse and heavy smoking may increase risk as much as 100 times that for a person who doesn't smoke or drink. Risk factors that cannot be changed are male gender, age 55 and over, certain genetic syndromes, and having a weakened immune system. Most pre-cancers of the oral cavity and pharynx can be found early during routine screening exams by a dental or other health care provider.

HPV DNA, especially HPV 16, is found in roughly two of three oropharyngeal cancers. Only certain anatomic sites of the oral cavity and pharynx are susceptible to HPV infection.⁴⁸ Oropharyngeal sites considered to be associated with HPV infection fall into three categories: (1) tonsils including Waldeyer ring, (2) base of tongue and lingual tonsil and (3) 'other' oropharynx. This last category includes: overlapping lesion of tongue, lateral wall of oropharynx, overlapping lesion of oropharynx, oropharynx NOS⁴⁹, pharynx NOS, and overlapping lesion of lip, oral cavity, and pharynx. In Delaware during 2006-2010, 242 cases (192 men and 50 women) fell into one of these anatomic site categories. Nine cases (seven men and two women) were excluded from analyses because they were non-Hodgkin lymphomas with primary site located in one of these oropharyngeal anatomic sites.

Table 12-8 shows the distribution of the 233 oropharyngeal cancer cases by subgroup and sex. About 40 percent of cases (94 cases) were tonsil (including Waldeyer ring), 43.8 percent (102 cases) were base of the tongue or lingual tonsil, and 15.9 percent (37 cases) were 'other' oropharynx.

Table 12-8. Distribution of Oropharyngeal Cancer Cases by Anatomic Site and Sex; Delaware, 2006-2010

Anatomic Site	All		Male		Female	
	Count	Percentage	Count	Percentage	Count	Percentage
tonsils including Waldeyer ring	94	40.3%	73	39.5%	21	42.9%
base tongue and lingual tonsil	102	43.8%	86	46.5%	16	32.7%
other oropharynx	37	15.9%	26	14.1%	11	22.4%
Total	233	100%	185	100%	49	100%

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Median age at diagnosis of oropharyngeal cancer cases was 59 in men and 63 in women. Among men, 85.9 percent were Caucasian and 13.0 percent were African American. Among women, 89.6 percent were Caucasian and 10.4 percent were African American. Persons of Hispanic ethnicity comprised 1.6 percent of men and 2.1 percent of women (Table 12-9).

Table 12-9. Demographics of Oropharyngeal Cancer Cases by Sex; Delaware, 2006-2010

Characteristic	All	Male	Female
Number of cases	233	185 (79.4%)	50 (20.6%)
Median age	59	59	63
Race			
Caucasian	86.7%	85.9%	89.6%
African American	12.4%	13.0%	10.4%
Other/unknown	0.9%	1.1%	0.0%
Ethnicity			
Hispanic	1.7%	1.6%	2.1%
Non-Hispanic	98.3%	98.4%	97.9%

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

⁴⁸ Saraiya M, Ahmed F, White M, Lawson H, Unger ER, Ehemann C. Toward Using National Cancer Surveillance Data for Preventing and Controlling Cervical and Other Human Papillomavirus-associated Cancers in the US. In: Assessing the Burden of HPV-Associated Cancers in the United States. Cancer 113 (Suppl 10) 2837-2840 (2008).

⁴⁹ NOS = not otherwise specified

Overall, 9.5 percent of oropharyngeal cancer cases were diagnosed in the local stage. The proportion of locally-diagnosed cases was much higher among women than men (24.0 percent vs. 5.7 percent, respectively). More women than men were diagnosed in the distant stage: 18.0 percent among women and 12.5 percent among men (Table 12-10).

Table 12-10. Stage at Diagnosis of Oropharyngeal Cancer Cases by Sex; Delaware, 2006–2010

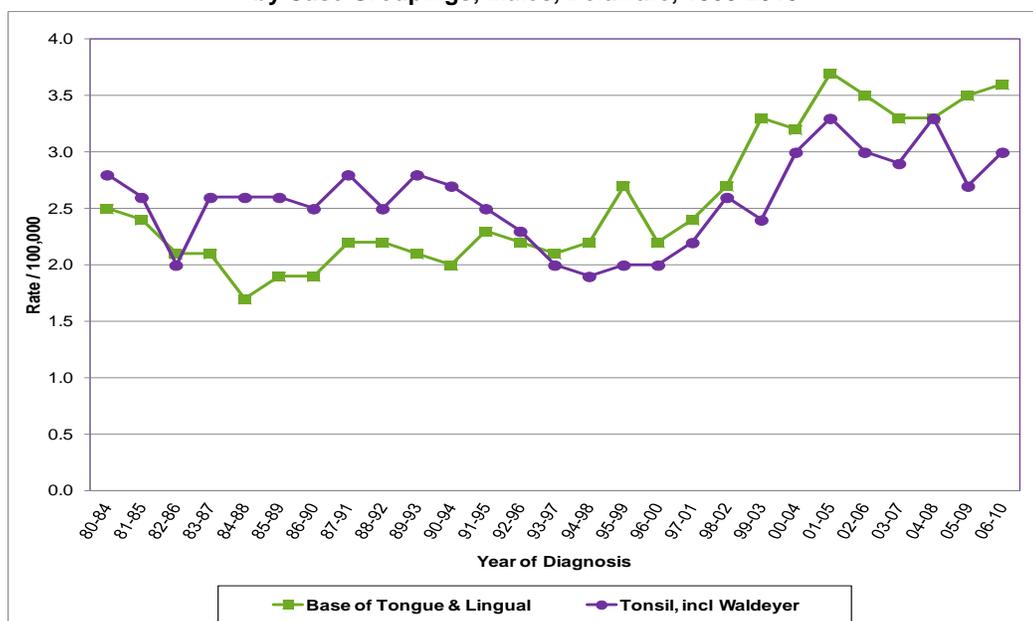
Stage at Diagnosis	All	Male	Female
Local	9.5%	5.7%	24.0%
Regional	73.1%	78.1%	54.0%
Distant	13.6%	12.5%	18.0%
Unknown	3.7%	3.6%	4.0%

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Oropharyngeal Cancer Incidence

In Figure 12-4 are incidence rates among males for two of the three oropharyngeal subgroups that are included in this report. There were too few cases in the ‘other’ oropharynx group to calculate reliable rates. Among males since 1996-2000 rates had increased 63.6 percent for cases of ‘base of tongue and lingual tonsil’ and 50.0 percent for cases of the ‘tonsil, including Waldeyer ring.’

Figure 12-4. Five-Year Average Age-Adjusted Incidence Rates for Oropharyngeal Cancers by Case Groupings; Males, Delaware, 1980-2010



* = Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Anal Cancer

Anal cancer is strongly associated with HPV types 33-36. The majority of rectal cancers, however, are adenocarcinoma which is not known to be associated with HPV. Although squamous cell carcinoma of the rectum is rare, it may be associated with HPV since overlapping squamous cell carcinoma of the anus can be misclassified as rectal squamous cell carcinoma.⁵⁰ Of the 473 rectal cancers diagnosed during 2006-2010,

⁵⁰ Saraiya M, Ahmed F, White M, Lawson H, Unger ER, Ehemann C. Toward Using National Cancer Surveillance Data for

only nine were squamous cell types (1.9 percent). A total of 87 anal cancers, including squamous cell carcinomas of the rectum, were identified as being associated with HPV (Table 12-11).

Table 12-11. Anatomic Site of Anal Cancers Associated with HPV by Sex; Delaware, 2006-2010

Anatomic Site	All	Male	Female
C20.9 - rectum, NOS	9	5	4
C21.0 - anus, NOS	31	12	19
C21.1 - anal canal	41	13	28
C21.8 - overlapping lesion of rectum, anus, and anal canal	6	4	2
Total	87	34	53

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

NOS = not otherwise specified

Median age at diagnosis of anal cancer cases was 59; 57 for men and 59 for women (Table 12-12). Caucasians comprised 83.9 percent of the 87 anal cancer cases. Proportions differed by sex: 73.5 percent of the 34 male cases were Caucasian and 90.6 percent of the 53 female cases were Caucasian. One male case was Hispanic.

Table 12-12. Demographics of Anal Cancer Cases by Sex; Delaware, 2006

Characteristic	All	Male	Female
Number of cases	87	34	53
Median age	59	57	59
Race			
Caucasian	83.9%	73.5%	90.6%
African American	14.9%	23.5%	9.4%
Other	1.1%	2.9%	0.0%
Ethnicity			
Hispanic	1.1%	2.9%	0.0%
Non-Hispanic	98.9%	97.1%	100.0%

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Overall, distribution of local and regional stages at diagnosis of the anal cancers was equal by sex; 59.8 percent were diagnosed in the local stage and 32.2 percent were diagnosed in the regional stage (Table 12-13). Proportionally more men than women were diagnosed in the distant stage (8.8 percent of men and 1.9 percent of women) but for 5.7 percent of women, stage at diagnosis was unknown.

Table 12-13. Stage at Diagnosis of Anal Cancer Cases by Sex; Delaware, 2006–2010

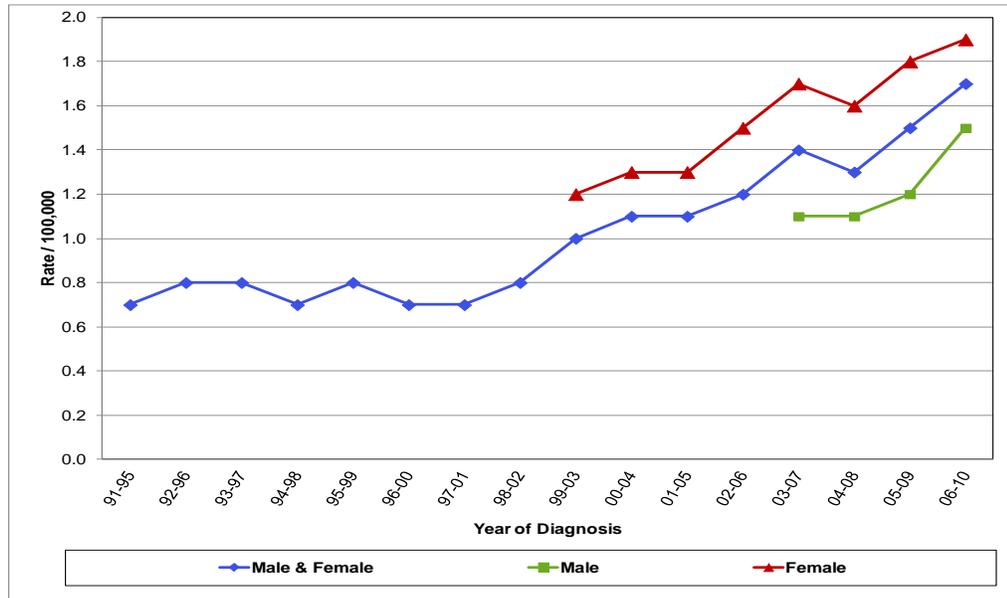
Stage at Diagnosis	All	Male	Female
Local	59.8%	58.8%	60.4%
Regional	32.2%	32.4%	32.1%
Distant	4.6%	8.8%	1.9%
Unknown	3.4%	0.0%	5.7%

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Figure 12-5 shows incidence rates for anal cancer by sex. Because the DPH policy states that incidence rates are only shown when there are 25 or more cases, incidence data for both sexes combined begin in 1991-1995: rates for women begin in 1999-2003 and for men in 2003-2007. Over the last ten time periods, the overall anal cancer incidence rate increased 143 percent. During the last four time periods, anal cancer incidence among women is about 44 percent higher than among men.

Preventing and Controlling Cervical and Other Human Papillomavirus-associated Cancers in the US. In: Assessing the Burden of HPV-Associated Cancers in the United States. Cancer 113 (Suppl 10) 2837–2840 (2008).

Figure 12-5. Five-Year Average Age-Adjusted Anal Cancers by Sex; Delaware, 1991-2010



* = Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

Other Anogenital Cancers

In Table 12-14 are demographic characteristics of the remaining anogenital cancers: cancers of the penis, vagina and vulva. Median ages at diagnosis are 63, 60 and 74 for cancers of the vulva, vagina and penis, respectively. The proportion of Caucasians ranges from 60.0 percent for vaginal cancers to 90.9 percent for penile cancers. Two of the 11 men with penile cancer are of Hispanic ethnicity.

Table 12-14. Demographics of Cancers of the Vulva, Vagina and Penis; Delaware, 2006–2010

Characteristic	Cancer Site		
	vulva	vagina	penis
Number of cases	79	20	11
Median age	63	60	74
Race			
Caucasian	88.0%	60.0%	90.9%
African American	11.0%	40.0%	9.1%
Other/unknown	1.0%	0.0%	0.0%
Ethnicity			
Hispanic	1.3%	0.0%	18.2%
Non-Hispanic	98.7%	100.0%	81.8%

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

About half of vulvar cancers were diagnosed in the local stage, compared with 30.0 percent of vaginal cancers and 81.8 percent of penile cancers (Table 12-15).

Table 12-15. Stage at Diagnosis for Cancers of the Vulva, Vagina and Penis; Delaware, 2006–2010

Stage at Diagnosis	vulva	vagina	penis
Local	50.6%	30.0%	81.8%
Regional	39.2%	30.0%	18.2%
Distant	3.8%	30.0%	0.0%
Unknown	6.3%	10.0%	0.0%

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2013.

13. CANCER INCIDENCE BY CENSUS TRACT

Background

As required by Title 16, Chapter 292 of the *Delaware Code* (Appendix F), the Delaware Division of Public Health (DPH) publishes cancer rates by census tract annually. Specifically:

“The agency [DPH] shall create a detailed map of each county in Delaware that graphically illustrates the overall incidence of cancer in each census tract. The census tracts will be identified on the maps and shall be color-coded to designate the degree of cancer incidence in each tract. These maps shall be created within 90 days of the agency receiving the cancer incidence data. The agency shall post the maps created ... on their website in a format that can be easily accessed and read by the public.”

Methods

Methods are described in detail in Appendix G.

Cancer Cases

- For 2006–2010, there were 25,474 cancer cases eligible for analysis. One case was excluded because the individual was homeless.

Census Tracts

- As of the 2010 Census, Delaware is divided into 214 census tracts.
- In 2006–2010, the least populated census tract (511.01 in Sussex County) had an average of 682 residents annually. The most populous census tract (402.02 in Kent County) had 10,955 residents. The average number of residents per census tract was 4,118

Results of Census Tract Analyses

Cancer incidence rates by census tract along with confidence intervals are shown in Appendix I for 2006–2010. Census tracts with rates that are significantly higher or lower than the state average are shaded in yellow and blue, respectively.

Results for 2006–2010 show that:

- In 11 of Delaware’s 214 census tracts, the all site cancer incidence rate was statistically significantly higher than Delaware’s average 2006–2010 incidence rate (512.1 per 100,000)⁵¹,
- In 11 census tracts, the all site cancer incidence rate was significantly lower than Delaware’s average incidence rate (512.1 per 100,000).
- Incidence rates for the remaining 192 census tracts are not significantly different from the state’s average rate.

For 2006–2010, maps showing cancer incidence rates by census tract grouped by quintile are in Appendix J and maps indicating census tracts that had either a significantly high or significantly low incidence rate are in Appendix K.

⁵¹ 512.1 is average 2006–2010 Delaware incidence rate calculated by Excel rather than SEER*Stat (511.1).

Discussion of Results of Census Tract Analyses

When assessing cancer incidence data by census tract, it should be kept in mind that the occurrence of cancer may differ across census tracts for a variety of reasons. For example, lifestyle behaviors may cluster in a homogeneous community. In addition, the presence or absence of exposure to environmental or occupational carcinogen(s) is often limited to a defined geographic area. In addition, residents in certain geographic areas may be more impoverished than other residents, which will affect their availability of health insurance coverage as well as their level of access to health care, particularly cancer screening services. Finally, chance or random variation can play a role, since approximately five percent of all comparisons will be significantly different due to chance alone.

Additional caution is needed when comparing results from the 2006–2010 census tract analysis with results for 2003–2007 and earlier time periods. Because of the change in the configuration of census tracts in Delaware; i.e. changing from 197 census tracts in the 2000 Census to 214 in the 2010 Census, results using the two different census tract analyses would be expected to differ due to various reasons, some of which can be characterized. Despite population growth in the intervening decade, the average population size of each census tract did decrease; from an average of 4,257 residents (using the 197 tracts from the 2000 Census) to 4,118 for the 214 census tracts (using the 2010 Census).

There is an inherent instability in calculating cancer incidence rates at the census tract level. In a small group, such as a census tract, the snapshot changes considerably from year to year. If one case of cancer is diagnosed in a census tract one year, and three cases of cancer are diagnosed in the same census tract the next year, the cancer rate for that census tract will change dramatically from one year to the next. These large fluctuations do not typically occur in larger populations. If we compare the cancer rate for a census tract to the cancer rate for the whole state of Delaware for a given time period, it would not be unusual to find the comparison different (perhaps even reversed) in the following time period.

The all site cancer incidence fluctuations in census tract 513.02 illustrate this key point. During 2003–2007, 134 cancer cases were diagnosed and the all site cancer incidence rate of 823.3 per 100,000 in census tract 513.02 was significantly elevated compared to the all site cancer incidence rate for Delaware as a whole. In 2004–2008, the number of cancer cases decreased by 11 and there were 123 cancer cases. However, despite the decrease in the number of cases, the all site cancer incidence rate of 649.2 per 100,000 for this time remained significantly elevated compared to the all site cancer incidence rate for Delaware as a whole. For the most recent time period, 2006–2010, the number of cancer cases diagnosed in this census tract decreased by 11 to 112 cancer cases and the all site cancer incidence rate of 583.9 per 100,000 was not statistically significantly different compared to the all site cancer incidence rate for Delaware. A small change in the estimated population of a census tract can also have a dramatic effect on the calculation of an incidence rate.

Inaccurate data on the population at risk in small geographic areas continues to complicate epidemiologic studies in community settings. Census data are known to be less accurate for cities or counties than for states. In addition: *“The uncertainty is greatest for demographic subgroups of the population during the 10-year interval between national census counts.”*⁵²

Since population estimates for census tracts in analyses during the three initial time periods (2001–2005, 2002–2006, 2003–2007) relied solely on 2000 Census population data to project census tract populations, there was the potential for major fluctuations in the rate when comparing data using the 2000 Census projections with data using the 2010 Census populations. A further complication is the fact that before 2004–2008, there was less accuracy because geocoding was not yet complete.

⁵² Thun M. Sinks T. Understanding Cancer Clusters. *Cancer: A Cancer Journal for Clinicians*, 54(5), 273-280 (2004)

Cancer Incidence Data

Delaware Cancer Registry

This report covers data on cancer cases diagnosed among Delawareans from January 1, 2006 to December 31, 2010 that were reported to the Delaware Cancer Registry (DCR) by May 2013. Trends in incidence rates are based on cancers diagnosed from January 1, 1980, to December 31, 2010.

During 2006–2010, 25,475 cancer cases were diagnosed among Delawareans, which includes individuals with cancers diagnosed at more than one site, known as multiple primaries. With the exception of bladder cancer, only malignant tumors are included in the analyses. *In situ* bladder cancer cases are included because, based on language used by pathologists, it is difficult to distinguish them from malignant cancers.

The International Classification of Diseases for Oncology, Second Edition (ICD-O-2), describes the topography (primary anatomic site) and morphology (histology) for cancers reported from 1988 through 2000. Cancers diagnosed from 2001 through the present are coded using the International Classification of Diseases for Oncology, Third Edition (ICD-O-3).⁵³ Relevant codes for this report are in Appendix B. The topography code defines both the site of the tumor and the type of cancer. The first four digits of the morphology code define the histology of the cancer and the fifth digit indicates whether or not the cancer is malignant, benign, *in situ* or uncertain. Consistent with publication of the Centers for Disease Control and Prevention's (CDC) U.S. Cancer Statistics, Kaposi's sarcoma and mesothelioma are considered separate sites based on distinct histology codes.

SEER Program of the National Cancer Institute

U.S. incidence and mortality data obtained from the Surveillance, Epidemiology and End Results (SEER) program of the National Cancer Institute were used as the comparison for Delaware's cancer incidence and mortality rates. These data were accessed using SEER*Stat. Since 1973 the SEER program collects, analyzes and disseminates cancer incidence data for cancer control, diagnosis, treatment and research from population-based registries throughout the United States. The initial SEER reporting areas were Connecticut, Iowa, New Mexico, Utah, and Hawaii; the metropolitan areas of Detroit, Michigan, and San Francisco-Oakland, California; and the Commonwealth of Puerto Rico (through 1989). Additional geographic areas were selected for inclusion in the SEER Program based on their ability to operate and maintain a high quality population-based cancer reporting system and for their epidemiologically-relevant population subgroups.⁵⁴

Historically, Delaware's cancer incidence rates have been compared to cancer incidence rates calculated using data from the original nine registries (SEER-9) that provided data to SEER beginning in 1974–1975. In 2009, Delaware's Division of Public Health (DPH) and the Delaware Cancer Consortium elected to begin using cancer incidence rates based on 17 population-based registries as a comparison for Delaware's cancer incidence rates. Currently SEER incidence rates are based on data from 18 population-based registries (SEER-18) that represent 28 percent of the U.S. population. The primary benefit of using U.S. comparison rates derived from SEER-18 is that these rates are based on a larger and more representative sub-sample of the U.S. population. Also, comparing Delaware's incidence rates with rates derived from the SEER-18 registries provides a comparison of cancer surveillance statistics that is consistent with those of other population-based registries throughout the U.S.

⁵³ Fritz A, Jack A, Parkin DM, Percy C, Shanmugarathan, Sobin L, Whelan S (eds). International Classification of Diseases for Oncology, Third Edition (ICD-O-3). World Health Organization, Geneva.

⁵⁴ Surveillance, Epidemiology and End Results (SEER) Program, National Cancer Institute. <http://seer.cancer.gov/about/>

Cancer Mortality Data

Delaware Health Statistics Center

Mortality data are provided by the Delaware Health Statistics Center for all death certificates filed in Delaware from 2006 through 2010. Five-year average annual age-adjusted cancer mortality rates are based on deaths that occurred in the five-year time period from January 1, 2006 to December 31, 2010. Trends in cancer mortality are presented for deaths that occurred from 1980 through 2010.

Underlying cause-of-death codes are based on the International Classification of Diseases, Ninth Edition (ICD-9) for deaths that occurred between 1980 and 1998. For deaths that occurred from 1999 to the present, the International Classification of Diseases, Tenth Edition (ICD-10) is used to code cause of death. To determine the underlying cause of death, the sequence of events leading to the individual's death are recorded on the death certificate and run through the Automated Classification of Medical Entities (ACME) software used by the National Center for Health Statistics. This program uses a series of rules and hierarchies of events to select the most appropriate underlying cause of death.

National Center for Health Statistics

U.S. mortality data from the National Center for Health Statistics (NCHS) are used for comparison with Delaware's cancer mortality rates. U.S. mortality data are compiled from all death certificates filed in the 50 states and the District of Columbia from 1980 through 2010. Cause of death was coded by NCHS in accordance with World Health Organization regulations that stipulate that cancer deaths be coded using the most current revision of the International Classification of Diseases. As in Delaware, deaths that occurred prior to 1999 in the U.S. are coded using ICD-9 and beginning with 1999 deaths are coded using ICD-10. These U.S. mortality data were accessed through SEER*Stat.⁵⁵

Population Estimates, 2006–2010

Cancer incidence and mortality rates for the U.S. are calculated using population totals estimated by the U.S. Census. Delaware rates are based on population estimates released by the Delaware Population Consortium (DPC) in March 2012. Population estimates for Delaware by race and sex are presented in Appendix D.

Risk Factors and Early Detection

Data on known and suspected cancer risk factors, prevention options and screening recommendations are at the beginning of each site-specific chapter of this report, as relevant. Primary resources for this information are: (1) American Cancer Society (www.cancer.org) and (2) National Cancer Institute (www.cancer.gov).

Behavioral Risk Factor Surveillance (BRFS) System

The Behavioral Risk Factor Surveillance (BRFS) system provides estimates of the prevalence of risk factors across Delaware and nationally. The most recently available risk factor data from BRFS are from 2012. Risk factor data are included in appropriate chapters for site-specific cancers; supplemental data on obesity, physical inactivity and diet are presented in Appendix E.

Statistical Methodology and Technical Terms

Age-Adjustment of Incidence and Mortality Rates

The age distribution of a population is an important determinant of the burden of cancer. Because cancer incidence and mortality increase with age, crude rates cannot be used for comparisons of cancer statistics between sexes, racial or ethnic groups, or geographic entities across different time spans.

⁵⁵ SEER*Stat Software, Surveillance, Epidemiology and End Results (SEER) program, National Cancer Institute. <http://seer.cancer.gov/seerstat/index.html>

Age adjustment is useful when comparing two or more populations with different age distributions at one point in time or one population at two or more points in time.⁵⁶ To calculate an age-adjusted incidence rate, the crude incidence rate for each of 18 five-year age groups is multiplied by a fixed population weight for that specific age group using the appropriate 2000 U.S. Standard Population (Table A-1).⁵⁷ Individual age-specific rates are then summed to obtain the overall age-adjusted rate.

Table A-1. U.S. Standard Year 2000 Population Weights, by Age Group

Age Group	Population Weight	Age Group	Population Weight
0-4	0.0691	45-49	0.0721
5-9	0.0725	50-54	0.0627
10-14	0.0730	55-59	0.0485
15-19	0.0722	60-64	0.0388
20-24	0.0665	65-69	0.0343
25-29	0.0645	70-74	0.0318
30-34	0.0710	75-79	0.0270
35-39	0.0808	80-84	0.0178
40-44	0.0819	85+	0.0155

The formula for an age-adjusted rate can be presented as follows:

$$\text{Age-Adjusted Rate} = \text{sum} (w_i \times ((c_i/n_i) \times 100,000))$$

- c_i is the number of new cases or deaths in the i age group, n_i is the population estimate for the i age group
- w_i is the proportion of the standard population in the i age group.
- All rates were expressed per 100,000 of the population.

Race- and Sex-Specific Incidence and Mortality Rates

Race- and sex-specific incidence and mortality rates are calculated to assess how cancer patterns differed across subgroups within the state. These rates are calculated by dividing the number of cases or deaths that occurred in each race and/or sex group by the total population in the corresponding race and/or sex group over the same time period. As with other rates, these rates were adjusted to the U.S. standard population and expressed per 100,000 of the population.

Confidence Intervals

Age-adjusted incidence and mortality rates are subject to chance variation, particularly when they are based on a small number of cancer cases or deaths occurring over a limited time period or in a limited geographic area. Aggregating several years of data provides more reliable estimates of incidence and mortality in these situations. The level of uncertainty associated with incidence and mortality rates is estimated by the 95-percent confidence interval.

When incidence rates are based on more than 100 cases, lower and upper limits of the 95 percent confidence intervals for an age-adjusted (AA) incidence or mortality rate are calculated using SEER*Stat⁵⁸ by methodology shown here:⁵⁹

⁵⁶ Anderson RN, Rosenberg HM. Report of the second workshop on age adjustment. National Center for Health Statistics. Vital Health Stat 4(30). 1998.

⁵⁷ Klein RJ, Schoenborn CA. Age Adjustment Using the 2000 Projected U.S. Population. Healthy People statistical notes, no. 20. <http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>

⁵⁸ Surveillance, Epidemiology and End Results (SEER) Program, National Cancer Institute. SEER*Stat Software, Latest Release: Version 7.1.0 – July 17, 2012. <http://seer.cancer.gov/seerstat/index.html>

⁵⁹ Tiwari RC, Clegg LX, Zou Z. Efficient interval estimation for age-adjusted cancer rates. Stat Methods Med Res 2006;15(6):547-69.

$$\text{Lower Confidence Limit} = \text{AA Rate} - 1.96 \left(\frac{(\text{AA Rate})}{\sqrt{\# \text{ Cases}}} \right)$$

$$\text{Upper Confidence Limit} = \text{AA Rate} + 1.96 \left(\frac{(\text{AA Rate})}{\sqrt{\# \text{ Cases}}} \right),$$

- where AA Rate is the age-adjusted incidence or mortality rate

When an incidence or mortality rate is based on fewer than 100 cases or deaths, the 95% confidence intervals are calculated using the following formulas:

$$\text{Lower Confidence Limit (LCL)} = \text{AA Rate} \times L$$

$$\text{Upper Confidence Limit (LCL)} = \text{AA Rate} \times U$$

where L and U are values published by the National Center for Health Statistics for the specific purpose of calculating 95% confidence intervals for rates based on fewer than 100 cases.⁶⁰

Stage at Diagnosis

Stage at diagnosis describes the extent to which a cancer has spread from the site of origin at the time of diagnosis. SEER summary staging is used to define the stage at diagnosis for all incident cancer cases. Cancer cases diagnosed between 1980 and 2000 are coded according to Summary Stage 1977. Cases diagnosed from 2001 through 2003 are coded according to Summary Stage 2000. Beginning in 2004, SEER Summary Stage 2000, derived using the Collaborative Staging Algorithm, is used.

Three categories define the stage at diagnosis for a particular cancer site:

- **Local** - Tumor is invasive but confined to the organ of origin.
- **Regional** - Tumor has extended beyond limits of the organ of origin with no evidence of distant metastasis.
- **Distant** - Cancer cells have detached from the tumor at the primary site and are growing at a new site in the body.

Data Release Standards

For this report, cancer frequencies and rates are released according to DPH Policy Memorandum 49 (Data and Data Release Standards). Incidence and mortality frequencies of fewer than six are not presented and age-adjusted incidence and mortality rates based on fewer than 25 cases or deaths are not calculated. This DPH policy helps protect patient privacy and confidentiality^{61, 62}. Furthermore, a cancer rate based on a very small number of cases is inherently unstable and cannot be reliably interpreted.

Definition of Race

Race-specific statistics in this report are limited to Caucasians and African Americans, with the exception of Section 12 (The Human Papillomavirus and Cancer) and Appendix C. Incidence and mortality rates for the total population, however, do include residents of all race categories or unknown race regardless of Hispanic ethnicity status.

⁶⁰ Martin JA, Hamilton BE, Ventura SJ, Menacker F, Park MM, Sutton PD. Births: Final data for 2001. National vital statistics reports; vol. 51 no. 2. Hyattsville, Maryland: National Center for Health Statistics, 2002.

⁶¹ Coughlin SS, Clutter GG, Hutton M. Ethics in Cancer Registries. *Journal of Cancer Registry Management*, 2: 5-10, 1999.

⁶² McLaughlin CC. Confidentiality protection in publicly released central registry data. *Journal of Cancer Registry Management*, 2: 84-88, 2002.

Appendix B: Primary Cancer Site Definitions⁶³

Cancer Site Group	ICD-O-3 Site (Topography)	ICD-O-3 Histology (Morphology)
female breast	C500–C509	excludes 9050–9055, 9140 and 9590–9992
colon and rectum	C180–C189, C260, C199, C209	excludes 9050–9055, 9140 and 9590–9992
liver, intrahepatic bile ducts and other biliary	C220, C221	excludes 9050–9055, 9140 and 9590–9992
lung and bronchus	C340–C349	excludes 9050–9055, 9140 and 9590–9992
melanoma of the skin	C440-C449	8720-8790
pancreas	C250–C259	excludes 9050–9055, 9140 and 9590–9992
prostate	C619	excludes 9050–9055, 9140 and 9590–9992
uterus	C540–C549, C559	excludes 9050–9055, 9140 and 9590–9992

HPV-Associated Cancer Site	ICD-O-3 Site (Topography)	ICD-O-3 Histology (Morphology)
anus, anal canal and anorectum	C210-C212, C218	excludes 9050–9055, 9140 and 9590–9992
cervix	C500–C509	excludes 9050–9055, 9140 and 9590–9992
(1) oropharyngeal – base of tongue and lingual tonsil	C01.9, C02.4	excludes 9050–9055, 9140 and 9590–9989
(2) oropharyngeal – tonsil, including Waldeyer ring	C09.0, C09.1, C09.8, C09.9, C14.2	excludes 9050–9055, 9140 and 9590–9989
(3) 'other' oropharynx	C02.8, C10.2, C10.8, C 10.9, C14.0, C14.8	excludes 9050–9055, 9140 and 9590–9989
penis	C600-C609	excludes 9590-9989, & sometimes 9050-9055, 9140 ⁶⁴
vagina	C529	excludes 9590-9989, & sometimes 9050-9055, 9140 ⁶⁵
vulva	C510-C519	excludes 9590-9989, & sometimes 9050-9055, 9140 ⁶⁶

⁶³ Site Recode ICD-O-3/WHO 2008 Definition. http://seer.cancer.gov/siterecode/icdo3_dwhoheme/index.html – accessed 6/17/2013.

⁶⁴ The Site Recode variable can be created with or without Mesothelioma (9050-9055) and Kaposi Sarcoma (9140) as separate groupings. The table above documents both possibilities.

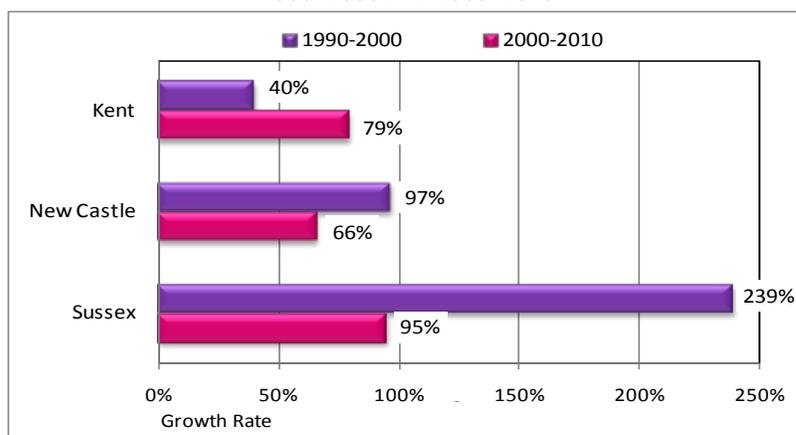
⁶⁵ The Site Recode variable can be created with or without Mesothelioma (9050-9055) and Kaposi Sarcoma (9140) as separate groupings. The table above documents both possibilities.

⁶⁶ The Site Recode variable can be created with or without Mesothelioma (9050-9055) and Kaposi Sarcoma (9140) as separate groupings. The table above documents both possibilities.

Appendix C: Cancer Incidence and Mortality among Persons of Hispanic Ethnicity

The Census Bureau defines "Hispanic or Latino" as "a person of Cuban, Mexican, Puerto Rican, South or Central American or other Spanish culture or origin regardless of race."⁶⁷ In 1990, persons of Hispanic ethnicity comprised 2.4 percent of Delaware's population. Delaware's Hispanic population doubled to 4.8 percent by 2000 and then increased by 71 percent during 2000–2010. As of the 2010 U.S. Census, persons of Hispanic origin comprise 8.4 percent of the State's population. The largest growth is seen in Sussex County, where the number of persons of Hispanic ethnicity grew by 239 percent in the decade 1990–2000 (from 1.3 percent to 4.4 percent) and then increased by 95 percent more during 2000–2010 (from 4.4 percent to 8.6 percent) (Figure C-1). New Castle County has had the largest percentage of persons of Hispanic ethnicity since 1990, the first census when data on Hispanic ethnicity were collected separately. The Hispanic population in New Castle County grew from 2.7 percent in 1990, to 5.3 percent in 2000 and to 8.7 percent in 2010. Kent County had the second largest relative increase in the proportion of Hispanics during the most recent decade (2.3 percent in 1990, 3.2 percent in 2000 and 5.8 percent in 2010).

Figure C-1. Changes in Delaware's Hispanic Population by County and Decade, 1990–2000 and 2000–2010



Source: U.S. Census Bureau 2010, American FactFinder <http://factfinder2.census.gov/>

Hispanic cancer rates were calculated for 2006–2010. Incidence and mortality frequencies of fewer than six cases and incidence and mortality rates based on fewer than 25 cases are not shown according to the Division of Public Health Policy Memorandum 49. Cancer rates are calculated by dividing the number of cancer cases (numerator) by a population (denominator); therefore, cancer rates are heavily influenced by changes or uncertainties in the number of cancer cases and the size of the population. Specific issues that suggest that Hispanic cancer rates would be subject to misinterpretation are presented below:

- Uncertain estimate of Delaware's Hispanic population** — Estimates of Delaware's population are derived from a census performed every 10 years by the U.S. Census Bureau. The Delaware Population Consortium (DPC) uses census data to estimate the Delaware population between census years. In preparation for the post 2010 Census benchmarking when the race categories will shift to white non-Hispanic, black non-Hispanic, other non-Hispanic, and Hispanic, a separate projection for Hispanics is provided by the DPC. This projection is made by using the overall age structure of the total population and applying the current percentage of a given age-sex category measured in the American Community

⁶⁷ Grieco, EM, Cassidy RC. (2001-03). "Overview of Race and Hispanic Origin: Census 2000 Brief" U.S. Census Bureau. <http://www.census.gov/prod/2001pubs/cenbr01-1.pdf> Accessed May 26, 2011.

Survey for years 2006–2010 combined. A final adjustment was made based on projections from the US Census Bureau as to the overall rate of growth for the Hispanic population in both the state and the nation. A more conventional methodology will be used for the 2012 Delaware Population Consortium release.

- **Inaccurate recording of Hispanic ethnicity on death certificates** — Race and Hispanic origin are treated as distinct categories and reported separately on death certificates and to the Delaware Cancer Registry, in accordance with guidelines from the federal Office of Management and Budget. However, there is the potential that the Hispanic race is under-reported both in the cancer registry and on death certificates.
- **Hispanic Identification in the Delaware Cancer Registry data** — NAACCR convened an Expert Panel in 2001 to develop a best practices approach to Hispanic identification. In the resulting approach to enhance Hispanic identification, the NAACCR Hispanic Identification Algorithm (NHIA) computerized and released for use by central cancer registries in 2003. NHIA is used for identification of Hispanic origin in this report. The expert panel continues to evaluate NHIA considering the possibility of under- or over-estimation of Hispanic cancer incidence using this algorithm due to misclassification.
- **Small number of cases or deaths and small population sizes** — An incidence or mortality rate is an estimate and the reliability of estimates can be measured by calculating a confidence interval. A narrow confidence interval suggests that the rate is a good estimate; a wide confidence interval suggests that the rate should be interpreted with caution. If the confidence intervals of two rates do not overlap, the rates are considered to be statistically different. Both the size of the numerator (the number of cases or deaths) and size of the denominator (the population) determine the width of the confidence interval. Typically, researchers report 95% confidence intervals; when constructed properly, a 95% confidence interval includes the true cancer rate 95 percent of the time.

Cancer Incidence among Persons of Hispanic Ethnicity (Table C-1)

- During 2006–2010, 574 cases of cancer were reported among Delawareans known to be of Hispanic ethnicity: 271 male (47.2 percent) and 303 female (52.8 percent).
- The all site cancer incidence rate was 416.1 per 100,000 and this incidence rate is significantly lower than the rate for the state of Delaware (511.1 per 100,000).
- The incidence rate among Hispanic males (413.3 per 100,000) is significantly lower than the rate for Delaware males (599.8 per 100,000). Among Hispanic females, however, the all site cancer incidence rate (452.7 per 100,000) is not significantly different from all Delaware females combined (443.5 per 100,000).

Cancer Mortality among Persons of Hispanic Ethnicity (Table C-2)

- During 2006–2010, 133 deaths from cancer occurred among Delawareans known to be of Hispanic ethnicity: 78 male (58.6 percent) and 55 female (41.4 percent).
- The all site cancer mortality rate was 124.5 per 100,000 and this mortality rate is significantly lower than the rate for the state of Delaware (182.9 per 100,000).
- The mortality rate among Hispanic males (140.9 per 100,000) is significantly lower than the rate for Delaware males (221.6 per 100,000). Among Hispanic females the all site cancer mortality rate (117.1 per 100,000) is lower than among all Delaware females combined (155.5 per 100,000), but the difference is not statistically significant.

**Table C-1. Cancer Cases, Population Size and Age-Adjusted* Cancer Incidence Rates;
Delaware Hispanic Population, 2006–2010**

Cancer Site and Sex	Number of Cases	Five-Year Population	Age-Adjusted Incidence Rate and 95% Confidence Interval
All Site (all)	574	338,028	416.1 (375.5 , 459.4)
All Site (male)	271	178,599	413.3 (355.7 , 476.6)
All Site (female)	303	159,429	452.7 (387.3 , 524.7)
Breast (female)	104	159,429	147.9 (112.4 , 189.6)
Colorectal (all)	40	338,028	28.7 (19.1 , 40.9)
Colorectal (male)	23	178,599	---
Colorectal (female)	17	159,429	---
Lung (all)	48	338,028	46.0 (32.3 , 62.8)
Lung (male)	21	178,599	---
Lung (female)	27	159,429	57.9 (34.2 , 89.4)
Prostate	89	178,599	158.8 (123.2 , 200.2)

* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

--- = Rate not shown when fewer than 25 cases.

Source: Delaware Cancer Registry, Delaware Division of Public Health, 2013

**Table C-2. Cancer Deaths, Population Size and Age-Adjusted* Cancer Mortality Rates;
Delaware Hispanic Population, 2006–2010**

Cancer Site and Sex	Number of Deaths	Five-Year Population	Age-Adjusted Mortality Rate and 95% Confidence Interval
All Site (all)	133	338,028	124.5 (101.1 , 150.8)
All Site (male)	78	178,599	140.9 (106.5 , 181.4)
All Site (female)	55	159,429	117.1 (82.0 , 159.9)
Breast (female)	6	159,429	---
Colorectal (all)	11	338,028	---
Lung (all)	48	338,028	28.8 (18.3 , 42.3)
Lung (male)	21	178,599	---
Lung (female)	27	159,429	19.7 (8.9 , 36.7)
Prostate	89	178,599	22.5 (8.5 , 44.7)

* = Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.

--- = Rate not shown when fewer than 25 deaths.

Source: Delaware Health Statistics Center, 2013

Appendix D: Delaware Population Estimates by Sex, Race, Years & Age Group, 1980–2010

TOTAL POPULATION

Years	Age group																	Total	
	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84		85+
1980-84	214,207	215,224	238,510	284,928	287,504	257,448	240,373	198,978	169,336	160,852	159,719	157,164	137,314	112,545	82,140	56,216	35,859	27,646	3,035,963
1981-85	218,519	217,674	235,624	278,183	285,957	262,204	247,217	205,957	176,370	163,939	158,955	156,135	138,915	115,869	84,762	58,120	36,884	28,312	3,069,596
1982-86	222,918	220,151	232,773	271,597	284,419	267,048	254,255	213,182	183,696	167,085	158,194	155,112	140,534	119,290	87,468	60,088	37,938	28,995	3,104,743
1983-87	227,406	222,657	229,956	265,167	282,889	271,982	261,493	220,660	191,326	170,291	157,437	154,097	142,173	122,813	90,260	62,123	39,023	29,694	3,141,447
1984-88	231,983	225,191	227,174	258,889	281,367	277,007	268,938	228,400	199,273	173,559	156,684	153,088	143,831	126,440	93,141	64,227	40,139	30,410	3,179,741
1985-89	236,653	227,754	224,425	252,761	279,854	282,125	276,595	236,411	207,551	176,889	155,935	152,086	145,508	130,174	96,115	66,402	41,286	31,143	3,219,667
1986-90	241,417	230,346	221,710	246,778	278,349	287,338	284,469	244,704	216,172	180,283	155,189	151,090	147,204	134,018	99,184	68,651	42,467	31,894	3,261,263
1987-91	247,002	233,344	221,422	239,937	277,915	290,859	292,199	253,305	226,107	183,991	155,843	150,234	148,777	137,280	102,762	70,853	43,848	33,044	3,308,722
1988-92	252,939	237,039	222,907	234,247	276,897	292,805	298,751	262,638	234,402	190,346	158,034	149,705	149,883	139,752	106,802	73,121	45,335	34,445	3,360,048
1989-93	258,679	241,198	226,409	230,132	275,530	292,343	303,805	272,267	241,848	198,345	162,375	149,809	150,596	141,613	110,952	75,571	46,885	36,158	3,414,515
1990-94	263,575	245,976	231,812	228,278	273,079	289,734	307,523	281,967	248,810	207,578	168,638	150,931	150,828	142,664	115,253	78,238	48,501	38,109	3,471,495
1991-95	267,276	251,644	238,648	229,237	269,266	285,672	309,672	291,351	255,795	218,395	176,552	152,922	150,922	142,984	119,406	81,230	50,469	40,220	3,531,662
1992-96	268,230	257,884	244,332	234,502	262,602	282,623	309,916	300,043	261,684	230,929	184,172	156,088	150,842	143,580	122,749	84,821	52,337	42,224	3,589,559
1993-97	267,318	264,096	249,956	241,269	256,251	279,379	309,039	307,035	269,684	240,209	193,595	160,553	150,922	144,422	125,162	88,785	54,357	44,091	3,646,121
1994-98	265,318	270,063	255,087	249,306	251,098	276,614	306,836	312,437	278,979	247,970	203,452	166,464	151,575	145,375	127,290	92,731	56,609	45,874	3,703,078
1995-99	263,097	275,155	259,963	257,829	248,402	273,725	303,060	316,753	288,783	254,999	213,433	173,368	153,324	146,388	128,811	96,676	59,072	47,686	3,760,523
1996-00	260,887	278,384	265,330	265,682	248,998	269,598	298,611	319,891	298,156	261,724	224,182	181,016	155,416	147,743	130,117	100,350	61,687	49,464	3,817,237
1997-01	260,222	279,236	271,171	270,361	254,617	262,938	294,526	321,205	306,718	267,541	236,586	188,557	158,410	148,605	131,729	103,494	64,856	51,192	3,871,965
1998-02	261,182	278,111	276,995	273,420	262,695	255,987	290,542	320,747	314,036	275,407	246,059	197,923	162,941	149,202	133,595	106,149	68,385	53,284	3,926,663
1999-03	263,147	275,728	282,716	276,063	270,531	250,646	286,717	318,458	319,534	284,720	253,936	208,082	168,894	150,079	135,437	108,913	72,185	55,811	3,981,596
2000-04	264,703	270,578	285,718	277,493	277,587	245,714	280,543	313,374	325,255	296,648	262,791	219,919	176,929	152,903	138,167	112,027	76,375	58,800	4,035,524
2001-05	269,887	268,661	288,360	279,988	283,773	248,988	276,405	308,047	328,334	306,127	269,536	230,755	184,250	154,074	138,993	113,367	79,463	61,847	4,090,855
2002-06	273,561	266,320	287,414	281,487	285,131	255,158	267,835	301,717	329,046	314,723	275,669	243,574	191,992	156,630	139,720	115,194	82,202	65,434	4,132,807
2003-07	278,085	268,768	286,896	287,332	285,412	267,557	262,491	298,299	329,386	323,070	284,463	253,878	201,691	161,040	140,063	116,993	84,512	69,443	4,199,379
2004-08	282,158	271,446	284,427	292,326	285,180	278,529	257,724	294,273	327,326	329,443	294,912	262,525	212,468	167,073	140,958	118,929	87,071	73,892	4,260,660
2005-09	290,706	281,357	285,927	299,434	287,888	292,698	260,768	293,349	323,638	333,892	304,844	270,096	223,256	173,751	142,100	119,924	88,963	79,217	4,351,808
2006-10	293,854	286,000	284,056	302,200	289,559	298,680	262,998	288,681	317,744	336,827	314,232	276,697	234,306	181,128	143,780	121,305	90,667	83,712	4,406,426

DATA SOURCE: Delaware Population Consortium, Population Projection Series. March 2012 (for 2006–2010). http://stateplanning.delaware.gov/information/dpc_projections.shtml – accessed 7/17/2012.

TOTAL MALE POPULATION

Years	Age group																	Total	
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84		85+
1980-84	109,306	109,805	121,585	141,190	140,621	126,224	117,528	96,927	82,646	78,388	77,061	74,473	65,132	50,443	33,955	21,202	11,611	7,269	1,465,366
1981-85	111,544	111,121	120,157	137,931	140,086	128,782	121,035	100,443	86,114	79,862	76,725	74,084	65,854	51,973	35,246	22,030	11,988	7,332	1,482,307
1982-86	113,828	112,453	118,745	134,748	139,553	131,392	124,646	104,086	89,727	81,364	76,391	73,698	66,584	53,549	36,586	22,890	12,378	7,395	1,500,013
1983-87	116,159	113,801	117,350	131,638	139,021	134,054	128,365	107,861	93,492	82,895	76,058	73,314	67,322	55,173	37,976	23,784	12,780	7,458	1,518,501
1984-88	118,537	115,165	115,971	128,600	138,491	136,771	132,195	111,773	97,415	84,454	75,727	72,931	68,068	56,846	39,420	24,712	13,196	7,522	1,537,794
1985-89	120,964	116,546	114,608	125,632	137,964	139,543	136,139	115,827	101,503	86,043	75,397	72,551	68,823	58,570	40,919	25,677	13,625	7,587	1,557,918
1986-90	123,441	117,943	113,261	122,733	137,438	142,371	140,201	120,028	105,762	87,662	75,069	72,173	69,585	60,346	42,474	26,679	14,068	7,652	1,578,887
1987-91	126,361	119,575	113,147	119,415	137,266	144,393	144,160	124,332	110,654	89,453	75,440	71,791	70,326	61,932	44,245	27,669	14,586	7,935	1,602,682
1988-92	129,420	121,562	113,881	116,683	136,734	145,559	147,517	129,015	114,657	92,613	76,507	71,522	70,884	63,213	46,211	28,723	15,182	8,316	1,628,201
1989-93	132,392	123,724	115,770	114,714	136,060	145,319	150,055	133,884	118,210	96,587	78,550	71,575	71,327	64,282	48,108	29,921	15,851	8,786	1,655,113
1990-94	134,893	126,195	118,659	113,863	134,793	143,882	151,941	138,762	121,554	101,108	81,480	72,141	71,505	65,105	49,980	31,199	16,567	9,376	1,683,004
1991-95	136,777	129,054	122,259	114,510	132,759	141,725	152,970	143,435	124,882	106,389	85,222	73,078	71,636	65,589	51,812	32,650	17,462	10,031	1,712,240
1992-96	137,127	132,227	125,389	117,153	129,509	139,932	153,216	147,705	127,627	112,514	88,790	74,649	71,602	66,183	53,329	34,376	18,327	10,620	1,740,276
1993-97	136,560	135,384	128,537	120,476	126,511	138,066	152,850	151,106	131,610	116,796	93,387	76,842	71,604	66,898	54,471	36,193	19,279	11,215	1,767,785
1994-98	135,513	138,493	131,217	124,569	124,021	136,681	151,765	153,614	136,352	120,327	98,249	79,630	71,829	67,657	55,678	37,857	20,366	11,836	1,795,655
1995-99	134,370	141,136	133,699	128,994	122,710	135,375	149,777	155,661	141,353	123,570	103,159	82,833	72,633	68,311	56,850	39,503	21,522	12,507	1,823,964
1996-00	133,161	142,939	136,383	132,978	123,174	133,430	147,574	157,118	146,142	126,696	108,399	86,446	73,549	69,158	57,860	41,098	22,776	13,252	1,852,133
1997-01	132,716	143,337	139,243	135,903	125,672	130,319	145,374	157,968	150,411	129,323	114,470	90,033	74,975	69,650	59,001	42,519	24,294	13,961	1,879,169
1998-02	133,022	142,634	142,083	138,230	129,134	127,095	143,248	157,865	153,944	133,336	118,785	94,643	77,147	69,924	60,295	43,821	25,892	14,804	1,905,901
1999-03	133,607	141,297	144,922	139,954	132,619	124,625	141,349	156,805	156,439	138,155	122,341	99,690	79,962	70,284	61,539	45,363	27,474	15,850	1,932,275
2000-04	133,866	138,540	146,752	141,377	136,179	121,992	138,334	154,139	159,016	144,235	126,427	105,497	83,734	71,511	62,883	47,165	29,106	16,901	1,957,654
2001-05	135,892	137,371	148,268	142,997	139,739	123,643	136,421	151,602	160,384	149,058	129,508	110,787	87,274	71,935	63,444	48,149	30,422	18,095	1,984,989
2002-06	137,265	135,917	147,704	144,139	141,449	126,110	132,225	148,261	160,868	153,322	132,263	117,033	91,054	73,119	63,851	49,302	31,590	19,437	2,004,909
2003-07	139,171	136,900	147,313	147,028	143,192	131,716	129,886	146,495	161,209	157,300	136,676	121,717	95,850	75,248	63,964	50,487	32,691	20,951	2,037,794
2004-08	140,985	137,783	145,940	149,651	144,305	136,594	127,772	144,536	160,287	160,168	142,024	125,638	101,206	78,122	64,309	51,673	34,049	22,555	2,067,597
2005-09	145,099	142,459	146,688	153,359	146,181	143,411	129,428	144,505	158,663	162,448	147,261	129,262	106,696	81,500	65,027	52,477	35,404	24,612	2,114,480
2006-10	146,670	144,197	145,491	155,031	147,494	146,632	130,503	142,314	155,855	163,734	152,068	132,292	112,098	85,073	65,758	53,318	36,475	26,316	2,141,319

DATA SOURCE: Delaware Population Consortium, Population Projection Series. March 2012 (for 2006–2010). http://stateplanning.delaware.gov/information/dpc_projections.shtml – accessed 7/17/2012.

TOTAL FEMALE POPULATION

Years	Age group																	Total	
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84		85+
1980-84	104,902	105,418	116,924	143,736	146,881	131,220	122,842	102,049	86,690	82,462	82,657	82,688	72,182	62,100	48,170	35,008	24,246	20,361	1,570,536
1981-85	106,976	106,551	115,467	140,250	145,868	133,416	126,178	105,512	90,256	84,074	82,228	82,047	73,061	63,894	49,496	36,082	24,893	20,959	1,587,208
1982-86	109,091	107,697	114,028	136,848	144,862	135,649	129,604	109,093	93,968	85,718	81,802	81,411	73,950	65,739	50,858	37,188	25,557	21,574	1,604,637
1983-87	111,248	108,855	112,607	133,529	143,863	137,919	133,123	112,795	97,833	87,394	81,378	80,780	74,851	67,638	52,258	38,328	26,239	22,208	1,622,846
1984-88	113,447	110,025	111,203	130,290	142,871	140,227	136,738	116,623	101,857	89,102	80,956	80,154	75,763	69,592	53,696	39,503	26,940	22,861	1,641,848
1985-89	115,689	111,208	109,817	127,130	141,885	142,574	140,451	120,581	106,047	90,844	80,536	79,533	76,686	71,602	55,174	40,714	27,659	23,533	1,661,663
1986-90	117,976	112,404	108,448	124,046	140,906	144,961	144,264	124,673	110,409	92,620	80,119	78,917	77,620	73,670	56,692	41,962	28,398	24,224	1,682,310
1987-91	120,640	113,769	108,274	120,523	140,646	146,461	148,036	128,971	115,454	94,537	80,402	78,442	78,453	75,346	58,505	43,178	29,261	25,098	1,705,994
1988-92	123,518	115,476	109,025	117,564	140,161	147,244	151,232	133,623	119,745	97,732	81,525	78,181	79,000	76,537	60,585	44,395	30,153	26,123	1,731,819
1989-93	126,286	117,475	110,640	115,418	139,469	147,023	153,749	138,383	123,639	101,757	83,825	78,235	79,270	77,330	62,842	45,649	31,034	27,370	1,759,392
1990-94	128,683	119,782	113,153	114,415	138,286	145,852	155,582	143,205	127,256	106,470	87,157	78,790	79,324	77,559	65,273	47,039	31,934	28,733	1,788,491
1991-95	130,498	122,590	116,390	114,727	136,507	143,947	156,702	147,916	130,913	112,005	91,330	79,843	79,287	77,395	67,594	48,581	33,007	30,190	1,819,422
1992-96	131,103	125,658	118,943	117,349	133,093	142,691	156,700	152,338	134,056	118,415	95,382	81,439	79,241	77,397	69,420	50,445	34,010	31,604	1,849,283
1993-97	130,758	128,712	121,419	120,793	129,740	141,313	156,188	155,930	138,074	123,412	100,207	83,711	79,318	77,523	70,691	52,591	35,079	32,877	1,878,336
1994-98	129,805	131,570	123,871	124,736	127,077	139,933	155,071	158,823	142,627	127,643	105,203	86,834	79,746	77,718	71,612	54,874	36,243	34,037	1,907,423
1995-99	128,726	134,019	126,264	128,834	125,692	138,350	153,282	161,092	147,431	131,428	110,275	90,535	80,691	78,077	71,961	57,173	37,550	35,178	1,936,559
1996-00	127,727	135,445	128,948	132,704	125,824	136,169	151,037	162,773	152,014	135,028	115,783	94,570	81,867	78,585	72,257	59,252	38,911	36,212	1,965,104
1997-01	127,506	135,899	131,928	134,457	128,945	132,619	149,152	163,237	156,307	138,218	122,117	98,525	83,436	78,955	72,728	60,976	40,562	37,231	1,992,796
1998-02	128,161	135,478	134,912	135,190	133,561	128,892	147,294	162,882	160,092	142,071	127,274	103,281	85,794	79,278	73,300	62,328	42,493	38,481	2,020,762
1999-03	129,539	134,430	137,794	136,109	137,912	126,022	145,368	161,653	163,095	146,566	131,594	108,392	88,931	79,795	73,898	63,550	44,712	39,962	2,049,321
2000-04	130,837	132,038	138,966	136,116	141,408	123,722	142,209	159,235	166,239	152,413	136,364	114,422	93,195	81,392	75,284	64,862	47,269	41,899	2,077,870
2001-05	133,995	131,290	140,092	136,991	144,034	125,345	139,984	156,445	167,950	157,069	140,028	119,968	96,976	82,139	75,549	65,218	49,041	43,752	2,105,866
2002-06	136,296	130,403	139,710	137,348	143,682	129,048	135,610	153,456	168,178	161,401	143,406	126,541	100,938	83,511	75,869	65,892	50,612	45,997	2,127,898
2003-07	138,914	131,868	139,583	140,304	142,220	135,841	132,605	151,804	168,177	165,770	147,787	132,161	105,841	85,792	76,099	66,506	51,821	48,492	2,161,585
2004-08	141,173	133,663	138,487	142,675	140,875	141,935	129,952	149,737	167,039	169,275	152,888	136,887	111,262	88,951	76,649	67,256	53,022	51,337	2,193,063
2005-09	145,607	138,898	139,239	146,075	141,707	149,287	131,340	148,844	164,975	171,444	157,583	140,834	116,560	92,251	77,073	67,447	53,559	54,605	2,237,328
2006-10	146,670	144,197	145,491	155,031	147,494	146,632	130,503	142,314	155,855	163,734	152,068	132,292	112,098	85,073	65,758	53,318	36,475	26,316	2,265,107

DATA SOURCE: Delaware Population Consortium, Population Projection Series. March 2012 (for 2006–2010). http://stateplanning.delaware.gov/information/dpc_projections.shtml – accessed 7/17/2012.

TOTAL CAUCASIAN POPULATION

Years	Age group																		Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	
1980-84	161,578	164,018	181,424	224,599	233,283	209,496	197,457	164,950	140,805	135,974	137,745	137,055	121,128	98,211	72,417	49,295	32,140	24,892	2,486,467
1981-85	165,108	165,832	179,045	218,700	231,353	213,038	202,745	170,315	146,500	138,347	136,602	135,821	122,426	101,259	74,803	51,006	33,035	25,460	2,511,395
1982-86	168,715	167,666	176,697	212,956	229,439	216,640	208,175	175,855	152,425	140,762	135,468	134,598	123,738	104,402	77,268	52,776	33,955	26,041	2,537,576
1983-87	172,401	169,520	174,380	207,363	227,541	220,304	213,750	181,575	158,590	143,218	134,344	133,386	125,064	107,642	79,814	54,607	34,901	26,635	2,565,035
1984-88	176,168	171,395	172,093	201,917	225,659	224,029	219,474	187,481	165,005	145,717	133,229	132,185	126,404	110,983	82,444	56,502	35,873	27,244	2,593,802
1985-89	180,017	173,291	169,836	196,614	223,792	227,817	225,351	193,578	171,679	148,260	132,123	130,995	127,758	114,428	85,161	58,463	36,872	27,866	2,623,901
1986-90	183,950	175,207	167,609	191,451	221,941	231,670	231,386	199,873	178,624	150,847	131,026	129,816	129,127	117,980	87,967	60,492	37,899	28,503	2,655,366
1987-91	187,894	177,153	166,863	185,435	220,429	233,668	236,950	206,300	186,376	153,654	131,079	128,661	130,340	120,965	91,201	62,536	39,077	29,527	2,688,106
1988-92	191,482	179,322	167,125	180,133	217,986	233,865	241,209	213,099	192,430	158,654	132,454	127,698	131,049	123,163	94,871	64,638	40,365	30,776	2,720,317
1989-93	194,527	181,518	168,606	175,680	215,064	231,556	243,878	219,891	197,450	164,885	135,647	127,228	131,291	124,781	98,560	66,965	41,688	32,322	2,751,535
1990-94	196,541	183,858	171,241	172,627	211,065	227,003	245,006	226,480	201,837	171,857	140,503	127,525	130,982	125,640	102,304	69,478	43,072	34,075	2,781,094
1991-95	197,412	186,426	174,732	171,429	205,735	220,756	244,418	232,502	205,982	179,838	146,738	128,525	130,397	125,760	105,836	72,293	44,756	35,969	2,809,504
1992-96	196,651	189,133	177,569	173,360	198,474	215,370	242,035	237,686	209,264	188,958	152,691	130,589	129,548	126,041	108,655	75,544	46,418	37,738	2,835,726
1993-97	194,914	191,522	180,524	176,197	191,712	209,970	238,546	241,328	214,237	194,942	160,089	133,824	128,769	126,460	110,586	79,153	48,220	39,380	2,860,373
1994-98	192,142	193,572	183,087	180,113	185,796	205,241	233,844	243,436	220,158	199,443	167,649	138,299	128,457	126,835	112,312	82,600	50,327	40,896	2,884,205
1995-99	188,932	194,765	185,366	184,555	181,700	200,659	227,822	244,375	226,303	203,325	174,928	143,676	129,091	127,140	113,534	85,979	52,617	42,427	2,907,193
1996-00	184,527	194,549	187,688	188,692	180,124	195,312	221,186	244,155	231,860	206,909	182,487	149,683	130,063	127,584	114,588	89,037	55,043	43,903	2,927,389
1997-01	181,606	192,937	190,124	190,745	182,626	188,335	215,368	242,431	236,668	209,906	191,266	155,510	131,973	127,505	115,785	91,683	57,891	45,339	2,947,698
1998-02	180,206	190,281	192,184	191,812	187,218	181,454	210,062	239,373	240,546	214,723	197,260	162,833	135,299	127,174	117,089	93,824	61,061	47,125	2,969,523
1999-03	180,280	186,740	193,974	192,646	191,680	176,071	205,224	235,036	242,929	220,703	201,862	170,609	139,929	127,053	118,258	96,126	64,358	49,368	2,992,844
2000-04	186,835	187,987	200,127	198,216	200,774	177,758	205,887	234,912	250,735	233,093	210,952	182,185	148,499	130,262	121,191	99,448	68,324	52,255	3,089,440
2001-05	190,276	184,030	199,279	197,701	202,464	177,487	199,949	227,159	250,088	238,326	214,137	189,424	153,961	130,197	120,959	100,382	70,818	54,891	3,101,528
2002-06	195,026	183,540	198,829	198,403	203,751	183,106	194,303	222,343	250,207	244,876	218,648	199,551	160,632	132,348	121,164	101,960	73,201	58,065	3,139,953
2003-07	197,043	183,209	195,767	199,561	200,958	189,524	186,790	216,225	246,580	248,580	223,352	205,485	167,690	135,128	120,296	103,007	74,955	61,453	3,155,603
2004-08	199,668	185,425	192,933	201,413	199,535	196,618	181,918	211,716	242,820	251,970	230,422	210,867	176,053	139,925	120,248	104,301	77,096	65,276	3,188,204
2005-09	198,677	184,844	187,081	198,847	194,343	199,966	177,216	205,021	234,280	251,342	235,846	214,806	183,644	144,800	120,013	104,444	78,564	69,899	3,183,633
2006-10	196,181	182,617	190,661	197,967	196,238	195,095	180,220	209,710	240,587	249,940	229,208	210,509	175,958	139,509	119,534	103,723	76,982	66,000	3,160,639

DATA SOURCE: Delaware Population Consortium, Population Projection Series. March 2012 (for 2006–2010). http://stateplanning.delaware.gov/information/dpc_projections.shtml – accessed 7/17/2012.

CAUCASIAN MALE POPULATION

Years	Age group																		Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	
1980-84	82,959	83,837	93,237	111,461	115,453	104,632	98,145	81,339	69,237	66,809	66,667	65,197	57,578	44,196	29,758	18,440	10,352	6,397	1,205,694
1981-85	84,785	84,833	92,019	108,599	114,559	106,506	100,888	84,155	72,123	67,961	66,144	64,724	58,206	45,589	30,962	19,201	10,689	6,443	1,218,386
1982-86	86,651	85,841	90,817	105,811	113,673	108,413	103,707	87,068	75,129	69,132	65,625	642,55	58,841	47,026	32,215	19,993	11,037	6,490	1,23,1724
1983-87	88,558	86,861	89,631	103,095	112,793	110,354	106,606	90,082	78,261	70,324	65,110	63,789	59,484	48,508	33,519	20,818	11,396	6,537	1,245,726
1984-88	90,507	87,893	88,459	100,448	111,919	112,330	109,586	93,200	81,523	71,537	64,600	63,327	60,133	50,037	34,875	21,677	11,766	6,584	1,260,401
1985-89	92,499	88,937	87,303	97,869	111,053	114,341	112,649	96,427	84,921	72,771	64,094	62,868	60,789	51,615	36,286	22,572	12,149	6,632	1,275,775
1986-90	94,536	89,993	86,162	95,356	110,193	116,388	115,797	99,764	88,461	74,025	63,592	62,412	61,453	53,243	37,755	23,503	12,544	6,680	1,291,859
1987-91	96,603	91,084	85,801	92,401	109,365	117,553	118,677	103,103	92,377	75,404	63,670	61,899	62,058	54,702	39,395	24,463	12,993	6,954	1,308,504
1988-92	98,415	92,299	85,916	89,772	108,060	117,753	120,867	106,617	95,377	77,933	64,379	61,412	62,459	55,871	41,201	25,486	13,518	7,317	1,324,653
1989-93	99,976	93,496	86,759	87,553	106,568	116,515	122,185	110,104	97,882	81,089	65,921	61,169	62,693	56,848	42,907	26,655	14,105	7,762	1,340,188
1990-94	100,944	94,755	88,204	86,059	104,476	114,058	122,732	113,431	100,104	84,572	68,261	61,295	62,616	57,611	44,554	27,878	14,727	8,326	1,354,604
1991-95	101,316	96,062	90,063	85,584	101,649	110,756	122,359	116,385	102,202	88,543	71,293	61,697	62,429	58,057	46,110	29,235	15,517	8,943	1,368,200
1992-96	100,728	97,455	91,652	86,573	98,014	107,767	121,224	118,867	103,867	93,072	74,142	62,694	62,034	58,543	47,411	30,791	16,313	9,468	1,380,616
1993-97	99,722	98,630	93,312	87,994	94,667	104,786	119,500	120,558	106,495	95,906	77,803	64,290	61,582	59,097	48,364	32,446	17,187	10,003	1,392,341
1994-98	98,201	99,623	94,637	90,036	91,660	102,343	117,163	121,394	109,608	98,028	81,613	66,398	61,292	59,607	49,390	33,899	18,212	10,551	1,403,657
1995-99	96,518	100,126	95,789	92,340	89,600	100,026	114,113	121,704	112,789	99,912	85,260	68,933	61,495	59,930	50,431	35,331	19,290	11,134	1,414,720
1996-00	94,269	99,975	96,920	94,357	88,932	97,325	110,832	121,464	115,584	101,719	88,998	71,844	61,777	60,338	51,357	36,685	20,435	11,787	1,424,600
1997-01	92,809	98,925	98,067	95,791	89,892	93,851	107,793	120,723	117,874	103,230	93,364	74,654	62,618	60,355	52,324	37,907	21,789	12,415	1,434,381
1998-02	92,038	97,369	99,020	96,917	91,678	90,456	104,973	119,239	119,639	105,824	96,193	78,306	64,200	60,112	53,379	38,978	23,227	13,155	1,444,703
1999-03	91,842	95,475	99,777	97,689	93,503	87,784	102,418	117,163	120,526	109,002	98,354	82,255	66,392	59,923	54,320	40,294	24,611	14,094	1,455,422
2000-04	94,820	96,174	102,959	101,051	98,245	88,770	102,796	117,238	124,250	115,365	102,790	88,032	70,507	61,313	55,810	42,205	26,227	15,137	1,503,689
2001-05	96,066	94,122	102,499	101,109	99,283	88,512	99,695	113,475	123,768	118,023	104,439	91,687	73,275	61,092	55,900	43,050	27,313	16,179	1,509,487
2002-06	98,037	93,887	102,045	101,834	100,707	90,788	96,761	110,967	123,980	121,196	106,721	96,727	76,598	62,044	56,031	44,115	28,364	17,388	1,528,190
2003-07	98,714	93,651	100,258	102,340	100,520	93,311	93,018	107,814	122,265	122,861	109,293	99,570	80,221	63,410	55,540	45,016	29,241	18,696	1,535,739
2004-08	99,827	94,485	98,748	103,221	100,845	96,219	90,645	105,471	120,544	124,253	113,037	102,168	84,509	65,722	55,402	45,953	30,412	20,106	1,551,567
2005-09	99,224	93,845	95,727	101,861	99,051	97,632	88,227	102,023	116,365	123,676	115,879	104,201	88,560	68,321	55,412	46,372	31,561	21,948	1,549,885
2005-09	99,224	93,845	95,727	101,861	99,051	97,632	88,227	102,023	116,365	123,676	115,879	104,201	88,560	68,321	55,412	46,372	31,561	21,948	1,549,885
2006-10	100,041	95,017	93,967	101,656	99,109	98,942	88,175	99,195	112,905	123,492	118,769	106,093	92,516	71,304	55,595	46,804	32,501	23,393	1,559,474

DATA SOURCE: Delaware Population Consortium, Population Projection Series. March 2012 (for 2006–2010). http://stateplanning.delaware.gov/information/dpc_projections.shtml – accessed 7/17/2012.

CAUCASIAN FEMALE POPULATION

Years	Age group																		Total	
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+		
1980-84	78,619	80,179	88,187	113,136	117,829	104,864	99,309	83,606	71,566	69,165	71,077	71,854	63,550	54,015	42,639	30,847	21,787	18,481	1,280,710	
1981-85	80,323	80,997	87,026	110,099	116,793	106,532	101,853	86,153	74,375	70,386	70,456	71,092	64,219	55,670	43,813	31,793	22,344	18,998	1,292,922	
1982-86	82,064	81,824	85,880	107,144	115,766	108,227	104,463	88,778	77,294	71,629	69,840	70,338	64,895	57,376	45,020	32,769	22,915	19,529	1,305,751	
1983-87	83,842	82,659	84,750	104,269	114,748	109,948	107,139	91,483	80,327	72,893	69,230	69,592	65,578	59,134	46,259	33,774	23,501	20,076	1,319,202	
1984-88	85,660	83,502	83,634	101,470	113,739	111,697	109,883	94,271	83,479	74,180	68,626	68,854	66,269	60,945	47,533	34,810	24,102	20,637	1,3332,91	
1985-89	87,517	84,354	82,533	98,746	112,739	113,474	112,698	97,143	86,755	75,490	68,027	68,124	66,967	62,812	48,842	35,878	24,719	21,214	1,348,032	
1986-90	89,414	85,214	81,446	96,096	111,747	115,279	115,585	100,103	90,159	76,823	67,433	67,401	67,673	64,736	50,187	36,979	25,352	21,808	1,363,437	
1987-91	91,290	86,069	81,061	93,036	111,064	116,114	118,271	103,194	93,997	78,251	67,409	66,761	68,282	66,261	51,788	38,067	26,082	22,563	1,379,558	
1988-92	93,067	87,022	81,208	90,361	109,925	116,111	120,341	106,481	97,052	80,722	68,076	66,286	68,590	67,291	53,660	39,149	26,846	23,453	1,395,640	
1989-93	94,551	88,022	81,847	88,126	108,496	115,042	121,693	109,787	99,568	83,796	69,726	66,059	68,598	67,933	55,649	40,309	27,583	24,557	1,411,340	
1990-94	95,596	89,103	83,037	86,568	106,589	11,2945	122,275	113,048	101,733	87,285	72,242	66,230	68,366	68,029	57,749	41,600	28,345	25,750	1,426,490	
1991-95	96,096	90,364	84,668	85,845	104,086	110,000	122,059	116,117	103,780	91,295	75,446	66,828	67,968	67,703	59,727	43,058	29,238	27,026	1,441,304	
1992-96	95,923	91,678	85,917	86,788	100,461	107,603	120,811	118,818	105,397	95,886	78,549	67,895	67,515	67,498	61,244	44,753	30,105	28,269	1,455,110	
1993-97	95,192	92,892	87,211	88,204	97,046	105,184	119,046	120,770	107,742	99,036	82,286	69,534	67,187	67,363	62,222	46,707	31,033	29,377	1,468,032	
1994-98	93,941	93,950	88,449	90,077	94,136	102,898	116,682	122,041	110,550	101,414	86,036	71,901	67,164	67,227	62,921	48,701	32,115	30,345	1,480,548	
1995-99	92,414	94,638	89,577	92,216	92,100	100,633	113,708	122,671	113,514	103,413	89,668	74,743	67,596	67,210	63,103	50,648	33,328	31,293	1,492,473	
1996-00	90,257	94,574	90,768	94,336	91,192	97,987	110,354	122,691	116,276	105,190	93,489	77,839	68,286	67,246	63,230	52,351	34,608	32,116	1,502,789	
1997-01	88,797	94,011	92,057	94,954	92,734	94,483	107,575	121,708	118,795	106,677	97,902	80,856	69,354	67,150	63,461	53,776	36,102	32,924	1,513,316	
1998-02	88,168	92,912	93,163	94,895	95,540	90,998	105,089	120,134	120,907	108,899	101,067	84,527	71,099	67,061	63,710	54,846	37,834	33,970	1,524,819	
1999-03	88,438	91,266	94,197	94,957	98,177	88,286	102,806	117,873	122,403	111,701	103,508	88,353	73,537	67,130	63,938	55,832	39,748	35,274	1,537,423	
2000-04	92,015	91,813	97,168	97,165	102,529	88,988	103,091	117,674	126,485	117,728	108,162	94,153	77,992	68,949	65,381	57,243	42,097	37,118	1,585,751	
2001-05	94,210	89,908	96,780	96,592	103,181	88,975	100,254	113,684	126,320	120,303	109,698	97,737	80,686	69,105	65,059	57,332	43,505	38,712	1,592,041	
2002-06	96,989	89,653	96,784	96,569	103,044	92,318	97,542	111,376	126,227	123,680	111,927	102,824	84,034	70,304	65,133	57,845	44,837	40,677	1,611,763	
2003-07	98,329	89,558	95,509	97,221	100,438	96,213	93,772	108,411	124,315	125,719	114,059	105,915	87,469	71,718	64,756	57,991	45,714	42,757	1,619,864	
2004-08	99,841	90,940	94,185	98,192	98,690	100,399	91,273	106,245	122,276	127,717	117,385	108,699	91,544	74,203	64,846	58,348	46,684	45,170	1,636,637	
2005-09	99,453	90,999	91,354	96,986	95,292	102,334	88,989	102,998	117,915	127,666	119,967	110,605	95,084	76,479	64,601	58,072	47,003	47,951	1,633,748	
2006-10	100,869	93,084	93,884	96,948	94,885	103,377	94,489	109,150	109,377	114,715	127,700	122,835	111,717	98,991	79,386	65,097	54,108	47,410	50,260	1,643,881

DATA SOURCE: Delaware Population Consortium, Population Projection Series. March 2012 (for 2006–2010). http://stateplanning.delaware.gov/information/dpc_projections.shtml – accessed 7/17/2012.

TOTAL AFRICAN AMERICAN POPULATION

Years	Age group																	Total	
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84		85+
1980-84	46,897	45,434	51,959	55,157	49,134	42,910	37,844	29,625	24,715	22,107	19,988	18,744	15,266	13,530	9,147	6,527	3,534	2,579	495,097
1981-85	47,798	46,196	51,582	54,338	49,512	44,071	39,300	31,127	25,939	22,701	20,217	18,846	15,518	13,785	9,379	6,711	3,653	2,675	503,348
1982-86	48,717	46,971	51,208	53,532	49,893	45,264	40,812	32,705	27,223	23,311	20,448	18,949	15,774	14,045	9,617	6,900	3,776	2,774	511,919
1983-87	49,653	47,759	50,837	52,737	50,277	46,489	42,383	34,362	28,572	23,938	20,682	19,052	16,035	14,310	9,861	7,095	3,903	2,878	520,823
1984-88	50,607	48,560	50,468	51,954	50,664	47,747	44,014	36,104	29,987	24,581	20,919	19,156	16,300	14,579	10,111	7,295	4,034	2,986	530,066
1985-89	51,579	49,374	50,102	51,183	51,054	49,040	45,708	37,934	31,472	25,241	21,159	19,260	16,569	14,853	10,367	7,500	4,170	3,097	539,662
1986-90	52,570	50,202	49,738	50,423	51,446	50,367	47,468	39,856	33,031	25,919	21,402	19,366	16,843	15,132	10,630	7,711	4,310	3,212	549,627
1987-91	54,172	51,175	50,053	49,380	52,258	51,673	49,437	41,844	34,988	26,674	21,825	19,558	17,117	15,379	10,960	7,860	4,499	3,339	562,191
1988-92	56,275	52,448	50,874	48,472	53,098	53,002	51,406	44,030	36,959	27,792	22,436	19,828	17,401	15,598	11,303	8,018	4,680	3,490	577,111
1989-93	58,557	53,977	52,253	48,037	53,735	54,200	53,281	46,384	39,055	29,223	23,336	20,179	17,717	15,768	11,715	8,128	4,887	3,653	594,086
1990-94	60,844	55,778	54,147	48,271	54,031	55,213	55,154	48,880	41,207	31,038	24,457	20,707	18,070	15,855	12,203	8,261	5,096	3,840	613,053
1991-95	62,920	57,989	56,443	49,280	53,969	56,174	56,918	51,458	43,509	33,330	25,785	21,344	18,506	15,917	12,721	8,409	5,361	4,035	634,069
1992-96	63,895	60,622	58,351	51,544	53,045	57,127	58,446	54,115	45,547	36,102	27,134	22,050	19,002	16,076	13,133	8,703	5,540	4,245	654,678
1993-97	64,057	63,449	60,202	54,537	52,021	57,719	59,830	56,586	47,878	38,767	28,753	22,904	19,548	16,313	13,491	8,991	5,742	4,437	675,224
1994-98	64,021	66,258	62,036	57,806	51,513	57,973	61,017	58,851	50,440	41,418	30,550	23,991	20,152	16,671	13,774	9,404	5,871	4,663	696,409
1995-99	63,978	68,919	63,926	61,065	51,864	57,878	61,835	61,040	53,223	43,955	32,627	25,196	20,862	17,138	13,925	9,881	6,005	4,905	718,221
1996-00	64,374	71,027	66,136	64,067	53,217	57,262	62,534	63,030	56,076	46,437	35,125	26,486	21,569	17,779	14,029	10,386	6,143	5,175	740,853
1997-01	65,054	72,187	68,668	66,184	55,750	56,044	62,816	64,727	58,871	48,620	38,016	27,870	22,250	18,402	14,284	10,768	6,400	5,421	762,333
1998-02	66,052	72,427	71,468	67,799	58,888	54,819	62,668	66,024	61,387	50,999	40,812	29,515	23,093	19,006	14,657	11,168	6,678	5,686	783,147
1999-03	66,965	72,306	74,289	69,286	62,010	54,087	62,215	66,882	63,510	53,597	43,489	31,386	24,127	19,632	15,102	11,524	7,083	5,923	803,414
2000-04	68,151	71,914	76,162	70,577	66,593	55,493	62,171	67,673	65,877	56,687	46,259	33,577	25,318	20,323	15,571	11,724	7,570	6,208	827,848
2001-05	68,509	71,176	77,157	71,577	69,120	56,766	60,849	67,403	67,128	59,057	48,388	35,892	26,367	20,800	16,146	11,841	7,995	6,499	842,670
2002-06	69,591	71,008	77,931	73,693	71,130	59,730	59,684	67,291	68,730	61,944	50,735	38,948	27,850	21,474	16,807	12,189	8,383	6,937	864,055
2003-07	70,433	71,028	77,412	75,737	72,032	63,251	58,420	66,567	69,572	64,177	52,949	41,674	29,393	22,188	17,326	12,544	8,721	7,374	880,798
2004-08	71,973	71,507	76,952	78,104	73,154	67,202	58,166	66,055	70,368	66,358	55,699	44,443	31,326	23,198	17,969	12,997	9,050	7,913	902,434
2005-09	73,856	74,174	77,192	80,779	75,043	71,694	59,297	65,644	70,489	67,633	57,459	46,004	32,731	23,800	18,176	13,096	9,039	8,233	924,339
2006-10	75,448	75,023	76,990	82,348	76,512	74,844	61,062	64,646	70,612	69,305	60,173	48,328	35,177	24,952	18,755	13,708	9,219	8,809	945,911

DATA SOURCE: Delaware Population Consortium, Population Projection Series. March 2012 (for 2006–2010). http://stateplanning.delaware.gov/information/dpc_projections.shtml – accessed 7/17/2012.

AFRICAN AMERICAN MALE POPULATION

Years	Age group																		Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	
1980-84	23,413	22,932	25,771	27,047	22,479	19,198	17,162	13,572	11,436	10,281	9,361	8,588	7,120	5,899	3,946	2,611	1,200	808	232,824
1981-85	23,891	23,338	25,628	26,664	22,826	19,852	17,861	14,215	11,990	10,553	9,467	8,635	7,190	6,021	4,026	2,670	1,235	825	236,887
1982-86	24,379	23,752	25,485	26,286	23,179	20,528	18,588	14,888	12,570	10,832	9,574	8,683	7,261	6,146	4,108	2,731	1,271	842	241,103
1983-87	24,876	24,173	25,343	25,914	23,537	21,227	19,345	15,593	13,179	11,118	9,682	8,730	7,333	6,274	4,191	2,793	1,308	859	245,475
1984-88	25,384	24,602	25,202	25,547	23,901	21,949	20,133	16,332	13,817	11,412	9,792	8,778	7,405	6,404	4,276	2,856	1,346	877	250,013
1985-89	25,902	25,038	25,062	25,185	24,270	22,696	20,952	17,106	14,487	11,714	9,903	8,826	7,478	6,536	4,363	2,921	1,386	896	254,721
1986-90	26,431	25,482	24,922	24,828	24,646	23,468	21,805	17,916	15,189	12,024	10,016	8,874	7,552	6,671	4,451	2,988	1,427	914	259,606
1987-91	27,285	25,995	25,079	24,352	25,172	24,218	22,764	18,777	16,088	12,375	10,225	8,954	7,649	6,779	4,574	3,013	1,490	925	265,715
1988-92	28,423	26,651	25,469	23,967	25,637	24,958	23,744	19,765	16,981	12,890	10,507	9,083	7,758	6,867	4,719	3,041	1,549	946	272,956
1989-93	29,636	27,393	26,167	23,794	25,968	25,603	24,686	20,891	17,881	13,544	10,917	9,253	7,899	6,933	4,882	3,067	1,618	969	281,102
1990-94	30,855	28,277	27,146	23,910	26,118	26,116	25,636	22,121	18,792	14,367	11,411	9,519	8,077	6,950	5,074	3,113	1,699	992	290,173
1991-95	31,970	29,365	283,38	24,385	26,063	26,594	26,507	23,431	19,740	15,413	11,998	9,853	8,291	6,933	5,303	3,192	1,792	1,021	300,191
1992-96	32,488	30,680	29,423	25,424	25,618	27,040	27,287	24,768	20,517	16,699	12,595	10,229	8,522	6,981	5,470	3,339	1,848	1,074	310,000
1993-97	32,547	32,134	30,512	26,801	25,168	27,304	27,979	26,010	21,491	17,863	13,334	10,665	8,813	7,062	5,612	3,469	1,919	1,118	319,801
1994-98	32,560	33,663	31,509	28,385	24,975	27,411	28,532	2,7136	22,672	18,977	14,152	11,193	9,144	7,209	5,755	3,633	1,978	1,172	330,057
1995-99	32,552	35,111	32,505	30,077	25,127	27,411	28,852	28,229	24,010	20,038	15,112	11,746	9,515	7,440	5,829	3,802	2,041	1,242	340,637
1996-00	32,685	36,310	33,646	31,728	25,735	27,143	29,164	29,185	25,459	21,032	16,268	12,317	9,918	7,763	5,853	3,995	2,125	1,313	351,639
1997-01	32,932	37,013	34,893	33,052	26,898	26,607	29,251	30,042	269,02	21,814	17,623	12,941	10,315	8,083	5,963	4,143	2,259	1,370	362,099
1998-02	33,346	37,160	36,259	34,125	28,367	26,072	29,153	30,712	28,173	22,838	18,820	13,682	10,760	8,434	6,114	4,330	2,382	1,451	372,179
1999-03	33,649	37,065	37,728	34,977	29,887	25,801	28,952	31,108	29,249	24,061	19,928	14,541	11,254	8,799	6,307	4,524	2,530	1,535	381,895
2000-04	34,094	36,791	38,896	35,893	32,393	26,525	29,075	31,372	30,367	25,505	21,024	15,503	11,760	9,106	6,464	4,604	2,668	1,620	393,660
2001-05	34,188	36,266	39,520	36,444	33,924	27,149	28,578	31,249	30,938	26,711	21,811	16,539	12,189	9,379	6,730	4,627	2,824	1,717	400,783
2002-06	34,696	35,967	40,002	37,505	35,342	28,600	28,149	31,151	31,696	28,158	22,591	17,922	12,814	9,730	7,046	4,757	2,958	1,869	410,973
2003-07	35,098	35,815	39,783	38,507	36,202	30,342	27,659	30,806	32,135	29,254	23,513	19,045	13,463	10,088	7,336	4,878	3,098	1,997	419,019
2004-08	35,869	35,884	39,487	39,814	37,019	32,355	27,675	30,618	32,479	30,301	24,775	20,141	14,311	10,544	7,671	5,041	3,258	2,156	429,398
2005-09	36,762	37,124	39,480	41,038	37,658	34,346	28,031	30,534	32,632	31,188	31,188	20,828	14,981	10,859	7,835	5,110	3,268	2,187	439,669
2006-10	37,557	37,456	39,208	41,976	38,440	36,145	28,838	30,159	32,674	31,963	27,187	21,716	16,081	11,340	8,158	5,389	3,329	2,375	449,991

DATA SOURCE: Delaware Population Consortium, Population Projection Series. March 2012 (for 2006–2010). http://stateplanning.delaware.gov/information/dpc_projections.shtml – accessed 7/17/2012.

AFRICAN AMERICAN FEMALE POPULATION

Years	Age group																		Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	
1980-84	23,486	22,500	26,187	28,110	26,638	23,700	20,681	16,052	13,279	11,827	10,628	10,155	8,143	7,631	5,200	3,915	2,336	1,769	262,237
1981-85	23,909	22,856	25,953	27,674	26,662	24,203	21,438	16,910	13,949	12,149	10,751	10,210	8,323	7,764	5,352	4,039	2,419	1,847	266,408
1982-86	24,339	23,217	25,721	27,245	26,686	24,717	22,223	17,814	14,653	12,480	10,875	10,266	8,508	7,899	5,508	4,167	2,505	1,929	270,752
1983-87	24,777	23,584	25,491	26,822	26,709	25,242	23,036	18,766	15,393	12,819	11,001	10,322	8,696	8,036	5,669	4,300	2,594	2,015	275,272
1984-88	25,223	23,957	25,263	26,407	26,733	25,778	23,879	19,769	16,170	13,168	11,128	10,379	8,888	8,176	5,835	4,437	2,687	2,104	279,981
1985-89	25,677	24,336	25,037	25,997	26,757	26,326	24,753	20,826	16,985	13,526	11,256	10,436	9,084	8,318	6,005	4,578	2,783	2,197	284,877
1986-90	26,139	24,720	24,813	25,594	26,781	26,885	25,660	21,939	17,842	13,894	11,386	10,494	9,285	8,462	6,180	4,723	2,883	2,295	289,975
1987-91	26,887	25,179	24,972	25,028	27,073	27,446	26,670	23,068	18,900	14,298	11,601	10,605	9,463	8,600	6,388	4,848	3,009	2,411	296,445
1988-92	27,852	25,797	25,404	24,506	27,453	28,040	27,660	24,264	19,978	14,902	11,929	10,746	9,640	8,732	6,585	4,978	3,131	2,544	304,139
1989-93	28,921	26,584	26,086	24,242	27,764	28,595	28,594	25,493	21,174	15,679	12,419	10,926	9,817	8,835	6,834	5,063	3,269	2,684	312,978
1990-94	29,989	27,501	27,002	24,361	27,913	29,097	29,518	26,760	22,415	16,671	13,045	11,188	9,992	8,905	7,129	5,148	3,397	2,848	322,880
1991-95	30,951	28,624	28,105	24,896	27,906	29,580	30,411	28,027	23,768	17,917	13,787	11,492	10,215	8,984	7,418	5,217	3,568	3,014	333,879
1992-96	31,407	29,943	28,928	26,120	27,427	30,087	31,159	29,347	25,031	19,403	14,540	11,821	10,480	9,095	7,663	5,364	3,692	3,171	344,678
1993-97	31,511	31,314	29,690	27,737	26,853	30,415	31,852	30,577	26,387	20,904	15,419	12,239	10,735	9,251	7,878	5,521	3,823	3,319	355,424
1994-98	31,461	32,595	30,528	29,420	26,538	30,562	32,485	31,715	27,768	22,441	16,398	12,798	11,008	9,462	8,019	5,771	3,893	3,490	366,352
1995-99	31,426	33,808	31,421	30,987	26,737	30,467	32,983	32,811	29,213	23,917	17,516	13,449	11,348	9,698	8,096	6,080	3,965	3,663	377,584
1996-00	31,689	34,717	32,490	32,339	27,482	30,120	33,370	33,845	30,617	25,405	18,857	14,169	11,650	10,016	8,177	6,391	4,018	3,862	306,470
1997-01	32,122	35,174	33,775	33,132	28,852	29,438	33,564	34,685	31,970	26,806	20,393	14,929	11,936	10,319	8,322	6,625	4,141	4,051	233,242
1998-02	32,707	35,267	35,209	33,674	30,521	28,747	33,515	35,311	33,214	28,161	21,992	15,833	12,333	10,571	8,544	6,838	4,296	4,235	410,968
1999-03	33,316	35,241	36,561	34,310	32,123	28,287	33,263	35,775	34,262	29,535	23,562	16,845	12,872	10,833	8,795	7,000	4,552	4,388	421,519
2000-04	34,057	35,123	37,266	34,684	34,200	28,968	33,096	36,301	35,510	31,182	25,235	18,074	13,558	11,217	9,107	7,120	4,902	4,588	434,188
2001-05	34,321	34,910	37,637	35,133	35,196	29,617	32,271	36,154	36,190	32,346	26,577	19,353	14,178	11,421	9,416	7,214	5,171	4,782	441,887
2002-06	34,895	35,041	37,909	36,188	35,788	31,130	31,535	36,140	37,034	33,786	28,144	21,026	15,036	11,744	9,761	7,432	5,425	5,068	453,082
2003-07	35,335	35,213	37,629	37,230	35,830	32,909	30,761	35,761	37,437	34,923	29,436	22,629	15,930	12,100	9,990	7,666	5,623	5,377	461,779
2004-08	36,104	35,623	37,465	38,290	36,135	34,847	30,491	35,437	37,889	36,057	30,924	24,302	17,015	12,654	10,298	7,956	5,792	5,757	473,036
2005-09	37,094	37,050	37,712	39,741	37,385	37,348	31,266	35,110	37,857	36,445	31,651	25,176	17,750	12,941	10,341	7,986	5,771	6,046	484,670
2006-10	37,891	37,567	37,782	40,372	38,072	38,699	32,224	34,487	37,938	37,342	32,986	26,612	19,096	13,612	10,597	8,319	5,890	6,434	495,920

DATA SOURCE: Delaware Population Consortium, Population Projection Series. March 2012 (for 2006–2010). http://stateplanning.delaware.gov/information/dpc_projections.shtml – accessed 7/17/2012.

Appendix E: Behavioral Risk Factors

The Behavioral Risk Factor Surveillance (BRFS) system is the world's largest, on-going telephone health survey system, tracking health conditions and risk behaviors in the United States yearly since 1984. Currently, data are collected monthly in all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and Guam. The survey was developed to monitor the statewide prevalence of behavioral risk factors that influence premature morbidity and mortality. The BRFS survey includes a core set of questions developed by the Centers for Disease Control and Prevention (CDC) and is administered to adults ages 18 and older. Delaware's BRFS system is a collaborative effort between Delaware's Division of Public Health (DPH) and the CDC. BRFS survey questions target lifestyle behaviors (including tobacco use, fruit and vegetable consumption, exercise and weight control), cancer screening practices, health status and health care access and use.⁶⁸

Technological and cultural changes are posing challenges to survey research. One of the most significant challenges has been the rapid increase in households in which telephone service is primarily or only by cell phones (as shown in the graph on the right). These "cell phone only" households are, at least currently, more common among young adults and minority populations.

Originally, the BRFS survey was administered by random-digit-dial telephone survey. Starting with reporting of 2011 data, the BRFS has become a "multi-mode survey," using several modes of data collection—including landline telephone interviews, cell phone interviews, and online follow-up surveys for some respondents who don't want to respond by phone. The BRFS is now also using a new method for weighting data called raking that more accurately reflects the actual population of each state.⁶⁹

Because cell phones are so quickly replacing landline phones, it has been difficult to obtain a true representative sample of some population subgroups during the late 2000s. The response rate problems likely resulted in less accurate prevalence estimates for some behaviors or conditions more prevalent in populations who primarily use cell phones. For example, prevalence of cigarette smoking, which is known to be more prevalent among young adults, may have been underestimated for several years.

The data provided below relate to risk factor prevalence among Delawareans for 2012. With the exception of cancer of the cervix, data on cancer screening patterns among Delawareans are provided in relevant cancer site chapters throughout this document: female breast, colon and rectum and prostate. Survey results that are related to specific cancers are included in those chapters of this report (e.g., smoking prevalence is in the lung cancer chapter).⁷⁰

Cervical Cancer Screening

The Behavioral Risk Factor Survey (BRFS) has collected data on cervical cancer screening in Delaware annually from 1995 to 2000 and biannually since then. As mentioned above, the BRFS 2012 prevalence data are not directly comparable to previous years of data because of changes in weighting methodology and the addition of the cell phone sampling frame.

- In 2012, Delaware women age 18 and older were tied with Maryland for the highest prevalence nationally (82.2 percent) of having had a Pap test within the previous three years. Nationally, 78.0 percent of U.S. women age 18 and older reported having had a Pap test within the previous three years.
- In Delaware, African Americans were more likely to have had a Pap test within the previous three years

⁶⁸ Behavioral Risk Factor Surveillance System <http://www.cdc.gov/brfss/>

⁶⁹ Behavioral Risk Factor Surveillance System (BRFSS) Fact Sheet: Raking— Changing Weighting Methodology. http://www.dhss.delaware.gov/dph/dpc/files/rakingweights_info.pdf

⁷⁰ Delaware Behavioral Risk Factor Survey – Measuring Behaviors that Affect Health. <http://www.dhss.delaware.gov/dph/dpc/brfsurveys.html>

than Caucasians but the difference was not statistically significant (87.5 of African Americans vs. 82.0 percent of Caucasians).

- In 2012, significantly fewer Delaware women ages 18-24 reported having had a Pap test in the last three years (61.1 percent) compared to women in all other age groups with the exception of 65 and older. Women ages 35-44 had the highest prevalence of all age groups (94.9 percent) and this prevalence was significantly higher than the three oldest age groups.
- The prevalence of having had a Pap test was significantly higher among women earning \$50,000 than among those in the \$15,000 - \$24,999 income bracket (88.8 percent versus 72.2 percent, respectively).
- There was a direct relationship between level of education and the prevalence of having had a Pap test. Only 73.3 percent of women with less than a high school education had a Pap test compared to 89.9 percent of women who completed college (a statistically significant difference).

Overweight/Obesity

Being overweight or obese is a risk factor for numerous cancers, including female breast (in postmenopausal women), colorectal, kidney and uterine cancers. In addition, being overweight or obese is a major risk factor for other chronic diseases, including coronary heart disease, type 2 diabetes and stroke.

The CDC defines overweight as a body mass index (BMI) from 25 to less than 30 and obese as a BMI equal to or greater than 30. BMI is calculated using an individual's height and weight.⁷¹ The following data are specific to the 2012 BRFSS:

- In Delaware, 66.0 percent of adults ages 18 and over were overweight or obese in 2012. At the national level, 63.4 percent of adults were overweight or obese.
- The prevalence of overweight in Delaware differed significantly by sex: 45.9 percent of males and 32.5 percent of females were overweight in 2012.
- The prevalence of obesity among adult Delawareans did not, however, differ by sex: 26.0 percent of males and 27.8 percent of females were obese in 2012.
- In Delaware during 2012, the prevalence of being overweight or obese was higher among African Americans than Caucasians, but the difference was not statistically significant.
- Significantly more African Americans (34.5 percent) than Caucasians (25.6 percent) in Delaware are obese.
- The prevalence of overweight did not differ significantly between Caucasians and African Americans (39.7 percent vs. 35.0 percent, respectively).
- The prevalence of being overweight was highest among college graduates (43.2 percent) and differed significantly from those with some education after high school (35.0 percent).
- The prevalence of obesity was statistically significantly higher among adults with some education after high school (31.2 percent) than among college graduates (20.5 percent).
- The prevalence of obesity was lowest among adults with an income level of more than \$50,000 (25.0 percent). This prevalence was significantly lower than from those earning \$25,000-\$34,999 (35.5 percent).
- The prevalence of obesity was highest among those ages 55-64 (34.7 percent) and differed significantly from those less than 35 or ages 65 and over.
- Ages 45-54 had the highest prevalence of overweight (45.3 percent) and differed significantly from those less than 35.

⁷¹ About BMI for Adults http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html

Physical Activity

Lack of physical activity is a substantiated risk factor for colorectal cancer and a suspected risk factor for other cancers (e.g., prostate cancer). The benefits of regular sustained physical activity also include reduction in risk for other chronic diseases including coronary heart disease, type 2 diabetes and stroke, and improved overall well-being.

Respondents in the 2012 survey are considered “physically active” if they respond ‘yes’ to the question: “During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?”

- In Delaware, 76.5 percent of adults ages 18 and older were considered physically active compared with 77.1 percent at the national level.
- The prevalence of adults who reported they were physically active was significantly higher among men than women (79.4 percent male vs. 73.9 percent female).
- African Americans were less likely to be physically active than Caucasians (74.7 percent and 76.8 percent, respectively) but the difference was not statistically significant.
- Persons in the 25-34 age category had the highest prevalence of physical activity (84.3 percent), followed by ages 18-24 (83.1 percent). The proportion of those ages 65 and older who were physically active (66.0 percent) was significantly less than the proportion in each of the four younger age categories.
- The prevalence of physical activity was significantly lower among incomes less than \$15,000 (67.2 percent) compared to the two highest income categories: \$35,000-\$49,000 (77.5 percent) and \$50,000 and over (84.4 percent). The same statistically significant difference was seen among those earning \$15,000-\$24,999 (60.6 percent).
- Significantly more college graduates (88.0 percent) were physically active than those in each of the categories with less education (61.1 percent for less than high school, 73.0 percent for high school diploma or GED and 77.4 percent for those with some post high school education).

Dietary Fruits and Vegetables

A diet high in fruits and vegetables is a protective factor against numerous cancers, including cancers of the breast, cervix, colon/rectum, uterus, esophagus, oral cavity, ovary, pancreas, prostate and stomach. The following data are specific to the 2009 BRFSS:

- More adults 18 and older in Delaware consumed five or more servings of fruits and vegetables a day compared to adults at the national average (25.0 Delaware vs. 23.4 percent U.S.). This difference was not statistically significant.
- Significantly fewer Delaware males (21.7 percent) consumed five or more servings of fruits and vegetables daily than females (28.0 percent).
- In Delaware, a larger percentage of Caucasians (24.9 percent) than African Americans (20.6 percent) consumed five or more servings of fruits and vegetables daily but the difference was not statistically significant.

Appendix F: Title 16 Chapter 292 of the Delaware Code

CHAPTER 292
FORMERLY
SENATE BILL NO. 235
AS AMENDED BY
SENATE AMENDMENT NO. 2
AND
HOUSE AMENDMENT NO. 1

AN ACT TO AMEND TITLE 16 OF THE DELAWARE CODE RELATING TO UNIFORM HEALTH DATA REPORTING.
BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF DELAWARE:

WHEREAS, the State of Delaware traditionally has one of the highest rates of cancer incidence and mortality in the United States;

WHEREAS, identification of clusters of certain types of cancers in specific locations can help public health agencies develop intervention strategies leading to early detection when cancer is more easily cured;

WHEREAS, providing such data to medical researchers outside state government may assist in the process of both identifying cancer clusters and developing intervention strategies;

WHEREAS, the public good is served by allowing citizens to know of potential hazards in their communities so they can take actions to preserve their health;

WHEREAS, it is equally important to preserve the privacy and dignity of people afflicted with cancer, and

WHEREAS, the Department of Health and Social Services, Division of Public Health has opted to err on the side of cancer patient privacy by withholding even generic data on cancer clusters from other researchers and the public;

NOW THEREFORE:

BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF DELAWARE:

Section 1. Amend Chapter 20, Title 16 of the Delaware Code by renumbering §2005 through 2008 as §2006 through 2009, respectively.

Section 2. Amend Chapter 20, Title 16 of the Delaware Code by inserting a new §2005 to read as follows:

“§2005(a). Cancer incidence data.

Notwithstanding any provisions in this Title to the contrary, the agency shall make available as public records cancer incidence by census tract and by type of cancer. Such released data shall be assigned consensus tract geography from the most recent decennial census. If release of such information by census tract will explicitly or implicitly identify any individual, the agency may combine data among contiguous census tracts, but only insofar as is necessary to protect patient confidentiality.

(b) The agency shall create a detailed map of each county in Delaware that graphically illustrates the overall incidence of cancer in each census tract. The census tracts will be identified on the maps and shall be color-coded to designate the degree of cancer incidence in each tract. These maps shall be created within 90 days of the agency receiving the cancer incidence data.

(c) The agency shall post the maps created under the subsection above on their website in a format that can be easily accessed and read by the public.”

Section 3. Amend §1232(d) Title 16 of the Delaware Code by deleting the word “or” at the end of paragraph (6) and by inserting the word “or” at the end of paragraph 7 and by adding a new paragraph “(8)” to read as follows:

“(8) Pursuant to Title 16 §2005.”

Section 4. Amend Subchapter III of Chapter 12 of Title 16 of the Delaware Code by inserting a new section §1233 to read as follows:

“§1233. Regulations.

The Department of Health and Social Services shall enforce this subchapter and shall from time to time promulgate any additional forms and regulations that are necessary for this purpose.”

Approved July 3, 2008

Appendix G: Cancer Incidence by Census Tract Methodology

Geocoding Validation Process

Accurate census tract assignment is necessary for valid rate calculation at the census tract level. The accuracy of census tract assignment is entirely dependent on the accuracy and quality of patient address data. To assure accuracy and quality, cancer cases submitted to the Delaware Cancer Registry (DCR) undergo quality assurance review of the data fields for each patient's address. The case-level quality review of street address data includes correction of misspellings, incomplete addresses and address formats. Accurint®, a Lexis Nexis® service, is used to assign a valid physical street address to P.O. Box addresses where possible. DCR staff also use Accurint to assign a valid physical street address to rural addresses where possible.

Geocoding software is then used to assign cases to a census tract based on the patient's address at time of diagnosis. Some cases may not be coded to the street address level in this step, due to recently created streets that are not yet embedded within the geocoding software. For these cases, further manual review and census tract assignment is conducted using the American Factfinder and Google Maps online databases.

Preliminary Analyses

Cancer case files created for DPH by the DCR include all eligible⁷² cancer cases diagnosed among Delawareans from January 1, 2006 through December 31, 2010. Within this time period, 100 percent of the cases (all but one case) were successfully geocoded; i.e. the residential census tract of the individual was identified. The table below shows the percentage level of certainty of the census tract assignments in each time period. The level of certainty code shown in the table below indicates the basis of the assignment of census tract for each individual. More than 99 percent of cases were assigned a census tract based on a complete and valid address of residence.

Census tract based on level of certainty:	2006–2010
1 – complete & valid street address of residence	25,313 (99.4%)
2 – residence ZIP + 4	7 (.03%)
3 – residence ZIP + 2	60 (.24%)
4 – residence ZIP code only	78 (.31%)
5 – ZIP code of P.O. Box	17 (.07%)
9 – address missing	1 (.00%)
Total number of cases:	25,476

Five-Year Population Estimates by Census Tract

As of the 2000 U.S. Census, Delaware was comprised of 197 census tracts and census tract analyses through 2003–2007 used the 2000 Census tract designations. As of the 2010 Census, however, Delaware was realigned into 214 census tracts. These new census tract subdivisions became available beginning with the 2004–2008 analyses. Approximately half of the 2010 Census tracts remained the same as in the 2000 Census and the rest have either combined with others or split into two or more new census tracts.

Note that census tracts do not follow a consecutive numbering scheme. New Castle County contains 129 census tracts numbered 2.00 through 169.04, Kent County is comprised of 32 tracts numbered 401.00 through 434.00, and Sussex County includes 53 tracts numbered 501.01 through 519.00.

Census tract populations for 2006–2010 were calculated using estimates from the Delaware Population Consortium (DPC) and both the 2000 Census and 2010 Census. Population data specific for each five-year age category and census tract from both the 2000 and 2010 Census were used to calculate the proportion that each of the 18 age groups contributed to the overall census tract population. For intervening years, age-specific population estimates were obtained by extrapolating between the 2000 and 2010 Census population data.

⁷² Excludes benign tumors, non-urinary bladder in situ tumors, and basal and squamous cell cancers per reporting guidelines mandated by the Surveillance, Epidemiology, and End Results Program of the National Cancer Institute.

For each census tract, denominators for each year within the five-year study period were summed to obtain the total population for the five-year study period. Five-year population estimates for the 2006–2010 study period range in size from 3,468 for census tract 511.01 to 50,241 for census tract 402.02. These census tracts are located in Sussex and Kent Counties, respectively.

Age-Adjusted and Crude Incidence Rates, by Census Tract

For each census tract, cross-tabulations (age group x census tract) were created to determine the number of cancer cases diagnosed by census tract and age group. These frequencies were used to calculate crude incidence rates at the census tract level.

Crude incidence rates represent the total number of new cancer diagnoses divided by the total population at risk, without consideration of any age-related characteristics of the population. To calculate a crude incidence rate by census tract, the number of cancer cases diagnosed in each age group is divided by the population size for that specific age group and these values were then multiplied by 100,000 (Equation 1).

Equation 1: 2006–2010 Crude All Site Incidence Rate, 45-49 year olds, census tract 999.99

$$\frac{(\text{No. cancer cases (2006 - 2010) among 45 - 49 year olds in CT999.99})}{(\text{2006 - 2010 population, 45 - 49 year olds in CT999.99})} = \frac{(5)}{(929)} \times 100,000 = 538.2 \text{ per } 100,000$$

Age-adjusted incidence rates were then calculated to take into account the different age distributions for the populations at risk. To calculate age-adjusted incidence rates, crude incidence rates for each age group were multiplied by the appropriate 2000 U.S. Standard Population weight for that age group (Appendix A). Age-adjusted incidence rates for each of the 18 age groups were then summed to yield the age-adjusted incidence rate for an entire census tract.

95% Confidence Intervals

Confidence intervals represent the range of values in which the cancer rate could reasonably fall. Our best estimate of the cancer rate in a particular census tract is the incidence rate, itself. However, the rate could reasonably lie anywhere between the lower confidence limit (LCL) and the upper confidence limit (UCL). Because of this, a confidence interval is sometimes called the “margin of error.”

When incidence rates are based on more than 100 cases, 95% confidence intervals are calculated using the following formulas:

$$\text{Lower Confidence Limit} = \text{AA Rate} - 1.96 \left(\frac{(\text{AA Rate})}{\sqrt{\# \text{ Cases}}} \right)$$

$$\text{Upper Confidence Limit} = \text{AA Rate} + 1.96 \left(\frac{(\text{AA Rate})}{\sqrt{\# \text{ Cases}}} \right),$$

- where AA Rate is the age-adjusted incidence rate for a particular census tract.

When incidence rates are based on fewer than 100 cases, 95% confidence intervals are calculated using the following formulas:

$$\text{Lower Confidence Limit} = \text{AA Rate} \times L$$

$$\text{Upper Confidence Limit} = \text{AA Rate} \times U,$$

Where:

- AA Rate is the age-adjusted incidence rate for a particular census tract, and
- L and U are values published by the National Center for Health Statistics for the specific purpose of calculating 95% confidence intervals for rates based on fewer than 100 cases.⁷³

⁷³ Martin JA, Hamilton BE, Ventura SJ, Menacker F, Park MM, Sutton PD. Births: Final data for 2001. National vital statistics reports; vol 51 no. 2. Hyattsville, Maryland: National Center for Health Statistics. 2002.
Delaware Health and Social Services, Division of Public Health
Cancer Incidence and Mortality in Delaware, 2006-2010 (2014)

Comparing Census Tract Rates to the State Rate

The level of uncertainty associated with an incidence rate is reflected in the width of its confidence interval. Very wide confidence intervals mean that the incidence rate is estimated with a small degree of certainty. Smaller intervals indicate an incidence rate estimate with a greater level of certainty.

The width of a confidence interval is influenced by two factors: (a) the number of cancer cases in the population and (b) the size of the population under consideration. When a cancer rate is calculated for a small population in which only a handful of cases were diagnosed, we would expect the confidence interval for the rate will be very wide. On the other hand, when a cancer rate is calculated for a large population in which many cases were diagnosed, we expect the confidence interval for the rate to be narrower.

The width of a confidence interval is important because it is used to determine if the amount by which two incidence rates differ is statistically significant. If the confidence interval for an incidence rate in one area overlaps with the confidence interval for a rate in another area, the rates are said to be “not statistically significantly different from one another.” Even though the two rates may look very different, if the cancer rate for one area is NOT statistically significantly different from the cancer rate for another area, researchers cannot say that one rate is truly different from the other rate.

On the other hand, if the confidence interval for the incidence rate in one area does NOT overlap with the confidence interval for an incidence rate in another area, the two rates are statistically significantly different. When the rate for one area is significantly different from the rate for another area, the difference between the rates is greater than would be expected by chance alone.

For each census tract, the all site incidence rate is compared to the all site incidence rate for the state of Delaware. This allows DPH to identify any census tracts that have a cancer incidence rate that is statistically significantly higher or lower than the incidence rate for Delaware as a whole. If the confidence interval for an incidence rate overlaps with the confidence interval for the state incidence rate, the census tract rate is not statistically significantly different from the state rate. If the confidence interval for a census tract rate does not overlap with the confidence interval for the state rate, the census tract rate is said to be statistically significantly different from the state rate. Census tracts with significantly higher or lower cancer rates compared to the state are denoted in the rate table in Appendix I and in all color-coded maps in Appendices J and K.

Supplemental Information

For 2006–2010 there were three census tracts with less than 25 cancer cases. When incidence rates are computed for an entire geographic area based on a very small number of cases, rates are estimated with a larger degree of uncertainty. This uncertainty is represented by a wide confidence interval which is more likely to overlap with the confidence intervals of incidence rates from other areas; this means that it is more difficult to establish a significant difference between incidence rates. For this reason, rates based on fewer than 25 cases are denoted in both the rate table and color-coded maps since they should be interpreted with caution.

Appendix H: Interpretation of Cancer Incidence Rates by Census Tract

In brief:

- A cancer rate in a census tract will change year to year because of the relatively small population in each of the census tracts. For this reason, the incidence rates are uncertain, subject to wide variation and difficult to interpret.
- To help understand how much confidence we should have in a cancer rate for a census tract, we calculated a confidence interval. A confidence interval represents the range of values in which the cancer incidence rate could reasonably fall and is sometimes referred to as the “margin of error.”
- If the confidence interval of a cancer incidence rate in a census tract does not overlap with the confidence interval for the state, we say that there is enough confidence to call the incidence rate in the census tract significantly different from the state rate.
- We have provided a table that shows the confidence interval for the cancer rate in each census tract and for the state as a whole. These data will help you determine if the incidence rate in a particular census tract is significantly different from the state rate.

Analysis of disease rates for small areas, such as census tracts, is difficult to interpret and can be misleading if not considered carefully. The following information is presented to help interpret the information on “Cancer Rates by Census Tract.”

To understand cancer in Delaware, researchers need to track the number of all newly diagnosed cancer cases each year. Researchers use different types of information to calculate cancer rates. This information includes estimates of the number of people living in Delaware and data on the cancer cases diagnosed in our state.

Even though researchers calculate cancer rates using the best possible information, cancer rates still have some amount of uncertainty. The rate of any disease in a population provides a snapshot of the impact of that disease for a specific time period. Because Delaware is a small state, we have a special problem when we try to interpret this snapshot.

In a small group, such as a census tract, the snapshot changes a lot from year to year. If one case of cancer is diagnosed in a census tract one year, and three cases of cancer are diagnosed in the same census tract the next year, the cancer rate for that census tract will change dramatically from one year to the next. These big fluctuations do not typically occur in larger populations. If we compare the cancer rate for a census tract to the cancer rate for the whole state of Delaware for a given time period, it would not be unusual to find the comparison different (perhaps even reversed) the following year. In Delaware, we publish five-year cancer incidence rates to allow for better understanding of cancer patterns among small populations. Cancer rates for five-year time periods are less vulnerable to the yearly fluctuations of cancer cases diagnosed in small populations.

We can tell how much uncertainty there is in cancer rate by looking at its confidence interval. A confidence interval is a range of values that shows where the cancer rate could reasonably be. This means that the cancer rate could be anywhere between the lower confidence limit and the upper confidence limit.

If the difference between the upper confidence limit and lower confidence limit is wide, there is greater uncertainty in the reliability of the cancer incidence rate. If the difference between the upper confidence limit and lower confidence limit is very narrow, there is much less uncertainty in the cancer rate.

The width of a confidence interval depends on two things: (a) the number of people living in that area and (b) the number of cancer cases diagnosed in that area.

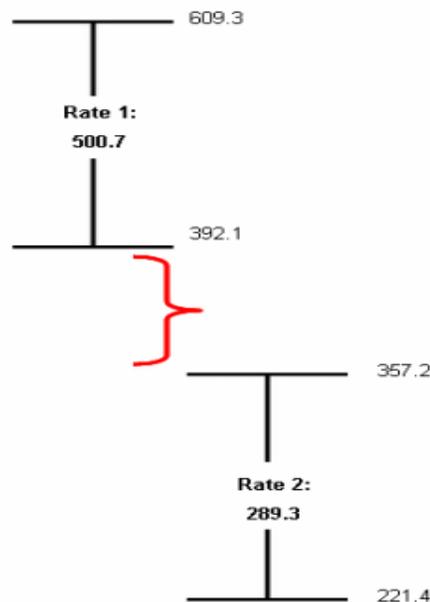
When a cancer rate is calculated for a small area (like a census tract or a neighborhood block), usually a small number of people live in that area. A much smaller number of people in that area will have been diagnosed with cancer. When a cancer rate is calculated for a small area, the cancer rate has a lot of uncertainty because

researchers do not have very much information to work with. Cancer rates based on small numbers of cases or deaths will probably have very wide confidence intervals.

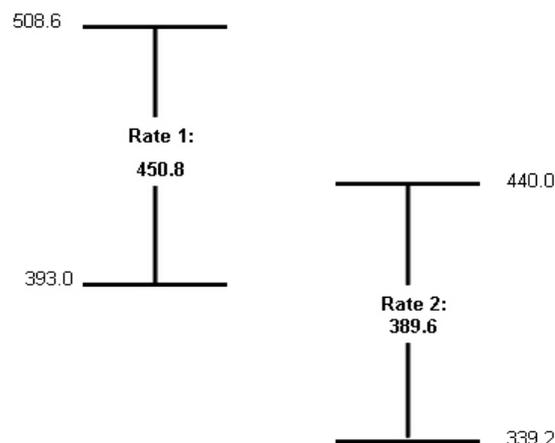
On the other hand, when a cancer rate is calculated for a large area (like a state or a country) with a large population, the odds are that more people will have been diagnosed with cancer compared to a smaller area. When a cancer rate is calculated based on a large number of cases or deaths, researchers are more certain of the level of cancer in that area. This means that cancer rates for large areas will usually have narrow confidence intervals.

Confidence intervals are important for another reason, too. They help researchers figure out if differences in cancer rates for two different areas are statistically significant. If the confidence interval for the incidence rate in one area does NOT overlap with the confidence interval for an incidence rate in another area, the two rates are significantly different. The figure below shows what non-overlapping confidence intervals look like.

If “Rate 1” is significantly higher than “Rate 2,” the lower confidence limit for “Rate 1” is greater than the upper confidence limit for “Rate 2”. When one rate is significantly different from another rate, the difference between the two rates is larger than we would expect by chance alone.



On the other hand, if the confidence interval for the incidence rate in one area overlaps with the confidence interval for an incidence rate in another area, the two rates are NOT significantly different. The figure below shows how the confidence intervals look when the cancer rates for two areas are NOT significantly different from one another.



If “Rate 1” is NOT significantly greater than “Rate 2”, the lower confidence limit for “Rate 1” is less than the upper confidence limit for “Rate 2”. Even though the numbers may look very different, if the cancer rate for one area is not significantly different from the cancer rate for another area, researchers cannot say that one rate is truly different from the other rate.

DPH compared cancer incidence rates for each census tract to the cancer rate for the state of Delaware. This means that we were able to tell if any census tracts had a significantly higher-than-expected or lower-than-expected overall cancer rate compared to the whole state.

To help you interpret the cancer rates for any census tract, we are providing maps, plus a table that lists the actual rate and the confidence intervals for both the state as a whole and for each census tract. When you look at the cancer rate for your census tract, it is important to look at the confidence interval. If a cancer rate has a relatively wide confidence interval, the cancer rate has a lot of uncertainty. When cancer rates have a lot of uncertainty, you should draw conclusions cautiously, keeping in mind that even our best guess may overestimate or underestimate the actual rate of cancer in a census tract.

Appendix I: Age-Adjusted All Site Cancer Incidence Rates by Census Tract; 2006–2010

Blue = Incidence rate is significantly **higher** than the state rate.

Yellow = Incidence rate is significantly **lower** than the state rate.

2010 Census Tract ID	Delaware: 512.1 (505.8, 518.4)
	AAR (95% CI)
2.00	557.6 (469.0 , 646.3)
3.00	548.8 (437.1 , 680.3)
4.00	446.8 (356.9 , 552.5)
5.00	428.1 (338.4 , 534.3)
6.01	529.8 (409.8 , 674.1)
6.02	580.8 (465.2 , 716.4)
9.00	554.6 (407.5 , 737.5)
11.00	376.2 (308.6 , 443.8)
12.00	494.5 (354.8 , 670.8)
13.00	440.0 (360.9 , 519.0)
14.00	468.0 (361.2 , 596.5)
15.00	455.2 (353.5 , 577.1)
16.00	370.3 (262.1 , 508.3)
19.02	464.7 (311.2 , 667.3)
21.00	536.6 (395.7 , 711.5)
22.00	345.0 (251.7 , 461.7)
23.00	478.9 (363.6 , 619.1)
24.00	456.3 (372.5 , 540.0)
25.00	586.5 (469.2 , 724.4)
26.00	511.8 (408.2 , 633.7)
27.00	406.7 (272.4 , 584.1)
28.00	433.9 (303.9 , 600.7)
29.00	581.9 (469.6 , 694.3)
30.02	270.8 (169.7 , 410.0) §
101.01	500.4 (406.0 , 594.7)
101.04	595.6 (478.9 , 712.3)
102.00	514.8 (395.5 , 658.6)
103.00	549.6 (441.4 , 676.3)
104.00	600.1 (505.6 , 694.5)
105.02	458.0 (385.2 , 530.9)
107.02	487.2 (401.5 , 573.0)
108.00	486.1 (413.5 , 558.7)
109.00	548.1 (446.1 , 650.1)
110.00	477.5 (387.1 , 568.0)
111.00	559.5 (458.5 , 660.4)
112.01	456.0 (344.4 , 592.1)
112.02	541.3 (451.6 , 630.9)
112.03	438.9 (357.3 , 520.6)

2010 Census Tract ID	Delaware: 512.1 (505.8, 518.4)
	AAR (95% CI)
112.04	466.1 (382.7 , 549.5)
112.05	444.4 (340.7 , 569.7)
112.06	455.3 (381.7 , 528.9)
113.00	528.3 (424.8 , 631.8)
114.00	470.8 (390.8 , 550.9)
115.00	441.4 (353.1 , 545.1)
116.00	421.6 (340.7 , 516.0)
117.00	376.9 (316.8 , 437.0)
118.00	475.2 (404.4 , 546.0)
119.00	497.5 (407.7 , 587.2)
120.00	600.5 (512.2 , 688.7)
121.00	532.3 (429.5 , 635.1)
122.00	538.3 (442.8 , 633.8)
123.00	496.0 (383.6 , 631.0)
124.00	508.4 (415.9 , 600.9)
125.00	473.0 (394.4 , 551.7)
126.00	580.1 (469.3 , 709.1)
127.00	492.7 (415.7 , 569.8)
129.00	508.6 (414.8 , 602.3)
130.00	568.8 (439.9 , 723.6)
131.00	575.5 (457.7 , 714.4)
132.00	456.6 (353.9 , 579.9)
133.00	551.5 (436.6 , 687.4)
134.00	501.6 (407.7 , 610.7)
135.01	456.0 (402.2 , 509.8)
135.03	511.7 (443.2 , 580.3)
135.05	514.4 (416.2 , 628.8)
135.06	533.9 (441.4 , 626.4)
136.04	569.4 (474.7 , 664.1)
136.07	471.9 (400.1 , 543.6)
136.08	388.7 (281.3 , 523.6)
136.10	423.8 (350.4 , 497.3)
136.11	430.1 (356.2 , 504.0)
136.12	374.2 (312.4 , 436.0)
136.13	565.9 (483.5 , 648.4)
136.14	403.9 (311.7 , 514.7)
136.15	545.0 (461.6 , 628.5)
137.00	555.8 (446.9 , 683.1)

§ Age-adjusted incidence rate is based on fewer than 25 cases.

Age-Adjusted All Site Cancer Incidence Rates by Census Tract, continued

Blue = Incidence rate is significantly **higher** than the state rate.

Yellow = Incidence rate is significantly **lower** than the state rate.

2010 Census Tract ID	Delaware: 512.1 (505.8, 518.4)
	AAR (95% CI)
138.00	503.4 (420.3 , 586.5)
139.01	563.1 (447.1 , 699.8)
139.03	488.5 (390.7 , 603.3)
139.04	516.1 (428.1 , 604.2)
140.00	477.0 (389.8 , 564.2)
141.00	515.4 (419.9 , 610.8)
142.00	477.3 (351.9 , 632.8)
143.00	475.4 (397.0 , 553.9)
144.02	473.5 (373.7 , 591.8)
144.03	462.5 (366.7 , 575.6)
144.04	410.8 (329.0 , 506.7)
145.01	468.7 (313.9 , 673.1)
145.02	499.5 (309.2 , 763.6) §
147.02	476.6 (357.0 , 623.4)
147.03	571.2 (481.8 , 660.5)
147.05	490.0 (409.7 , 570.4)
147.06	475.8 (340.0 , 648.0)
148.03	452.9 (369.8 , 536.1)
148.05	547.3 (466.9 , 627.7)
148.07	565.7 (474.9 , 656.6)
148.08	519.1 (426.6 , 611.6)
148.09	534.8 (455.5 , 614.0)
148.10	580.4 (492.4 , 668.4)
149.03	566.5 (462.0 , 670.9)
149.04	494.1 (403.0 , 585.2)
149.06	464.6 (359.4 , 591.1)
149.07	525.8 (424.8 , 626.9)
149.08	340.6 (235.9 , 475.9)
149.09	525.2 (429.2 , 621.2)
150.00	520.0 (435.6 , 604.3)
152.00	593.9 (495.2 , 692.7)
154.00	580.5 (490.8 , 670.2)
155.02	454.9 (363.4 , 562.5)
156.00	512.3 (404.3 , 640.3)
158.02	627.7 (503.5 , 773.4)
159.00	481.9 (359.9 , 632.0)
160.00	685.6 (568.2 , 803.0)
161.00	558.5 (445.5 , 691.5)

2010 Census Tract ID	Delaware: 512.1 (505.8, 518.4)
	AAR (95% CI)
162.00	606.8 (490.3 , 742.5)
163.01	661.8 (561.7 , 761.8)
163.02	522.3 (436.4 , 608.2)
163.05	482.5 (405.8 , 559.2)
164.01	548.9 (453.8 , 644.0)
164.04	527.2 (422.8 , 649.5)
166.01	547.7 (481.9 , 613.5)
166.02	511.9 (422.5 , 601.3)
166.04	567.3 (488.3 , 646.3)
166.08	579.6 (476.4 , 682.9)
168.01	416.4 (337.6 , 507.9)
169.01	530.0 (434.8 , 625.3)
169.04	555.7 (436.3 , 697.6)
401.00	520.7 (414.2 , 646.4)
402.01	660.3 (568.6 , 752.1)
402.02	625.6 (517.7 , 733.6)
402.03	524.1 (467.4 , 580.7)
405.01	450.6 (365.4 , 549.7)
405.02	500.3 (415.9 , 584.8)
407.00	452.1 (362.1 , 557.7)
409.00	502.5 (423.6 , 581.3)
410.00	451.6 (360.7 , 558.4)
411.00	450.5 (370.8 , 530.1) §
412.00	183.3 (73.7 , 377.7)
413.00	485.2 (392.0 , 578.5)
414.00	631.2 (486.1 , 806.0)
415.00	536.8 (433.3 , 657.6)
416.00	536.7 (444.1 , 629.3)
417.01	548.6 (445.4 , 668.6)
417.02	631.2 (547.6 , 714.8)
418.01	519.9 (428.4 , 611.4)
412.00	606.8 (490.3 , 742.5)
413.00	661.8 (561.7 , 761.8)
414.00	522.3 (436.4 , 608.2)
415.00	482.5 (405.8 , 559.2)
416.00	548.9 (453.8 , 644.0)
417.01	527.2 (422.8 , 649.5)
417.02	547.7 (481.9 , 613.5)

§ Age-adjusted incidence rate is based on fewer than 25 cases.

Age-Adjusted All Site Cancer Incidence Rates by Census Tract, continued

Blue = Incidence rate is significantly **higher** than the state rate.

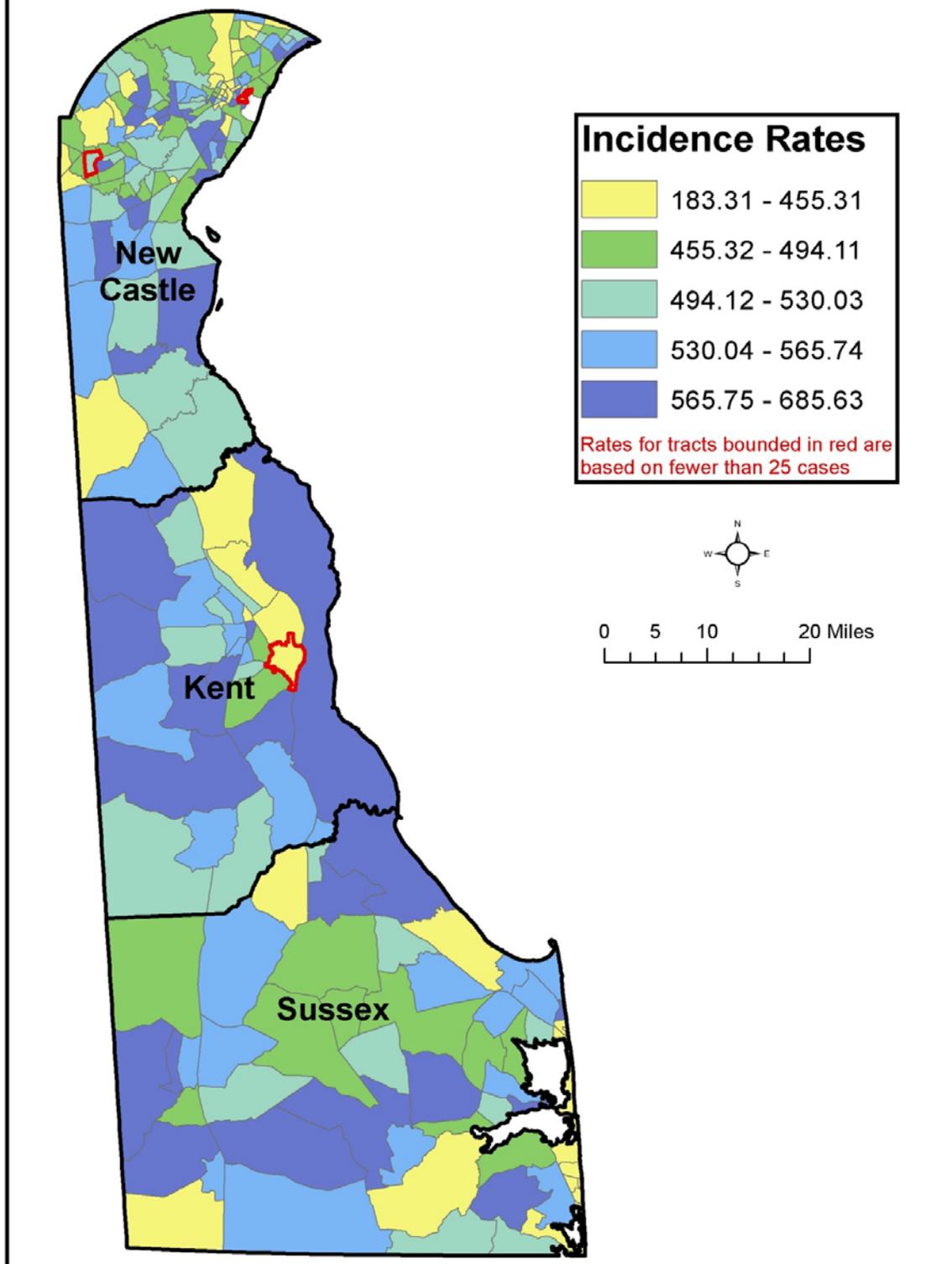
Yellow = Incidence rate is significantly **lower** than the state rate.

2010 Census Tract ID	Delaware: 512.1 (505.8, 518.4)
	AAR (95% CI)
418.01	552.8 (486.5 , 619.2)
418.02	517.3 (421.5 , 613.2)
419.00	606.3 (514.3 , 698.2)
420.00	553.3 (446.6 , 677.8)
421.00	626.3 (522.9 , 729.7)
422.01	462.8 (393.2 , 532.3)
422.02	629.3 (552.8 , 705.8)
425.00	557.1 (452.3 , 678.9)
428.00	670.8 (586.8 , 754.8)
429.00	517.2 (432.1 , 602.3)
430.00	544.2 (458.8 , 629.6)
431.00	516.9 (410.5 , 642.5)
432.02	588.5 (489.3 , 687.8)
433.00	555.7 (465.6 , 645.9)
434.00	531.1 (444.9 , 617.2)
501.01	423.5 (342.5 , 504.5)
501.03	620.6 (529.4 , 711.7)
501.04	503.6 (416.0 , 591.2)
501.05	608.9 (512.7 , 705.1)
502.00	483.2 (380.7 , 604.7)
503.01	490.2 (423.6 , 556.8)
503.02	554.3 (461.9 , 646.8)
504.01	633.9 (528.9 , 738.9)
504.03	490.0 (391.4 , 605.9)
504.05	605.9 (511.4 , 700.4)
504.06	558.8 (476.0 , 641.6)
504.07	548.3 (463.3 , 633.2)
504.08	524.9 (436.4 , 613.5)
505.01	490.6 (398.3 , 597.8)
505.03	474.9 (382.9 , 582.4)
505.04	525.2 (440.0 , 610.4)
506.01	604.7 (508.9 , 700.5)
506.02	538.9 (461.6 , 616.1)
507.01	568.0 (475.5 , 660.4)

2010 Census Tract ID	Delaware: 512.1 (505.8, 518.4)
	AAR (95% CI)
507.03	493.7 (397.0 , 606.8)
507.04	511.3 (435.3 , 587.3)
507.05	536.7 (467.6 , 605.7)
507.06	575.3 (464.2 , 686.4)
508.01	496.4 (400.1 , 592.7)
508.02	474.5 (395.0 , 553.9)
508.03	563.2 (497.4 , 628.9)
509.01	440.1 (340.4 , 559.9)
509.02	558.4 (491.6 , 625.1)
510.03	532.7 (456.4 , 609.1)
510.04	550.2 (471.8 , 628.7)
510.05	470.6 (400.0 , 541.1)
510.06	479.1 (398.0 , 560.2)
510.07	495.9 (426.3 , 565.5)
511.01	613.8 (449.4 , 818.7)
511.02	398.0 (295.4 , 524.7)
511.03	438.0 (311.5 , 598.8)
512.01	424.7 (322.5 , 549.0)
512.02	295.7 (210.3 , 404.2)
512.03	421.6 (306.3 , 566.0)
512.04	396.2 (279.0 , 546.2)
512.05	351.3 (229.5 , 514.7)
513.01	467.2 (406.1 , 528.4)
513.02	583.9 (475.8 , 692.0)
513.03	531.9 (459.6 , 604.2)
513.05	495.0 (414.2 , 575.9)
513.06	445.3 (362.8 , 527.8)
514.00	518.3 (421.9 , 614.7)
515.00	437.2 (365.3 , 509.1)
517.01	629.2 (525.4 , 733.1)
517.02	539.3 (458.0 , 620.6)
518.01	661.0 (563.6 , 758.3)
518.02	548.7 (452.9 , 644.5)
519.00	453.1 (372.7 , 533.5)

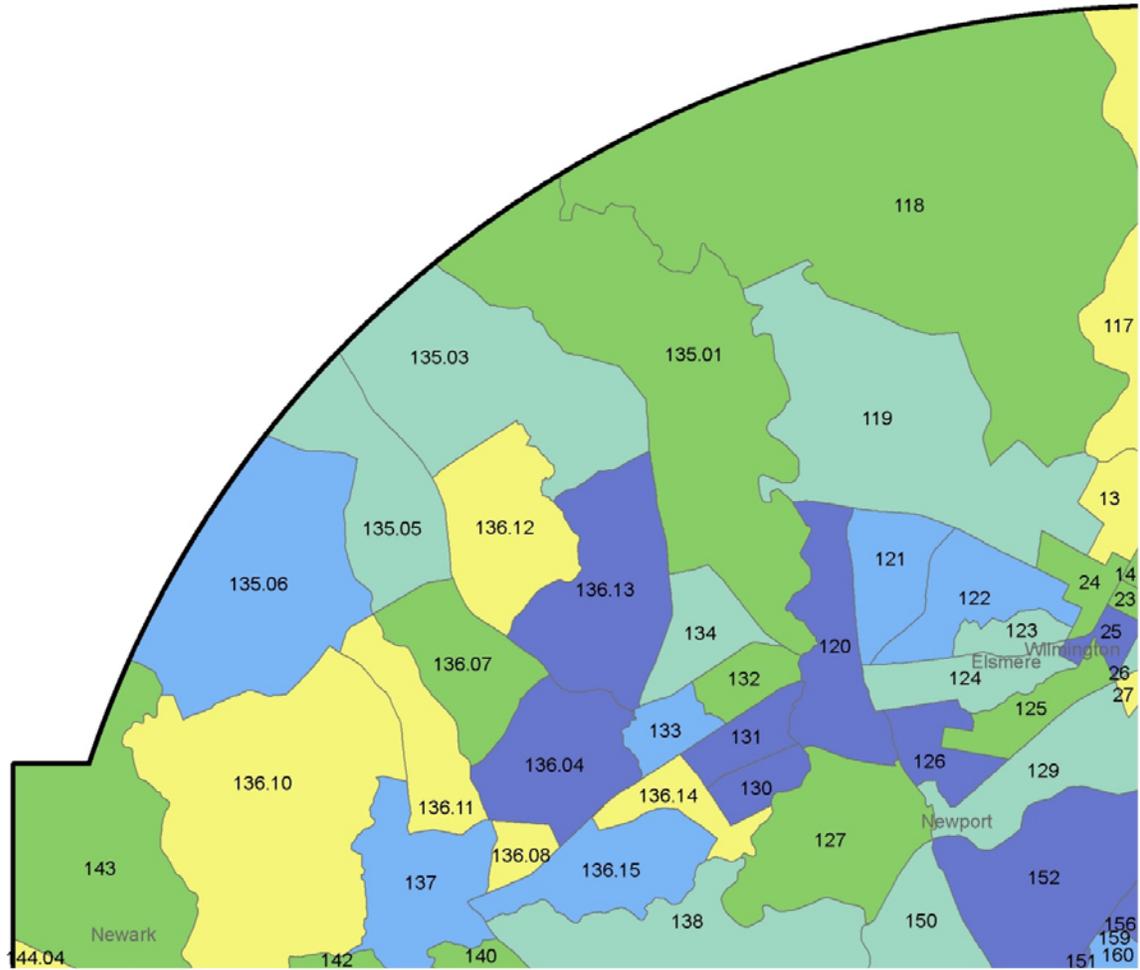
Appendix J:
Maps of Delaware Census Tracts by 2006–2010 Cancer incidence Rate Quintiles

Delaware Five-Year Age-Adjusted Cancer Incidence Rates, by Census Tract, 2006-2010



Source: Delaware Cancer Registry

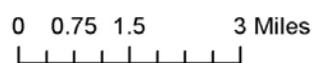
Delaware Five-Year Age-Adjusted Cancer Incidence Rates, by Census Tract, 2006-2010 Hockessin and Northwestern New Castle County



Incidence Rates

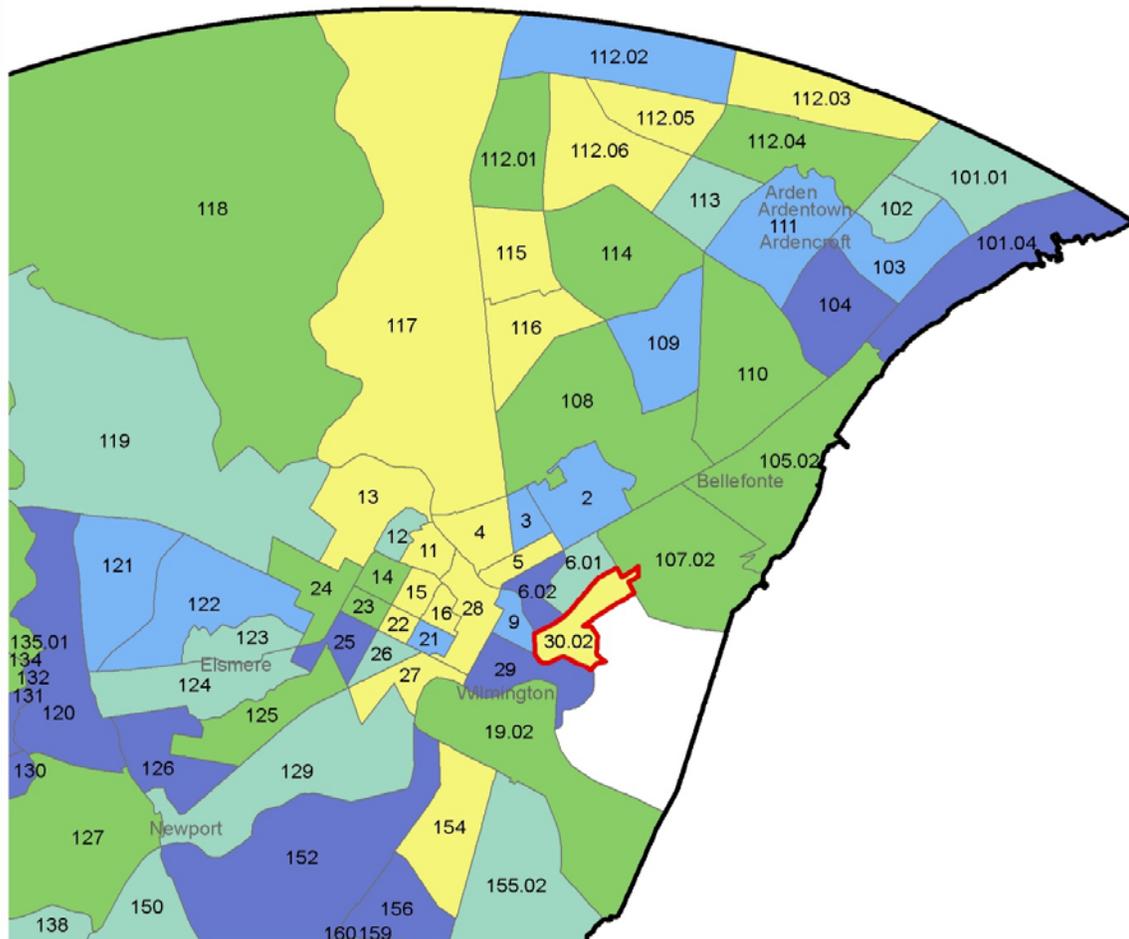
- 183.31 - 455.31
- 455.32 - 494.11
- 494.12 - 530.03
- 530.04 - 565.74
- 565.75 - 685.63

Rates for tracts bounded in red are based on fewer than 25 cases



Source: Delaware Cancer Registry

Delaware Five-Year Age-Adjusted Cancer Incidence Rates, by Census Tract, 2006-2010 Wilmington and Northeastern New Castle County



Incidence Rates

	183.31 - 455.31
	455.32 - 494.11
	494.12 - 530.03
	530.04 - 565.74
	565.75 - 685.63

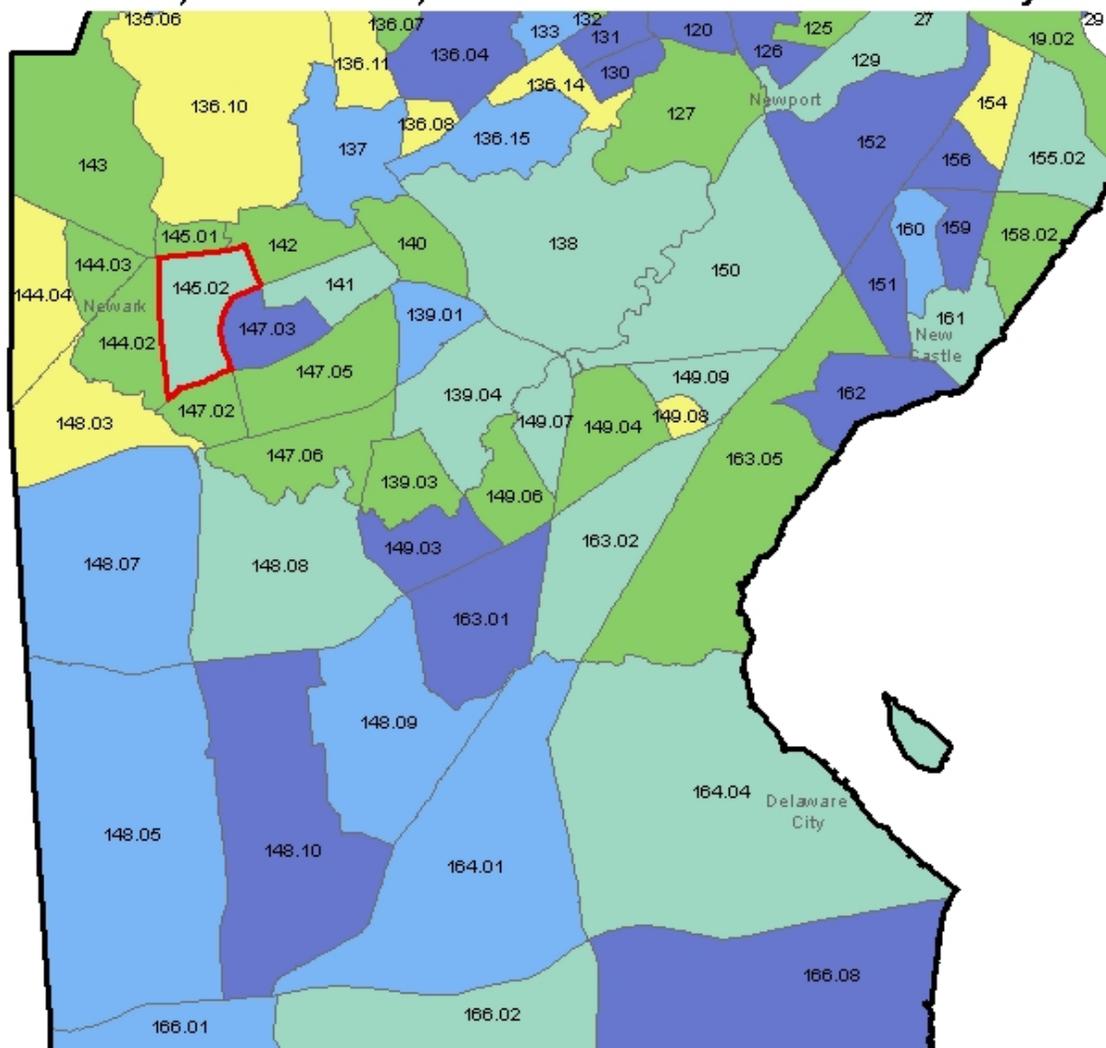
Rates for tracts bounded in red are based on fewer than 25 cases



Source: Delaware Cancer Registry

Delaware Five-Year Age-Adjusted Cancer Incidence Rates, by Census Tract, 2006-2010

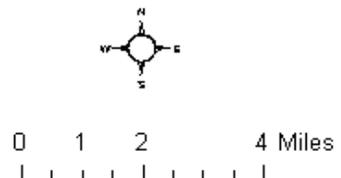
Newark, New Castle, and Central New Castle County



Incidence Rates

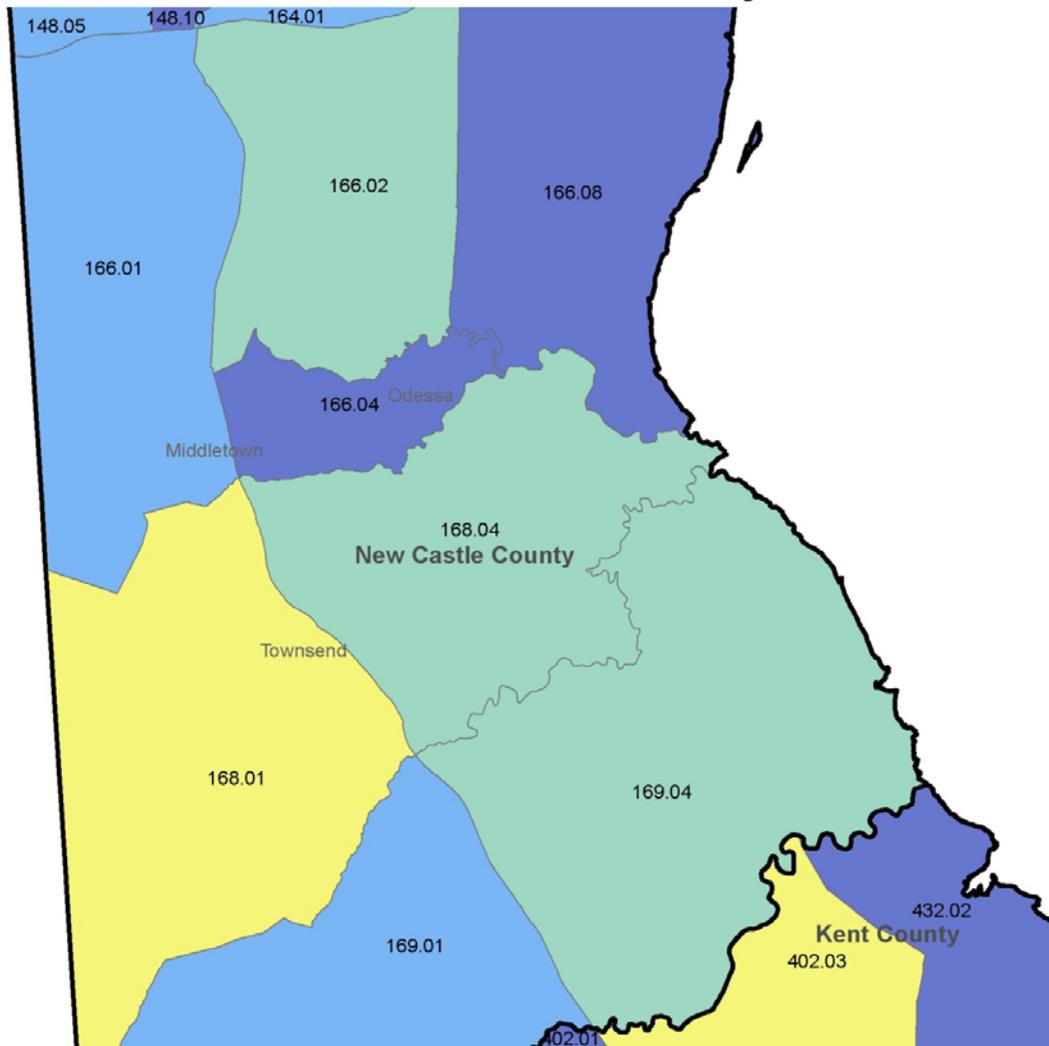
- 183.31 - 455.31
- 455.32 - 494.11
- 494.12 - 530.03
- 530.04 - 565.74
- 565.75 - 685.63

Rates for tracts bounded in red are based on fewer than 25 cases

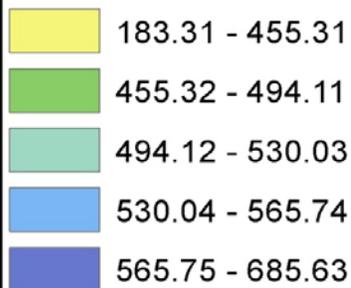


Source: Delaware Cancer Registry

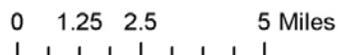
Delaware Five-Year Age-Adjusted Cancer Incidence Rates, by Census Tract, 2006-2010 Southern New Castle County



Incidence Rates

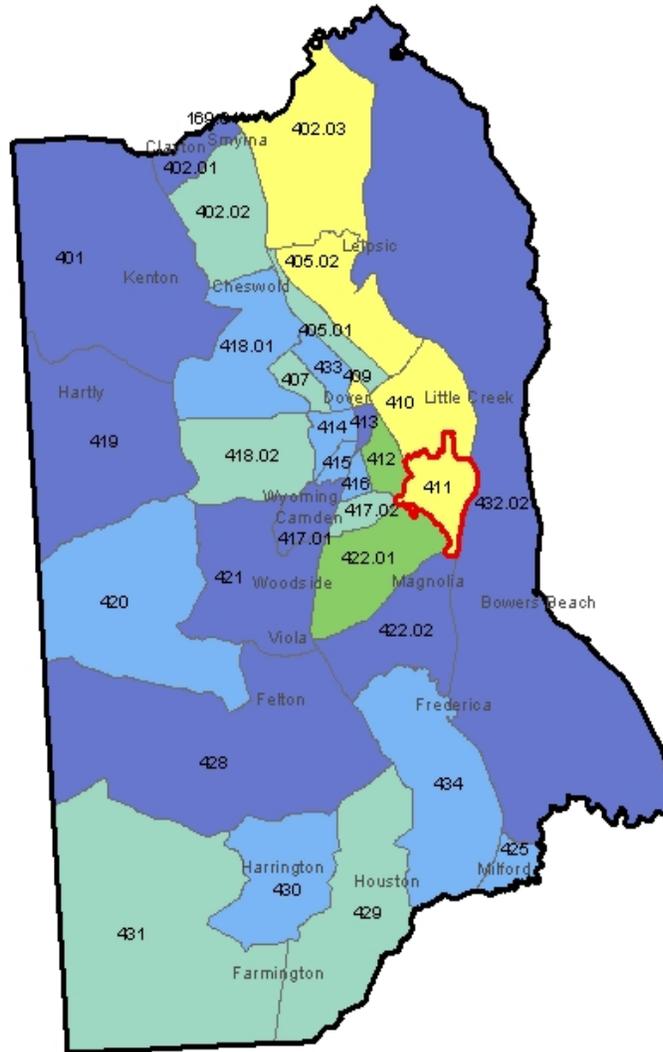


Rates for tracts bounded in red are based on fewer than 25 cases

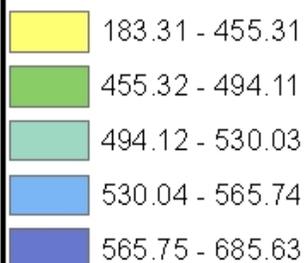


Source: Delaware Cancer Registry

Delaware Five-Year Age-Adjusted Cancer Incidence Rates, by Census Tract, 2006-2010 Kent County



Incidence Rates



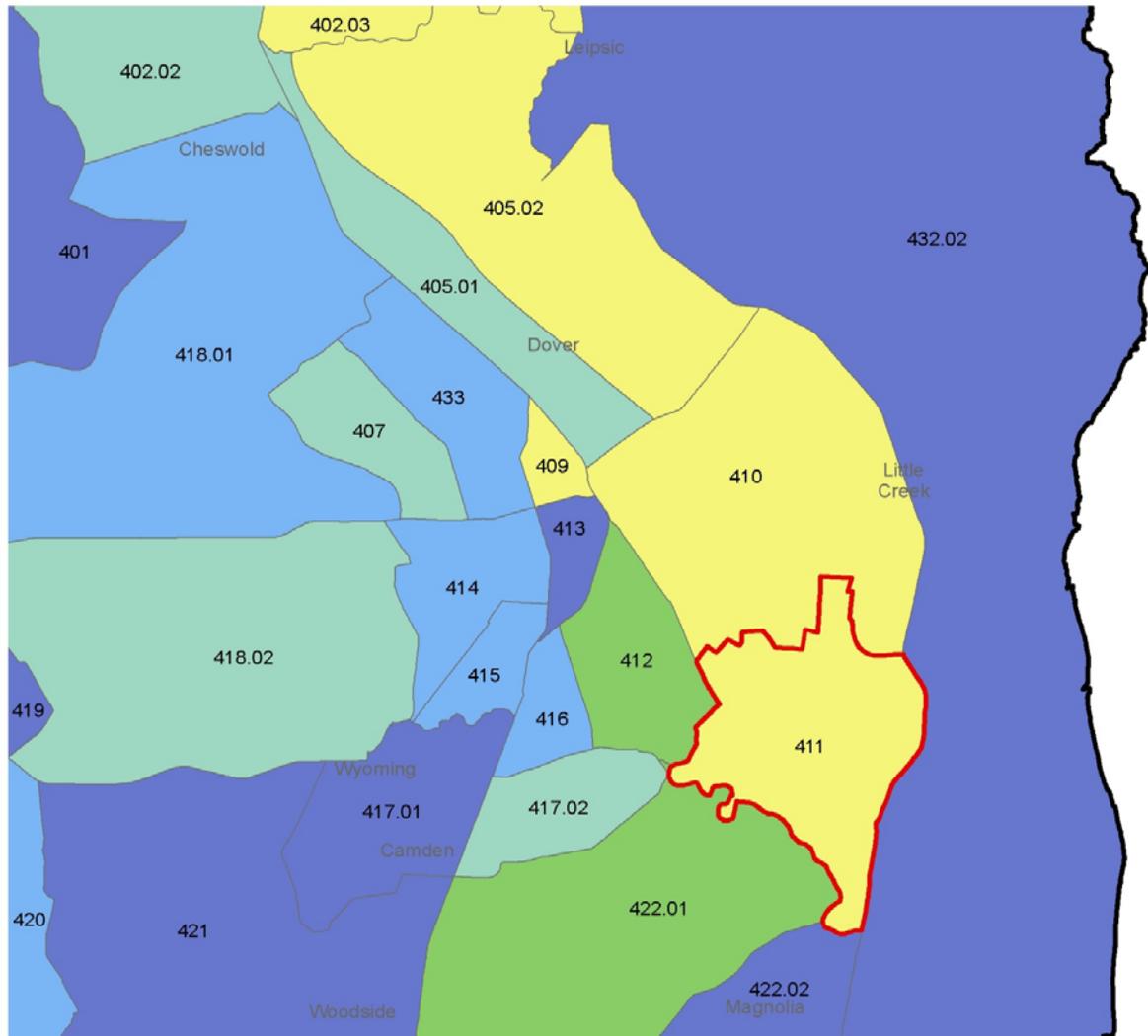
Rates for tracts bounded in red are based on fewer than 25 cases



0 3 6 12 Miles

Source: Delaware Cancer Registry

Delaware Five-Year Age-Adjusted Cancer Incidence Rates, by Census Tract, 2006-2010 Greater Dover



Incidence Rates

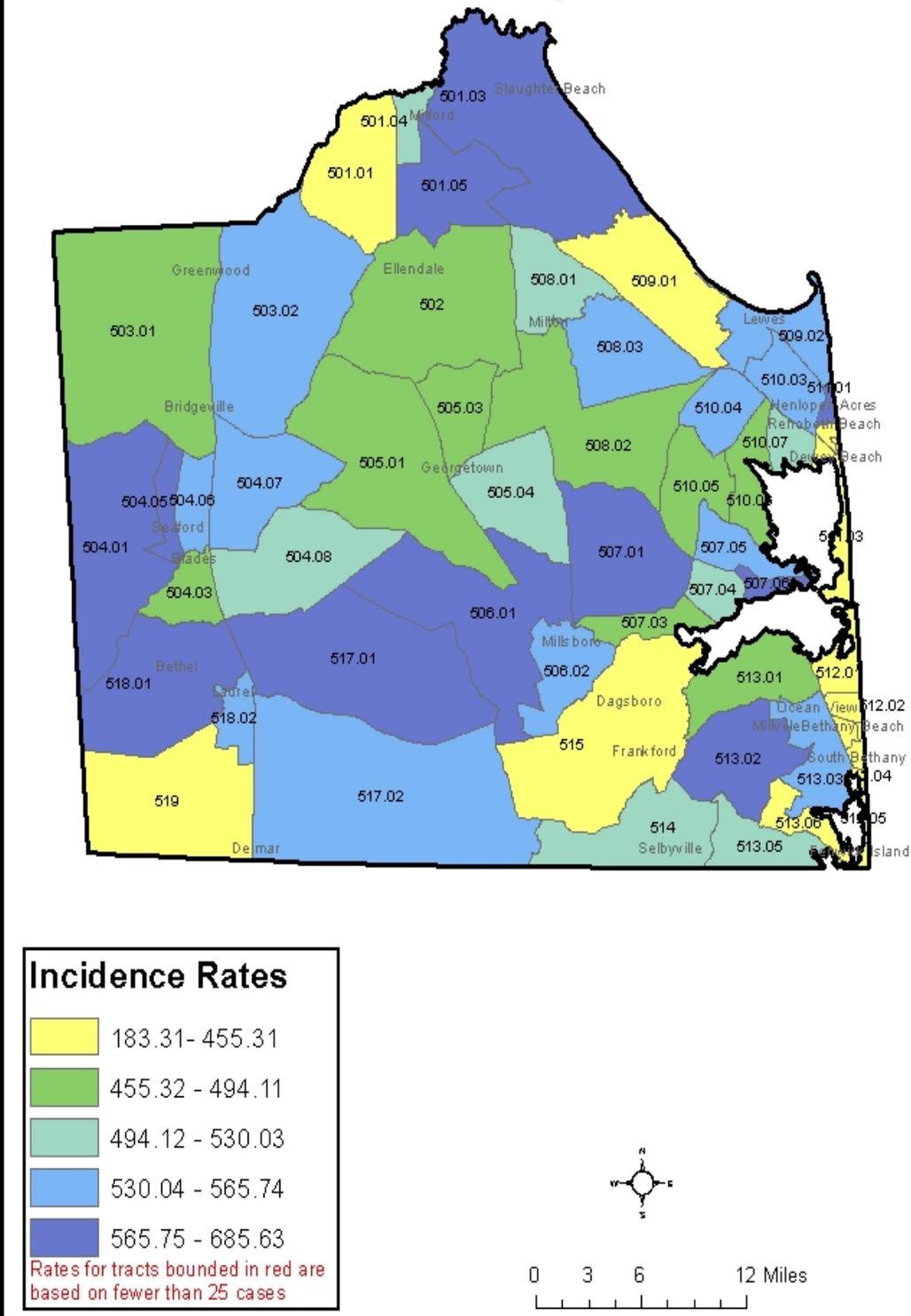
- 183.31 - 455.31
- 455.32 - 494.11
- 494.12 - 530.03
- 530.04 - 565.74
- 565.75 - 685.63

Rates for tracts bounded in red are based on fewer than 25 cases



Source: Delaware Cancer Registry

Delaware Five-Year Age-Adjusted Cancer Incidence Rates, by Census Tract, 2006-2010 Sussex County

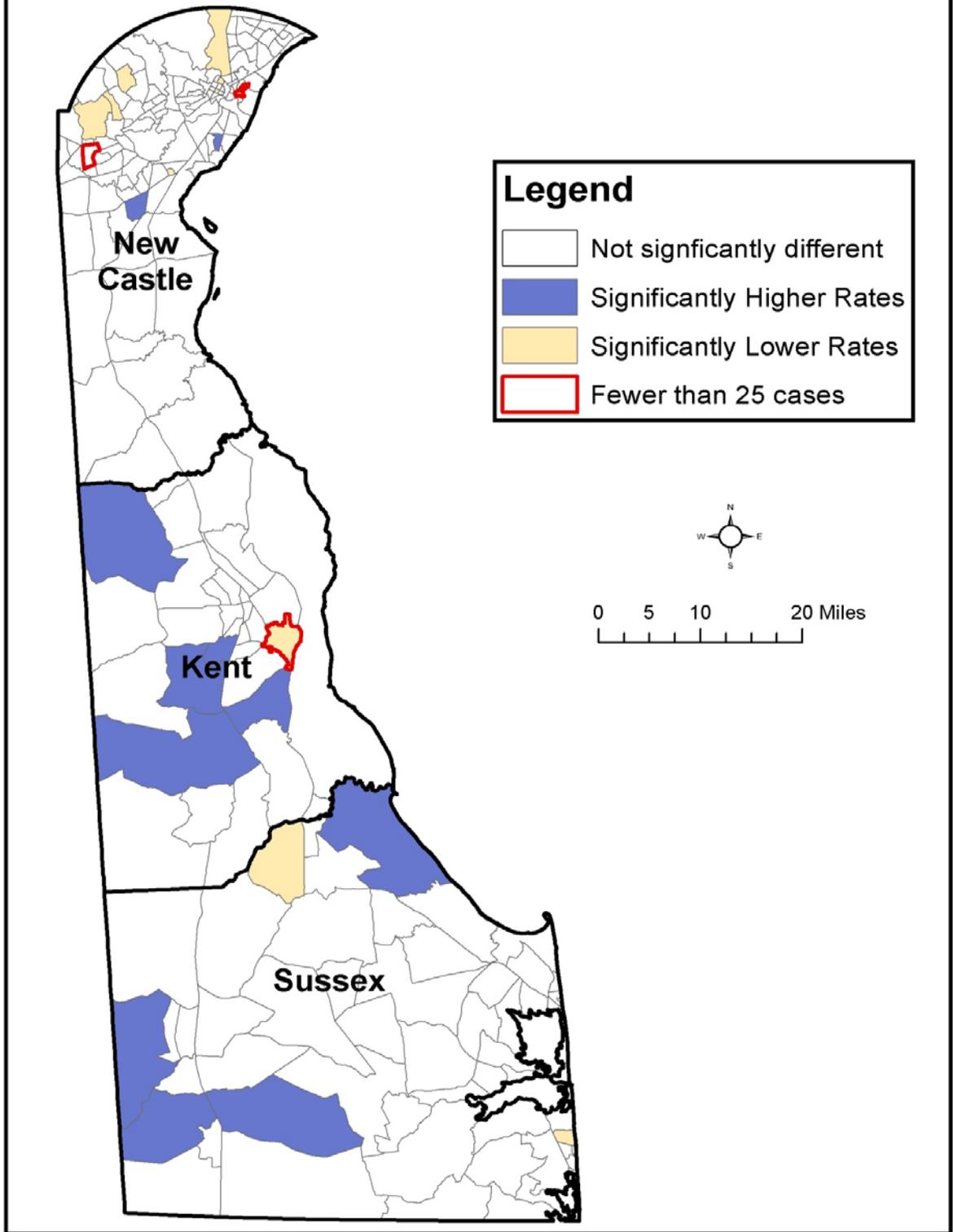


Source: Delaware Cancer Registry

Appendix K:

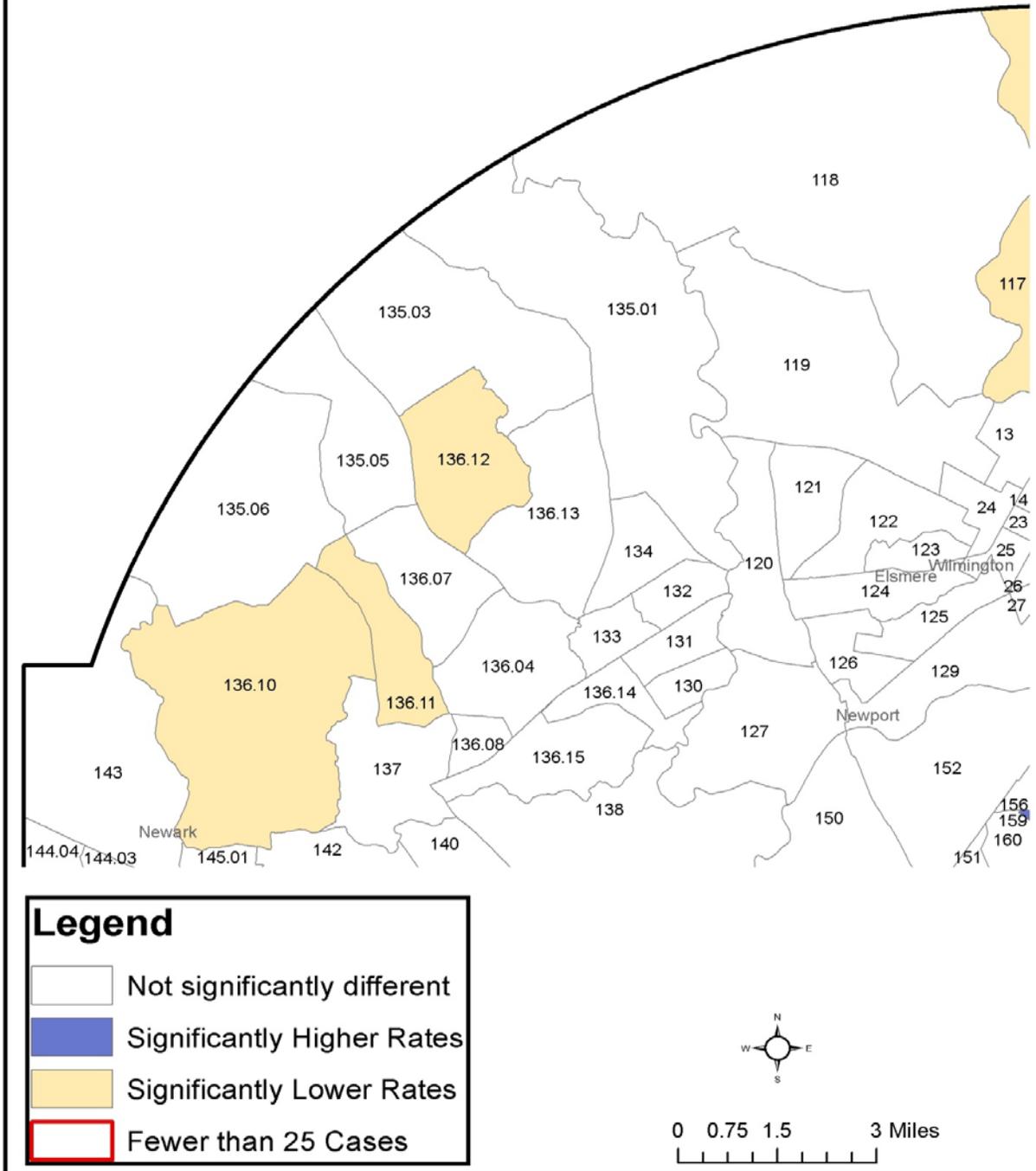
Maps of Delaware Census Tracts, with High and Low Cancer Incidence Rates, 2006–2010

Delaware Five-Year Age-Adjusted Cancer Incidence Rates, by Census Tract, 2006-2010



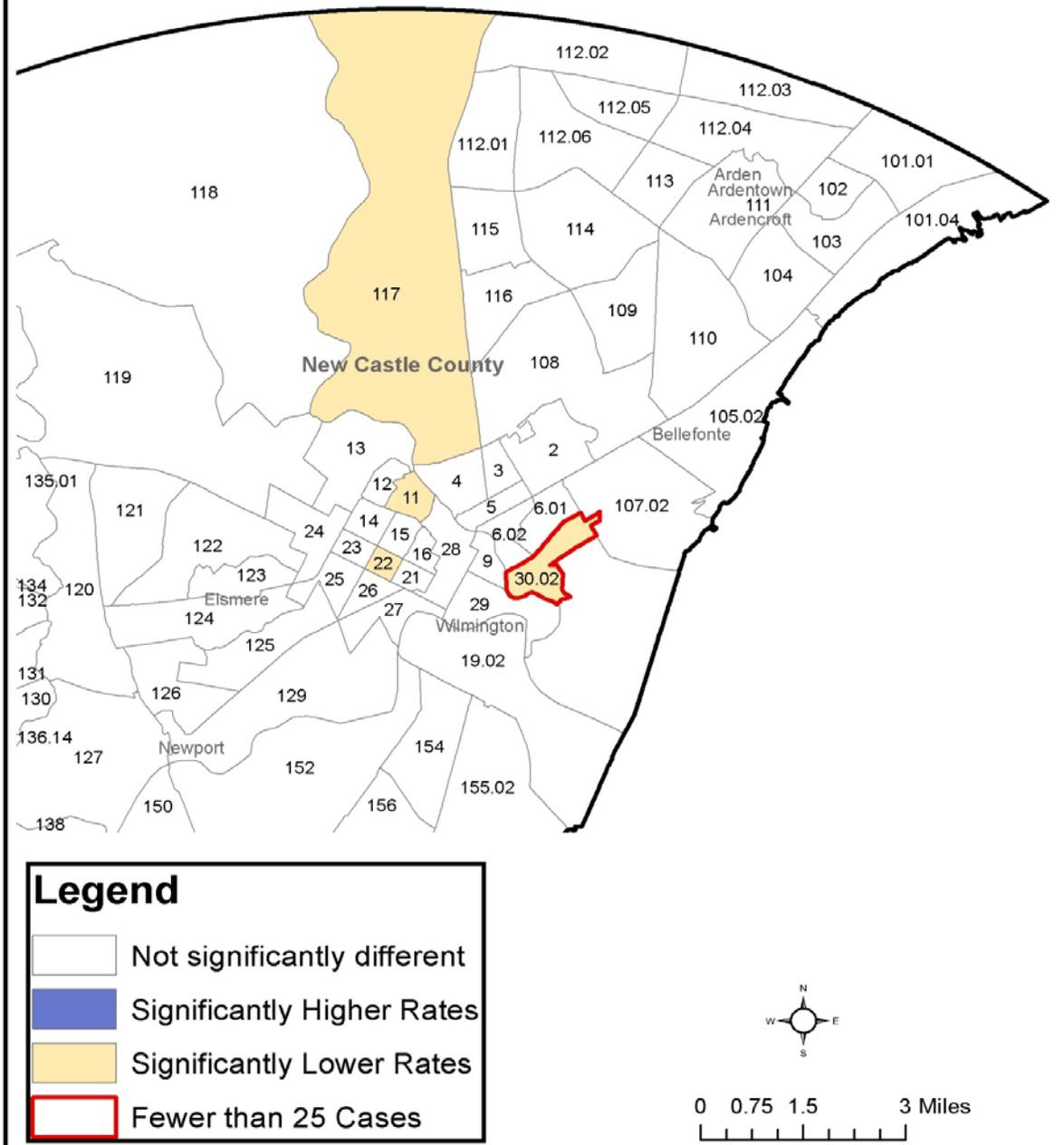
Source: Delaware Cancer Registry

Delaware Five-Year Age-Adjusted Cancer Incidence Rates, by Census Tract, 2006-2010 Hockessin and Northwestern New Castle County



Source: Delaware Cancer Registry

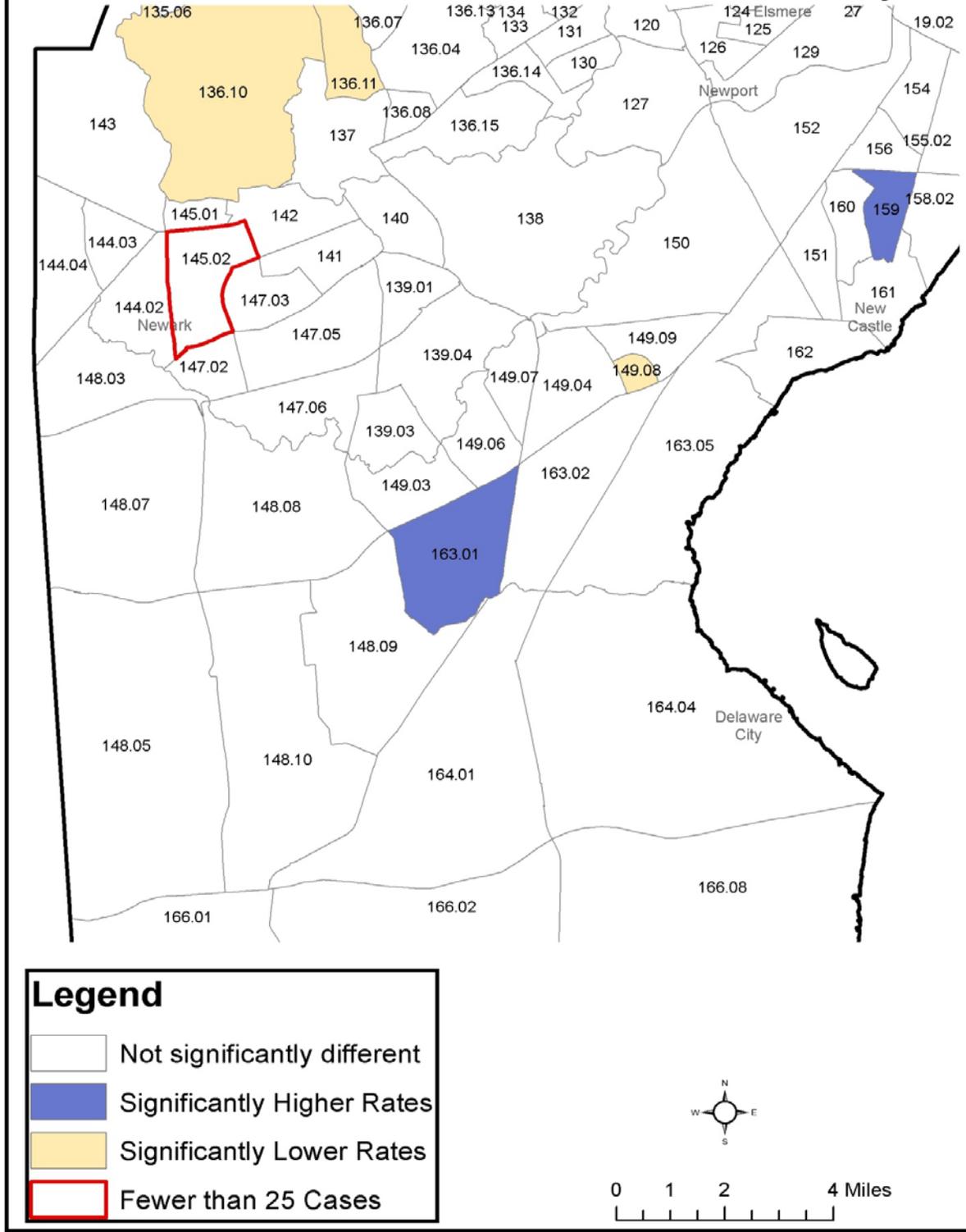
Delaware Five-Year Age-Adjusted Cancer Incidence Rates, by Census Tract, 2006-2010 Wilmington and Northeastern New Castle County



Source: Delaware Cancer Registry

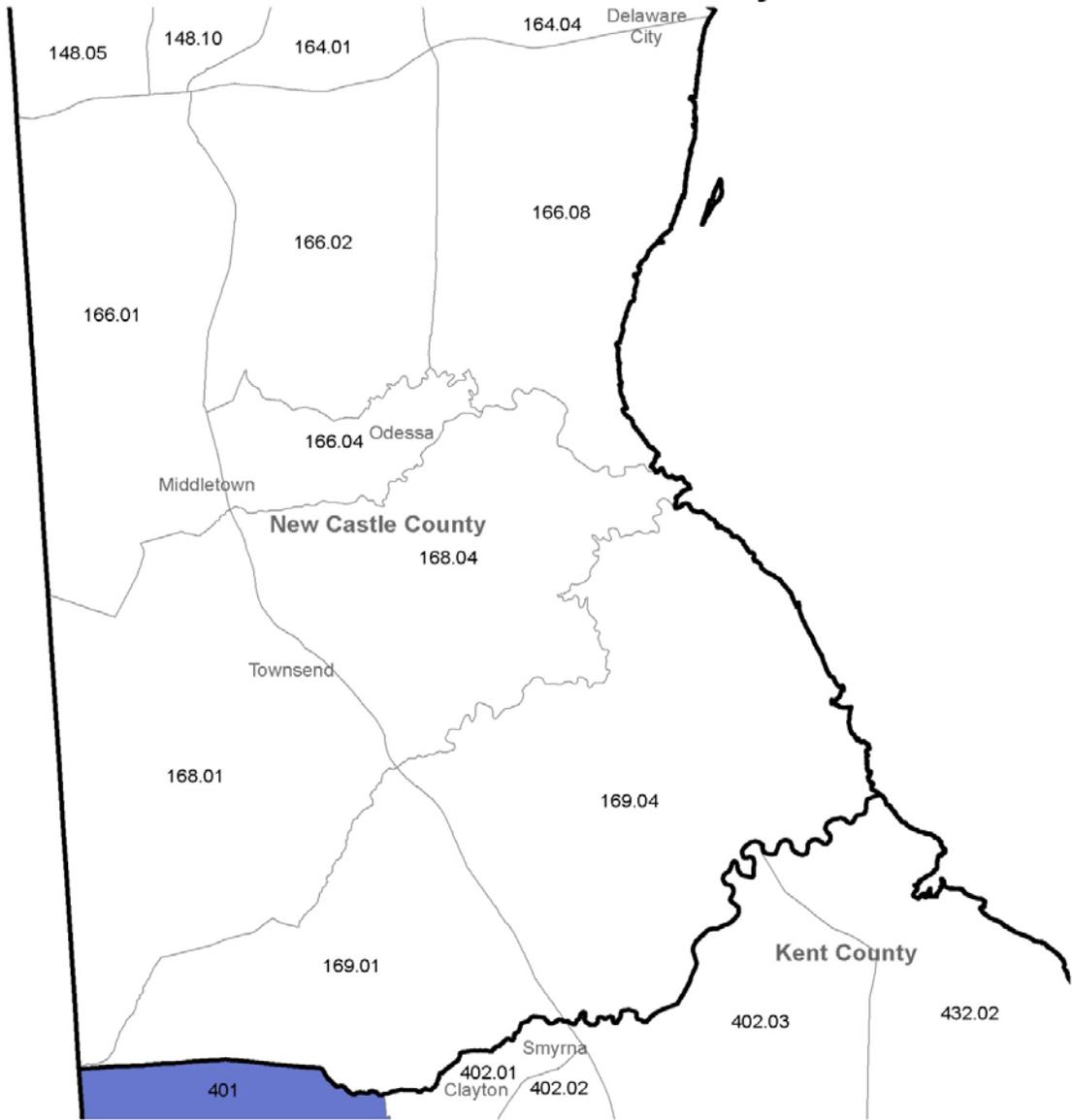
Delaware Five-Year Age-Adjusted Cancer Incidence Rates, by Census Tract, 2006-2010

Newark, New Castle, and Central New Castle County



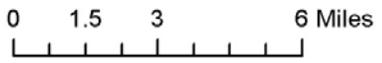
Source: Delaware Cancer Registry

Delaware Five-Year Age-Adjusted Cancer Incidence Rates, by Census Tract, 2006-2010 Southern New Castle County



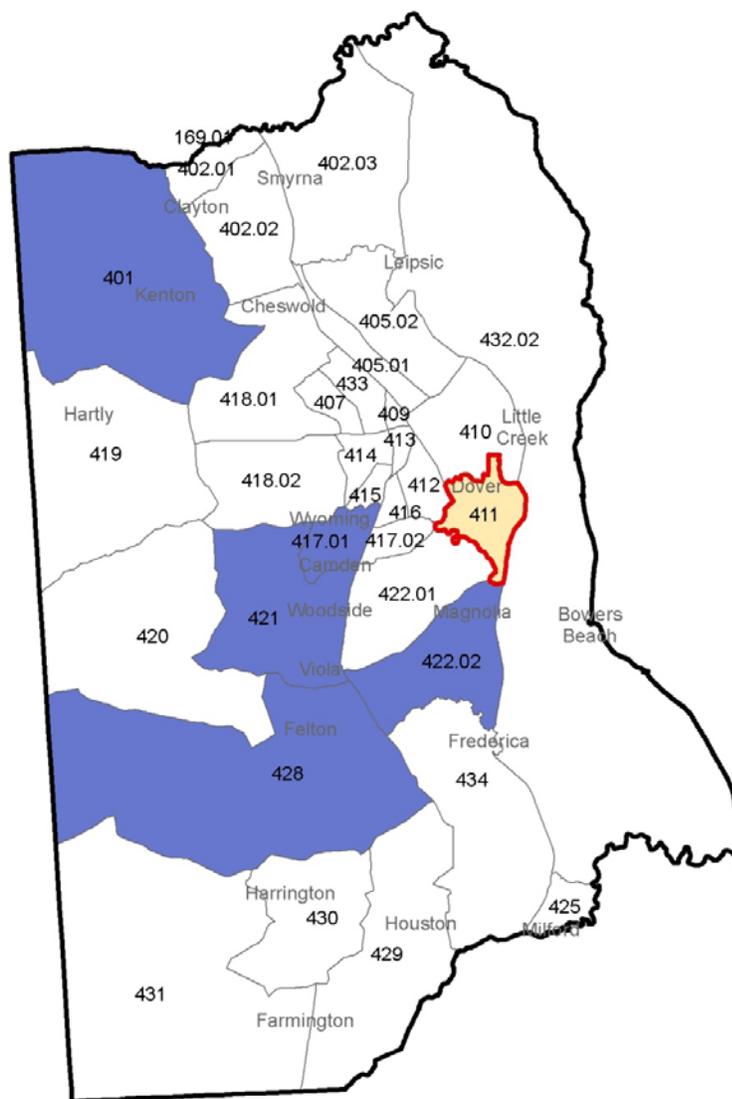
Legend

- Not significantly different
- Significantly Higher Rates
- Significantly Lower Rates
- Fewer than 25 Cases



Source: Delaware Cancer Registry

Delaware Five-Year Age-Adjusted Cancer Incidence Rates, by Census Tract, 2006-2010 Kent County



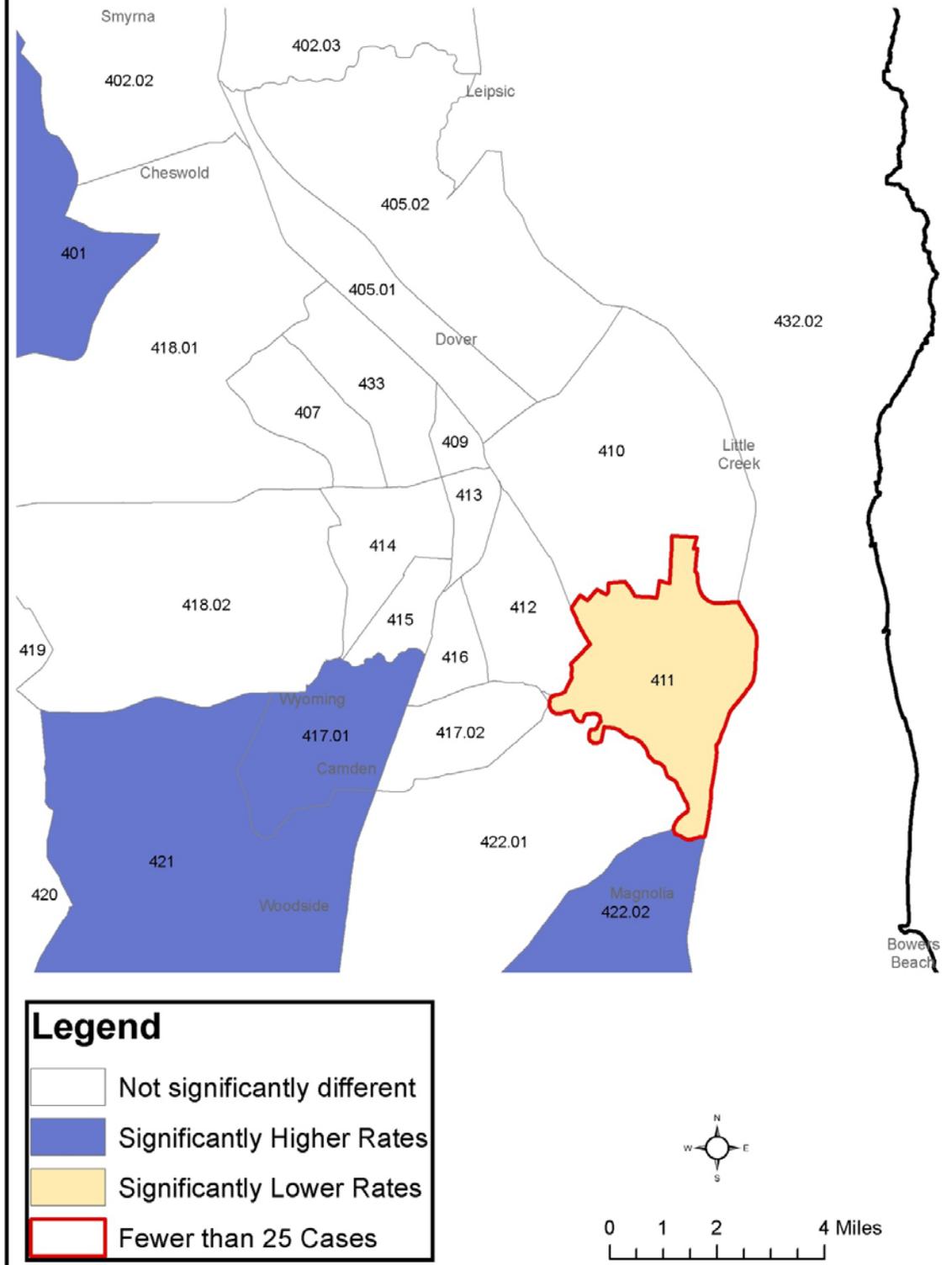
Legend

- Not significantly different
- Fewer than 25 Cases
- Significantly Lower Rates
- Significantly Higher Rates



Source: Delaware Cancer Registry

Delaware Five-Year Age-Adjusted Cancer Incidence Rates, by Census Tract, 2006-2010 Greater Dover



Source: Delaware Cancer Registry

