

# **CANCER INCIDENCE AND MORTALITY IN DELAWARE, 2015-2019**

DELAWARE DEPARTMENT OF HEALTH AND SOCIAL SERVICES  
DIVISION OF PUBLIC HEALTH  
2022



*DELAWARE HEALTH AND SOCIAL SERVICES*  
Division of Public Health  
Comprehensive Cancer Control Program



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<http://www.dhss.delaware.gov/dhss/dph/dpc/cancer.html>

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## CHAPTER 1: EXECUTIVE SUMMARY

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This report presents the 2015-2019 cancer incidence and mortality data and statistics for Delaware. The Delaware Department of Health and Social Services (DHSS), Division of Public Health (DPH), in conjunction with the Delaware Cancer Consortium (DCC), publishes this report as a source of cancer incidence and mortality information. DPH and other stakeholders also use this report to inform decisions on outreach and program strategies to combat cancer incidence and mortality in Delaware.

Cancer incidence (the number of new cases of cancer in a population over a time period)<sup>1</sup> and mortality (the number of deaths from cancer in a population over a time period)<sup>2</sup> rates and other analyses are performed by the Delaware Comprehensive Cancer Control Program staff. Incidence data are obtained from the Delaware Cancer Registry (DCR) and mortality data are obtained from the Delaware Health Statistics Center.

This report includes cancer statistics for all cancer sites combined (all-site cancer), as well as the top 23 site-specific cancer types: female breast, cervix, uterine, ovary, prostate, testis, oral cavity and pharynx, esophagus, stomach, colorectal, liver and intrahepatic bile duct, pancreas, larynx, lung and bronchus, melanoma, urinary bladder, kidney and renal pelvis, brain and other nervous system, thyroid, Hodgkin lymphoma, non-Hodgkin lymphoma, myeloma, and leukemia. These cancer statistics reflect incidence and mortality data for 2015-2019. DPH compares Delaware's cancer incidence and mortality statistics for 2015-2019 to those of the U.S. over the same period. DPH also summarizes how Delaware and U.S. cancer rates have changed from 2005 to 2019.

Between 2005 and 2019, incidence rates for all-site cancer decreased an average of 1.1% per year in Delaware and an average of 0.7% per year in the U.S. While progress continues to be made, Delaware's 2015-2019 all-site cancer incidence rate (468.8 per 100,000 population) remains 4% higher than the comparable U.S. rate (449.0 per 100,000 population). Delaware currently ranks 13<sup>th</sup> among the states for highest all-site cancer incidence. Between 2005 and 2019, incidence rates for all-site cancer decreased an average of 1.8% per year among non-Hispanic White males and remained stable for non-Hispanic White females. During that same period, incidence rates for all-site cancer decreased an average of 3.1% per year among non-Hispanic Black males and remained stable for non-Hispanic Black females. Between 2005 and 2019, the trend in incidence rates for all-site cancer were stable among both Hispanic males and Hispanic females.

Of the 23 site-specific cancers analyzed, Delaware had a significantly higher age-adjusted incidence rate for lung and bronchus, melanoma, urinary bladder, and thyroid cancers compared to the U.S. during 2015-2019. Delaware had a significantly lower age-adjusted leukemia incidence rate compared to the U.S. during the same time period. Delaware males had a significantly higher age-adjusted incidence rate for lung and bronchus, melanoma, prostate, and urinary bladder compared to U.S. males during 2015-2019. Delaware females had a significantly higher age-adjusted incidence rate for larynx, lung and bronchus, melanoma, female breast, uterine, urinary bladder, and thyroid cancer compared to U.S. females during 2015-2019. Delaware females had a significantly lower age-adjusted leukemia incidence rate compared to U.S. females during this time period. Among the 17 non-sex specific cancers, only non-Hodgkin lymphoma did not have a significantly different age-adjusted incidence rate when comparing Delaware males to Delaware females during 2015-2019. Of the cancers that were significantly different between Delaware males and females, only thyroid cancer was significantly higher among females. Delaware males had a significantly higher age-adjusted incidence rate for all other non-sex specific cancer sites.

Delaware's 2015-2019 all-site cancer mortality rate of 160.8 per 100,000 population was 6% higher than the U.S. rate of 152.4 per 100,000 population. This difference in all-site cancer mortality rates was statistically

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<sup>1</sup> <https://seer.cancer.gov/statistics/types/incidence.html>

<sup>2</sup> <https://seer.cancer.gov/statistics/types/mortality.html>

significant. Although Delaware's all-site cancer mortality rate has historically been higher than the U.S. rate, the gap has narrowed over the last decade as the state continues to make strides in reducing the cancer mortality rate through cancer screening and early detection. Delaware's current ranking of 15<sup>th</sup> among the states for highest all-site cancer mortality is the same ranking as in the 2021 report, which examined the 2013-2017 time period. Though the ranking has increased since the 2011-2015 period when Delaware ranked 18<sup>th</sup>, it still represents considerable continued progress since the 1990s, when the state ranked second. Between 2005 and 2019, mortality rates for all-site cancer decreased an average of 1.7% per year in both Delaware and the U.S. The decrease was consistent in Delaware over this time period, but the U.S. had a greater average decrease of 2.1% between 2015 and 2019.

Between 2005 and 2019, mortality rates for all-site cancer decreased an average of 1.6% per year among non-Hispanic White males and decreased an average of 1.8% per year among non-Hispanic White females. Between 2005 and 2019, mortality rates for all-site cancer decreased an average of 2.5% per year among non-Hispanic Black males and remained stable for non-Hispanic Black females. Between 2005 and 2019, the trend in mortality rates for all-site cancer was stable among both Hispanic males and Hispanic females in Delaware.

Of the 23 site-specific cancers, Delaware had significantly higher age-adjusted mortality rates for pancreas, larynx, lung and bronchus, melanoma, urinary bladder, and myeloma compared to the U.S from 2015-2019. Delaware males had a significantly higher age-adjusted mortality rates for lung and bronchus, melanoma, prostate, urinary bladder, and leukemia compared to U.S. males during the same time period. Delaware females had significantly higher age-adjusted mortality rates for larynx, lung and bronchus, uterine, and myeloma compared to U.S. females during the same time period. Delaware males had higher age-adjusted mortality rates for 14 non-sex specific cancers compared to Delaware females. Of the non-sex specific cancers that had rates stable enough to be compared, only myeloma was not significantly higher among Delaware males when compared to Delaware females.

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## CHAPTER 2: INTRODUCTION

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### DELAWARE CANCER REGISTRY

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The Delaware Cancer Registry (DCR) is managed by the Delaware Department of Health and Social Services (DHSS), Division of Public Health (DPH) and serves as the state’s central cancer information center. The DCR was founded in 1972 and was legally established in 1980 under the Delaware Cancer Control Act<sup>3</sup>. 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 the 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 46 states whose central cancer registry is supported by the National Program of Cancer Registries (NPCR) of the Centers for Disease Control and Prevention (CDC).<sup>4</sup> The DCR ensures accurate, timely, and routine surveillance of cancer trends among Delawareans.

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### REPORTING FACILITIES

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Seven Delaware hospitals currently report cancer cases to the DCR. Non-hospital offices that submit data to the DCR include 14 diagnostic laboratories, 12 freestanding ambulatory surgery centers, and at least 18 physicians. Additionally, the DCR has reciprocal data exchange agreements with Alaska, Alabama, Arkansas, California, Colorado, Connecticut, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Louisiana, Maine, Maryland, Massachusetts, Michigan, Montana, Nebraska, Nevada, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Puerto Rico, Rhode Island, South Carolina, Tennessee, Texas, Utah, Virginia, Washington, Wisconsin, Wyoming, West Virginia, and the District of Columbia. Interstate data exchange agreements assist in identifying Delaware residents whose cancer was diagnosed and/or treated in another state.

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### DATA CONFIDENTIALITY

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The DCR maintains patient confidentiality using a combination of techniques. Reporting facilities submit cancer data using computerized data encryption techniques. Published reports are limited to aggregate data and requests for data releases are all reviewed by the Delaware Division of Public Health Privacy Board and need to be approved prior to release. Researchers who use DCR data must comply with regulations stated in DPH data use agreements and in some cases obtain clearance from Delaware’s Human Subjects Review Board.

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### DATA QUALITY

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The DCR implements internal quality control procedures to verify the consistency of cancer data continually throughout the year as data is submitted by reporting facilities. In addition, the DCR strives to meet data consistency standards set by the North American Association of Central Cancer Registries (NAACCR). Data is submitted by DCR to NAACCR annually. 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.

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<sup>3</sup> <http://delcode.delaware.gov/title16/c032/index.shtml>

<sup>4</sup> [https://nccd.cdc.gov/dcpc\\_Programs/index.aspx#3](https://nccd.cdc.gov/dcpc_Programs/index.aspx#3)

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## NAACCR CERTIFICATION AND NPCR STANDARD STATUS

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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<sup>5</sup>. 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 in 1999, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, and 2019 (the 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 the CDC. Delaware's data submissions for diagnosis years 2000 through 2019 surpassed all standard levels for quality, completeness, and timeliness.

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## USES OF DATA

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DPH uses DCR data to support various programs and initiatives, including the Screening for Life (SFL) program 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 (DCC) utilize DCR data to monitor cancer trends across the state, promote research, and guide policy planning.

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## ORGANIZATION OF THIS REPORT

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This report includes cancer statistics for all cancer sites combined (all-site cancer) and the top 23 site-specific cancers. Cancer statistics reflect incidence and mortality data for 2015-2019. Delaware's cancer incidence and mortality statistics for 2015-2019 are compared to the U.S. over the same time period. Changes in Delaware and U.S. cancer incidence and mortality rates are shown from 2005 through 2019 using joinpoint trend analysis. In addition to incidence and mortality, age-specific statistics are presented. In many cases, these statistics are also calculated separately by sex, race, county of residence, and age group.

Data regarding cancer screening recommendations and compliance is presented in Appendix D. Behavioral risk factor data relevant to adult Delawareans are presented in Appendix E.

Delaware's 2015-2019 cancer incidence and mortality rankings among all 50 U.S. states are provided for each cancer site included in the report. State rankings for cancer incidence and mortality were obtained from the U.S. Cancer Statistics Working Group<sup>6</sup>.

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## DELAWARE'S POPULATION

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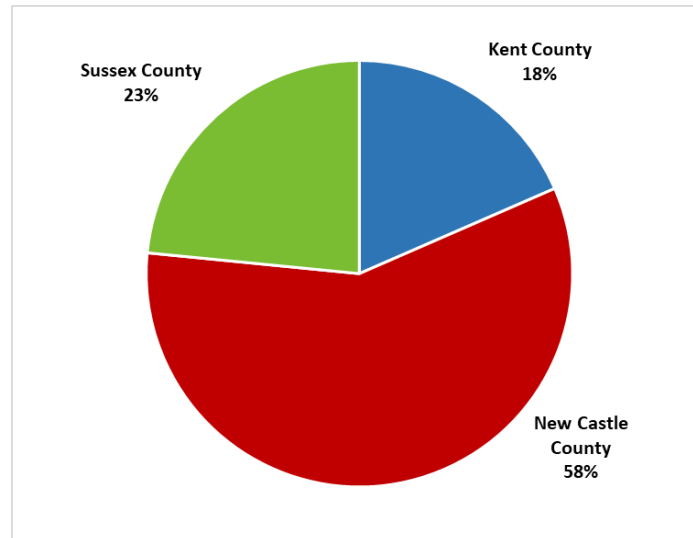
In 2015-2019, census data estimated Delaware's total average population at 967,679. Fifty-eight percent of Delawareans reside in New Castle County. Kent and Sussex counties are home to 18% and 23% of Delawareans, respectively (Figure 2-1).

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<sup>5</sup> <https://www.naaccr.org/certification-criteria/>

<sup>6</sup> U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2021 submission data (1999-2019): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; [www.cdc.gov/cancer/dataviz](http://www.cdc.gov/cancer/dataviz), released in June 2022.

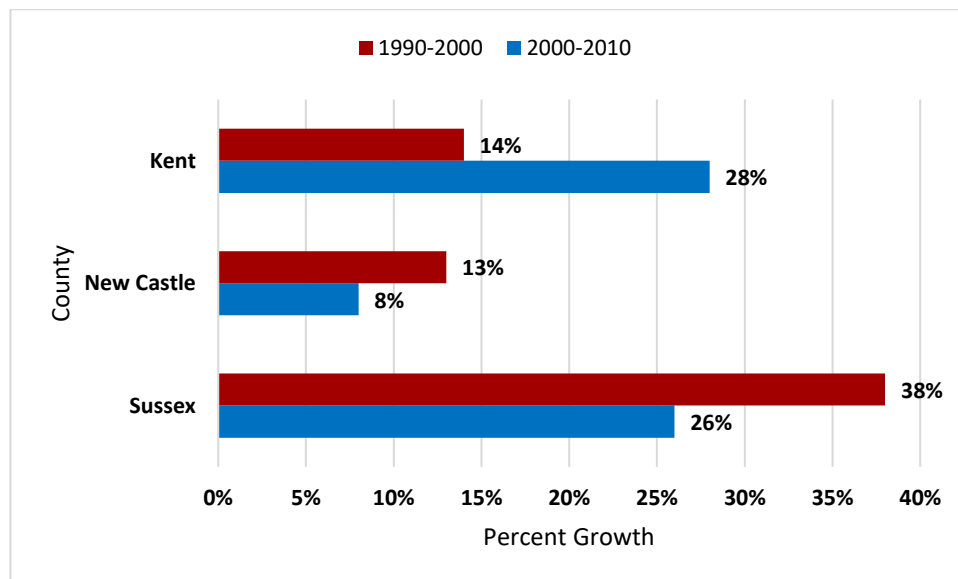
**FIGURE 2-1: PERCENTAGE OF POPULATION BY COUNTY, DELAWARE, 2015-2019**



Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates, <https://data.census.gov/>.

Since 1990, population growth rates have varied across Delaware counties (Figure 2-2). New Castle County is Delaware’s most populated county. New Castle County experienced the smallest population growth, increasing its total population by 13% from 1990 to 2000 and just 8% from 2000 to 2010. Kent County grew in total population by 14% from 1990 to 2000, and by 28% from 2000 to 2010. Sussex County, Delaware’s southernmost county, experienced the largest population growth of 38% from 1990 to 2000, a rate that slowed to 26% from 2000 to 2010.

**FIGURE 2-2: PERCENTAGE OF POPULATION GROWTH BY COUNTY AND DECADE, DELAWARE, 1990-2000 AND 2000-2010**



Source: U.S. Census Bureau 2010, <https://data.census.gov/>

Census data from 2015-2019 show that 62% of all Delawareans are non-Hispanic White. Non-Hispanic Whites are a majority of the population in all three Delaware counties: 62% in Kent County, 57% in New Castle County, and 75% in Sussex County (Table 2-1). Twenty-two percent of Delaware’s population are non-Hispanic Black. The distribution of non-Hispanic Blacks varies by county: 25% in Kent County, 25% in New Castle



County, and 12% in Sussex County. Four percent of Delawareans are Asians. Another 3% of Delawareans are considered “other” race, which is defined as: (a) any other race group that was too small to enumerate separately; (b) unknown race; or (c) mixed race (i.e., two or more races). Regardless of race, persons of Hispanic ethnicity make up just over 9% of Delaware’s population.

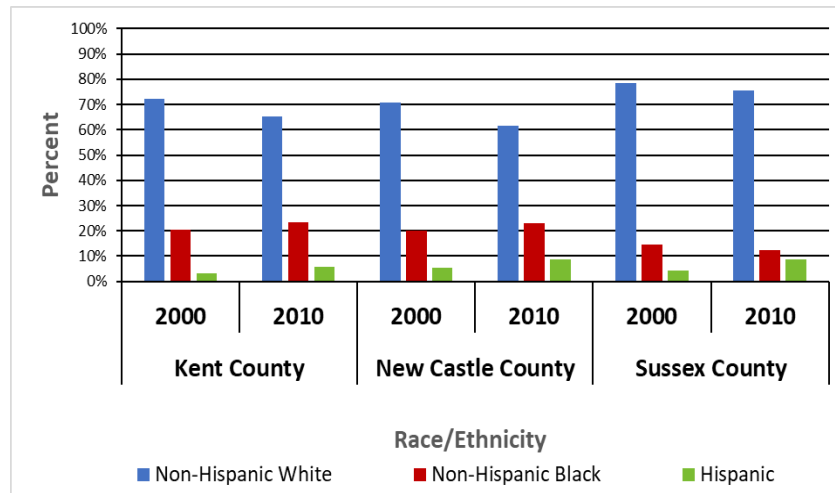
**TABLE 2-1: PERCENTAGE OF POPULATION BY RACE/ETHNICITY AND COUNTY, DELAWARE, 2015-2019**

Race/Ethnicity	Delaware	Kent	New Castle	Sussex
<b>Not Hispanic or Latino</b>				
<b>White</b>	62%	62%	57%	75%
<b>Black</b>	22%	25%	25%	12%
<b>American Indian and Alaska Native</b>	0%	1%	0%	0%
<b>Asian</b>	4%	2%	5%	1%
<b>Native Hawaiian and Other Pacific Islander</b>	0%	0%	0%	0%
<b>Other race</b>	0%	0%	0%	0%
<b>Two or more races</b>	3%	3%	2%	2%
<b>Hispanic or Latino</b>	9%	7%	10%	9%

Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates, <https://data.census.gov/>.

Since 2000, racial diversity has expanded at different rates across Delaware’s counties. Both Kent and New Castle counties experienced substantial increases in the proportion of non-Hispanic Black and Hispanic residents (and concurrent decreases in the proportion of non-Hispanic White residents) from 2000 to 2010 (Figure 2-3). In Kent County, the non-Hispanic Black population increased from 20% in 2000 to 23% in 2010; the non-Hispanic White population declined from 72% to 65%; and the Hispanic population increased from 3% to 6%. In New Castle County, the non-Hispanic Black population increased from 20% in 2000 to 23% in 2010; the non-Hispanic White population declined from 71% to 62%; and the Hispanic population increased from 5% to 9%. A different trend was observed in Sussex County, where the non-Hispanic Black population decreased from 15% in 2000 to 12% in 2010. However, similar to the trends in the other counties, the non-Hispanic White population declined from 78% to 76%, and the Hispanic population increased from 4% to 9%.

**FIGURE 2-3: PERCENTAGE OF RESIDENTS BY RACE/ETHNICITY, DELAWARE AND COUNTIES, 2000 AND 2010**



Source: U.S. Census Bureau 2010, <https://data.census.gov/>

## GUIDELINES FOR INTERPRETATION OF INCIDENCE AND MORTALITY RATES

Incidence and mortality rates for Delaware are expressed per 100,000 Delawareans and rates for the U.S. are 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% 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, upon exploratory analysis. When one rate is significantly different from another rate, it is assumed the difference between the rates is larger than would be expected by chance alone, meaning it is statistically significant. If the confidence interval for one rate overlaps with the confidence interval for another rate, the two rates are not statistically significantly different, commonly referred to as “no meaningful difference” between rates. However, because confidence rates are based on the number cases, rates based on fewer cases will have a larger confidence interval. Likewise, rates based on many cases will have a smaller confidence interval. Confidence intervals are subject to both Type I and Type II errors. Therefore, in this report rates between two or more populations with confidence intervals that do not overlap have an incidence rate ratio calculated. If both the confidence interval method and the incidence rate ratio prove to be statistically significant at the  $p < 0.05$  level, these differences are determined to be confirmed and written as such in the body of the document.

For this report, cancer frequencies and rates were suppressed according to the CDC’s United States Cancer Statistics Suppression of Rates<sup>7</sup> and:

- Incidence and mortality frequencies of fewer than 16 were not shown to protect patient privacy and confidentiality. In some instances, additional cells were suppressed so that one cannot deduce the actual

<sup>7</sup> Centers for Disease Control and Prevention. (2022, June 6). *Statistical methods: Suppression of rates and counts*. United States Cancer Statistics (USCS). Retrieved August 18, 2022, from [https://www.cdc.gov/cancer/uscs/technical\\_notes/stat\\_methods/suppression.htm](https://www.cdc.gov/cancer/uscs/technical_notes/stat_methods/suppression.htm)

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.<sup>8,9</sup>

- Age-adjusted incidence and mortality rates based on fewer than 16 cases or deaths were suppressed as they are inherently unstable and cannot be reliably interpreted.

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<sup>8</sup> Coughlin SS, Clutter GG, Hutton M. Ethics in Cancer Registries. *Journal of Cancer Registry Management*, 2: 5-10, 1999.

<sup>9</sup> McLaughlin CC. Confidentiality protection in publicly released central registry data. *Journal of Cancer Registry Management*, 2: 84-88, 2002.

## CHAPTER 3: ALL-SITE CANCER

### INCIDENCE

For 2015-2019, Delaware ranked 13<sup>th</sup> in the U.S. for all-site cancer incidence (8<sup>th</sup> in 2014-2018); males ranked 11<sup>th</sup> (9<sup>th</sup> in 2014-2018) and females ranked 13<sup>th</sup> (10<sup>th</sup> in 2014-2018)<sup>10</sup>.

#### 2015-2019 DATA

**TABLE 3-1: NUMBER OF ALL-SITE CANCER CASES, BY SEX AND RACE/ETHNICITY; DELAWARE AND COUNTIES, 2015-2019**

	All Races			Non-Hispanic White			Non-Hispanic Black			Hispanic		
	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female
<b>Delaware</b>	29,671	15,215	14,456	22,772	11,726	11,046	4,987	2,480	2,507	942	445	497
<b>Kent</b>	5,431	2,835	2,596	4,015	2,057	1,958	1,087	592	495	171	93	78
<b>New Castle</b>	15,586	7,682	7,904	11,113	5,481	5,632	3,251	1,561	1,690	613	289	324
<b>Sussex</b>	8,644	4,691	3,953	7,643	4,187	3,456	648	327	321	157	63	94

*Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.*

- In Delaware in 2015-2019:
  - There were 29,671 new all-site cancer cases diagnosed, an average of 5,934 per year.
  - Males accounted for 51% of all-site cancer cases.
  - Non-Hispanic Whites accounted for 77% of all-site cancer cases.

**TABLE 3-2: FIVE-YEAR AVERAGE AGE-ADJUSTED ALL-SITE CANCER INCIDENCE RATES OVERALL AND BY SEX; U.S., DELAWARE, AND COUNTIES, 2015-2019**

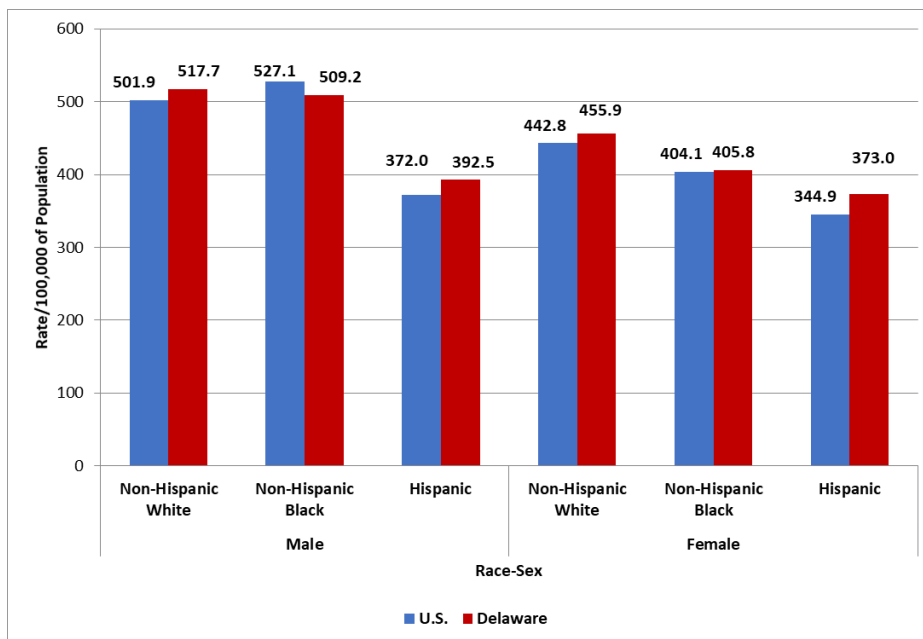
	Overall	Male	Female
<b>U.S.</b>	449.2	487.9	423.2
<b>Delaware</b>	468.8	513.1	436.8
<b>Kent</b>	499.2	557.2	454.8
<b>New Castle</b>	470.5	507.8	446.4
<b>Sussex</b>	448.7	498	409.4

*Source (Delaware): Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.*

*Source (U.S.): National Program of Cancer Registries and Surveillance, Epidemiology, and End Results Program SEER\*Stat Database: U.S. Cancer Statistics 2001–2019 Public Use Research Database, 2021 submission  
Rates are per 100,000 of population age-adjusted to the 2000 U.S. standard population.*

<sup>10</sup> U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2021 submission data (1999-2019): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; [www.cdc.gov/cancer/dataviz](http://www.cdc.gov/cancer/dataviz), June 2022.

**FIGURE 3-1: FIVE-YEAR AVERAGE AGE-ADJUSTED ALL-SITE CANCER INCIDENCE RATES BY SEX AND RACE/ETHNICITY; U.S. AND DELAWARE, 2015-2019**



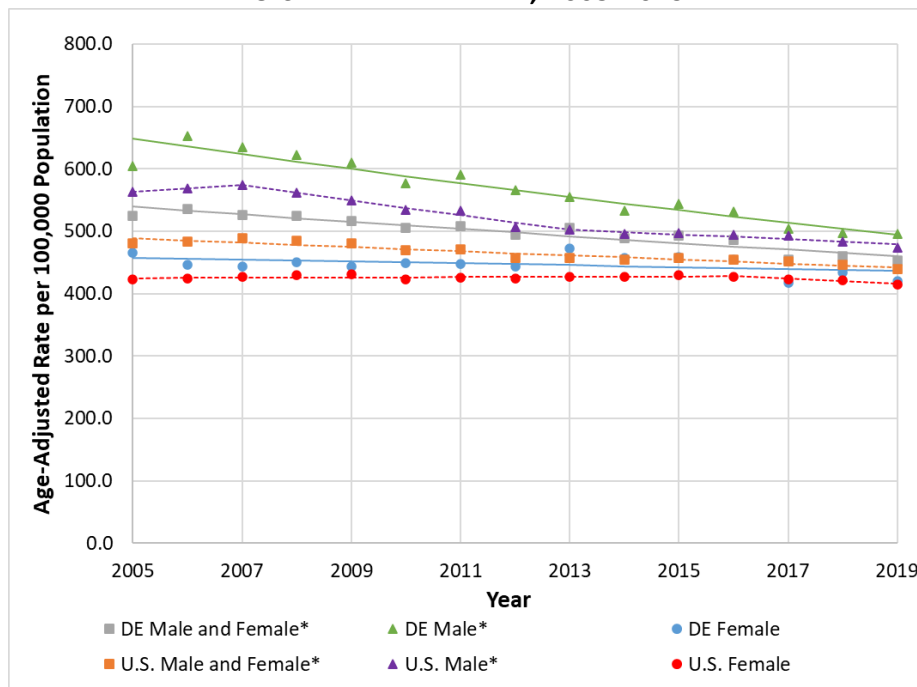
Source (Delaware): Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022. Source (U.S.): National Program of Cancer Registries and Surveillance, Epidemiology, and End Results Program SEER\*Stat Database: U.S. Cancer Statistics 2001–2019 Public Use Research Database, 2021 submission  
Rates are per 100,000 of population age-adjusted to the 2000 U.S. standard population.

- In Delaware from 2015-2019:
  - Males (531.5 per 100,000 population) had a statistically significantly higher all-site cancer incidence rate compared to females (436.8 per 100,000 population).
  - The difference in all-site cancer incidence rates between non-Hispanic Whites (481.3 per 100,000 population) and non-Hispanic Blacks (448.5 per 100,000 population) was statistically significant.
  - Hispanics (378.8 per 100,000 population) had a statistically significantly lower all-site cancer incidence rate compared to both non-Hispanic Whites (481.3 per 100,000 population) and non-Hispanic Blacks (448.5 per 100,000 population).
- Comparing Delaware and the U.S. from 2015-2019:
  - Delaware (468.8 per 100,000 population) had a statistically significantly higher all-site cancer incidence rate compared to the U.S. (449.2 per 100,000 population).
  - Delaware males (513.1 per 100,000 population) had a statistically significantly higher all-site cancer incidence rate compared to U.S. males (487.9 per 100,000 population).
  - Delaware females (436.8 per 100,000 population) had a statistically significantly higher all-site cancer incidence rate compared to U.S. females (423.2 per 100,000 population).
  - Non-Hispanic Whites in Delaware (481.3 per 100,000 population) had a statistically significantly higher all-site cancer incidence rate compared to non-Hispanic Whites in the U.S. (466.5 per 100,000 population).

- The difference in all-site cancer incidence rates between non-Hispanic Blacks in Delaware (448.5 per 100,000 population) and non-Hispanic Blacks in the U.S. (453.5 per 100,000 population) was not statistically significant.
- The difference in all-site cancer incidence rates between Hispanics in Delaware (378.8 per 100,000 population) and Hispanics in the U.S. (352.2 per 100,000) was not statistically significant

### TRENDS OVER TIME - DELAWARE AND U.S.

**FIGURE 3-2: AGE-ADJUSTED ALL-SITE CANCER INCIDENCE RATE TREND BY SEX; U.S. AND DELAWARE, 2005-2019**



Source (Delaware): Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022. Source (U.S.): National Program of Cancer Registries and Surveillance, Epidemiology, and End Results Program SEER\*Stat Database: U.S. Cancer Statistics 2001–2019 Public Use Research Database, 2021 submission

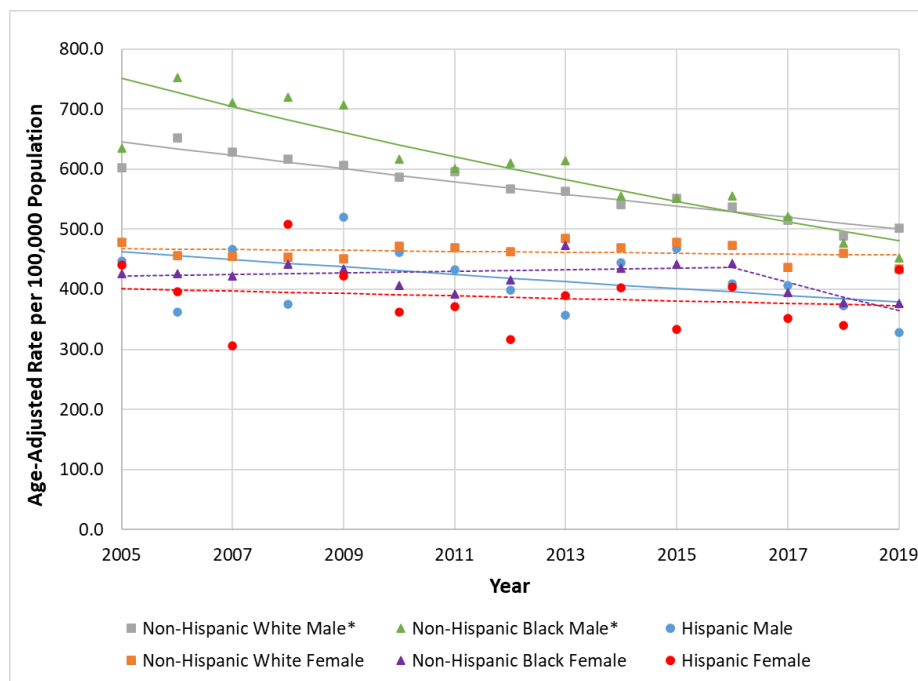
Rates are per 100,000 of population age-adjusted to the 2000 U.S. standard population.

\*Significantly different from zero at the alpha = 0.05 level.

- Comparing age-adjusted all-site cancer incidence rates between the U.S. and Delaware:
  - Between 2005 and 2019, incidence rates for all-site cancer decreased an average of 1.1% per year in Delaware and an average of 0.7% per year in the U.S.
  - Between 2005 and 2019, incidence rates for all-site cancer decreased an average of 1.9% per year among Delaware males and decreased an average of 1.1% per year among U.S. males. The decrease was consistent in Delaware males over this time period, but the incidence rates among U.S. males had a greater decrease from 2007 to 2013 with an average decrease of 2.2% per year and more recently has had an average decrease of 0.8% per year from 2013 to 2019.
  - Between 2005 and 2019, the trend in incidence rates for all-site cancer were stable among both Delaware females and U.S. females.

## TRENDS OVER TIME - DELAWARE

**FIGURE 3-3: AGE-ADJUSTED ALL-SITE CANCER INCIDENCE RATE TREND BY SEX AND RACE/ETHNICITY; DELAWARE, 2005-2019**

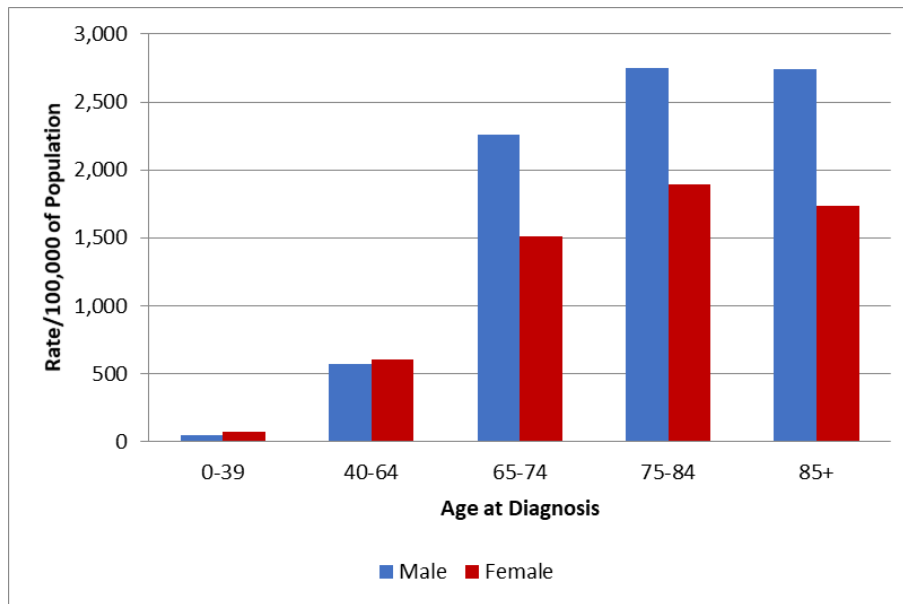


Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022  
 Rates are per 100,000 of population age-adjusted to the 2000 U.S. standard population.  
 \*Significantly different from zero at the alpha = 0.05 level.

- Comparing age-adjusted all-site cancer incidence rates by sex and race/ethnicity in Delaware:
  - Between 2005 and 2019, incidence rates for all-site cancer decreased an average of 1.8% per year among non-Hispanic White males and remained stable for non-Hispanic White females.
  - Between 2005 and 2019, incidence rates for all-site cancer decreased an average of 3.1% per year among non-Hispanic Black males and remained stable for non-Hispanic Black females.
  - Between 2005 and 2019, the trend in incidence rates for all-site cancer were stable among both Hispanic males and Hispanic females.

## AGE-SPECIFIC INCIDENCE RATES – DELAWARE

**FIGURE 3-4: AGE-SPECIFIC ALL-SITE CANCER INCIDENCE RATES BY SEX; DELAWARE, 2015-2019**



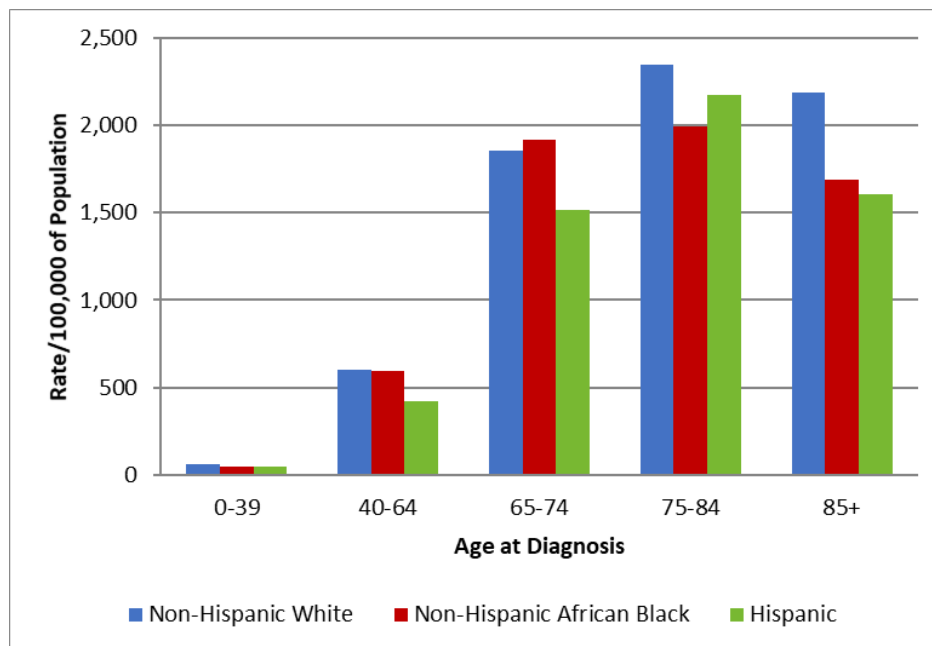
Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.

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

- In 2015-2019 in Delaware, the all-site cancer incidence rate was highest for males 85 years of age and older and for females between 75 and 84 years of age.



**FIGURE 3-5: AGE-SPECIFIC ALL-SITE CANCER INCIDENCE RATES BY RACE/ETHNICITY; DELAWARE, 2015-2019**



Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.

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

- Delaware’s 2015-2019 all-site cancer incidence rate was highest for non-Hispanic Whites, non-Hispanic Blacks, and Hispanics between 75 and 84 years of age.

**TABLE 3-3: AGE-SPECIFIC ALL-SITE CANCER INCIDENCE RATES BY SEX AND RACE/ETHNICITY; DELAWARE, 2015-2019**

Age at Diagnosis	Non-Hispanic White			Non-Hispanic Black			Hispanic		
	All	Male	Female	All	Male	Female	All	Male	Female
0-39	64.0	47.9	79.8	46.3	33.4	57.6	48.7	40.0	58.2
40-64	603.9	571.8	635.9	592.8	612.4	578.6	423.4	367.3	482.8
65-74	1,852.7	2,199.2	1,547.0	1,915.7	2,566.1	1,432.8	1,517.1	1,745.2	1,322.5
75-84	2,343.2	2,821.4	1,952.9	1,989.8	2,356.6	1,730.4	2,171.7	2,420.9	1,970.3
85+	2,185.1	2,896.2	1,768.2	1,688.1	1,864.2	1,604.5	1,601.3	2,209.4	----

Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.

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

--- Rates based on less than 16 cases are not shown.

- In 2015-2019, the all-site cancer incidence rate was highest for non-Hispanic White males 85 years of age and older and for non-Hispanic Black and Hispanic males between 75 and 84 years of age.
- The 2015-2019 all-site cancer incidence rate was highest for non-Hispanic White and Hispanic females between 75 and 84 years of age and for non-Hispanic Black females 74 and 84 years.

## MORTALITY

For 2015-2019, Delaware ranked 15<sup>th</sup> in the U.S. for all-site cancer mortality (15<sup>th</sup> in 2014-2018); males ranked 14<sup>th</sup> (18<sup>th</sup> in 2014-2018) and females ranked 17<sup>th</sup> (15<sup>th</sup> in 2014-2018)<sup>11</sup>.

### 2015-2019 DATA

**TABLE 3-4: NUMBER OF ALL-SITE CANCER DEATHS, BY SEX AND RACE/ETHNICITY; DELAWARE AND COUNTIES, 2015-2019**

	All Races			Non-Hispanic White			Non-Hispanic Black			Hispanic		
	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female
<b>Delaware</b>	10,363	5,499	4,864	8,196	4,429	3,767	1,775	841	934	243	145	98
<b>Kent</b>	1,911	991	920	1,453	757	696	366	178	188	56	36	20
<b>New Castle</b>	5,329	2,764	2,565	3,893	2,068	1,825	1,188	554	634	158	91	67
<b>Sussex</b>	3,123	1,744	1,379	2,850	1,604	1,246	221	109	112	29	18	11

*Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Health Statistics Center, 2022.*

- In Delaware in 2015-2019:
  - There were 10,363 deaths from cancer, an average of 2,073 per year.
  - Males accounted for 53% of all-site cancer deaths.
  - Non-Hispanic Whites accounted for 79% of all-site cancer deaths.

**TABLE 3-5: FIVE-YEAR AVERAGE AGE-ADJUSTED ALL-SITE CANCER MORTALITY RATES OVERALL AND BY SEX; U.S., DELAWARE, AND COUNTIES, 2015-2019**

	Overall	Male	Female
<b>U.S.</b>	152.4	181.4	131.1
<b>Delaware</b>	160.8	192.1	137.4
<b>Kent</b>	173.0	202.8	150.2
<b>New Castle</b>	161.1	193.7	138.1
<b>Sussex</b>	155.4	185.8	130.9

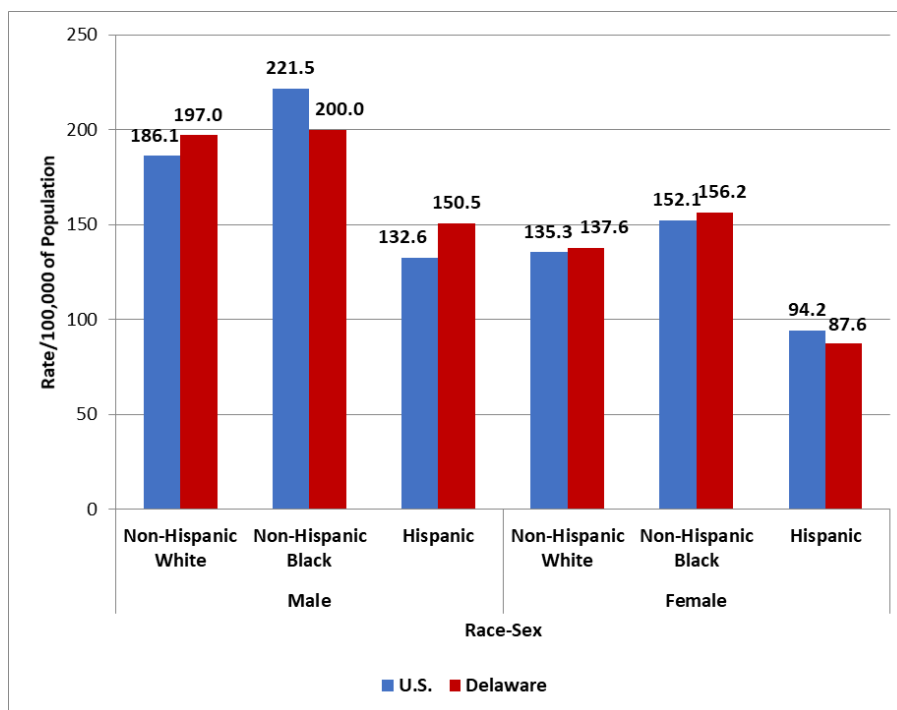
*Source (Delaware): Delaware Department of Health and Social Services, Division of Public Health, Delaware Health Statistics Center, 2022.*

*Source (U.S.): Surveillance, Epidemiology, and End Results (SEER) Program, SEER\*Stat Database: Mortality - All COD, Aggregated With State, Total U.S. (1990-2020)*

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

<sup>11</sup> U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2021 submission data (1999-2019): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; [www.cdc.gov/cancer/dataviz](http://www.cdc.gov/cancer/dataviz), released in June 2022.

**FIGURE 3-6: FIVE-YEAR AVERAGE AGE-ADJUSTED ALL-SITE CANCER MORTALITY RATES BY SEX AND RACE/ETHNICITY; U.S. AND DELAWARE, 2015-2019**



Source (Delaware): Delaware Department of Health and Social Services, Division of Public Health, Delaware Health Statistics Center, 2021.

Source (U.S.): Surveillance, Epidemiology, and End Results (SEER)\*Stat Database: Mortality - All COD, Aggregated With State, Total U.S. (1990-2020)

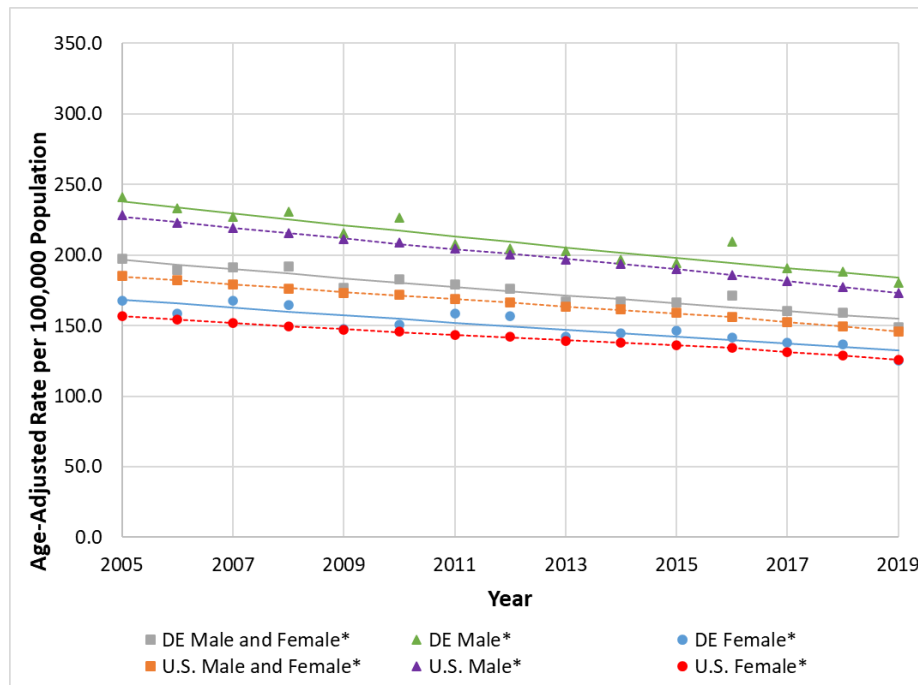
Rates are per 100,000 of population age-adjusted to the 2000 U.S. standard population.

- In Delaware from 2015-2019:
  - Males (192.1 per 100,000 population) had a statistically significantly higher all-site cancer mortality rate compared to females (137.4 per 100,000 population).
  - Non-Hispanic Blacks (172.6 per 100,000 population) had a statistically significantly higher all-site cancer mortality rate compared to Hispanics (116.6 per 100,000 population), but they did not significantly differ compared to non-Hispanic Whites (163.5 per 100,000 population).
  - Non-Hispanic Whites (163.5 per 100,000 population) had a statistically significantly higher all-site cancer mortality rate compared to Hispanics (116.6 per 100,000 population).
- Comparing Delaware and the U.S. from 2015-2019:
  - Delaware (180.8 per 100,000 population) had a statistically significantly higher all-site cancer mortality rate compared to the U.S. (152.4 per 100,000 population).
  - Delaware males (192.1 per 100,000 population) had a statistically significantly higher all-site cancer mortality rate compared to the U.S. males (181.4 per 100,000 population).
  - Delaware females (137.4 per 100,000 population) had a statistically significantly higher all-site cancer mortality rate compared to U.S. females (131.1 per 100,000 population).
  - Non-Hispanic Whites in Delaware (163.5 per 100,000 population) had a statistically significantly higher all-site cancer mortality rate compared to the non-Hispanic Whites in the U.S. (157.2 per 100,000 population).

- The difference in all-site cancer mortality rates between non-Hispanic Blacks in Delaware (172.6 per 100,000 population) and the U.S. (178.6 per 100,000 population) was not statistically significant.
- The difference in all-site cancer mortality rates between Hispanics in Delaware (116.6 per 100,000 population) and the U.S. (110.0 per 100,000 population) was not statistically significant.

### TRENDS OVER TIME - DELAWARE AND U.S.

**FIGURE 3-7: AGE-ADJUSTED ALL-SITE CANCER MORTALITY RATE TREND BY SEX; U.S. AND DELAWARE, 2005-2019**



Source (Delaware): Delaware Department of Health and Social Services, Division of Public Health, Delaware Health Statistics Center, 2021.

Source (U.S.): Surveillance, Epidemiology, and End Results (SEER) Program ([www.seer.cancer.gov](http://www.seer.cancer.gov))

SEER\*Stat Database: Mortality - All COD, Aggregated With State, Total U.S. (1990-2020)

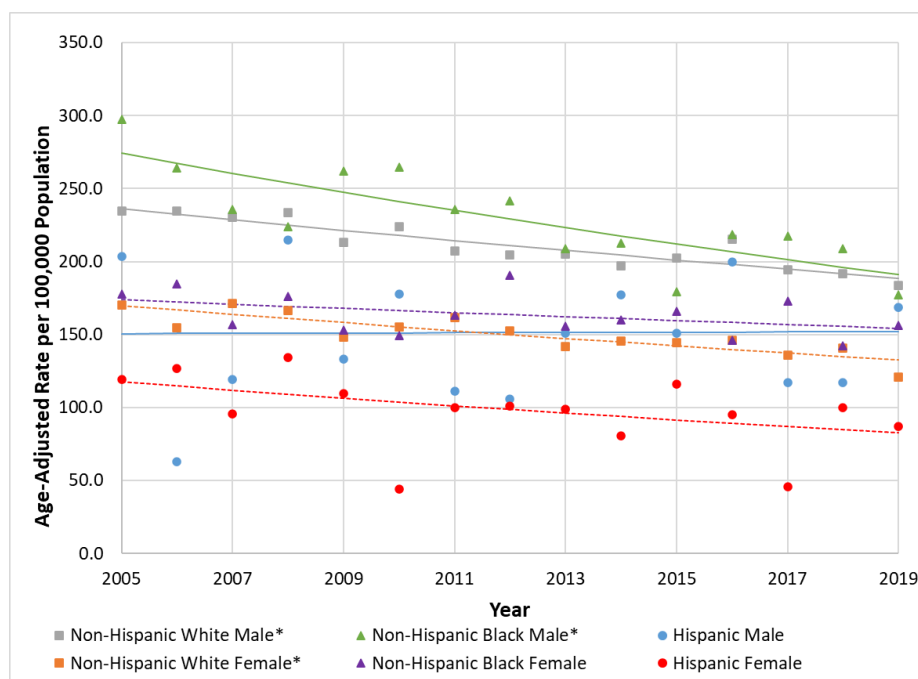
Rates are per 100,000 of population age-adjusted to the 2000 U.S. standard population.

\*Significantly different from zero at the alpha = 0.05 level.

- Comparing age-adjusted all-site cancer mortality rates between the U.S. and Delaware:
  - Between 2005 and 2019, mortality rates for all-site cancer decreased an average of 1.7% per year in both Delaware and the U.S. The decrease was consistent in Delaware over this time period, but the U.S. had a greater average decrease of 2.1% between 2015 and 2019.
  - Between 2005 and 2019, mortality rates for all-site cancer decreased an average of 1.8% per year among Delaware males and decreased an average of 1.9% per year among U.S. males. The decrease was consistent in Delaware males over this time period, but the mortality rates among U.S. males had a greater average decrease of 2.3% between 2015 and 2019.
  - Between 2005 and 2019, mortality rates for all-site cancer decreased an average of 1.7% per year among Delaware females and decreased an average of 1.6% per year among U.S. females. The decrease was consistent in Delaware females over this time period, but the mortality rates among U.S. females had a greater average decrease of 1.9% between 2015 and 2019.

## TRENDS OVER TIME - DELAWARE

**FIGURE 3-8: AGE-ADJUSTED ALL-SITE CANCER MORTALITY RATE TREND BY SEX AND RACE/ETHNICITY; DELAWARE, 2005-2019**



Source (Delaware): Delaware Department of Health and Social Services, Division of Public Health, Delaware Health Statistics Center, 2021.

Source (U.S.): Surveillance, Epidemiology, and End Results (SEER) Program ([www.seer.cancer.gov](http://www.seer.cancer.gov)) SEER\*Stat Database: Mortality - All COD, Aggregated With State, Total U.S. (1990-2020)

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

\*Significantly different from zero at the alpha = 0.05 level.

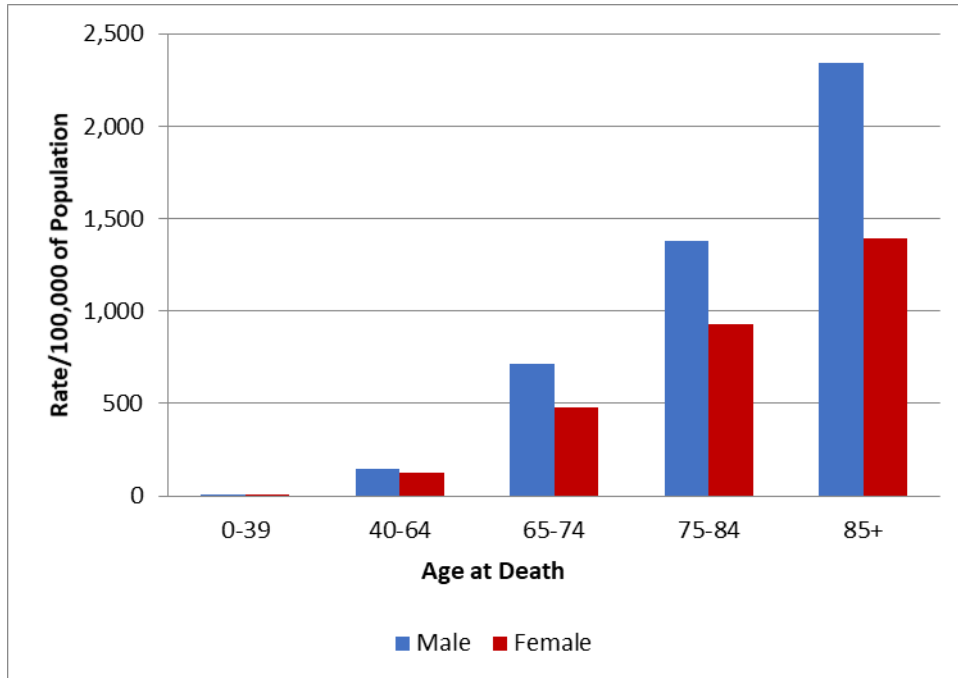
- Comparing age-adjusted all-site cancer mortality rates by sex and race/ethnicity in Delaware:
  - Between 2005 and 2019, mortality rates for all-site cancer decreased an average of 1.6% per year among non-Hispanic White males and decreased an average of 1.8% per year among non-Hispanic White females.
  - Between 2005 and 2019, mortality rates for all-site cancer decreased an average of 2.5% per year among non-Hispanic Black males and remained stable for non-Hispanic Black females.
  - Between 2005 and 2019, the trend in mortality rates for all-site cancer was stable among both Hispanic males and Hispanic females.

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## AGE-SPECIFIC MORTALITY RATES – DELAWARE

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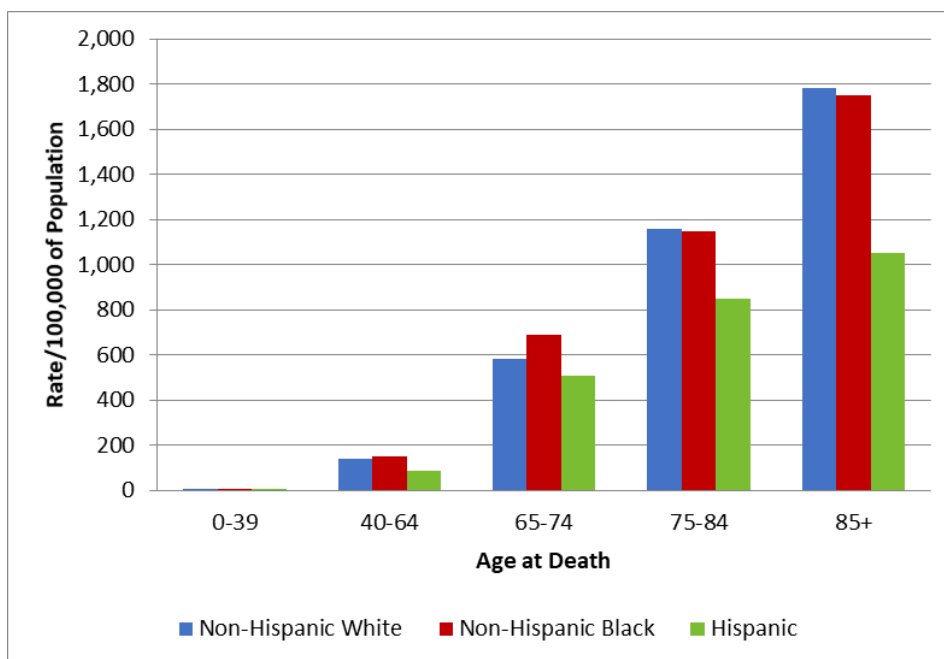
**FIGURE 3-9: AGE-SPECIFIC ALL-SITE CANCER MORTALITY RATES BY SEX; DELAWARE, 2015-2019**



Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Health Statistics Center, 2021. Rates are per 100,000 of population age-adjusted to the 2000 U.S. standard population.

- In 2015-2019, Delaware’s all-site mortality rate was highest for both males and females 85 years of age and older.

**FIGURE 3-10: AGE-SPECIFIC ALL-SITE CANCER MORTALITY RATES BY RACE/ETHNICITY; DELAWARE, 2015-2019**



Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Health Statistics Center, 2021.

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

- Delaware’s 2015-2019 all-site mortality rate was highest for non-Hispanic Whites, non-Hispanic Blacks, and Hispanics 85 years of age and older.

**TABLE 3-6: AGE-SPECIFIC ALL-SITE CANCER MORTALITY RATES BY SEX AND RACE/ETHNICITY; DELAWARE, 2015-2019**

Age at Death	Males			Females		
	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic White	Non-Hispanic Black	Hispanic
0-39	5.9	---	---	6.2	6.6	---
40-64	153.2	140.2	105.9	126.8	158.8	62.7
65-74	693	876.5	689.4	478.8	547.6	341.6
75-84	1,428.80	1,321.70	1,151.20	933	1,027.30	603.8
85+	2,402.90	2,450.10	---	1,422.40	1,415.00	---

Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Health Statistics Center, 2021.

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

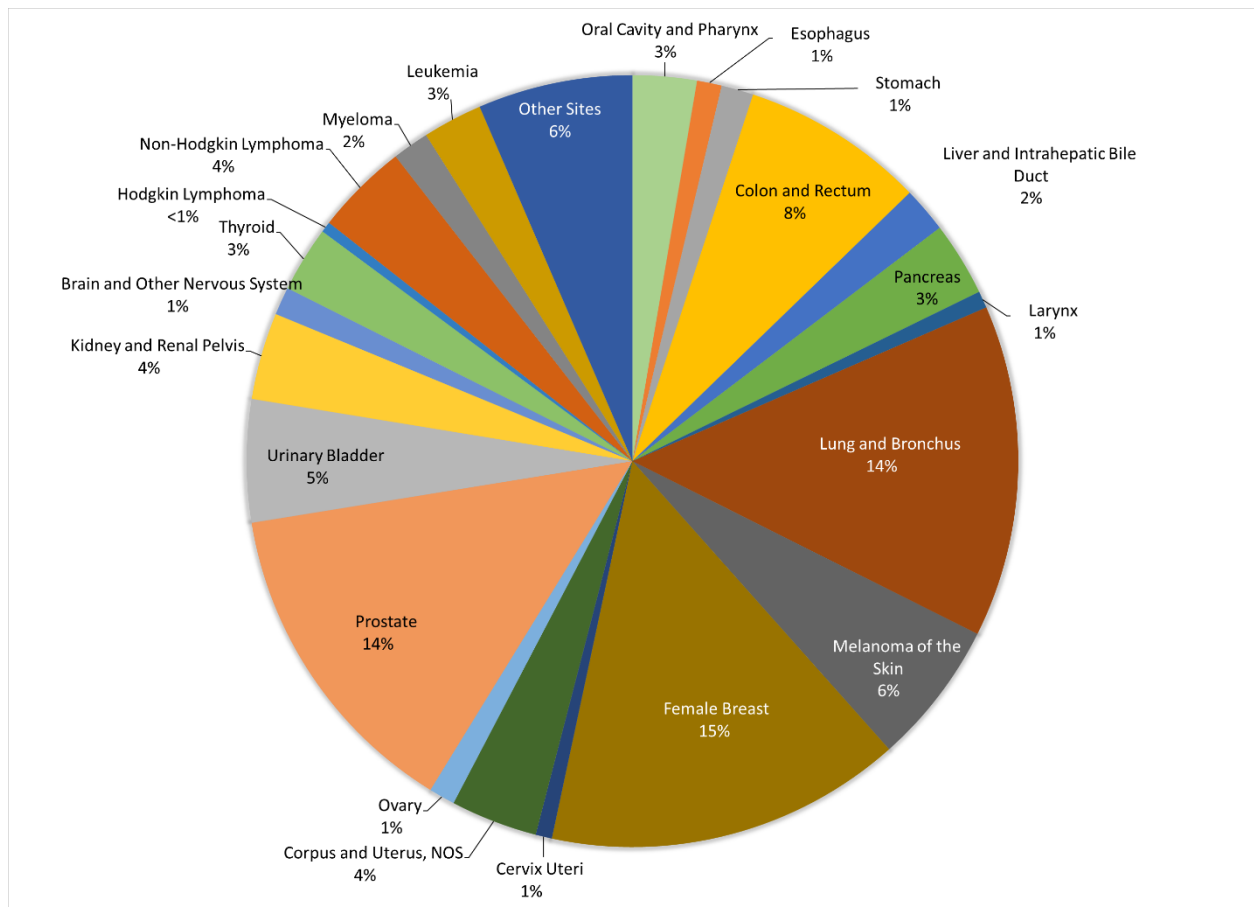
---Rates based on 16 or fewer cases are not shown.

- In Delaware in 2015-2019:
  - The all-site mortality rate was highest for non-Hispanic White and non-Hispanic Black males 85 years of age and older.
  - The all-site mortality rate was highest for non-Hispanic White and non-Hispanic Black females 85 years of age and older.
  - Due to small numbers, mortality rates could not be calculated for certain groups.

## CHAPTER 4: SITE-SPECIFIC CANCER

### INCIDENCE

FIGURE 4-1: PERCENT DISTRIBUTION OF CANCER CASES BY CANCER SITE, DELAWARE, 2015-2019



Source: Delaware Department of Social Services, Division of Public Health, Delaware Cancer Registry, 2022.

- In 2015-2019 in Delaware:
  - There were 29,671 new all-site cancer cases diagnosed, an average of 5,934 per year.
  - Female breast cancer accounted for 15% of all new cancer cases.
  - Lung and bronchus cancer accounted for 14% of all new cancer cases.
  - Prostate cancer accounted for 14% of all new cancer cases.
  - Colorectal cancer accounted for 8% of all new cancer cases.



**TABLE 4-2: FIVE-YEAR AVERAGE AGE-ADJUSTED ALL-SITE AND SITE-SPECIFIC CANCER INCIDENCE RATES OVERALL; U.S. AND DELAWARE, 2015-2019**

Cancer Site	DE Rate (Overall)	U.S. Rate (Overall)	DE Cases (Overall)	National Ranking (2015-2019)
All Sites	468.8	449.2	29,671	13th
Lung and Bronchus	61.7*	56.3	4,127	17th
Colon and Rectum	37.1	37.6	2,284	26th†
Melanoma of the Skin	28.9*	22.9	1,788	8th†
Urinary Bladder	23.4*	19.4	1,524	5th
Non-Hodgkin Lymphoma	18.5	19.0	1,153	25th†
Kidney and Renal Pelvis	17.2	17.3	1,081	26th†
Thyroid	15.9*	13.8	817	10th†
Pancreas	14.1	13.2	922	6th†
Oral Cavity and Pharynx	12.5	12.0	795	18th†
Leukemia	12.3*	14.1	743	40th†
Liver/Intrahepatic Bile Duct	8.2	8.6	565	23rd
Myeloma	7.0	7.0	455	17th†
Stomach	6.3	6.4	399	20th†
Brain/Nervous System	6.1	6.4	347	38th†
Esophagus	4.7	4.5	308	26th†
Larynx	3.2	3.1	210	22nd
Hodgkin Lymphoma	2.8	2.6	133	11th†

Rates are per 100,000 population and are age-adjusted to the 2000 U.S. standard population (19 age groups – Census P25–1130) and exclude basal cell and squamous cell skin cancers. Incidence rates exclude in situ carcinomas except urinary bladder. Incidence data were coded using the International Classification of Disease for Oncology (ICD-O) coding system. Delaware cases include Delaware residents only at the time of diagnosis. The Delaware and U.S. incidence rates are based on the Delaware Cancer Registry, Delaware Division of Public Health, 2021 submission and the NPCR and SEER Incidence - U.S. Cancer Statistics Public Use Database, 2021 submission (2001-2019), United States Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute. Released June 2022. Available at [www.cdc.gov/cancer/uscs/public-use](http://www.cdc.gov/cancer/uscs/public-use). Delaware rates are referenced as DE and U.S. references the United States. National rankings were accessed using Centers for Disease Control and Prevention, U.S. Cancer Statistics. Available at [https://gis.cdc.gov/Cancer/USCS/?CDC\\_AA\\_refVal=https%3A%2F%2Fwww.cdc.gov%2Fdata%2Fdata%2Findex.htm#/AtAGlance/](https://gis.cdc.gov/Cancer/USCS/?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fdata%2Fdata%2Findex.htm#/AtAGlance/)

\*Statistically significantly higher than the U.S. rate.  
† One or more states tied with Delaware for listed rank

- Comparing Delaware to the U.S. from 2015-2019:
  - Delaware (61.7 cases per 100,000 population) had a statistically significantly higher lung and bronchus cancer incidence rate compared to the U.S. (56.3 cases per 100,000 population). Delaware was ranked 17th among all states for lung and bronchus age-adjusted incidence rate.
  - Delaware (28.9 cases per 100,000 population) had a statistically significantly higher melanoma incidence rate compared to the U.S. (22.9 cases per 100,000 population). Among all states, Delaware and Montana tied for the eighth highest age-adjusted incidence rate for melanoma.

- Delaware (23.4 cases per 100,000 population) had a statistically significantly higher urinary bladder cancer incidence rate compared to the U.S. (19.4 cases per 100,000 population). Among all states, Delaware's urinary bladder age-adjusted incidence rate was ranked fifth highest.
- Delaware (15.9 cases per 100,000 population) had a statistically significantly higher thyroid cancer incidence rate compared to the U.S. (13.8 cases per 100,000 population). Delaware and Wyoming tied for the 10th highest incidence rate among all states for thyroid age-adjusted incidence rate.
- Delaware (12.3 cases per 100,000 population) had a statistically significantly lower leukemia incidence rate compared to the U.S. (14.1 cases per 100,000 population). Delaware, Maryland, and Ohio tied for 40th highest incidence rate among all states for leukemia age-adjusted incidence rate.

**TABLE 4-2: FIVE-YEAR AVERAGE AGE-ADJUSTED ALL-SITE AND SITE-SPECIFIC CANCER INCIDENCE RATES AND NUMBER OF CASES FOR MALES; U.S. AND DELAWARE, 2015-2019**

Cancer Site	DE Rate (Males)	U.S. Rate (Males)	DE Cases (Males)	National Ranking (2015-2019)
All Sites	513.1	487.9	15,215	11th
Prostate	125.9*	109.8	4,057	10 <sup>th</sup>
Lung and Bronchus	68.8*	64.0	2,065	20 <sup>th</sup>
Colon and Rectum	42.7	43.0	1,193	27 <sup>th</sup>
Urinary Bladder	40.3*	33.5	1,164	5 <sup>th</sup>
Melanoma of the Skin	38.0*	29.1	1,092	5 <sup>th</sup>
Kidney and Renal Pelvis	23.4	23.5	690	26 <sup>th</sup>
Non-Hodgkin Lymphoma	22.6	22.9	637	24 <sup>th</sup> †
Oral Cavity and Pharynx	19.7	18.2	586	13 <sup>th</sup> †
Leukemia	16.7	17.9	462	32 <sup>nd</sup>
Pancreas	16.1	15.1	476	8 <sup>th</sup> †
Liver/Intrahepatic Bile Duct	12.7	13.1	408	22 <sup>nd</sup>
Stomach	8.9	8.5	254	12 <sup>th</sup> †
Esophagus	8.3	7.9	247	20 <sup>th</sup> †
Myeloma	8.0	8.6	237	34 <sup>th</sup> †
Thyroid	7.7	7.2	204	20 <sup>th</sup>
Brain/Nervous System	7.2	7.6	190	37 <sup>th</sup>
Testis	5.2	5.7	116	39 <sup>th</sup> †
Larynx	4.9	5.3	149	32 <sup>nd</sup> †
Hodgkin Lymphoma	3.2	2.9	75	10 <sup>th</sup> †

Rates are per 100,000 population and are age-adjusted to the 2000 U.S. standard population (19 age groups – Census P25–1130) and exclude basal cell and squamous cell skin cancers. Incidence rates exclude in situ carcinomas except urinary bladder. Incidence data were coded using the International Classification of Disease for Oncology (ICD-O) coding system. Delaware cases include Delaware residents only at the time of diagnosis. The Delaware and U.S. incidence rates are based on the Delaware Cancer Registry, Delaware Division of Public Health, 2021 submission and the NPCR and SEER Incidence - U.S. Cancer Statistics Public Use Database, 2021 submission (2001-2019), United States Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute. Released June 2022. Available at [www.cdc.gov/cancer/uscs/public-use](http://www.cdc.gov/cancer/uscs/public-use). Delaware rates are referenced as DE and U.S. references the United States. National rankings were accessed using Centers for Disease Control and Prevention, U.S Cancer Statistics. Available at [https://gis.cdc.gov/Cancer/USCS/?CDC\\_AA\\_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcancer%2Fdataviz%2Findex.htm#/AtAGlance/](https://gis.cdc.gov/Cancer/USCS/?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcancer%2Fdataviz%2Findex.htm#/AtAGlance/)

\*Statistically significantly higher than the U.S. rate.  
† One or more states tied with Delaware for listed rank

- Comparing Delaware males to U.S. males from 2015-2019:
  - Delaware males (125.9 cases per 100,000 population) age-adjusted incidence rate for prostate cancer was significantly higher compared to U.S. males (109.8 cases per 100,000 population). Delaware had the 10th highest age-adjusted incidence rate among all states.

- Delaware males (68.8 cases per 100,000 population) had a statistically significantly higher lung and bronchus cancer incidence rate compared to U.S. males (64.0 per 100,000 population). Delaware ranked 20th highest among males among all states for the lung and bronchus age-adjusted incidence rate.
- Delaware males (38.0 cases per 100,000 population) had a statistically significantly higher melanoma age-adjusted incidence rate compared to U.S. males (29.1 cases per 100,000 population). Delaware males ranked fifth highest among all states for the melanoma age-adjusted incidence rate.
- Delaware males (40.3 cases per 100,000 population) had a statistically significantly higher urinary bladder cancer incidence rate compared to U.S. males (33.5 cases per 100,000 population). Delaware males ranked fifth highest among all states for the urinary bladder age-adjusted incidence rate.
- No other site-specific cancer incidence rates were significantly different among Delaware males compared to U.S. males.

**TABLE 4-3: FIVE-YEAR AVERAGE AGE-ADJUSTED ALL-SITE AND SITE-SPECIFIC CANCER INCIDENCE RATES AND NUMBER OF CASES FOR FEMALES; U.S., DELAWARE, 2015-2019**

Cancer Site	DE Rate (Females)	U.S. Rate (Females)	DE Cases (2015-2019)	National Ranking (2015-2019)
All Sites	436.8	423.2	14,456	13 <sup>th</sup>
Female Breast	136.1*	128.0	4,392	10 <sup>th</sup>
Lung and Bronchus	56.2*	50.3	2,062	15 <sup>th</sup>
Colon and Rectum	32.5	33.0	1,091	28 <sup>th</sup>
Uterus	30.6*	27.6	1,080	13 <sup>th</sup>
Thyroid	23.5*	20.3	613	12 <sup>th</sup>
Melanoma of the Skin	22.0*	18.3	696	14 <sup>th</sup> †
Non-Hodgkin Lymphoma	15.2	15.7	516	26 <sup>th</sup>
Pancreas	12.5	11.6	446	6 <sup>th</sup> †
Kidney and Renal Pelvis	11.8	12.0	391	26 <sup>th</sup> †
Urinary Bladder	10.1	8.4	360	8 <sup>th</sup> †
Ovary	9.7	10.4	325	35 <sup>th</sup> †
Leukemia	8.8*	11.0	281	46 <sup>th</sup>
Cervix	7.7	7.7	203	21 <sup>st</sup> †
Oral Cavity and Pharynx	6.3	6.5	209	37 <sup>th</sup>
Myeloma	6.1	5.7	218	13 <sup>th</sup>
Brain/Nervous System	5.2	5.4	157	35 <sup>th</sup> †
Liver/Intrahepatic Bile Duct	4.4	4.8	157	24 <sup>th</sup> †
Stomach	4.2	4.6	145	22 <sup>nd</sup> †
Hodgkin Lymphoma	2.4	2.3	58	14 <sup>th</sup> †
Esophagus	1.8	1.8	61	22 <sup>nd</sup> †
Larynx	1.7*	1.2	61	7 <sup>th</sup> †

Rates are per 100,000 population and are age-adjusted to the 2000 U.S. standard population (19 age groups – Census P25–1130) and exclude basal cell and squamous cell skin cancers. Incidence rates exclude in situ carcinomas except urinary bladder. Incidence data were coded using the International Classification of Disease for Oncology (ICD-O) coding system. Delaware cases include Delaware residents only at the time of diagnosis. The Delaware and U.S. incidence rates are based on the Delaware Cancer Registry, Delaware Division of Public Health, 2021 submission and the NPCR and SEER Incidence - U.S. Cancer Statistics Public Use Database, 2021 submission (2001-2019), United States Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute. Released June 2022. Available at [www.cdc.gov/cancer/uscs/public-use](http://www.cdc.gov/cancer/uscs/public-use). Delaware rates are referenced as DE and U.S. references the United States. National rankings were accessed using Centers for Disease Control and Prevention, U.S Cancer Statistics. Available at [https://gis.cdc.gov/Cancer/USCS/?CDC\\_AA\\_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcancer%2Fdataviz%2Findex.htm#/AtAGlance/](https://gis.cdc.gov/Cancer/USCS/?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcancer%2Fdataviz%2Findex.htm#/AtAGlance/)

\*Statistically significantly higher than the U.S. rate.  
† One or more states tied with Delaware for listed rank

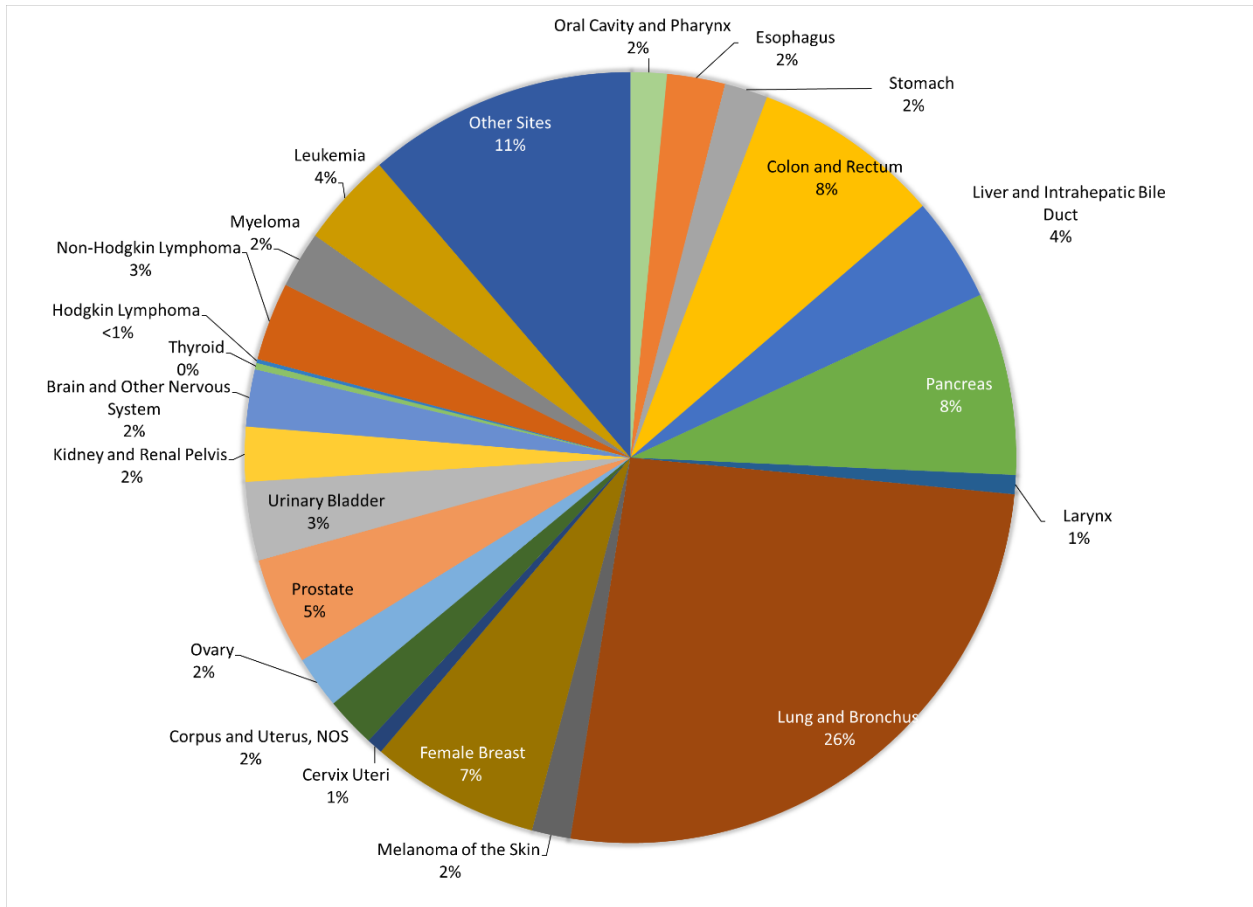
- Comparing Delaware females to U.S. females from 2015-2019:
  - Delaware females (136.1 cases per 100,000 population) had a statistically significantly higher breast cancer incidence rate compared to U.S. females (128.0 cases per 100,000 population). Delaware females ranked 10<sup>th</sup> highest among all states for the breast age-adjusted incidence rate.

- Delaware females (56.2 cases per 100,000 population) had a statistically significantly higher lung and bronchus cancer incidence rate compared to U.S. females (50.3 cases per 100,000 population). Delaware females ranked 15<sup>th</sup> highest among all states for the lung and bronchus cancer age-adjusted incidence rate.
  - Delaware females (30.6 cases per 100,000 population) had a statistically significantly higher uterine cancer incidence rate compared to U.S. females (27.6 cases per 100,000 population). Delaware females ranked 13<sup>th</sup> highest among all states for the uterine cancer age-adjusted incidence rate.
  - Delaware females (23.5 cases per 100,000 population) had a statistically significantly higher thyroid cancer incidence rate compared to U.S. females (20.3 cases per 100,000 population). Delaware females ranked 12<sup>th</sup> highest among all states for the thyroid age-adjusted incidence rate.
  - Delaware females (22.0 cases per 100,000 population) had a statistically significantly higher melanoma incidence rate compared to U.S. females (18.3 per 100,000 population). Delaware females tied with Washington for 14<sup>th</sup> highest among all states for the melanoma age-adjusted incidence rate.
  - Delaware females (1.7 cases per 100,000 population) had a statistically significantly higher larynx cancer incidence rate compared to U.S. females (1.2 cases per 100,000 population). Delaware females tied with Missouri, Mississippi, Vermont, and Ohio for seventh highest among all states for the larynx bladder age-adjusted incidence rate.
  - Delaware females (8.8 cases per 100,000 population) had a statistically significantly lower leukemia incidence rate compared to U.S. females (11.0 cases per 100,000 population). Delaware females ranked 46<sup>th</sup> highest among all states for the larynx bladder age-adjusted incidence rate.
- Comparing Delaware females to Delaware males from 2015-2019:
    - Delaware males have a significantly higher age-adjusted incidence rate for oral cavity and pharynx cancer compared to Delaware females (19.7 cases per 100,000 population vs. 6.3 cases per 100,000 population).
    - Delaware males have a significantly higher age-adjusted incidence rate for esophagus cancer compared to Delaware females (8.3 cases per 100,000 vs. 1.8 cases per 100,000 population).
    - Delaware males have a significantly higher age-adjusted incidence rate for stomach cancer compared to Delaware females (8.9 cases per 100,000 vs. 4.2 cases per 100,000 population).
    - Delaware males have a significantly higher age-adjusted incidence rate for colorectal cancer compared to Delaware females (42.7 cases per 100,000 population vs. 32.5 cases per 100,000 population).
    - Delaware males have a significantly higher age-adjusted incidence rate for liver and intrahepatic bile duct cancer compared to Delaware females (12.7 cases per 100,000 population vs. 4.4 cases per 100,000 population).
    - Delaware males have a significantly higher age-adjusted incidence rate for pancreatic cancer compared to Delaware females (16.1 cases per 100,000 population vs 12.5 cases per 100,000 population).
    - Delaware males have a significantly higher age-adjusted incidence rate for larynx cancer compared to Delaware females (4.9 cases per 100,000 population vs 1.7 cases per 100,000 population).
    - Delaware males have a significantly higher age-adjusted incidence rate for lung and bronchus cancer compared to Delaware females (68.8 cases per 100,000 population vs 56.2 cases per 100,000 population).

- Delaware males have a significantly higher age-adjusted incidence rate for melanoma compared to Delaware females (38.0 cases per 100,000 population vs 22.0 cases per 100,000 population).
- Delaware males have a significantly higher age-adjusted incidence rate for urinary bladder cancer compared to Delaware females (40.3 cases per 100,000 population vs 10.1 cases per 100,000 population).
- Delaware males have a significantly higher age-adjusted incidence rate for kidney and renal pelvis cancer compared to Delaware females (23.4 cases per 100,000 population vs 11.8 cases per 100,000 population).
- Delaware males have a significantly higher age-adjusted incidence rate for brain and nervous system cancer compared to Delaware females (7.2 cases per 100,000 population vs 5.2 cases per 100,000 population).
- Delaware males have a significantly higher age-adjusted incidence rate for non-Hodgkin lymphoma compared to Delaware females (22.6 cases per 100,000 population vs 15.2 cases per 100,000 population).
- Delaware males have a significantly higher age-adjusted incidence rate for myeloma compared to Delaware females (8.0 cases per 100,000 population vs 6.1 cases per 100,000 population).
- Delaware males have a significantly higher age-adjusted incidence rate for leukemia compared to Delaware females (16.7 cases per 100,000 population vs 8.8 cases per 100,000 population).
- Delaware males have a significantly lower age-adjusted incidence rate for thyroid cancer compared to Delaware females (7.7 cases per 100,000 population vs 23.5 cases per 100,000 population).

## MORTALITY

**FIGURE 4-2: PERCENT DISTRIBUTION OF CANCER DEATHS BY CANCER SITE, DELAWARE, 2015-2019**



Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Health Statistics Center, 2022.

- In 2015-2019 in Delaware:
  - There were 10,363 deaths from cancer, an average of 2,073 per year.
  - Lung and bronchus cancer accounted for 26% of all new cancer deaths.
  - Female breast cancer accounted for 7% of all new cancer deaths.
  - Prostate cancer accounted for 5% of all new cancer deaths.
  - Colorectal cancer accounted for 8% of all new cancer deaths.



**TABLE 4-4: FIVE-YEAR AVERAGE AGE-ADJUSTED ALL-SITE AND SITE-SPECIFIC CANCER MORTALITY RATES OVERALL; U.S. AND DELAWARE, 2015-2019**

Cancer Site	DE Rate (Overall)	U.S. Rate (Overall)	DE Cases (2015-2019)	National Ranking (2015-2019)
All Sites	160.8	152.4	10,362	15 <sup>th</sup>
Lung and Bronchus	40.9*	36.7	2,691	15 <sup>th</sup>
Colon and Rectum	13.0	13.4	820	29 <sup>th†</sup>
Pancreas	12.1*	11.1	793	5 <sup>th†</sup>
Liver/Intrahepatic Bile Duct	6.7	6.6	455	15 <sup>th†</sup>
Leukemia	6.5	6.1	409	11 <sup>th†</sup>
Urinary Bladder	5.4*	4.2	341	1 <sup>st</sup>
Non-Hodgkin Lymphoma	5.4	5.3	340	20 <sup>th†</sup>
Brain/Nervous System	4.0	4.4	248	46 <sup>th†</sup>
Esophagus	3.9	3.9	252	29 <sup>th†</sup>
Myeloma	3.9*	3.2	246	2 <sup>nd</sup>
Kidney and Renal Pelvis	3.6	3.6	238	29 <sup>th†</sup>
Stomach	3.0	2.9	188	15 <sup>th†</sup>
Melanoma of the Skin	2.7*	2.2	168	5 <sup>th†</sup>
Oral Cavity and Pharynx	2.4	2.5	157	33 <sup>rd†</sup>
Larynx	1.2*	0.9	83	5 <sup>th†</sup>
Thyroid	0.4	0.5	28	37 <sup>th†</sup>
Hodgkin Lymphoma	0.3	0.3	17	7 <sup>th†</sup>

Rates are per 100,000 population and are age-adjusted to the 2000 U.S. standard population (19 age groups – Census P25–1130) and exclude basal cell and squamous cell skin cancers. Mortality data were coded using the International Classification of Disease Tenth Revision (ICD-10) coding system. Delaware deaths include Delaware residents only at the time of death. The Delaware and the U.S. mortality rates are based on the Delaware Health Statistics, Delaware Division of Public Health, 2022 and the Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER\*Stat Database: Mortality - All COD, Aggregated With State, Total U. S. (1990-2019) , Delaware rates are referenced as DE and U.S. references the United States. National rankings were accessed using Centers for Disease Control and Prevention, U.S Cancer Statistics. Available at [https://gis.cdc.gov/Cancer/USCS/?CDC\\_AA\\_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcancer%2Fdataviz%2Findex.htm#/AtAGlance/](https://gis.cdc.gov/Cancer/USCS/?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcancer%2Fdataviz%2Findex.htm#/AtAGlance/)

\*Statistically significantly higher than the U.S. rate.  
† One or more states tied with Delaware for listed rank

- Comparing Delaware to the U.S. from 2015-2019:
  - Delaware (40.9 deaths per 100,000 population) had a statistically significantly higher lung and bronchus cancer mortality rate compared to the U.S. (36.7 deaths per 100,000 population). Delaware was ranked 15<sup>th</sup> among all states for the lung and bronchus cancer age-adjusted mortality rate.
  - Delaware (12.1 deaths per 100,000 population) had a statistically significantly higher pancreatic cancer mortality rate compared to the U.S. (11.1 deaths per 100,000 population). Delaware and Ohio tied for fifth among all states for the pancreatic cancer age-adjusted mortality rate.
  - Delaware (5.4 deaths per 100,000 population) had a statistically significantly higher urinary bladder cancer mortality rate compared to the U.S. (4.2 deaths per 100,000 population). Delaware was ranked first among all states for the urinary bladder cancer age-adjusted mortality rate.

- Delaware (3.9 deaths per 100,000 population) had a statistically significantly higher myeloma cancer mortality rate compared to the U.S. (3.2 deaths per 100,000 population). Delaware was ranked second among all states for the myeloma age-adjusted mortality rate.
- Delaware (2.7 deaths per 100,000 population) had a statistically significantly higher melanoma mortality rate compared to the U.S. (2.2 deaths per 100,000 population). Delaware tied Kentucky, New Hampshire, and Tennessee for fifth among all states for the melanoma age-adjusted mortality rate.
- Delaware (1.2 deaths per 100,000 population) had a statistically significantly higher larynx mortality rate compared to the U.S. (0.9 deaths per 100,000 population). Delaware tied Alabama, the District of Columbia, Ohio, and South Carolina for fifth among all states for the larynx cancer age-adjusted mortality rate.

**TABLE 4-5: FIVE-YEAR AVERAGE AGE-ADJUSTED ALL-SITE AND SITE-SPECIFIC CANCER MORTALITY RATES AND NUMBER OF CASES FOR MALES; U.S. AND DELAWARE, 2015-2019**

Cancer Site	DE Rate (Males)	U.S. Rate (Males)	DE Cases (2015-2019)	National Ranking (2015-2019)
All Sites	192.1	181.4	5,498	14 <sup>th</sup>
Lung and Bronchus	49.1*	44.5	1,433	17 <sup>th</sup>
Prostate	17.0*	18.9	467	47 <sup>th</sup>
Colon and Rectum	15.5	16.0	439	31 <sup>st</sup>
Pancreas	14.3	12.7	421	4 <sup>th</sup>
Liver/Intrahepatic Bile Duct	10.1	9.7	318	12 <sup>th</sup> †
Leukemia	9.6*	8.1	263	3 <sup>rd</sup>
Urinary Bladder	9.6*	7.3	259	1 <sup>st</sup>
Non-Hodgkin Lymphoma	7.3	6.9	202	15 <sup>th</sup> †
Esophagus	7.0	6.8	206	28 <sup>th</sup> †
Brain/Nervous System	5.4	5.4	151	31 <sup>st</sup> †
Kidney and Renal Pelvis	5.0	5.2	144	32 <sup>nd</sup> †
Myeloma	4.5	4.0	126	9 <sup>th</sup> †
Stomach	4.2	3.9	115	12 <sup>th</sup>
Oral Cavity and Pharynx	4.0	3.9	119	20 <sup>th</sup> †
Melanoma of the Skin	3.9	3.2	110	7 <sup>th</sup> †
Larynx	2.0	1.6	60	8 <sup>th</sup> †
Hodgkin Lymphoma	--	0.4	--	
Thyroid	--	0.5	--	
Testis	--	0.3	--	

Rates are per 100,000 and are age-adjusted to the 2000 U.S. standard population (19 age groups – Census P25–1130) and exclude basal cell and squamous cell skin cancers. Mortality data were coded using the International Classification of Disease Tenth Revision (ICD-10) coding system. Delaware deaths include Delaware residents only at the time of death. The Delaware and the U.S. mortality rates are based on the Delaware Health Statistics, Delaware Division of Public Health, 2022 and the Surveillance, Epidemiology, and End Results (SEER) Program ([www.seer.cancer.gov](http://www.seer.cancer.gov)) SEER\*Stat Database: Mortality - All COD, Aggregated With State, Total U.S. (1990-2019) , Delaware rates are referenced as DE and U.S. references the United States. National rankings were accessed using Centers for Disease Control and Prevention, U.S Cancer Statistics. Available at [https://gis.cdc.gov/Cancer/USCS/?CDC\\_AA\\_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcancer%2Fdataviz%2Findex.htm#/AtAGlance/](https://gis.cdc.gov/Cancer/USCS/?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcancer%2Fdataviz%2Findex.htm#/AtAGlance/)

\*Statistically significantly higher than the U.S. rate.  
 -- Rates based on 16 or fewer deaths are not individually calculated  
 † One or more states tied with Delaware for listed rank

- Comparing Delaware males to U.S. males from 2015-2019:
  - Delaware males (49.1 deaths per 100,000 population) had a statistically significantly higher lung and bronchus cancer mortality rate compared to U.S. males (44.5 deaths per 100,000 population). Delaware was ranked 17<sup>th</sup> among all states for the lung and bronchus cancer age-adjusted mortality rate.
  - Delaware males (9.6 deaths per 100,000 population) had a statistically significantly higher urinary bladder cancer mortality rate compared to U.S. males (7.3 deaths per 100,000 population).

Delaware was ranked first among all states for the urinary bladder cancer age-adjusted mortality rate.

- Delaware males (9.6 deaths per 100,000 population) had a statistically significantly higher leukemia mortality rate compared to U.S. males (8.1 deaths per 100,000 population). Delaware was ranked third among all states for the leukemia age-adjusted mortality rate.
- Delaware males (17.0 deaths per 100,000 population) had a statistically significantly lower prostate cancer mortality rate compared to U.S. males (18.9 deaths per 100,000 population). Delaware was ranked 47<sup>th</sup> among all states for the prostate cancer age-adjusted mortality rate.

**TABLE 4-6: FIVE-YEAR AVERAGE AGE-ADJUSTED ALL-SITE AND SITE-SPECIFIC CANCER MORTALITY RATES AND NUMBER OF CASES FOR FEMALES; U.S., DELAWARE, 2015-2019**

Cancer Site	DE Rate (Females)	U.S. Rate (Females)	DE Cases (2015-2019)	National Ranking (2015-2019)
All Sites	137.4	131.1	4,864	17 <sup>th</sup>
Lung and Bronchus	34.5*	30.7	1,258	15 <sup>th</sup>
Female Breast	21.2	19.9	723	10 <sup>th</sup> †
Colon and Rectum	11.0	11.3	381	31 <sup>st</sup> †
Pancreas	10.4	9.6	372	6 <sup>th</sup> †
Ovary	6.4	6.5	228	27 <sup>th</sup> †
Uterus	5.9*	5.0	219	2 <sup>nd</sup> †
Leukemia	4.2	4.6	146	45 <sup>th</sup> †
Non-Hodgkin Lymphoma	3.9	4.0	138	23 <sup>rd</sup> †
Liver/Intrahepatic Bile Duct	3.8	4.1	137	25 <sup>th</sup> †
Myeloma	3.4*	2.5	120	1 <sup>st</sup>
Brain/Nervous System	2.8	3.6	97	49 <sup>th</sup>
Kidney and Renal Pelvis	2.4	2.2	94	21 <sup>st</sup> †
Urinary Bladder	2.3	2.1	82	11 <sup>th</sup> †
Cervix	2.3	2.2	71	18 <sup>th</sup> †
Stomach	2.1	2.1	73	18 <sup>th</sup> †
Melanoma of the Skin	1.7	1.4	58	5 <sup>th</sup> †
Esophagus	1.3	1.4	46	39 <sup>th</sup> †
Oral Cavity and Pharynx	1.1	1.4	38	44 <sup>th</sup> †
Larynx	0.6*	0.4	23	3 <sup>rd</sup>
Thyroid	0.5	0.5	19	8 <sup>th</sup> †
Hodgkin Lymphoma	--	0.2	--	

Rates are per 100,000 and are age-adjusted to the 2000 U.S. standard population (19 age groups – Census P25–1130) and exclude basal cell and squamous cell skin cancers. Mortality data were coded using the International Classification of Disease Tenth Revision (ICD-10) coding system. Delaware deaths include Delaware residents only at the time of death. The Delaware and the U.S. mortality rates are based on the Delaware Health Statistics, Delaware Division of Public Health, 2022 and the Surveillance, Epidemiology, and End Results (SEER) Program ([www.seer.cancer.gov](http://www.seer.cancer.gov)) SEER\*Stat Database: Mortality - All COD, Aggregated With State, Total U.S. (1990-2019) , Delaware rates are referenced as DE and U.S. references the United States. National rankings were accessed using Centers for Disease Control and Prevention, U.S Cancer Statistics. Available at [https://gis.cdc.gov/Cancer/USCS/?CDC\\_AA\\_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcancer%2Fdataviz%2Findex.htm#/AtAGlance/](https://gis.cdc.gov/Cancer/USCS/?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcancer%2Fdataviz%2Findex.htm#/AtAGlance/)

\*Statistically significantly higher than the U.S. rate.  
 -- Rates based on 16 or fewer deaths are not individually calculated  
 † One or more states tied with Delaware for listed rank

- Comparing Delaware females to U.S. females from 2015-2019:
  - Delaware females (34.5 deaths per 100,000 population) had a statistically significantly higher lung and bronchus cancer mortality rate compared to U.S. females (30.7 deaths per 100,000 population). Delaware was ranked 15<sup>th</sup> among all states for the lung and bronchus cancer age-adjusted mortality rate.

- Delaware females (5.9 deaths per 100,000 population) had a statistically significantly higher uterine cancer mortality rate compared to U.S. females (5.0 deaths per 100,000 population). Delaware tied with Maryland and New York for second among all states for the uterine cancer age-adjusted mortality rate.
- Delaware females (3.4 deaths per 100,000 population) had a statistically significantly higher myeloma mortality rate compared to U.S. females (2.5 deaths per 100,000 population). Delaware ranked first among all states for the myeloma age-adjusted mortality rate.
- Delaware females (0.6 deaths per 100,000 population) had a statistically significantly higher larynx cancer mortality rate compared to U.S. females (0.4 deaths per 100,000 population). Delaware ranked third among all states for the larynx cancer age-adjusted mortality rate.
- Comparing Delaware females to Delaware males from 2015-2019:
  - Delaware males have a significantly higher age-adjusted mortality rate for lung and bronchus cancer compared to Delaware females (49.1 deaths per 100,000 population vs 34.5 deaths per 100,000 population).
  - Delaware males have a significantly higher age-adjusted mortality rate for colorectal cancer compared to Delaware females (15.5 deaths per 100,000 population vs. 11.0 deaths per 100,000 population).
  - Delaware males have a significantly higher age-adjusted mortality rate for pancreatic cancer compared to Delaware females (14.3 deaths per 100,000 population vs 10.4 deaths per 100,000 population).
  - Delaware males have a significantly higher age-adjusted mortality rate for liver and intrahepatic bile duct cancer compared to Delaware females (10.1 deaths per 100,000 population vs. 3.8 deaths per 100,000 population).
  - Delaware males have a significantly higher age-adjusted mortality rate for leukemia compared to Delaware females (9.6 deaths per 100,000 population vs 4.2 deaths per 100,000 population).
  - Delaware males have a significantly higher age-adjusted mortality rate for urinary bladder cancer compared to Delaware females (9.6 deaths per 100,000 population vs 2.3 deaths per 100,000 population).
  - Delaware males have a significantly higher age-adjusted mortality rate for non-Hodgkin lymphoma compared to Delaware females (7.3 deaths per 100,000 population vs 3.9 deaths per 100,000 population).
  - Delaware males have a significantly higher age-adjusted mortality rate for esophagus cancer compared to Delaware females (7.0 deaths per 100,000 vs. 1.3 deaths per 100,000 population).
  - Delaware males have a significantly higher age-adjusted mortality rate for brain and nervous system cancer compared to Delaware females (5.4 deaths per 100,000 population vs 2.8 deaths per 100,000 population).
  - Delaware males have a significantly higher age-adjusted mortality rate for kidney and renal pelvis cancer compared to Delaware females (5.0 deaths per 100,000 population vs 2.4 deaths per 100,000 population).
  - Delaware males have a significantly higher age-adjusted mortality rate for stomach cancer compared to Delaware females (4.2 deaths per 100,000 vs. 2.1 deaths per 100,000 population).

- Delaware males have a significantly higher age-adjusted mortality rate for oral cavity and pharynx cancer compared to Delaware females (4.0 deaths per 100,000 population vs. 1.1 deaths per 100,000 population).
- Delaware males have a significantly higher age-adjusted mortality rate for melanoma compared to Delaware females (3.9 deaths per 100,000 population vs 1.7 deaths per 100,000 population).
- Delaware males have a significantly higher age-adjusted mortality rate for larynx cancer compared to Delaware females (2.0 deaths per 100,000 population vs 0.6 deaths per 100,000 population).

## APPENDIX A: DATA SOURCES AND METHODOLOGY

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### CANCER INCIDENCE DATA

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#### DELAWARE CANCER REGISTRY

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This report covers data on cancer cases diagnosed among Delawareans from January 1, 2015, to December 31, 2019, that were reported to the Delaware Cancer Registry (DCR) by November 2021. Trends in incidence rates are based on cancers diagnosed from January 1, 1980 to December 31, 2019.

During 2015-2019, there were 29,671 cancer cases diagnosed among Delawareans, which includes individuals with cancers diagnosed at more than one site (known as multiple primaries). With the exception of urinary bladder cancer, only malignant tumors are included in the analyses. *In situ* urinary 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)<sup>12</sup>. 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 the CDC's publication of the *U.S. Cancer Statistics*, Kaposi's sarcoma and mesothelioma are considered separate sites based on distinct histology codes.

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#### UNITED STATES CANCER STATISTICS (USCS)

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U.S. incidence data were obtained from United States Cancer Statistics (USCS) which consists of data from cancer registries participating in the Centers for Disease Control and Prevention's (CDC's) National Program of Cancer Registries (NPCR) and the National Cancer Institute's (NCI's) Surveillance, Epidemiology, and End Results (SEER) Program. Incidence data are included from selected cancer registries meeting U.S. Cancer Statistics data quality criteria covering 99% of the U.S. population.

Historically, Delaware's cancer incidence rates were compared to cancer incidence rates calculated using data from the SEER program, which began in 1973 with data collected from nine SEER program cancer registries (SEER-9). Over time, the number of SEER program registries expanded. In 2009, the Delaware Department of Health and Social Services (DHSS), Division of Public Health (DPH) and the Delaware Cancer Consortium (DCC) began using cancer incidence rates based on 18 population-based registries as a comparison for Delaware's cancer incidence rates. Starting with the current report, USCS data was used in order to align with national statistics presented by national standard setters that includes the most comprehensive data covering a majority of the U.S. population.

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<sup>12</sup> 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.



## CANCER MORTALITY DATA

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### DELAWARE HEALTH STATISTICS CENTER

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Mortality data are provided by the Delaware Health Statistics Center (DHSC) for all death certificates filed in Delaware from 2005 through 2019. Trend analyses for cancer mortality are based on deaths that occurred from January 1, 2005, to December 31, 2019.

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 (NCHS). This program uses a series of rules and hierarchies of events to select the most appropriate underlying cause of death.

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### NATIONAL CENTER FOR HEALTH STATISTICS

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U.S. mortality data were obtained from the NCHS. U.S. mortality data are compiled from all death certificates filed in the 50 states and the District of Columbia from 1980 through 2020. 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<sup>13</sup>.

### POPULATION ESTIMATES, 2015-2019

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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 U.S. Census Bureau. Population files are obtained from the SEER website.<sup>14</sup>

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### RISK FACTORS AND EARLY DETECTION

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The Behavioral Risk Factor Survey (BRFS) is the world's largest ongoing telephone health survey tracking health conditions and risk behaviors in the United States yearly since 1984. Currently, data are collected in all 50 states and four territories. The survey was developed to monitor the statewide prevalence of behavioral risk factors influencing premature morbidity and mortality. The BRFS includes a core set of questions developed by the CDC and is administered to adults 18 years of age and older. Delaware's BRFS is a collaborative effort between DPH and the CDC. BRFS 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<sup>15</sup>. Technological and cultural changes are posing challenges to survey research. One of the most significant challenges is the rapid increase in households where telephone service is provided primarily, or only, via cell phone service. These "cell phone" households are, at least currently, more common among young adults and minority populations.

Originally, the BRFS survey was administered by a random-digit-dial telephone survey. Starting with reporting 2011 data, the BRFS became 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

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<sup>13</sup> Surveillance, Epidemiology, and End Results (SEER) Program ([www.seer.cancer.gov](http://www.seer.cancer.gov)) SEER\*Stat Database: Mortality - All COD, Aggregated Total U.S. (1990-2020) <Katrina/Rita Population Adjustment>, National Cancer Institute, DCCPS, Surveillance Research Program, released June 2022. Underlying mortality data provided by NCHS ([www.cdc.gov/nchs](http://www.cdc.gov/nchs)).

<sup>14</sup> National Cancer Institute. (n.d.). *Download U.S. population data - seer population data*. Surveillance, Epidemiology, and End Results Program. Retrieved August 18, 2022, from <https://seer.cancer.gov/popdata/download.html>

<sup>15</sup> Behavioral Risk Factor Surveillance System, <http://www.cdc.gov/BRFS/>

did not want to respond by phone. Also, the BRFs uses a new method for weighting data, called “raking,” which more accurately reflects the actual population of each state<sup>16</sup>. Because cell phones are quickly replacing landline phones, it was 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, the prevalence of cigarette smoking, known to be more prevalent among young adults, may have been under-estimated for several years.

The data in Appendix D and E relate to cancer screening and risk factor prevalence among Delawareans. Data on breast, cervical, colorectal, and prostate cancer screening patterns among Delawareans are provided in relevant cancer site chapters earlier in this document. Data on overweight and obesity, physical activity, and consumption of dietary fruits and vegetables are provided in Appendix E<sup>17</sup>. Data on known and suspected cancer risk factors and screening recommendations are located in Appendices D and E. The BRFs provides estimates of the prevalence of risk factors across Delaware and nationally. The most recently available risk factor data from BRFs are from 2020. Screening compliance data are presented in Appendix D. Risk factor data are included 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.

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<sup>18</sup>. 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)<sup>19</sup>. 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

Source: U.S. Census 2000, accessed from SEER, <http://seer.cancer.gov/stdpopulations/19ages.proportions.html>.

<sup>16</sup> Behavioral Risk Factor Surveillance System (BRFS) Fact Sheet: Raking— Changing Weighting Methodology, [http://www.dhss.delaware.gov/dph/dpc/files/rakingweights\\_info.pdf](http://www.dhss.delaware.gov/dph/dpc/files/rakingweights_info.pdf)

<sup>17</sup> Delaware Behavioral Risk Factor Survey – Measuring Behaviors that Affect Health, <http://www.dhss.delaware.gov/dph/dpc/brfsurveys.html>

<sup>18</sup> Anderson RN, Rosenberg HM. Report of the second workshop on age adjustment. National Center for Health Statistics. Vital Health Stat 4(30). 1998.

<sup>19</sup> 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>

The formula for an age-adjusted rate can be presented as follows:

$$\text{Age-Adjusted Rate} = \sum (w_i \times ((c_i/n_i) \times 100,000))$$

- $c_i$  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 are expressed per 100,000 of the population.

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## TRENDS OVER TIME: JOINPOINT METHODOLOGY

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For this report, trend analysis was calculated using Joinpoint statistical software available through the NCI.<sup>20</sup> Briefly, trend data (e.g., cancer incidence and mortality rates), are input into the software and the software fits the simplest joinpoint model that is identified from the data. The model provides information about significant changes in the trend across the years and calculates the annual percent change.

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## RACE/ETHNICITY- AND SEX-SPECIFIC INCIDENCE AND MORTALITY RATES

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Race/ethnicity- 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/ethnic and/or sex group by the total population in the corresponding race/ethnic and/or sex group over the same time period. As with other rates, these rates were adjusted to the 2000 U.S. standard population and expressed per 100,000 of the population.

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## CONFIDENCE INTERVALS

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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% confidence interval.

When incidence rates are based on more than 100 cases, lower and upper limits of the 95% confidence intervals for an age-adjusted (AA) incidence or mortality rate are calculated using SEER\*Stat<sup>21</sup> by methodology shown here:<sup>22</sup>

$$\text{Lower Confidence Limit} = \text{AA Rate} - 1.96 \left[ \frac{\text{AA Rate}}{\sqrt{\# \text{ Cases}}} \right]$$

$$\text{Upper Confidence Limit} = \text{AA Rate} + 1.96 \left[ \frac{\text{AA Rate}}{\sqrt{\# \text{ Cases}}} \right]$$

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:

$$\text{Lower Confidence Limit (LCL)} = \text{AA Rate} \times L$$

$$\text{Upper Confidence Limit (LCL)} = \text{AA Rate} \times U$$

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<sup>20</sup> <https://surveillance.cancer.gov/joinpoint/>

<sup>21</sup> Surveillance, Epidemiology and End Results (SEER) Program, National Cancer Institute. SEER\*Stat Software, Version 8.3.5, <http://seer.cancer.gov/seerstat/index.html>

<sup>22</sup> Tiwari RC, Clegg LX, Zou Z. Efficient interval estimation for age-adjusted cancer rates. Stat Methods Med Res 2006;15(6):547-69.

where L and U are values published by the NCHS for the specific purpose of calculating 95% confidence intervals for rates based on fewer than 100 cases<sup>23</sup>.

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## LIMITATIONS OF CONFIDENCE INTERVALS

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Confidence intervals are part of the standard calculations provided within SEER\*Stat. While confidence intervals can be helpful to explore potential differences between populations, identifying statistically significant differences by overlapping confidence intervals alone is subject to Type I and Type II errors more often than standard hypothesis testing. Therefore, for the purpose of this report, confidence intervals are calculated but not reported within the report. For comparison of rates between two populations, an incidence rate ratio is calculated with corresponding p-value. Significance has been set to <0.05, an industry standard. The IRR is not reported but used to determine the language used to describe differences. Statements that include “statistically significant,” “significantly higher,” or “significantly lower” used the confidence interval method and were confirmed by a statistically significant incidence rate ratio.

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## DATA RELEASE STANDARDS

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For this report, cancer frequencies and rates are released according to CDC’s USCS suppression of rates and counts guidance.<sup>24</sup> Incidence and mortality frequencies of fewer than 16 are not presented and age-adjusted incidence and mortality rates based on 16 or fewer cases or deaths are not calculated. This DPH policy helps protect patient privacy and confidentiality<sup>25,26</sup>. Furthermore, a cancer rate based on a very small number of cases is inherently unstable and cannot be reliably interpreted.

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## DEFINITION OF RACE/ETHNICITY

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In this report, the race/ethnicity category is defined as follows:

1. **Non-Hispanic White** – cases who are reported to have White race and not of Hispanic/Latino ethnicity.
2. **Non-Hispanic Black** – cases who are reported to have Black race and not of Hispanic/Latino ethnicity.
3. **Hispanic** – cases who are reported to be of Hispanic/Latino ethnicity regardless of race.

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<sup>23</sup> 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.

<sup>24</sup> Centers for Disease Control and Prevention. (2022, June 6). *Statistical methods: Suppression of rates and counts*. United States Cancer Statistics (USCS). Retrieved August 18, 2022, from [https://www.cdc.gov/cancer/uscs/technical\\_notes/stat\\_methods/suppression.htm](https://www.cdc.gov/cancer/uscs/technical_notes/stat_methods/suppression.htm)

<sup>25</sup> Coughlin SS, Clutter GG, Hutton M. Ethics in Cancer Registries. *Journal of Cancer Registry Management*, 2: 5-10, 1999.

<sup>26</sup> McLaughlin CC. Confidentiality protection in publicly released central registry data. *Journal of Cancer Registry Management*, 2: 84-88, 2002.

## APPENDIX B: PRIMARY CANCER SITE DEFINITIONS

**TABLE B-1: PRIMARY CANCER SITE DEFINITIONS**

Cancer Site Group	ICD-O-3 Site	ICD-O-3 Histology (Type)
<b>Oral Cavity and Pharynx</b>		
Lip	C000-C009	excluding 9050-9055, 9140, 9590-9992
Tongue	C019-C029	excluding 9050-9055, 9140, 9590-9992
Salivary Gland	C079-C089	excluding 9050-9055, 9140, 9590-9992
Floor of Mouth	C040-C049	excluding 9050-9055, 9140, 9590-9992
Gum and Other Mouth	C030-C039, C050-C059, C060-C069	excluding 9050-9055, 9140, 9590-9992
Nasopharynx	C110-C119	excluding 9050-9055, 9140, 9590-9992
Tonsil	C090-C099	excluding 9050-9055, 9140, 9590-9992
Oropharynx	C100-C109	excluding 9050-9055, 9140, 9590-9992
Hypopharynx	C129, C130-C139	excluding 9050-9055, 9140, 9590-9992
Other Oral Cavity and Pharynx	C140, C142, C148	excluding 9050-9055, 9140, 9590-9992
<b>Esophagus</b>	C150-C159	excluding 9050-9055, 9140, 9590-9992
<b>Stomach</b>	C160-C169	excluding 9050-9055, 9140, 9590-9992
<b>Colon and Rectum</b>	C180-C189, C260, C199, C209	excluding 9050-9055, 9140, 9590-9992
<b>Liver and Intrahepatic Bile Duct</b>	C220-C221	excluding 9050-9055, 9140, 9590-9992
<b>Pancreas</b>	C250-C259	excluding 9050-9055, 9140, 9590-9992
<b>Larynx</b>	C320-C329	excluding 9050-9055, 9140, 9590-9992
<b>Lung and Bronchus</b>	C340-C349	excluding 9050-9055, 9140, 9590-9992
<b>Melanoma of the Skin</b>	C440-C449	8720-8790
<b>Breast</b>	C500-C509	excluding 9050-9055, 9140, 9590-9992
<b>Cervix Uteri</b>	C530-C539	excluding 9050-9055, 9140, 9590-9992
<b>Corpus and Uterus, NOS</b>	C540-C549, C559	excluding 9050-9055, 9140, 9590-9992
<b>Ovary</b>	C569	excluding 9050-9055, 9140, 9590-9992
<b>Prostate</b>	C619	excluding 9050-9055, 9140, 9590-9992
<b>Testis</b>	C620-C629	excluding 9050-9055, 9140, 9590-9992
<b>Urinary Bladder</b>	C670-C679	excluding 9050-9055, 9140, 9590-9992
<b>Kidney and Renal Pelvis</b>	C649, C659	excluding 9050-9055, 9140, 9590-9992
<b>Brain and Other Nervous System</b>		
Brain	C710-C719	excluding 9050-9055, 9140, 9530-9539, 9590-9992
Cranial Nerves Other Nervous System	C710-C719	9530-9539
	C700-C709, C720-C729	excluding 9050-9055, 9140, 9590-9992
<b>Thyroid</b>	C739	excluding 9050-9055, 9140, 9590-9992
<b>Hodgkin Lymphoma</b>		
Hodgkin - Nodal	C024, C098-C099, C111, C142, C379, C422, C770-C779	9650-9667

Cancer Site Group	ICD-O-3 Site	ICD-O-3 Histology (Type)
Hodgkin - Extranodal	All other sites	9650-9667
<b>Non-Hodgkin Lymphoma</b>		
NHL - Nodal	C024, C098,C099, C111,C142, C379,C422, C770- C779	9590-9597, 9670-9671, 9673, 9675, 9678- 9680, 9684, 9687-9691, 9695, 9698-9702, 9705, 9708-9709, 9712, 9714-9719, 9724- 9729, 9735, 9737-9738, 9811-9818, 9823, 9827, 9837
NHL - Extranodal	All sites except C024, C098-C099, C111, C142, C379, C422, C770-C779	9590-9597, 9670-9671, 9673, 9675, 9678- 9680, 9684, 9687, 9688, 9689-9691, 9695, 9698-9702, 9705, 9708-9709, 9712, 9714- 9719, 9724-9729, 9735, 9737, 9738
	All sites except C024, C098-C099, C111, C142, C379, C420- C422, C424, C770- C779	9811-9818, 9823, 9827, 9837
<b>Myeloma</b>		9731-9732, 9734
<b>Leukemia</b>		
Lymphocytic Leukemia		
Acute Lymphocytic Leukemia		9826, 9835-9836
	C420, C421, C424	9811-9818, 9837
Chronic Lymphocytic Leukemia	C420, C421, C424	9823
Other Lymphocytic Leukemia		9820, 9832-9834, 9940
Myeloid and Monocytic Leukemia		
Acute Myeloid Leukemia		9840, 9861, 9865-9867, 9869, 9871-9874, 9895-9897, 9898, 9910-9911, 9920
Acute Monocytic Leukemia		9891
Chronic Myeloid Leukemia		9863, 9875-9876, 9945-9946
Other Myeloid/Monocytic Leukemia		9860, 9930
Other Leukemia		
Other Acute Leukemia		9801, 9805-9809, 9931
Aleukemic, subleukemic and NOS		9733, 9742, 9800, 9831, 9870, 9948, 9963- 9964
	C420, C421, C424	9827

Source: National Cancer Institute, Surveillance, Epidemiology, and End Results (SEER) Program, Site Recode ICD-O-3/WHO 2008 Definition [http://seer.cancer.gov/siterecode/icdo3\\_dwho/home/index.html](http://seer.cancer.gov/siterecode/icdo3_dwho/home/index.html).

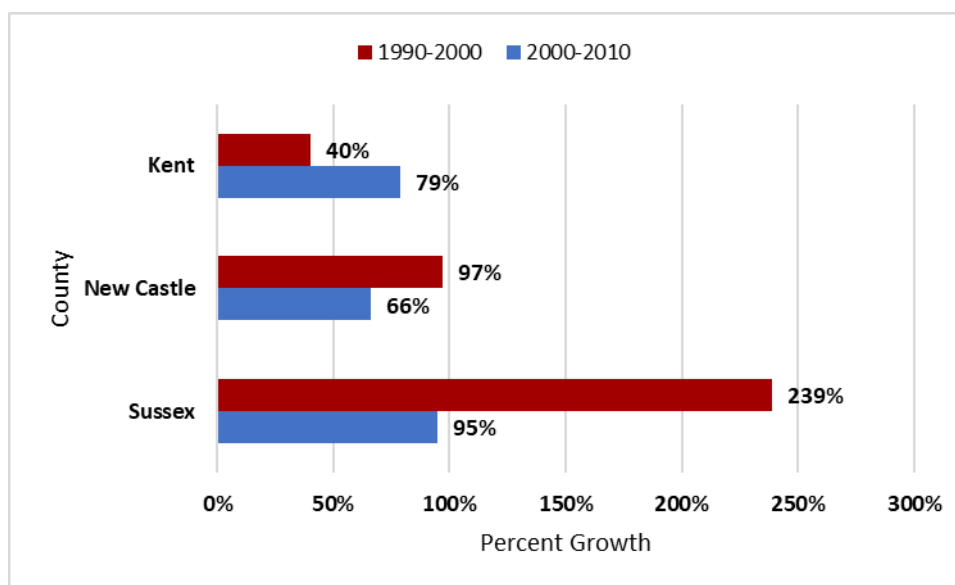
## APPENDIX C: HISPANIC ETHNICITY

The U.S. 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."<sup>27</sup> According to the Census Bureau, in 1990, persons of Hispanic ethnicity comprised 2% of Delaware's population. By 2000, Delaware's Hispanic population increased to 5%. In the 2010 U.S. Census, persons of Hispanic origin comprised 8% of Delaware's population.

The largest growth in the Hispanic population occurred in Sussex County, where the Hispanic prevalence grew from 1% in 1990 to 4% in 2000, and to 9% in 2010. Historically, since 1990 when Hispanic prevalence data began to be collected, New Castle County had the largest percentage of persons of Hispanic ethnicity. The Hispanic population in New Castle County grew from 3% in 1990, to 5% in 2000, and to 9% in 2010. Among Kent County residents, the Hispanic population grew from 2% in 1990, to 3% in 2000, and to 6% in 2010.

Figure C-1 shows the percentage change of the Hispanic population by county and decade in Delaware. From 1990 to 2000, the Hispanic population grew by 40% in Kent County, 97% in New Castle County, and 239% in Sussex County. In the following decade, from 2000 to 2010, the Hispanic population grew by 79% in Kent County, 66% in New Castle County, and 95% in Sussex County.

**FIGURE C-1: PERCENTAGE OF CHANGES IN HISPANIC POPULATION BY COUNTY AND DECADE, DELAWARE, 1990-2000 AND 2000-2010**



Source: U.S. Census Bureau 2010, <https://data.census.gov/>

Specific issues that suggest that Hispanic cancer rates could be subject to misinterpretation are discussed below:

- **Uncertain estimate of Delaware's Hispanic population** — Estimates of Delaware's population are derived from the census performed every 10 years by the U.S. Census Bureau and a final adjustment based on projections from the U.S. Census Bureau as to the overall rate of growth for the Hispanic population in both the state and the nation.
- **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

<sup>27</sup> Grieco, EM, Cassidy RC. (2001-03). "[Overview of Race and Hispanic Origin: Census 2000 Brief](#)" U.S. Census Bureau. Accessed May 26, 2011.

accordance with guidelines from the federal Office of Management and Budget. However, it is possible that Hispanic race is under-reported both in the cancer registry and on death certificates.

- **Hispanic identification in the Delaware Cancer Registry data** — The North American Association of Central Cancer Registries (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) was computerized and released for use by central cancer registries in 2003. In this report, NHIA is used to identify Delawareans of Hispanic origin. To minimize misclassification, the expert panel continues to evaluate the NHIA while considering the possibility of the under- or over-estimation of Hispanic cancer incidence.
- **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 the 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% of the time.



## APPENDIX D: EARLY DETECTION

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### FEMALE BREAST CANCER SCREENING RECOMMENDATIONS

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A screening mammogram (x-ray of the breast) is used to detect breast disease in females who appear to have no breast problems. For early breast cancer detection in females without breast symptoms, the Delaware Cancer Consortium (DCC) recommends that:<sup>28</sup>

- Females 40 years of age and older should get a mammogram and clinical breast exam annually.
- Females 18-39 years of age should get a clinical breast exam annually.

Also, as females should know how their breasts normally look and feel, they should report any breast change promptly to their health care provider. Breast self-exam is encouraged for females starting in their 20s<sup>28</sup>. Females 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.

### FEMALE BREAST CANCER SCREENING IN DELAWARE

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The Behavioral Risk Factor Survey (BRFS) has collected yearly mammogram use data through 2000; after 2000, mammogram use data are collected biennially. The BRFS asks a female respondent about her receiving a mammogram during the previous two years (as opposed to the annual mammogram screening schedule recommended by the DCC) to account for minor variations in scheduling that may cause a woman to miss the one-year threshold (e.g., two mammogram screening appointments 14 months apart).

Data from the 2020 BRFS provides information on breast cancer screening among Delaware females:

- Of Delaware females 40 years of age and older, 73% reported having a mammogram within the previous two years, compared to a national median of 72%. Delaware females ranked 17<sup>th</sup> highest nationally for this response.
- In Delaware, the percentage of non-Hispanic Caucasian females 40 years of age and older who reported having a mammogram in the past two years was slightly lower compared to non-Hispanic African American females. The difference was not significantly different (74% vs. 76%, respectively).
- Delaware females 40 years of age and older in the two highest income categories had the highest percentages of mammography use (79% for females with an annual household income between \$35,000 to \$49,999 and 75% for females with an annual income of \$50,000 or more).
- Delaware females (40 years of age and older) who were college graduates (78%) had a higher prevalence of having had a mammogram in the past two years, compared to Delaware females who had less than a high school diploma (53%); this difference was statistically significant.

### CERVICAL CANCER SCREENING RECOMMENDATIONS

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In 2020, the American Cancer Society (ACS) updated their recommendations for cervical cancer screening. Their recommendations are that “individuals with a cervix initiate cervical cancer screening at age 25 and undergo primary HPV testing every 5 years through age 65 (preferred). If primary HPV testing is not available, individuals aged 25–65 years should be screened with co-testing (HPV testing in combination with cytology) every 5 years or cytology alone every 3 years (acceptable) (*strong recommendation*)”\*. As well, “The ACS recommends that individuals with a cervix who are older than age 65, who have no history of cervical

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<sup>28</sup> American Cancer Society recommendations for early breast cancer detection in women without breast symptoms. Accessed March 15, 2016. <http://www.cancer.org/Cancer/BreastCancer/MoreInformation/BreastCancerEarlyDetection/breast-cancer-early-detection-acs-recs>

intraepithelial neoplasia grade 2 or a more severe diagnosis within the past 25 years, and who have documented adequate negative prior screening in the 10-year period before age 65 discontinue cervical cancer screening with any modality (*qualified recommendation*)\*.<sup>29</sup> A Pap test is conducted as part of cervical cancer screening.<sup>30</sup>

\*"A strong recommendation conveys the consensus that the benefits of adherence to that intervention outweigh the undesirable effects that may result from screening. Qualified recommendations indicate there is clear evidence of benefit of screening but less certainty about the balance of benefits and harms or about patients' values and preferences, which could lead to different decisions about screening."

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## CERVICAL CANCER SCREENING IN DELAWARE

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The BRFSS has collected data on cervical cancer screening in Delaware annually from 1995 to 2000 and biannually since then. In 2020 the BRFSS showed that:

- Seventy-seven percent of Delaware women aged 21 to 65 years reported that they had had a Pap test within the previous three years, compared to the nation median of 80% among U.S. women of the same ages. Delaware ranked 31<sup>th</sup> highest among all states.
- In Delaware, the prevalence of receiving a Pap test in the past three years was slightly lower for Hispanic females (80%) compared to non-Hispanic White females and non-Hispanic Black females (78% vs. 83%, respectively). However, this difference was not statistically significant.
- As age increases, the prevalence increases for receiving a Pap smear within the past three years. Delaware women aged 21 to 30 had the lowest prevalence (67%) of receiving a Pap test in the past three years. The prevalence increases to 82% among Delaware women aged 46 to 55. However, this increase in screening compliance as age increase was not statistically significant.
- In Delaware, women aged 21 to 65 years with an annual household income of less than \$15,000 (70%) had the lowest prevalence of receiving a Pap test within the past three years. Delaware women aged 21 to 65 with an annual household income of \$50,000 or more (82%) had the highest prevalence of receiving a Pap test within the past three years. Differences among the different annual household income groups was not significant.
- Delaware women without a high school diploma had the lowest percentage of reporting having a Pap test within the past three years (59.2%). The percentage of Delaware women reporting having a Pap test in the past three years increased to 83.4% among women with a college degree. This difference between the lowest educational attainment category and the highest educational attainment category was statistically significant.

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## COLORECTAL CANCER SCREENING RECOMMENDATIONS

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The ACS and Delaware Cancer Consortium (DCC) colorectal cancer screening guidelines recommend that at 50 years of age, males and females at average risk of developing colorectal cancer should use one of the following screening options<sup>31</sup>:

- a. Fecal occult blood tests (FOBT) every year
- b. Fecal immunochemical test (FIT) every year

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<sup>29</sup> Fontham ETH, Wolf AMD, Church TR, Etzioni R, Flowers CR, Herzig A, Guerra CE, Oeffinger KC, Shih YT, Walter LC, Kim JJ, Andrews KS, DeSantis CE, Fedewa SA, Manassaram-Baptiste D, Saslow D, Wender RC, Smith RA. Cervical cancer screening for individuals at average risk: 2020 guideline update from the American Cancer Society. *CA Cancer J Clin.* 2020 Sep;70(5):321-346. doi: 10.3322/caac.21628. Epub 2020 Jul 30. PMID: 32729638. <https://acsjournals.onlinelibrary.wiley.com/doi/full/10.3322/caac.21628>

<sup>30</sup> <https://www.cancer.org/cancer/cervical-cancer/detection-diagnosis-staging/screening-tests/pap-test.html>

<sup>31</sup> Detailed screening guidelines for colorectal cancer:

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

- c. Flexible sigmoidoscopy every five years
- d. Double-contrast barium enema every five years
- e. Computed tomography (CT) colonography (virtual colonoscopy) every five years
- f. Colonoscopy every 10 years.

For options ‘a’ through ‘e,’ a follow-up colonoscopy should be performed if results from an initial screening test are positive. ACS and DCC screening guidelines offer suggested screening schedules for individuals with an elevated risk of developing colorectal cancer.

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## COLORECTAL CANCER SCREENING IN DELAWARE

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Data from the 2020 BRFSS provides information on colorectal cancer screening patterns among Delawareans:

- Delaware ranked 10<sup>th</sup> highest in the prevalence (77%) of adults aged 50 to 74 years who reported meeting the U.S. Preventive Services Task Force (USPSTF) recommendations for colorectal screening. The U.S. national median for meeting the USPSTF recommendation for colorectal cancer screening was 74%.
- The percentage of Delawareans who met the USPSTF recommendation for colorectal cancer screening increased by age group. Significantly more Delawareans aged 60 to 69 years and aged 70 to 75 years (81% and 89%, respectively) reported meeting the recommendation, compared to those aged 50 to 59 years (66%).
- The prevalence of non-Hispanic Whites 50 to 74 years of age in Delaware who met the USPSTF recommendation for colorectal cancer screening (78%) was lower compared to the prevalence for non-Hispanic African Americans in Delaware (80%). However, this difference was not statistically significant.
- In Delaware, the prevalence of adults 50 to 74 years of age who met the USPSTF colorectal cancer screening increased by education level.
- As income increases, so does the prevalence of meeting the USPSTF recommendation for colorectal cancer screening. Delawareans who reported having the recommended colorectal cancer screenings differed significantly between income levels: 62% of Delaware adults reporting lowest income category (less than \$15,000 annual household income) reported meeting the USPSTF recommendation compared to 79% in the highest income category (\$50,000 or more).

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## LUNG CANCER SCREENING RECOMMENDATIONS

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In January 2013, the ACS published new lung cancer screening guidelines<sup>32</sup> that recommend that doctors discuss screening options with patients who meet certain criteria for high risk of developing the disease. High-risk patients are defined as those who:

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

If a high-risk individual decides to be screened for lung cancer, the ACS recommends that the testing be performed using a low dose computed tomography (CT) scan at a facility with experience in lung cancer screening. The guidelines emphasize that screening is not a substitute for quitting smoking.

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<sup>32</sup> Wender, R., Fontham, E. T., Barrera, E., Jr, Colditz, G. A., Church, T. R., Ettinger, D. S., ... Smith, R. A. (2013). American Cancer Society lung cancer screening guidelines. *CA: a cancer journal for clinicians*, 63(2), 107–117. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3632634/>

## LUNG CANCER SCREENING IN DELAWARE

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Data from the 2020 BRFSS provides information on lung cancer screening patterns among Delawareans:

- It is estimated approximately 8% of Delaware adults between the ages of 55 and 80 years of age may be eligible for lung cancer screening.
- The vast majority of Delaware adults eligible for lung cancer screening are White (93%). Therefore, breakdowns by race/ethnicity cannot be reported.
- Of Delaware adults eligible for lung cancer screening, only 14.6% reported having a CT scan to screen for lung cancer.
- Of Delaware adults eligible for lung cancer screening, there were no differences between Delaware males (16.2%) and Delaware females (14%) who reported having a CT scan to screen for lung cancer.
- Due to the low percentage of Delaware adults who are eligible being screened for lung cancer, breakdowns by annual household income and educational attainment cannot be reported due to small sample size.

## PROSTATE CANCER SCREENING RECOMMENDATIONS

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The ACS recommends that males make an informed decision with their health care provider about whether to be screened for prostate cancer. Males should receive information from their doctors about the risks and possible benefits of prostate cancer screening. Males should not be screened unless they receive this information<sup>33</sup>.

The DCC recommends the following prostate cancer screening guidelines for Delaware males:

- ‘No mass’ prostate cancer screening efforts
- Promote education for informed prostate cancer screening decision-making.
- Screening in males older than 75 years of age is less desirable; however, screening decisions should be made on an individual basis.
- Screening is not recommended for males with a life expectancy of less than 10 years.
- Offer screening for individuals considered to be at average risk for the disease beginning at 50 years of age, using an informed decision-making process.
- High-risk individuals should be encouraged to be screened starting at 40 years of age if they:
  - Have first-degree relatives with prostate cancer
  - Are non-Hispanic African American males
  - Have family or personal history of BRCA1 or BRCA2 gene.
- Screening at one- to two-year intervals via prostate specific antigen (PSA) test, with or without digital rectal exam (DRE).

## PROSTATE CANCER SCREENING IN DELAWARE

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Data from the 2020 BRFSS provides information on the prevalence of prostate cancer screening among Delaware males:

- Thirty-three percent of Delaware males 40 years of age and older reported having had a PSA blood test in the past two years, compared to the national median prevalence of 32%. Delaware ranked 15<sup>th</sup> highest in the nation.

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<sup>33</sup> American Cancer Society; Prostate Cancer: Early Detection.

<http://www.cancer.org/cancer/prostatecancer/moreinformation/prostatecancerearlydetection/prostate-cancer-early-detection-acs-recommendations>

- The prevalence of Delaware males who received a PSA test within the past two years increased with age: 25% of males aged 50 to 59 years were tested, compared to 51% of males aged 65 years and older. This difference was statistically significant.
- In Delaware, there was no statistically significant difference in the prevalence of having a PSA test within the past two years between non-Hispanic White males (36%) and non-Hispanic Black males (26%).
- As the level of education increased, the prevalence of Delaware males who had a PSA test within the past two years increased. Only 19% of Delaware males with less than high school education reported having a PSA test within the past two years, compared to 41% of Delaware males who graduated from college. This difference was statistically significant.
- According to the 2018 BRFSS, 44% of Delaware males reported making the decision together with their health care provider to have the PSA test done. Another 26% of Delaware males made the decision with one or more other person. Only 16% of Delaware males made the decision to have the PSA test done alone. Data about prostate cancer screening decision making was last asked in 2018.

## APPENDIX E: BEHAVIORAL RISK FACTORS

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### CURRENT TRENDS IN SMOKING IN DELAWARE

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

In recent years, tobacco use prevalence has continued to slowly decline among adult Delawareans and among high school students. In 2020, 15% of adult Delawareans smoked cigarettes regularly. The following data highlights smoking trends in Delaware in 2020:

- The prevalence for current smokers in Delaware (15%) is almost the same as the 2020 U.S. median prevalence of 16%.
- Delaware adult males (18%) had a significantly higher current smoking prevalence compared to Delaware females (13%).
- There were no differences in current smoking prevalence among non-Hispanic White (15%), non-Hispanic Black (16%), and Hispanics (14%) in Delaware.
- When smoking prevalence was stratified by age group, Delawareans aged 25 to 34 reported the highest prevalence of current smoking (24%). This prevalence was statistically significantly higher compared to that for Delawareans 65 years of age and older.
- Current smoking prevalence changed with education attainment. In Delaware, 28% of residents who did not complete their high school education said they were current smokers. As education level increased, smoking prevalence decreased. Twenty percent of Delaware adults who had high school diploma or equivalent reported being a current smoker, compared to 16% with some post-high school education, and 6% who completed college.
- Current smoking prevalence also decreased with higher income levels. In Delaware, 28% of Delaware adults with a household income between \$15,000 and \$24,000 were current smokers. The lowest smoking prevalence was among those who earned \$50,000 or more per year (10%).

### OVERWEIGHT/OBESITY

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Being overweight or obese is a risk factor for numerous cancers, including female breast, 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 Centers for Disease Control and Prevention (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<sup>34</sup>. The following data are specific to the 2020 Delaware BRFS:

- In Delaware, 69% of adults 18 years of age and older were overweight or obese in 2020, compared to the national median of 67%.

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<sup>34</sup> About BMI for Adults, [http://www.cdc.gov/healthyweight/assessing/bmi/adult\\_bmi/index.html](http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html)

- In 2020, the prevalence of being overweight in Delaware differed significantly by sex: 35% of males and 29% of females were overweight.
- The prevalence of obesity among adult Delawareans did not differ by sex: 35% of males and 38% of females were obese in 2020.
- In 2020, the prevalence of being overweight differed significantly between non-Hispanic White (34%) and non-Hispanic Black (25%) Delawareans.
- In Delaware, non-Hispanic Blacks (50%) had a higher prevalence of obesity non-Hispanic Whites (34%) in 2020. This difference was statistically significant.
- In 2020, the prevalence of being overweight was highest among Delaware college graduates (38%).
- In 2020, as education increases, the prevalence of obesity decreases. However, there were no statistically significant differences among educational attainment groups.
- In 2020, there were no significant differences in obesity among those with different annual household incomes; adults with annual household income between \$25,000 and \$34,000 had the highest obesity prevalence (40%).
- Among Delawareans in 2020, the prevalence of obesity was highest among those aged 45 to 64 years (42%).

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## PHYSICAL ACTIVITY

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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 includes reduced risk for chronic diseases including coronary heart disease, stroke, and type 2 diabetes; and improved well-being.

Respondents in the 2019 Delaware BRFSS answered a series of questions to determine what percentage of respondents met aerobic guidelines, strengthening guidelines, both, or neither<sup>35</sup>. These questions are asked every other year. The most recent year asked was 2019.

The following data are from the 2019 Delaware BRFSS:

- In Delaware, 37% of adults 18 years of age and older did not meet either aerobic or strengthening guidelines, similar to the national median of 37%.
- In Delaware, the prevalence of adults who reported they did not meet aerobic or strengthening guidelines was statistically significantly higher among females (40%) than males (33%).
- More Hispanic (46%) and Black Delawareans (43%) did not meet aerobic or strengthening guidelines than Whites (33%). This difference was statistically significant.
- Delawareans aged 45 to 54 years (41%) had the highest prevalence of not meeting aerobic or strengthening guidelines.
- Delawareans in lower income categories reported a statistically significantly higher prevalence of prevalence of not meeting aerobic or strengthening guidelines (39% of those earning less than \$15,000 did not meet the guidelines; 43% of those earning \$15,000 to \$24,999 did not meet the guidelines). This compares to Delawareans in the highest income category, where 33% of those earning \$50,000 or more per year did not meet the guidelines.

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<sup>35</sup>U.S. Department of Health and Human Services. 2008 Physical Activity Guidelines for Americans. Hyattsville, MD: U.S. Department of Health and Human Services; 2008. <https://health.gov/paguidelines/>

- Delawareans in lower education levels reported a statistically significantly higher prevalence of not meeting the physical activity guidelines. In Delaware, 49% of adults with less than a high school diploma and 41% of adults with a high school education or GED did not meet the physical activity guidelines, compared to 34% of adults with some post high school education, or 31% of adults who were college graduates.

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## DIETARY FRUITS AND VEGETABLES

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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. These questions are asked every other year. The most recent year asked was 2019.

The following data are from the 2019 Delaware BRFSS:

- In Delaware, 14% of adults consumed five or more servings of fruits and/or vegetables a day, compared to the national median of 13% of adults.
- Fewer Delaware males (12%) consumed five or more servings of fruits and vegetables daily than females (16%). This difference was not statistically significant.
- In Delaware, 13% of non-Hispanic Whites, 14% of non-Hispanic Blacks, and 14% of Hispanics consumed five or more servings of fruits and vegetables daily. This difference was not statistically significant.