

# CENSUS TRACT-LEVEL CANCER INCIDENCE 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



This report is made possible with funding from the Delaware Health Fund, with strategic leadership and guidance provided by the Delaware Cancer Consortium. This report was prepared by the Delaware Department of Health and Social Services, Division of Public Health, Comprehensive Cancer Control Program.

For more information, contact:  
Delaware Comprehensive Cancer Program  
Division of Public Health  
Thomas Collins Building, Suite 11  
540 S. DuPont Highway  
Dover, DE 19901  
Phone: 302-744-1020  
Fax: 302-739-2545

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

# A. Cancer Incidence by Census Tract

---

## Background

As required by Title 16, Chapter 20 of the *Delaware Code*<sup>1</sup>(see Appendix), the Delaware Department of Health and Social Services (DHSS), Division of Public Health (DPH) publishes cancer rates by census tract annually. Specifically:

*“The agency [DPH] shall create a detailed map of each county in Delaware that graphically illustrates the overall incidence of cancer in each census tract. The census tracts will be identified on the maps and shall be color-coded to designate the degree of cancer incidence in each tract. These maps shall be created within 90 days of the agency receiving the cancer incidence data. The agency shall post the maps created ... on their website in a format that can be easily accessed and read by the public.”*

## Delaware Census Tracts

As of the 2010 U.S. Census, Delaware is divided into 214 census tracts. To determine what census tract an address falls into, use this online search tool from the U.S. Census Bureau:

<https://geocoding.geo.census.gov/geocoder/geographies/address?form>.

- For 2015-2019, the least populated census tract (511.01 in Sussex County) had an annual average of 802 residents. The most populous census tract (402.02 in Kent County) had an annual average population of 13,924 residents. The average annual number of residents per census tract was 4,473.
- For 2015-2019 census tract analyses, 29,452 Delaware cancer cases diagnosed during the period were included in the analyses.

## Discussion of Results of Census Tract Analyses

When assessing cancer incidence data by census tract, the occurrence of cancer may differ across census tracts for a variety of reasons. For example, lifestyle behaviors may cluster in a homogeneous community. In addition, exposure to environmental or occupational carcinogens is often limited to a defined geographic area.<sup>2</sup> Also, residents in certain geographic areas may be more impoverished than other residents, which affects their health insurance coverage and their level of access to health care, particularly cancer screening services.<sup>3</sup> Finally, chance or random variation can play a role, since approximately 5% of all comparisons will be significantly different due to chance alone.

Additional caution is needed when comparing results from the 2015-2019 census tract analysis to results for 2003-2007 and earlier time periods. Because of the change in the configuration of census tracts in Delaware (i.e., shifting from 197 census tracts defined by the 2000 Census to 214 census tracts defined

---

<sup>1</sup> <https://delcode.delaware.gov/title16/c020/index.html>

<sup>2</sup> Gomez SL, Shariff-Marco S, DeRouen M, Keegan TH, Yen IH, Mujahid M, Satariano WA, Glaser SL. The impact of neighborhood social and built environment factors across the cancer continuum: Current research, methodological considerations, and future directions. *Cancer*. 2015 Jul 15;121(14):2314-30. doi: 10.1002/cncr.29345. Epub 2015 Apr 6. PMID: 25847484; PMCID: PMC4490083.

<sup>3</sup> Kirby JB, Kaneda T. Neighborhood socioeconomic disadvantage and access to health care. *J Health Soc Behav*. 2005 Mar;46(1):15-31. doi: 10.1177/002214650504600103. PMID: 15869118.

by the 2010 Census), results derived using the two different census tract configurations would be expected to differ due to various reasons. Despite population growth in the intervening decade, the average population size of each census tract decreased when census tracts were redrawn for the 2010 Census. Using the 2000 Census configuration of 197 census tracts, each census tract had an average of 4,257 residents.<sup>4</sup> Using the 2010 Census configuration of 214 census tracts, each census tract had an average of 4,118 residents.<sup>5</sup>

Furthermore, there is an inherent instability in calculating cancer incidence rates at the census tract level. In a small area such as a census tract, the relative number of cancer diagnoses can change considerably from year to year. If one case of cancer is diagnosed in a census tract one year, and three cases of cancer are diagnosed in the same census tract the next year, the cancer rate for that census tract will change dramatically from one year to the next. These relatively large fluctuations do not typically occur in larger populations. If a census tract has an all-site cancer incidence rate that is significantly different from the state rate for one time period, it is not unusual to find a non-significant difference in rates for the following time period (and vice versa).

Inaccurate data on the population at risk in small geographic areas continues to complicate epidemiologic studies in community settings. Census data are known to be less accurate for cities or counties than for states. In addition: “The uncertainty is greatest for demographic subgroups of the population during the 10-year interval between national census counts.”<sup>6</sup> Because population estimates for census tracts in analyses during the three initial time periods (2001-2005, 2002-2006, and 2003-2007) relied solely on 2000 Census population data, there was the potential for major fluctuations in the rate when comparing those data with data using the 2010 Census population projections. A further complication is that before 2004-2008, geocoding was not yet available, reducing the accuracy of geographic data.

## Geocoding Validation Process

Accurate census tract assignment is necessary for valid rate calculation at the census tract level and relies on the accuracy and quality of patient address data. To assure accuracy and quality, cancer cases submitted to the Delaware Cancer Registry (DCR) undergo quality assurance review of the data fields for each patient’s address. The case-level quality review of street address data includes correction of misspellings, incomplete addresses, and address formats. Accurint®, a Lexis Nexis® service, is used to assign a valid physical street address to post office box addresses where possible. DCR staff also use Accurint® to assign a valid physical street address to rural addresses where possible.

Geocoding software assigns cases to a census tract based on the patient’s address at time of diagnosis. Some cases may not be coded to the street address level due to recently created streets that are not yet embedded within the software. For these cases, further manual review and census tract assignment is conducted using the American Factfinder® and Google Maps® online databases.

---

<sup>4</sup> U.S. Census Bureau; Census 2000, DEC Summary File 2 Demographic Profile, Table DP1; [https://data.census.gov/cedsci/table?t=Populations%20and%20People&g=0400000US10%241400000&y=2000&tid=DECENNIALDPSF22000\\_DP1&hidePreview=true&tp=true.>](https://data.census.gov/cedsci/table?t=Populations%20and%20People&g=0400000US10%241400000&y=2000&tid=DECENNIALDPSF22000_DP1&hidePreview=true&tp=true.>); (23 September 2021)

<sup>5</sup> U.S. Census Bureau; Census 2010, DEC Summary File 1, Table P1; <https://data.census.gov/cedsci/table?t=Populations%20and%20People&g=0400000US10%241400000&tid=DECENNIALLSF12010.P1&hidePreview=true.>>; (23 September 2021)

<sup>6</sup> Thun M., Sinks T. Understanding Cancer Clusters. *Cancer: A Cancer Journal for Clinicians*, 54(5), 273-280 (2004). Retrieved from <https://onlinelibrary.wiley.com/doi/full/10.3322/canjclin.54.5.273>

## Preliminary Analyses

Cancer cases used for analysis totaled 29,671 and include all eligible<sup>7</sup> cancer cases diagnosed among Delawareans from January 1, 2015 through December 31, 2019. Within this time period, 99.3% of the cases were successfully geocoded. Table A-1 shows the percentage level of certainty of the residential census tract assignments for each individual. The analysis includes 98.5% of cases assigned to a census tract based on a complete and valid address of residence.

**TABLE A-1: NUMBER OF CASES AND PERCENTAGE OF CENSUS TRACT CERTAINTY FOR CANCER INCIDENCE DATA, DELAWARE, 2015-2019**

Census Tract Based on Level of Certainty	n (%)
Complete and valid street address of residence	29,234 (98.5%)
Residence ZIP + 4	0 (0.0%)
Residence ZIP + 2	0 (0.0%)
Residence ZIP code only	132 (0.4%)
ZIP code of P.O. Box	85 (0.3%)
<b>Residence city where city has only one census tract, or based on residence ZIP code where ZIP code has only one census tract</b>	1 (0.0%)
Not assigned, geocoding attempted or blank	219 (0.7%)
<b>Total Number of Cases</b>	<b>29,671</b>

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

## Five-Year Population Estimates by Census Tract

As of the 2000 U.S. Census, Delaware was comprised of 197 census tracts. Census tract analyses through 2003-2007 used the 2000 Census tract designations. As of the 2010 Census, however, Delaware was realigned into 214 census tracts that became available beginning with the 2004-2008 analyses. Approximately half of the 2010 Census tracts remained the same as in the 2000 Census and the rest either combined with others or split into two or more new census tracts.

Note that census tracts do not follow a consecutive numbering scheme. New Castle County contains 129 census tracts numbered 2.00 through 169.04. Kent County is comprised of 32 tracts numbered 401.00 through 434.00. Sussex County includes 53 tracts numbered 501.01 through 519.00.

Census tract populations for 2015-2019 were calculated using estimates from Woods & Poole Economics, Inc. Population data specific for each five-year age category and census tract were provided from the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program, made available through the SEER website (<https://seer.cancer.gov/censustract-pops/>).<sup>8</sup>

<sup>7</sup> Excludes benign tumors, non-urinary bladder in situ tumors, and basal and squamous cell cancers per reporting guidelines mandated by the National Program of Cancer Registries (NPCR) of the Centers for Disease Control and Prevention (CDC).

<sup>8</sup> Populations - Total U.S. (2006-2019), Census Tract Estimates by Race/Origin Controlling to Vintage 2019 <2010 Tract Geographies>, National Cancer Institute, DCCPS, Surveillance Research Program, released October 2021. Source: Woods & Poole Economics, Inc. Washington, D.C. Copyright 2021.

## Age-Adjusted Incidence Rates, by Census Tract

For each census tract, age-adjusted incidence rates were calculated at the census tract level.

Age-adjusted incidence rates take into account the different age distributions of the populations at risk. To calculate age-adjusted incidence rates, crude incidence rates for each age group are multiplied by the appropriate 2000 U.S. Standard Population weight for that age group (Table A-2). Age-adjusted incidence rates for each of the 18 age groups are then summed to yield the age-adjusted incidence rate for an entire census tract. All age-adjusted incidence rates were calculated for each census tract using a local SEER\*Stat database built using DCR data and the census tract population estimates mentioned previously.<sup>9</sup>

**TABLE A-2: 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>.

## 95% Confidence Intervals

Confidence intervals represent the range of values in which the cancer rate could reasonably fall. Our best estimate of the cancer rate in a particular census tract is the incidence rate itself. However, the rate could reasonably lie anywhere between the lower confidence limit (LCL) and the upper confidence limit (UCL). Because of this, a confidence interval is sometimes called the “margin of error.”

**When incidence rates are based on more than 100 cases**, 95% confidence intervals are calculated using equation A-1.

---

<sup>9</sup> SEER\*Stat Database: DE Census Tract 2006-2019 NPCR 2021 Submission - Linked To Census Tract Attributes Census 2010 Geographies Time Dependent (2006-2018; 2008 copied to 06, 07; 2017 copied to 18) - Delaware

In the equations below:

- Age-adjusted (AA) rate is the age-adjusted incidence rate for a particular census tract, and
- L and U are values published by the National Center for Health Statistics for the specific purpose of calculating 95% confidence intervals for rates based on fewer than 100 cases<sup>10</sup>.

#### EQUATION A-1: CONFIDENCE LIMIT EQUATIONS FOR 100 OR MORE CASES

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

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

where AA Rate is the age-adjusted incidence rate for a particular census tract.

**When incidence rates are based on fewer than 100 cases**, 95% confidence intervals are calculated using equation A-2.

#### EQUATION A-2: CONFIDENCE LIMIT EQUATIONS FOR FEWER THAN 100 CASES

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

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

## Comparing Census Tract Rates to the State Rate

The level of variability associated with an incidence rate is reflected in the width of its confidence interval. Very wide confidence intervals mean that the incidence rate is estimated with a small degree of certainty. Smaller intervals indicate an incidence rate estimate with a greater level of certainty.

The width of a confidence interval is influenced by two factors: (a) the number of cancer cases in the population and (b) the size of the population under consideration. When a cancer rate is calculated for a small population in which only a handful of cases were diagnosed, the expectation would be for the rate's confidence interval to be very wide. On the other hand, when a cancer rate is calculated for a large population in which many cases were diagnosed, the expectation would be for the rate's confidence interval to be narrower.

The width of a confidence interval is important because it is used to determine if the amount by which two incidence rates differ is statistically significant. If the confidence interval for an incidence rate in one area overlaps with the confidence interval for a rate in another area, the rates are said to be "not statistically significantly different from one another." Even though the two rates may look very different, if the cancer rate for one area is NOT statistically significantly different from the cancer rate for another area, researchers cannot say that one rate is truly different from the other rate.

On the other hand, if the confidence interval for the incidence rate in one area does NOT overlap with the confidence interval for an incidence rate in another area, the two rates are statistically significantly

---

<sup>10</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. Retrieved from [https://www.cdc.gov/nchs/data/nvsr/nvsr51/nvsr51\\_02.pdf](https://www.cdc.gov/nchs/data/nvsr/nvsr51/nvsr51_02.pdf)

different. When the rate for one area is significantly different from the rate for another area, the difference between the rates is greater than would be expected by chance alone.

For each census tract, the all-site cancer incidence rate is compared to the all-site cancer incidence rate for the state. This allows DPH to identify census tracts with cancer incidence rates that are statistically significantly higher or lower than the incidence rate for Delaware. If the confidence interval for an incidence rate overlaps with the confidence interval for the state incidence rate, the census tract rate is not statistically significantly different from the state rate. If the confidence interval for a census tract rate does not overlap with the confidence interval for the state rate, the census tract rate is said to be statistically significantly different from the state rate. Census tracts with statistically significantly higher or lower cancer rates compared to the state are denoted in the rate table in Section C and in all color-coded maps in Sections D and E.

### LIMITATIONS OF CONFIDENCE INTERVALS

---

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 (IRR) is calculated with corresponding p-value. Significance was set to  $<0.05$ , an industry standard. The IRR is not reported but was used to confirm whether differences were statistically significant.

## Supplemental Information

For 2015-2019, one census tract had fewer than 16 cancer cases: census tract 411.00 (denoted by the symbol “\*” in Section C). When incidence rates are computed for an entire geographic area based on a very small number of cases, rates are estimated with a larger degree of uncertainty. This uncertainty is represented by a wide confidence interval that is more likely to overlap with the confidence intervals of incidence rates from other areas. This means that it is more difficult to establish a significant difference between incidence rates. For this reason, rates based on fewer than 16 cases should be interpreted with caution and have been suppressed; they are denoted in both the rate table and color-coded maps.

## Results of Census Tract Analyses

Cancer incidence rates by census tract (with confidence intervals) are shown in Section C for the 2015-2019 period. Census tracts shaded in yellow have statistically significantly higher incidence rates and those shaded in blue have statistically significantly lower incidence rates (when compared to the overall state incidence rate).

Results for 2015-2019 show that:

- In 29 of Delaware’s 214 census tracts (14%), the all-site cancer incidence rate was statistically significantly higher than Delaware’s average 2015-2019 incidence rate (468.8 per 100,000).
- In 22 of Delaware’s 214 census tracts (10%), the all-site cancer incidence rate was statistically significantly lower than Delaware’s average 2015-2019 incidence rate (468.8 per 100,000).
- All-site cancer incidence rates for the remaining 163 census tracts (76%) were not significantly different from the state’s average rate for the 2015-2019 period or could not be calculated.

Section D shows maps of Delaware census tracts grouped by 2015-2019 all-site cancer incidence quintile. Section E shows maps of Delaware census tracts in which census tracts with 2015-2019 all-site cancer incidence rates are significantly different from the state average. These are shaded for ease of identification.

## B. Cancer Incidence Rates by Census Tract – Interpretation

---

In brief:

- A cancer rate in a census tract will change year to year because of the relatively small population in each of the census tracts. For this reason, the incidence rates are uncertain, subject to wide variation, and difficult to interpret.
- To help understand how much confidence there should be in a cancer rate for a census tract, a confidence interval was calculated. A confidence interval represents the range of values in which the cancer incidence rate could reasonably fall. It is sometimes referred to as the “margin of error.”
- If the confidence interval of a cancer incidence rate in a census tract does not overlap with the confidence interval for the state, there is enough confidence to call the incidence rate in the census tract “significantly different” from the state rate.
- Section C shows the confidence intervals for the cancer rates in each census tract and for the state. These data help determine if the incidence rate in a particular census tract is significantly different from the state rate.

Analysis of disease rates for small areas, such as census tracts, is difficult to interpret and can be misleading if not considered carefully. To understand cancer in Delaware, researchers need to track the number of all newly diagnosed cancer cases each year. Researchers use different types of information to calculate cancer rates. This information includes estimates of the number of people living in Delaware and data on the cancer cases diagnosed in our state.

Even though researchers calculate cancer rates using the best possible information, cancer rates have some uncertainty. The rate of any disease in a population provides a snapshot of the impact of that disease for a specific time period. Because Delaware is a small state, researchers must interpret this snapshot carefully.

In a small area such as a census tract, the snapshot changes much from year to year. If one case of cancer is diagnosed in a census tract one year, and three cases of cancer are diagnosed in the same census tract the next year, the cancer rate for that census tract will change dramatically from one year to the next. These big fluctuations do not typically occur in larger populations. If cancer rates for a census tract are compared to the cancer rate for the whole state of Delaware for a given time period, it would not be unusual to find the comparison different (perhaps even reversed) the following year. DPH publishes five-year cancer incidence rates to better understand cancer patterns among small populations. Cancer rates for five-year time periods are less vulnerable to yearly fluctuations of cancer cases diagnosed in small populations.

DPH can tell how much uncertainty there is in a cancer rate by studying its confidence interval. A confidence interval is a range of values that shows where the cancer rate could reasonably be. This means that the cancer rate could be anywhere between the lower confidence limit and the upper confidence limit.

If the difference between the upper confidence limit and the lower confidence limit is wide, there is greater uncertainty in the reliability of the cancer incidence rate. If the difference between the upper confidence limit and the lower confidence limit is very narrow, there is much less uncertainty in the cancer rate.

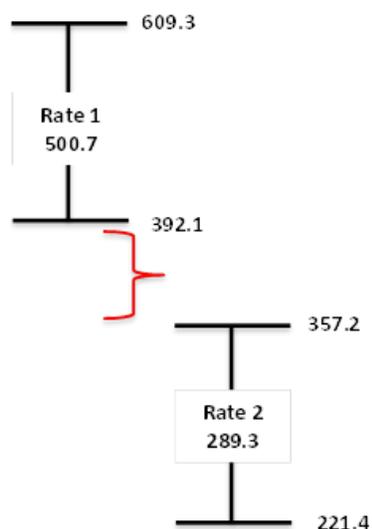
The width of a confidence interval depends on two things: (a) the number of people living in that area; and (b) the number of cancer cases diagnosed in that area.

When a cancer rate is calculated for a small area (like a census tract or a neighborhood block), usually a small number of people live in that area. A much smaller number of people in that area will have been diagnosed with cancer. When a cancer rate is calculated for a small area, the cancer rate has a lot of uncertainty because researchers do not have very much information. Cancer rates based on small numbers of cases or deaths will typically have very wide confidence intervals.

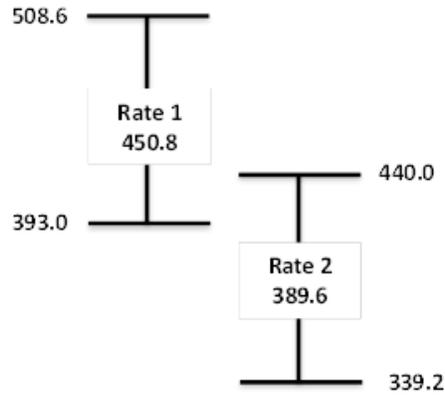
On the other hand, when a cancer rate is calculated for a large area (like a state or a country) with a large population, the odds are that more people will have been diagnosed with cancer compared to a smaller area. When a cancer rate is calculated based on a large number of cases or deaths, researchers are more certain of the level of cancer in that area. This means that cancer rates for large areas will usually have narrow confidence intervals.

Confidence intervals are important for another reason, too. They help researchers determine if differences in cancer rates for two different areas are statistically significant. If the confidence interval for the incidence rate in one area does NOT overlap with the confidence interval for an incidence rate in another area, the two rates are significantly different. The figure below shows what non-overlapping confidence intervals look like.

If “Rate 1” is statistically significantly higher than “Rate 2,” the lower confidence limit for “Rate 1” is greater than the upper confidence limit for “Rate 2.” When one rate is significantly different from another rate, the difference between the two rates is larger than we would expect by chance alone.



If the confidence interval for the incidence rate in one area overlaps with the confidence interval for an incidence rate in another area, the two rates are NOT significantly different. The figure below shows how the confidence intervals look when the cancer rates for two areas are NOT significantly different from one another.



If “Rate 1” is not significantly greater than “Rate 2”, the lower confidence limit for “Rate 1” is less than the upper confidence limit for “Rate 2.” Even though the numbers may look very different, if the cancer rate for one area is not significantly different from the cancer rate for another area, researchers cannot say that one rate is truly different from the other rate.

DPH compared cancer incidence rates for each census tract to the cancer rate for the state to tell if any census tracts had a statistically significantly higher-than-expected or lower-than-expected overall cancer rate compared to the whole state.

When interpreting the cancer rates for any census tract, review the maps, plus the table in Section C that lists the actual rate and the confidence intervals for both the state and for each census tract. When viewing the cancer rate in a census tract, it is important to look at the confidence interval. If a cancer rate has a relatively wide confidence interval, the cancer rate has a lot of uncertainty. When cancer rates have a lot of uncertainty, conclusions should be drawn cautiously. Even our best guess may overestimate or underestimate the actual rate of cancer in a census tract.

## **C. Five-Year Age-Adjusted All-Site Cancer Incidence Rates by Census Tract, Delaware, 2015-2019**

---

**TABLE C-1: FIVE-YEAR AGE-ADJUSTED ALL-SITE CANCER INCIDENCE RATES BY CENSUS TRACT;  
DELAWARE, 2015-2019**

Blue = Incidence rate is statistically significantly lower than the state rate.  
Yellow = Incidence rate is statistically significantly higher than the state rate.

2010 Census Tract ID	Delaware: 468.8 (463.3, 474.4)		2010 Census Tract ID	Delaware: 468.8 (463.3, 474.4)	
	Age-Adjusted Rate (95% confidence Interval)			Age-Adjusted Rate (95% confidence Interval)	
2.00	516.7 (436.9, 607.0)		109.00	435.4 (349.0, 540.1)	
3.00	402.8 (310.5, 514.3)		110.00	443.9 (361.6, 541.8)	
4.00	301.6 (232.5, 387.0)		111.00	406.5 (327.3, 503.4)	
5.00	528.5 (418.2, 658.7)		112.01	511.6 (392.1, 656.8)	
6.01	468.3 (357.9, 601.4)		112.02	627.0 (532.7, 734.8)	
6.02	488.8 (379.9, 619.7)		112.03	504.1 (422.0, 598.0)	
9.00	428.8 (309.6, 579.3)		112.04	438.8 (361.0, 530.8)	
11.00	490.1 (390.7, 616.2)		112.05	445.2 (340.4, 575.9)	
12.00	378.0 (251.9, 554.4)		112.06	402.4 (331.6, 485.7)	
13.00	465.1 (386.7, 557.9)		113.00	395.0 (305.6, 506.3)	
14.00	523.6 (407.3, 664.5)		114.00	426.6 (344.4, 525.1)	
15.00	406.6 (308.3, 527.5)		115.00	483.7 (395.9, 587.8)	
16.00	512.5 (382.0, 672.3)		116.00	471.9 (382.4, 577.4)	
19.02	604.0 (408.0, 856.8)		117.00	427.1 (343.2, 528.4)	
21.00	628.5 (471.5, 820.7)		118.00	384.2 (318.2, 462.2)	
22.00	393.1 (286.4, 525.3)		119.00	378.6 (301.9, 472.8)	
23.00	404.5 (303.6, 527.5)		120.00	382.9 (320.1, 456.1)	
24.00	388.0 (315.8, 472.1)		121.00	384.8 (302.3, 483.8)	
25.00	410.0 (314.4, 525.3)		122.00	459.1 (378.1, 552.5)	
26.00	489.0 (388.5, 607.1)		123.00	423.7 (325.5, 543.2)	
27.00	657.4 (475.7, 882.8)		124.00	429.2 (352.4, 518.1)	
28.00	471.0 (323.8, 662.2)		125.00	421.8 (354.2, 498.9)	
29.00	502.1 (403.1, 618.5)		126.00	577.9 (471.3, 702.7)	
30.02	446.2 (297.2, 642.2)		127.00	441.0 (369.3, 523.5)	
101.01	341.5 (272.9, 422.5)		129.00	465.6 (385.0, 558.3)	
101.04	403.3 (315.5, 508.2)		130.00	457.8 (344.6, 598.6)	
102.00	527.8 (409.6, 671.8)		131.00	451.9 (354.3, 569.3)	
103.00	575.0 (467.1, 701.1)		132.00	523.4 (419.3, 646.7)	
104.00	458.3 (381.4, 546.8)		133.00	509.3 (390.8, 655.2)	
105.02	469.0 (397.3, 550.2)		134.00	452.0 (357.7, 565.8)	
107.02	650.7 (556.0, 757.0)		135.01	394.2 (338.5, 458.1)	
108.00	439.2 (370.7, 518.3)		135.03	480.7 (418.2, 550.6)	

Source: Delaware Department of Social Services, Division of Public Health, Delaware Cancer Registry, 2020.

\* Age-adjusted incidence rate is based on fewer than 16 cases.

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

**TABLE C-1: FIVE-YEAR AGE-ADJUSTED ALL-SITE CANCER INCIDENCE RATES BY CENSUS TRACT;  
DELAWARE, 2015-2019 (CONTINUED)**

Blue = Incidence rate is statistically significantly lower than the state

Yellow = Incidence rate is statistically significantly higher than the state

2010 Census Tract ID	Delaware: 468.8 (463.3, 474.4)
	Age-Adjusted Rate (95% confidence Interval)
135.05	666.0 (542.5, 810.2)
135.06	470.7 (385.9, 569.9)
136.04	484.1 (403.2, 577.4)
136.07	367.0 (308.1, 434.5)
136.08	403.9 (295.5, 540.6)
136.10	479.6 (406.0, 562.9)
136.11	452.3 (371.0, 545.4)
136.12	369.5 (311.0, 436.6)
136.13	450.0 (380.6, 529.0)
136.14	544.2 (440.5, 665.5)
136.15	414.1 (344.7, 495.8)
137.00	430.4 (341.7, 535.3)
138.00	495.6 (417.2, 584.6)
139.01	676.4 (544.1, 830.9)
139.03	764.5 (617.0, 934.1)
139.04	487.1 (408.7, 575.5)
140.00	481.0 (403.8, 568.9)
141.00	465.4 (382.5, 560.9)
142.00	589.9 (451.5, 759.7)
143.00	373.7 (299.7, 461.3)
144.02	403.7 (313.3, 514.4)
144.03	390.6 (305.2, 492.5)
144.04	399.8 (319.7, 494.8)
145.01	389.0 (230.8, 655.6)
145.02	610.9 (391.8, 907.3)
147.02	555.9 (425.3, 715.0)
147.03	483.6 (408.3, 569.4)
147.05	454.6 (382.9, 536.2)
147.06	508.1 (368.8, 681.4)
148.03	359.4 (294.2, 436.2)
148.05	719.3 (623.0, 825.4)
148.07	527.1 (447.0, 616.9)

2010 Census Tract ID	Delaware: 468.8 (463.3, 474.4)
	Age-Adjusted Rate (95% confidence Interval)
148.08	498.8 (399.5, 614.0)
148.09	482.1 (411.6, 561.1)
148.10	522.6 (440.1, 615.8)
149.03	808.6 (664.0, 972.3)
149.04	554.0 (461.1, 659.9)
149.06	628.2 (495.2, 784.6)
149.07	484.3 (395.4, 587.3)
149.08	525.4 (389.9, 691.2)
149.09	572.0 (475.6, 681.6)
150.00	605.2 (513.9, 707.9)
151.00	459.1 (377.0, 555.2)
152.00	440.6 (369.4, 521.6)
154.00	364.4 (285.8, 459.1)
155.02	468.9 (368.1, 589.5)
156.00	541.0 (421.7, 684.7)
158.02	456.1 (342.2, 595.9)
159.00	461.8 (373.8, 565.1)
160.00	351.2 (262.9, 460.6)
161.00	409.1 (308.3, 536.6)
162.00	519.4 (417.4, 640.3)
163.01	614.0 (527.5, 711.2)
163.02	469.5 (395.4, 553.2)
163.05	604.6 (523.4, 694.8)
164.01	636.2 (537.6, 747.4)
164.04	481.0 (387.3, 591.9)
166.01	556.0 (498.3, 618.8)
166.02	890.0 (772.8, 1019.7)
166.04	606.3 (533.0, 686.5)
166.08	808.2 (689.9, 941.4)
168.01	617.3 (526.9, 718.8)
168.04	648.5 (546.8, 763.0)
169.01	558.0 (443.0, 696.2)

Source: Delaware Department of Social Services, Division of Public Health, Delaware Cancer Registry, 2020.

\* Age-adjusted incidence rate is based on fewer than 16 cases.

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

**TABLE C-1: FIVE-YEAR AGE-ADJUSTED ALL-SITE CANCER INCIDENCE RATES BY CENSUS TRACT;  
DELAWARE, 2015-2019 (CONTINUED)**

Blue = Incidence rate is statistically significantly lower than the state  
Yellow = Incidence rate is statistically significantly higher than the state

2010 Census Tract ID	Delaware: 468.8 (463.3, 474.4)
	Age-Adjusted Rate (95% confidence Interval)
169.04	325.8 (240.8, 431.6)
401.00	589.4 (513.1, 674.2)
402.01	484.1 (401.1, 579.2)
402.02	551.7 (501.1, 606.2)
402.03	634.8 (544.5, 736.0)
405.01	519.6 (440.9, 608.7)
405.02	403.1 (311.3, 518.6)
407.00	401.1 (336.6, 475.3)
409.00	342.6 (249.7, 461.2)
410.00	461.3 (391.8, 539.8)
411.00	*
412.00	538.9 (453.4, 636.3)
413.00	546.4 (414.9, 706.0)
414.00	482.7 (392.1, 588.1)
415.00	444.8 (364.4, 538.3)
416.00	473.0 (369.6, 599.5)
417.01	533.4 (464.2, 610.7)
417.02	470.0 (394.0, 557.7)
418.01	525.5 (467.8, 588.6)
418.02	561.5 (472.8, 662.1)
419.00	515.4 (440.5, 600.0)
420.00	489.9 (399.3, 596.3)
421.00	481.3 (396.3, 580.0)
422.01	621.0 (549.8, 698.9)
422.02	493.5 (435.4, 557.4)
425.00	523.6 (427.0, 635.9)
428.00	527.4 (462.6, 599.2)
429.00	456.6 (385.6, 537.7)
430.00	483.9 (412.3, 564.9)
431.00	573.1 (464.5, 701.1)
432.02	444.3 (367.3, 533.8)

2010 Census Tract ID	Delaware: 468.8 (463.3, 474.4)
	Age-Adjusted Rate (95% confidence Interval)
433.00	461.6 (375.9, 560.6)
434.00	626.1 (537.3, 726.4)
501.01	410.3 (338.4, 494.4)
501.03	384.3 (320.9, 458.4)
501.04	478.7 (398.6, 570.6)
501.05	521.9 (444.0, 609.8)
502.00	551.8 (451.4, 668.6)
503.01	478.3 (420.1, 543.1)
503.02	431.1 (360.7, 511.8)
504.01	401.6 (325.5, 491.2)
504.03	432.5 (348.1, 532.0)
504.05	476.1 (393.8, 571.5)
504.06	414.5 (346.1, 493.0)
504.07	438.4 (369.1, 518.0)
504.08	430.5 (360.3, 511.5)
505.01	461.0 (378.2, 557.7)
505.03	361.2 (287.2, 447.9)
505.04	456.7 (389.9, 531.9)
506.01	435.6 (366.5, 514.7)
506.02	491.7 (425.2, 566.5)
507.01	444.2 (375.7, 524.3)
507.03	353.9 (275.3, 455.0)
507.04	459.9 (390.8, 541.4)
507.05	430.9 (368.9, 504.1)
507.06	488.9 (346.5, 678.3)
508.01	567.1 (477.0, 670.4)
508.02	699.7 (616.9, 791.8)
508.03	592.0 (527.9, 663.2)
509.01	468.9 (376.8, 581.4)
509.02	437.2 (371.0, 516.0)
510.03	506.5 (437.8, 584.9)

Source: Delaware Department of Social Services, Division of Public Health, Delaware Cancer Registry, 2020.

\* Age-adjusted incidence rate is based on fewer than 16 cases.

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

**TABLE C-1: FIVE-YEAR AGE-ADJUSTED ALL-SITE CANCER INCIDENCE RATES BY CENSUS TRACT;  
DELAWARE, 2015-2019 (CONTINUED)**

Blue = Incidence rate is statistically significantly lower than the state  
 Yellow = Incidence rate is statistically significantly higher than the state

2010 Census Tract ID	Delaware: 468.8 (463.3, 474.4)
	Age-Adjusted Rate (95% confidence Interval)
510.04	473.9 (411.7, 546.2)
510.05	474.1 (407.6, 551.2)
510.06	510.0 (412.3, 628.9)
510.07	493.8 (423.4, 575.4)
511.01	556.4 (289.7, 984.9)
511.02	261.4 (176.8, 408.4)
511.03	427.0 (302.0, 618.4)
512.01	382.2 (264.4, 558.7)
512.02	192.7 (134.5, 389.9)
512.03	229.9 (166.1, 406.4)
512.04	497.0 (238.5, 1001.5)
512.05	198.9 (131.1, 421.9)

2010 Census Tract ID	Delaware: 468.8 (463.3, 474.4)
	Age-Adjusted Rate (95% confidence Interval)
513.01	439.5 (376.9, 512.1)
513.02	573.3 (487.0, 674.3)
513.03	446.4 (375.5, 528.9)
513.05	395.2 (324.9, 482.8)
513.06	409.7 (333.3, 509.1)
514.00	386.7 (311.5, 475.6)
515.00	433.5 (368.2, 507.9)
517.01	380.9 (310.6, 463.5)
517.02	385.3 (325.8, 453.3)
518.01	398.4 (331.6, 475.4)
518.02	413.3 (338.2, 500.6)
519.00	366.5 (304.9, 438.2)

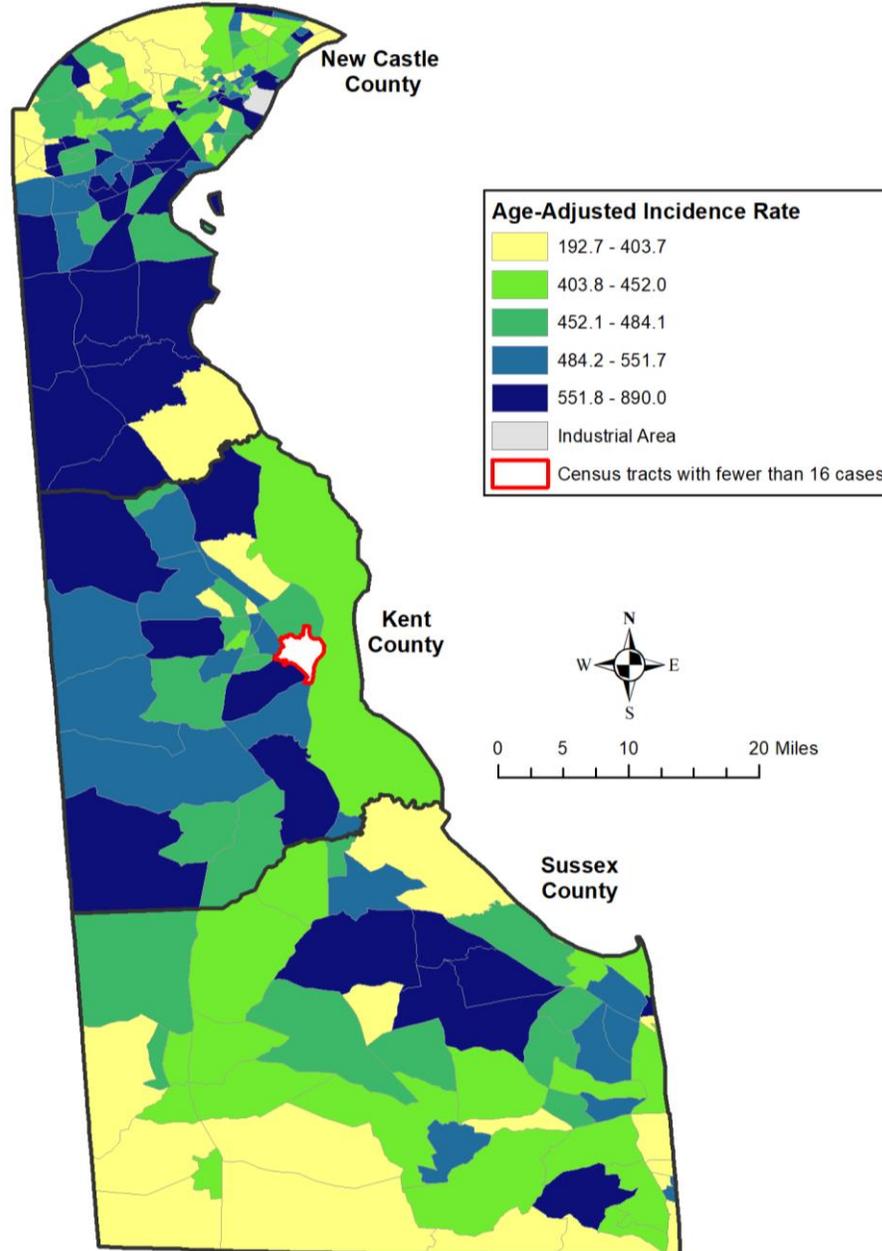
Source: Delaware Department of Social Services, Division of Public Health, Delaware Cancer Registry, 2020.

\* Age-adjusted incidence rate is based on fewer than 16 cases.

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

## D. Maps of Cancer Incidence Rates Quintiles by Census Tracts, Delaware, 2015-2019

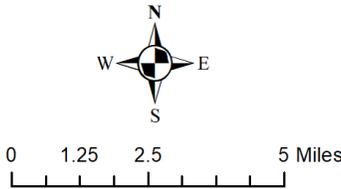
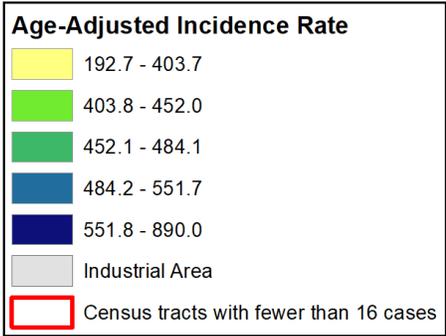
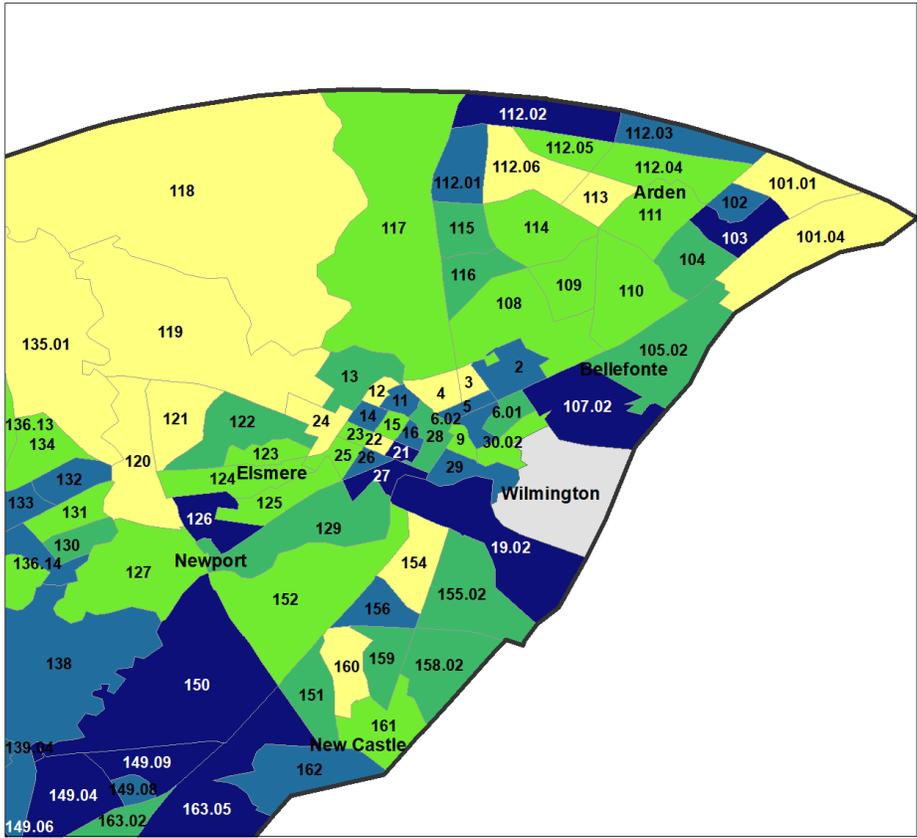
Figure D-1: Five-Year Age-Adjusted Cancer Incidence Rates by Census Tract, Delaware, 2015-2019



Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022  
Source: 2010 U.S. Census county and tract shapefiles: <https://www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.2010.html>

**Figure D-2: Five-Year Age-Adjusted Cancer Incidence Rates by Census Tract, Delaware, 2015-2019**

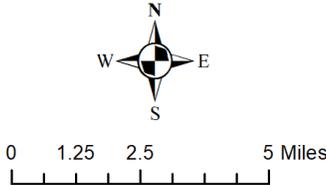
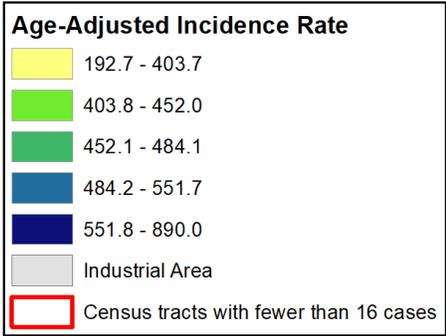
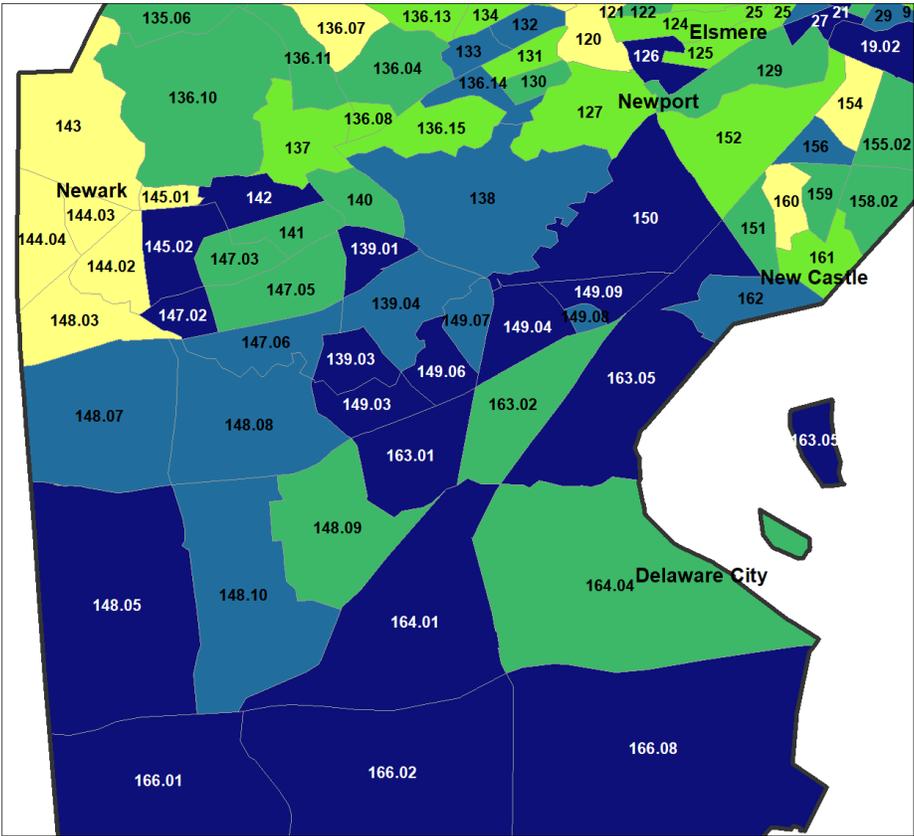
**Wilmington and Northeastern New Castle County**



Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.  
 Source: 2010 U.S. Census county and tract shapefiles: <https://www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.2010.html>

**Figure D-3: Five-Year Age-Adjusted Cancer Incidence Rates by Census Tract, Delaware, 2015-2019**

**Newark, New Castle, and Central New Castle County**

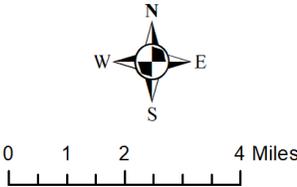
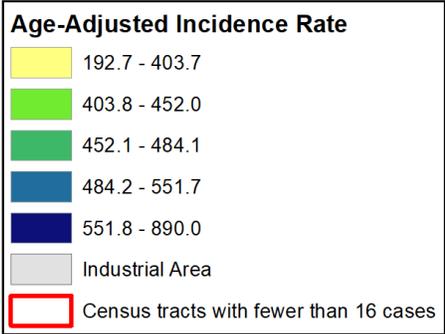
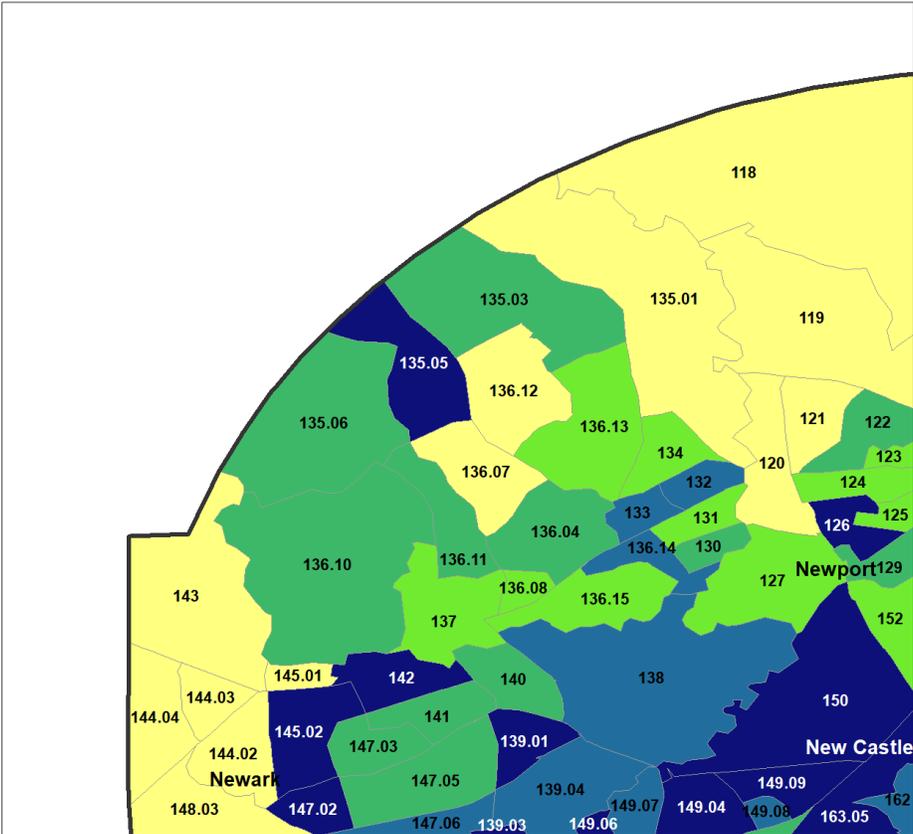


Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.

Source: 2010 U.S. Census county and tract shapefiles: <https://www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.2010.html>

**Figure D-4: Five-Year Age-Adjusted Cancer Incidence Rates by Census Tract, Delaware, 2015-2019**

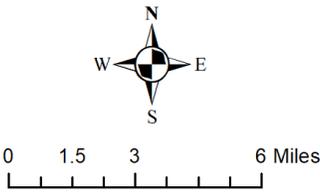
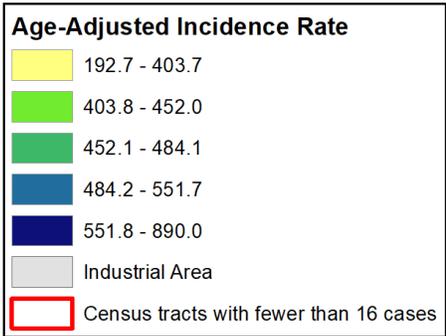
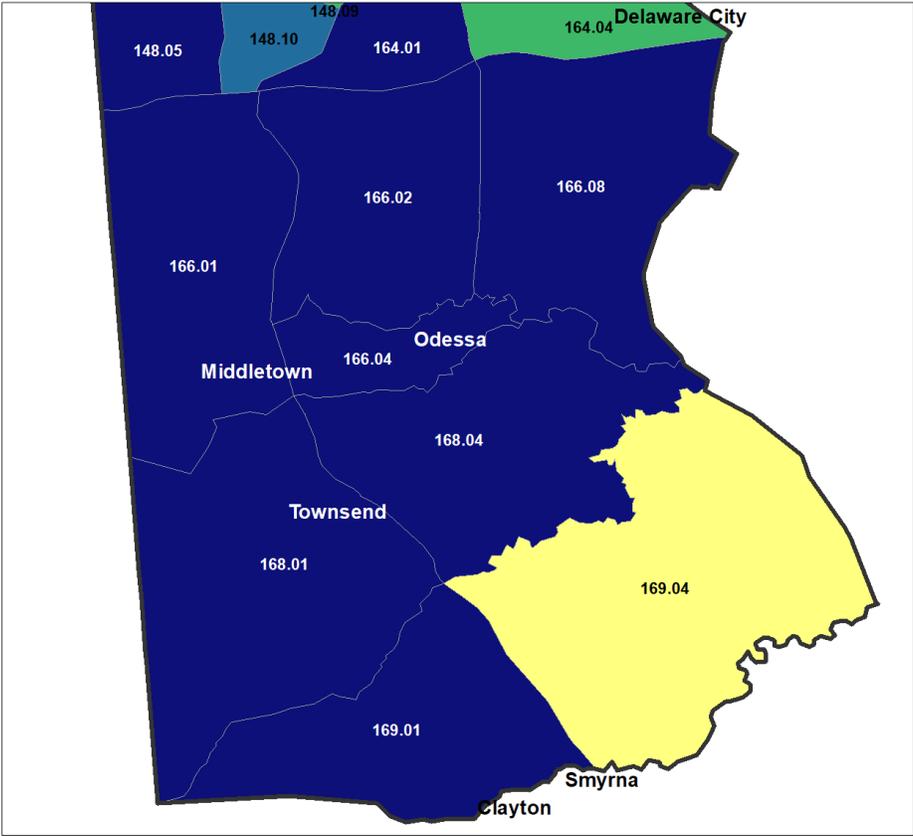
**Hockessin and Northwestern New Castle County**



Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.  
 Source: 2010 U.S. Census county and tract shapefiles: <https://www.census.gov/geographies/mapping-files/time-series/geo/cartographic-boundary-file.2010.html>

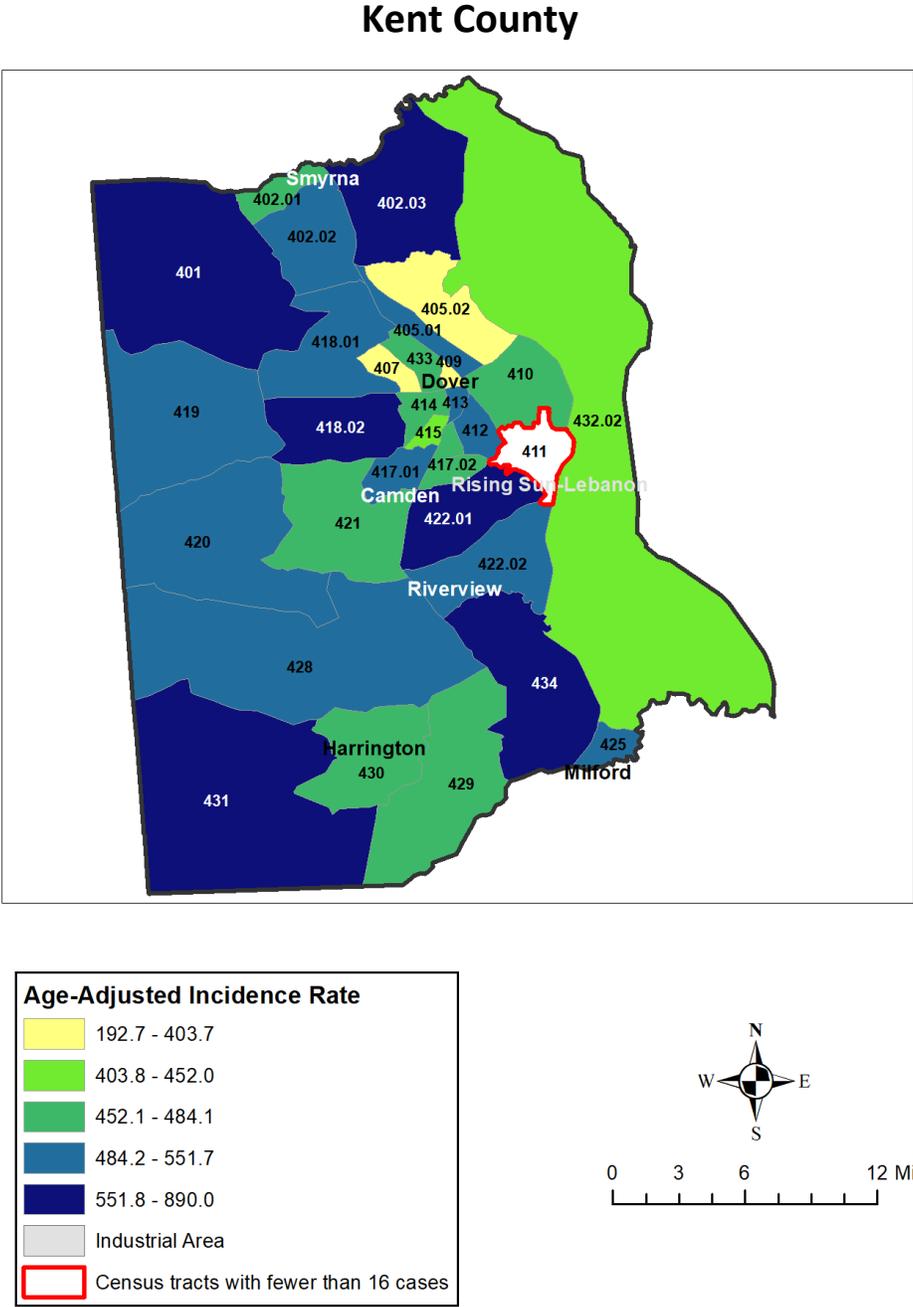
**Figure D-5: Five-Year Age-Adjusted Cancer Incidence Rates by Census Tract, Delaware, 2015-2019**

**Southern New Castle County**



Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.  
 Source: 2010 U.S. Census county and tract shapefiles: <https://www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.2010.html>

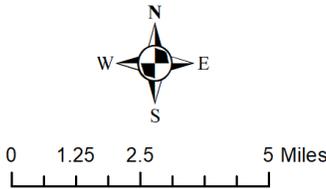
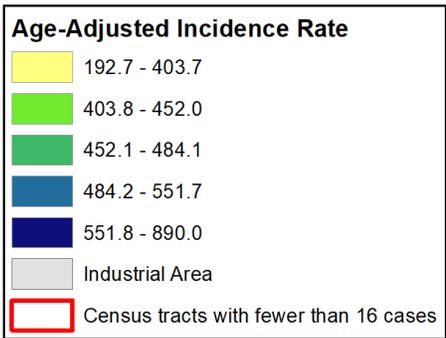
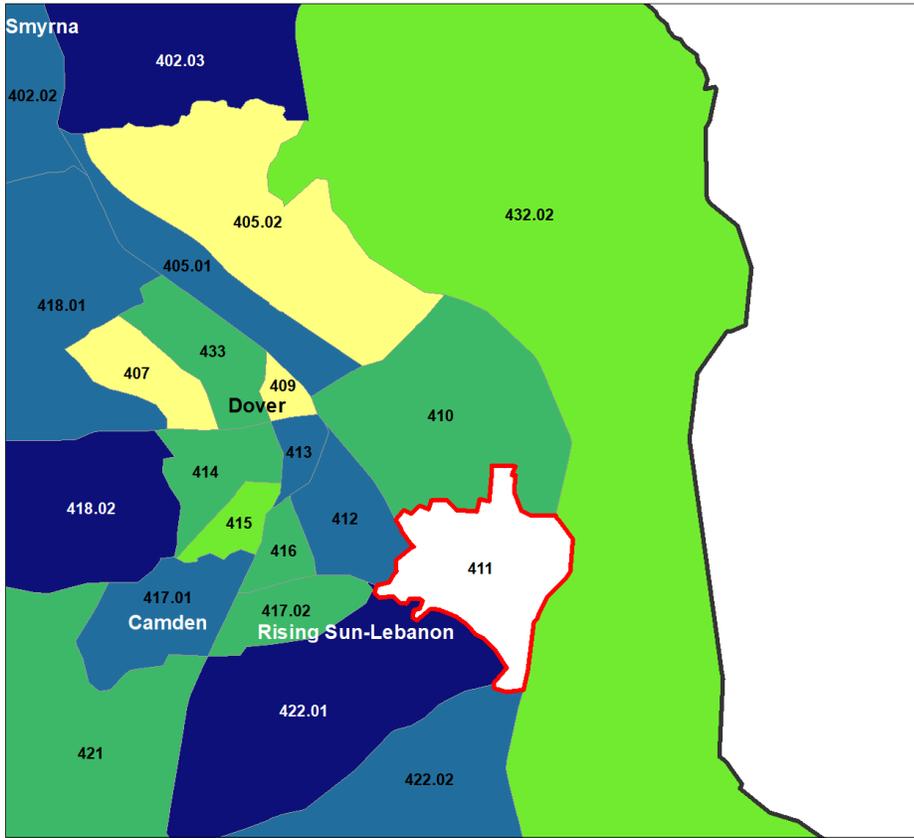
**Figure D-6: Five-Year Age-Adjusted Cancer Incidence Rates by Census Tract, Delaware, 2015-2019**



Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.  
 Source: 2010 U.S. Census county and tract shapefiles: <https://www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.2010.html>

**Figure D-7: Five-Year Age-Adjusted Cancer Incidence Rates by Census Tract, Delaware, 2015-2019**

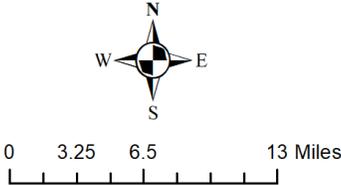
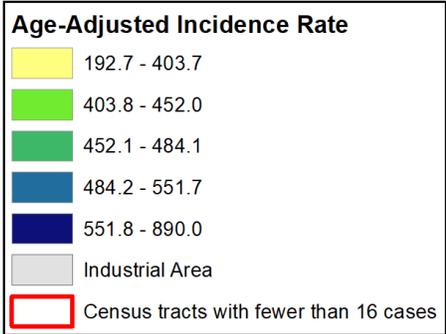
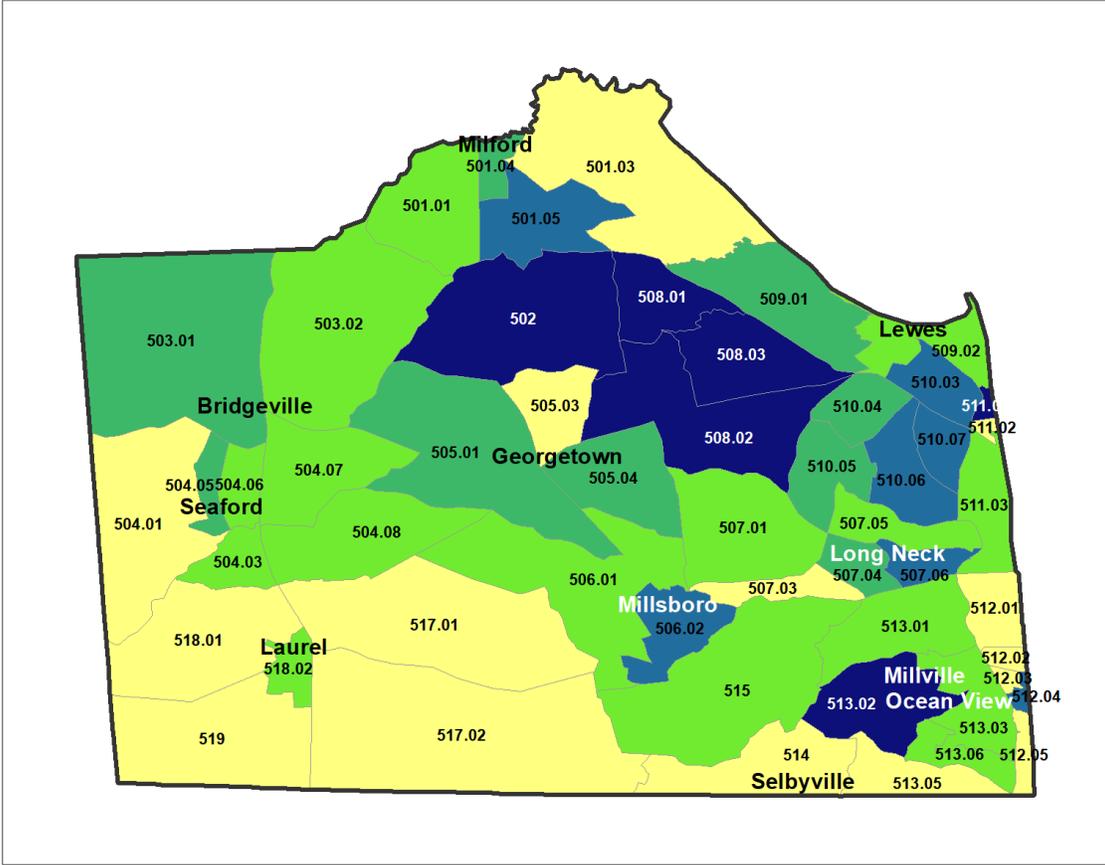
**Greater Dover**



Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.  
 Source: 2010 U.S. Census county and tract shapefiles: <https://www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.2010.html>

**Figure D-8: Five-Year Age-Adjusted Cancer Incidence Rates by Census Tract, Delaware, 2015-2019**

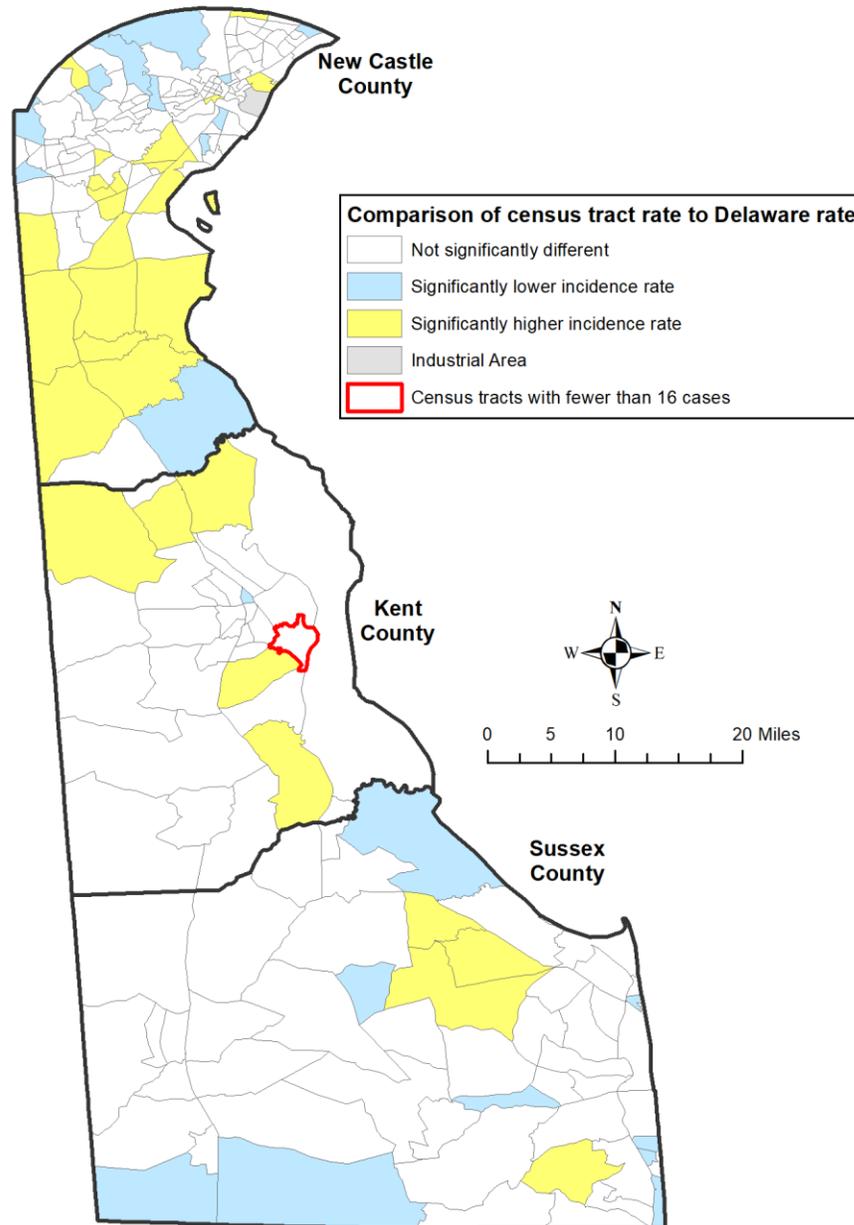
**Sussex County**



Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.  
 Source: 2010 U.S. Census county and tract shapefiles: <https://www.census.gov/geographies/mapping-files/time-series/geo/cartographic-boundary-file.2010.html>

## E. Maps of High/Low Cancer Incidence Rates by Census Tracts, Delaware, 2015-2019

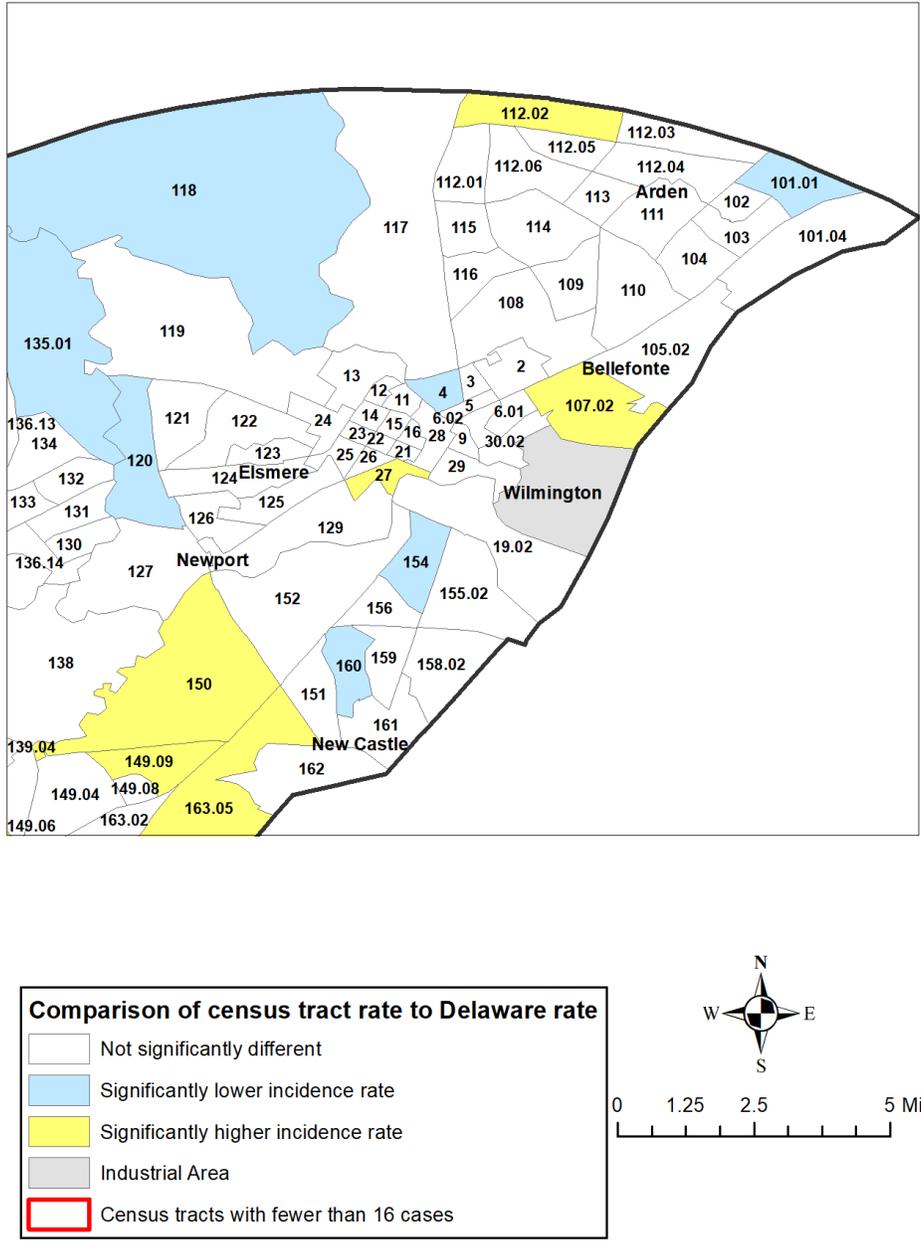
Figure E-1: Five-Year Age-Adjusted Cancer Incidence Rates by Census Tract, Delaware, 2015-2019



Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.  
Source: 2010 U.S. Census county and tract shapefiles: <https://www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.2010.html>

**Figure E-2: Five-Year Age-Adjusted Cancer Incidence Rates by Census Tract, Delaware, 2015-2019**

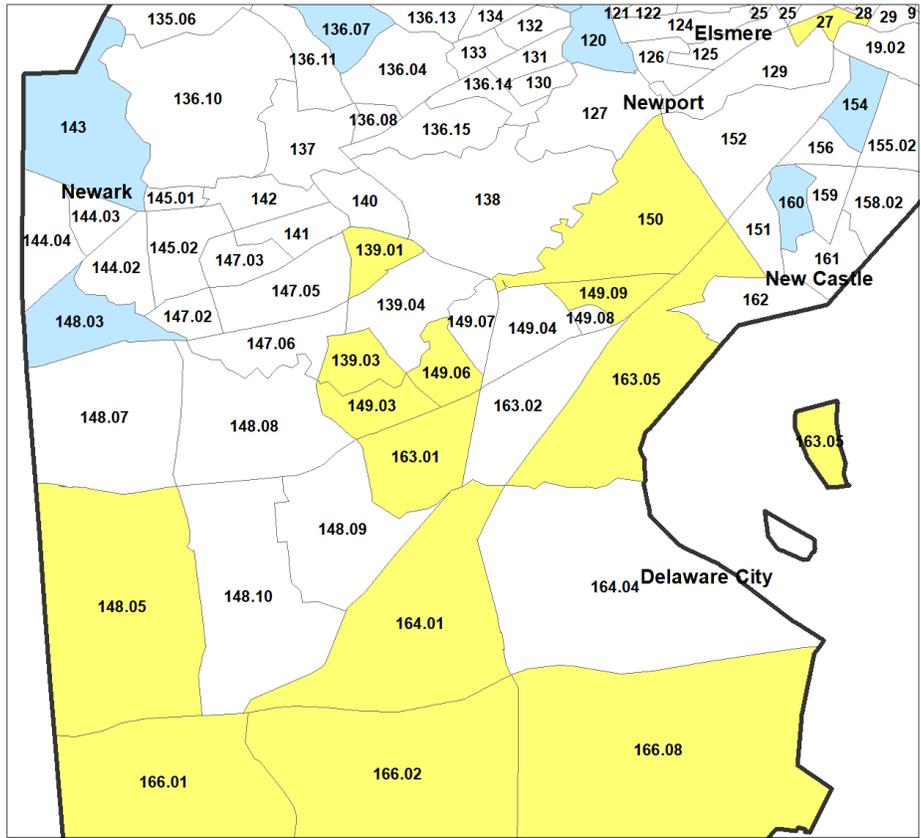
**Wilmington and Northeastern New Castle County**



Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.  
 Source: 2010 U.S. Census county and tract shapefiles: <https://www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.2010.html>

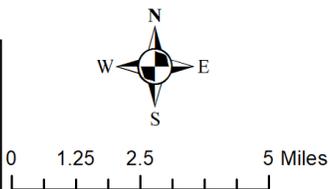
**Figure E-3: Five-Year Age-Adjusted Cancer Incidence Rates by Census Tract, Delaware, 2015-2019**

**Newark, New Castle, and Central New Castle County**



**Comparison of census tract rate to Delaware rate**

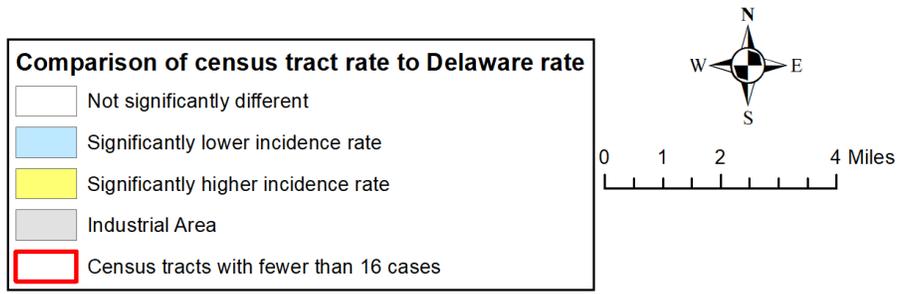
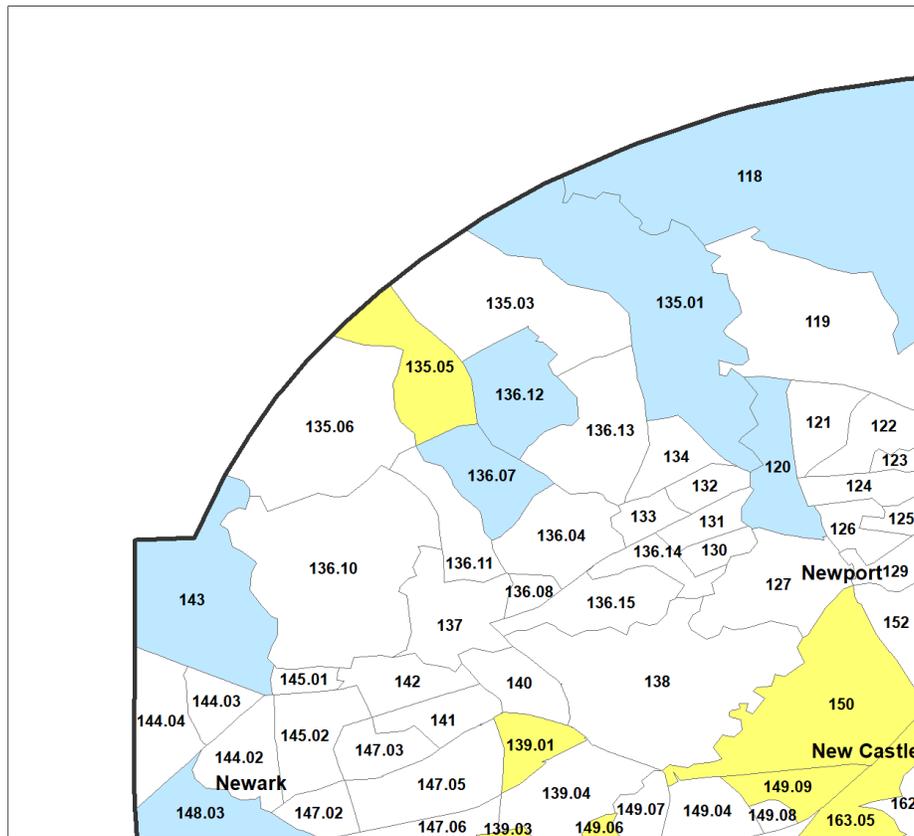
- Not significantly different
- Significantly lower incidence rate
- Significantly higher incidence rate
- Industrial Area
- Census tracts with fewer than 16 cases



Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.  
 Source: 2010 U.S. Census county and tract shapefiles: <https://www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.2010.html>

**Figure E-4: Five-Year Age-Adjusted Cancer Incidence Rates by Census Tract, Delaware, 2015-2019**

**Hockessin and Northwestern New Castle County**

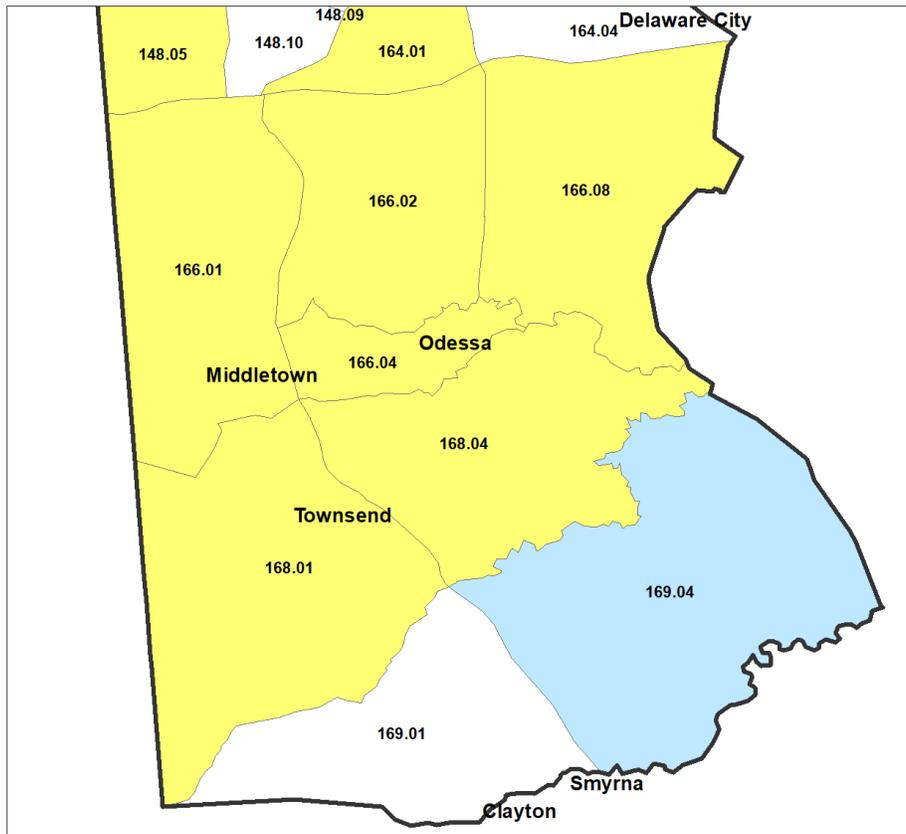


Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.

Source: 2010 U.S. Census county and tract shapefiles: <https://www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.2010.html>

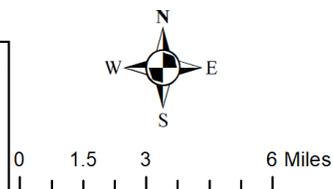
**Figure E-5: Five-Year Age-Adjusted Cancer Incidence Rates by Census Tract, Delaware, 2015-2019**

**Southern New Castle County**



**Comparison of census tract rate to Delaware rate**

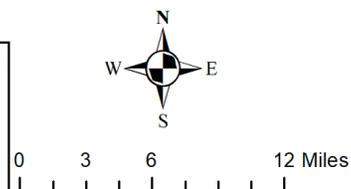
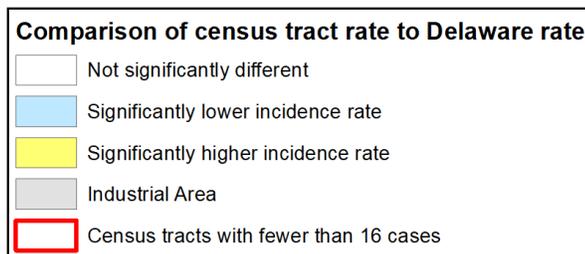
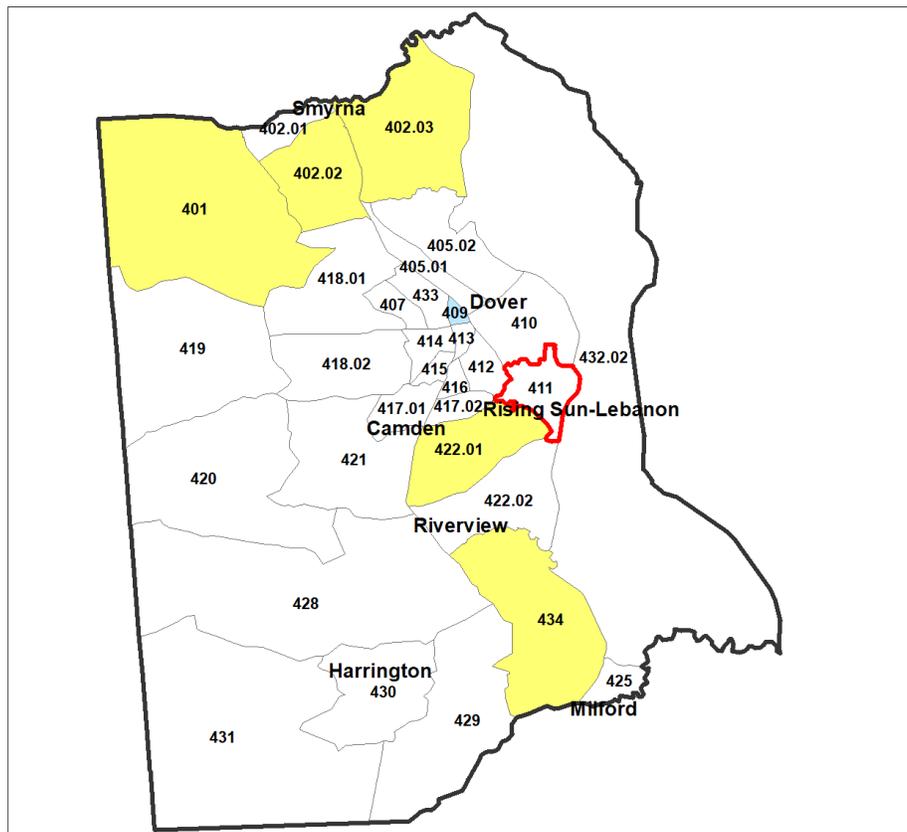
- Not significantly different
- Significantly lower incidence rate
- Significantly higher incidence rate
- Industrial Area
- Census tracts with fewer than 16 cases



Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.  
 Source: 2010 U.S. Census county and tract shapefiles: <https://www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.2010.html>

**Figure E-6: Five-Year Age-Adjusted Cancer Incidence Rates by Census Tract, Delaware, 2015-2019**

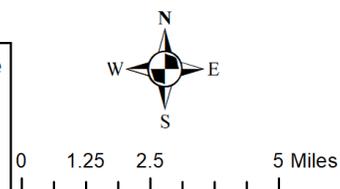
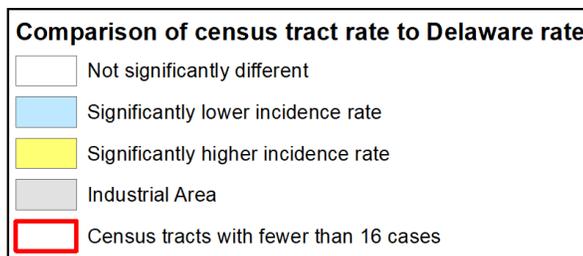
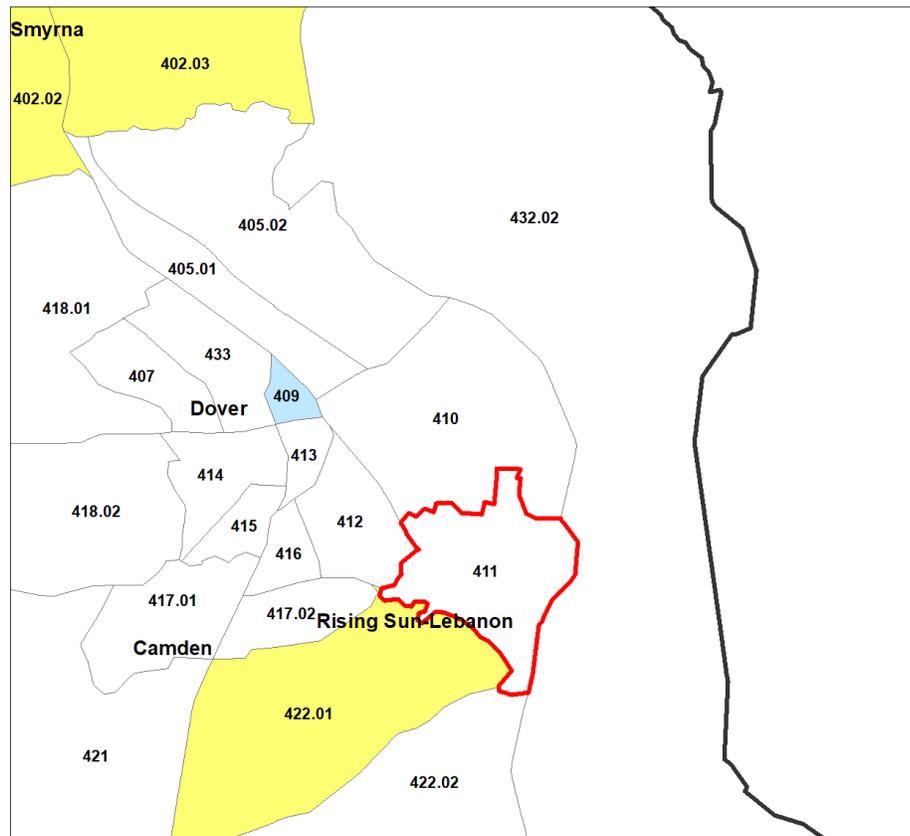
**Kent County**



Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.  
 Source: 2010 U.S. Census county and tract shapefiles: <https://www.census.gov/geographies/mapping-files/time-series/geo/cartoboundary-file.2010.html>

**Figure E-7: Five-Year Age-Adjusted Cancer Incidence Rates by Census Tract, Delaware, 2015-2019**

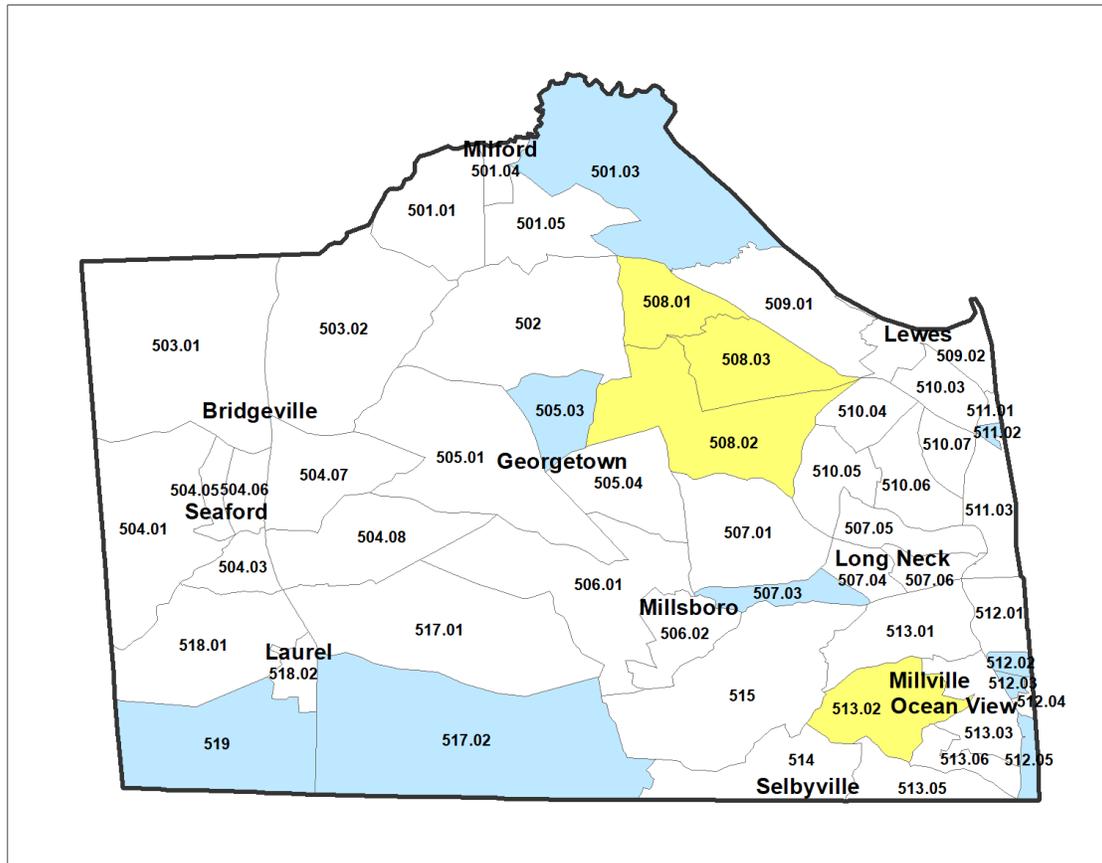
**Greater Dover**



Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.  
 Source: 2010 U.S. Census county and tract shapefiles: <https://www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.2010.html>

**Figure E-8: Five-Year Age-Adjusted Cancer Incidence Rates by Census Tract, Delaware, 2015-2019**

**Sussex County**



Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Cancer Registry, 2022.  
 Source: 2010 U.S. Census county and tract shapefiles: <https://www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.2010.html>

## Appendix: Title 16, Chapter 20 of the Delaware Code (76 Del. Laws., C 292 §1)<sup>11</sup>

---

CHAPTER 292 FORMERLY  
SENATE BILL NO. 235  
AS AMENDED BY  
SENATE AMENDMENT NO. 2  
AND  
HOUSE AMENDMENT NO. 1

AN ACT TO AMEND TITLE 16 OF THE DELAWARE CODE RELATING TO UNIFORM HEALTH DATA REPORTING.  
BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF DELAWARE:

WHEREAS, the State of Delaware traditionally has one of the highest rates of cancer incidence and mortality in the United States;

WHEREAS, identification of clusters of certain types of cancers in specific locations can help public health agencies develop intervention strategies leading to early detection when cancer is more easily cured;

WHEREAS, providing such data to medical researchers outside state government may assist in the process of both identifying cancer clusters and developing intervention strategies;

WHEREAS, the public good is served by allowing citizens to know of potential hazards in their communities so they can take actions to preserve their health;

WHEREAS, it is equally important to preserve the privacy and dignity of people afflicted with cancer, and

WHEREAS, the Department of Health and Social Services, Division of Public Health has opted to err on the side of cancer patient privacy by withholding even generic data on cancer clusters from other researchers and the public;

NOW THEREFORE:

BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF DELAWARE:

Section 1. Amend Chapter 20, Title 16 of the Delaware Code by renumbering §2005 through 2008 as §2006 through 2009, respectively.

Section 2. Amend Chapter 20, Title 16 of the Delaware Code by inserting a new §2005 to read as follows:

“§2005(a). Cancer incidence data.

Notwithstanding any provisions in this Title to the contrary, the agency shall make available as public records cancer incidence by census tract and by type of cancer. Such released data shall be assigned consensus tract geography from the most recent decennial census. If release of such information by census tract will explicitly or implicitly identify any individual, the agency may combine data among contiguous census tracts, but only insofar as is necessary to protect patient confidentiality.

(b) The agency shall create a detailed map of each county in Delaware that graphically illustrates the overall incidence of cancer in each census tract. The census tracts will be identified on the maps and shall be color-coded to designate the degree of cancer incidence in each tract. These maps shall be created within 90 days of the agency receiving the cancer incidence data.

(c) The agency shall post the maps created under the subsection above on their website in a format that can be easily accessed and read by the public.”

Section 3. Amend §1232(d) Title 16 of the Delaware Code by deleting the word “or” at the end of paragraph (6) and by inserting the word “or” at the end of paragraph 7 and by adding a new paragraph “(8)” to read as follows:

“(8) Pursuant to Title 16 §2005.”

Section 4. Amend Subchapter III of Chapter 12 of Title 16 of the Delaware Code by inserting a new section §1233 to read as follows:

“§1233. Regulations.

The Department of Health and Social Services shall enforce this subchapter and shall from time to time promulgate any additional forms and regulations that are necessary for this purpose.”

Approved July 3, 2008

---

<sup>11</sup> <https://delcode.delaware.gov/title16/c020/index.html>