



**Secondary Analysis of Census Tracts with Consistently-Elevated All-Site Cancer Rates in Delaware over Six Time Periods – from 2001–2005 through 2006–2010  
June 2014**

In February 2014, the Delaware Division of Public Health (DPH) released its annual *Cancer Incidence & Mortality (I&M) Report, 2006–2010*. As part of the report, and in accordance with Delaware legislation, DPH calculated 2006–2010 all-site cancer incidence rates for each of Delaware’s 214 census tracts.

All-site cancer incidence rates measure the overall cancer burden for an area over a five-year time period. Cancer incidence rates are calculated by dividing the total number of cancer cases in an area by the total number of people living in that area and are expressed as the average annual number of new cases diagnosed per year per 100,000 people. Cancer cases diagnosed among Delaware residents during the time period under study are obtained from the Delaware Cancer Registry. For each time period, the all-site cancer incidence rate for each census tract was compared to the all-site cancer incidence rate for Delaware as a whole.

DPH used standard statistical procedures to determine if the difference in incidence rates between a census tract and the state reached the threshold of statistical significance. If a census tract rate is significantly different from the state rate, the difference between the rates would be interpreted as “larger than would be expected by chance alone.” If a census tract rate is not significantly different from the state rate, it is interpreted as “no meaningful difference” between the two rates.

**Results for 2006–2010 show that:**

- In 11 of Delaware’s 214 census tracts, the overall cancer incidence rate was significantly higher than Delaware’s average 2006–2010 incidence rate (512.1 per 100,000).
- In 11 of Delaware’s 214 census tracts, the overall cancer incidence rate was significantly lower than Delaware’s average 2006–2010 incidence rate (512.1 per 100,000).

Previously, DPH had conducted analyses on cancer incidence by census tract for five time periods 2001–2005, 2002–2006, 2003–2007, 2004–2008 and 2005–2009. Analyses on the first three time periods originally covered 197 census tracts that had been established by the 2000 Census. As of the 2010 Census, however, Delaware was reorganized into 214 census tracts. It was then possible to recalculate population data for the individual years 2001 through 2009 by extrapolating between the Census 2000 and Census 2010 population estimates. This update of population data from the earlier time periods (2001–2005, 2002–2006, and 2003–2007) resulted in more accurate population data that were based on both the 2000 and 2010 Census. In Table 1 are results of analyses for the six time periods from 2001–2005 through 2006–2010 based on the 214 census tracts from the 2010 Census.

**Table 1. Numbers of Census Tracts with Significantly High and Low Cancer Incidence Rates Using Census 2010 Population Data, by Time Period**

CT 2010	2001–2005	2002–2006	2003–2007	2004–2008	2005–2009	2006–2010
Significantly high	15	10	10	11	9	11
Significantly low	13	12	13	17	16	11

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2014.

***Consistently-Elevated Census Tracts by Time Period***

Since cancer case and population data from all six time periods were all in Census 2010 format, it was possible to examine trends in all-site cancer incidence across all six time periods. To focus the secondary



analysis, patterns of elevated all-site cancer were examined by census tract across these time periods to identify areas of potential concern. Shown in Table 2 are census tracts that show a consistent pattern of having an all-site cancer incidence rate that is significantly elevated. Here ‘consistent’ is defined as a census tract that has a significantly elevated all-site cancer incidence rate in two or more adjacent time periods. There are three census tracts in Kent County, nine in New Castle County and five in Sussex County that meet this definition.

None of the census tracts had a significantly elevated incidence rate in all six time periods. There are three tracts that had a significantly elevated incidence rate over four consecutive time periods; two in New Castle County (6.02 and 139.01) and one in Sussex County (513.02). There are seven census tracts that had a significantly elevated incidence rate over three adjacent time periods. In all, there are 49 census tract/time period combinations that were assessed in this secondary analysis.

**Table 2. Consistently-Elevated\*\* Census Tracts by County and Time Period**

County	Census Tract	2001–2005	2002–2006	2003–2007	2004–2008	2005–2009	2006–2010
Kent	417.01					X	X
	421.00				X	X	X
	428.00		X		X	X	X
New Castle	6.02	X	X	X	X		
	139.01	X	X	X	X		
	149.06	X	X				
	156.00			X	X	X	
	159.00					X	X
	160.00	X	X	X			
	163.01					X	X
	169.01	X	X	X			
	169.04	X	X	X			
Sussex	501.05			X	X	X	
	506.02	X	X				
	513.02	X	X	X	X		
	513.05	X	X				
	517.01			X	X		X

\*\* – Two or more adjacent time periods with a significantly elevated incidence rate.

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2014.

**Secondary Analyses on Consistently-Elevated Census Tracts**

For the consistently-elevated census tracts, DPH analyzed cancer data for the relevant time periods indicated in Table 2. Therefore, these secondary analyses were limited to the following number of census tracts: nine in 2001–2005, 10 in 2002–2006, nine in 2003–2007, eight in 2004–2008, seven in 2005–2009 and six in 2006–2010. DPH anticipated that the secondary analyses would help determine unique patterns which could suggest an environmental, occupational or other unusual cause. Analyses were conducted on consistently-elevated census tract/time period combinations to examine incidence patterns with respect to four factors that would help identify any areas of concern. These factors are:

- sex distribution,
- age at diagnosis,
- types of cancers elevated and
- cancers with suspected environmental or chemical etiology.



### Sex Distribution of Elevated Cancer Incidence Rates

To determine if the elevated overall cancer rate in a census tract affected males and females differently, age-adjusted all-site cancer incidence rates were calculated separately by sex. Male- and female-specific rates for each census tract/time period were compared to those at the state level. The census tracts fell into one of the following four categories compared to Delaware as a whole:

- All-site cancer incidence rates were significantly elevated for both males and females.
- Only males in the census tract had a significantly elevated all-site cancer incidence rate.
- Only females in the census tract had a significantly elevated all-site cancer incidence rate.
- Neither sex had a significantly elevated overall cancer rate. Rather, minor (non-significant) elevations in the male and female cancer rates produced a significantly-elevated overall cancer rate for both sexes combined.

Results of the comparison of sex-specific rates for the 49 census tract/time period combinations are in Table 3. Five census tracts (three during 2004–2008, one in 2005–2009 and one in 2006–2010) had a significant excess of all-site cancer in both males and females. In the majority of the 49 census tract/time period combinations (22 or 44.9%), incidence was significantly elevated for males but not for females.

**Table 3. Number of Census Tracts with Significant Elevations in All-Site Cancer Incidence by Sex and Time Period**

Time Period	Rate Elevated for Both Males & Females	Rate Elevated for Males Only	Rate Elevated for Females Only	Rate not Elevated for Males or Females	TOTAL
2001–2005	0	7	2	0	9
2002–2006	0	6	1	3	10
2003–2007	0	3	3	3	9
2004–2008	3	2	1	2	8
2005–2009	1	1	1	4	7
2006–2010	1	3	1	1	6
<b>TOTAL</b>	<b>5</b>	<b>22</b>	<b>9</b>	<b>13</b>	<b>49</b>

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2014.

### Age at Diagnosis of Cases in Census Tracts with Elevated Rates

The median age of diagnosis of all cancer cases was 67 during 2001–2005; 66 for 2002–2006, 2003–2007 and 2004–2008; 65 for 2005–2009, and 66 for 2006–2010. In other words, during a specific time period, half of all Delawareans diagnosed with cancer were younger than the median age at diagnosis and half were older than the median age for that time period. The median age of cases of all cancers combined in each census tract was compared to the median age of all cases of cancer combined at the state level for the same time period. A significantly younger median age at diagnosis in the census tract could suggest a unique exposure, such as from the environment or an occupation. Statistical significance was determined by the “sign test.” Of the 49 census tract/time period combinations analyzed (Table 4):

- Seven census tract/time period combinations (14.3%) had a significantly lower median age at diagnosis than the state's median age at diagnosis.
- One census tract/time period combinations (2.0%) had a significantly higher median age at diagnosis than the state's median age at diagnosis.
- Forty-one census tract/time period combinations (83.7%) had a median age at diagnosis that did not differ significantly from the state's median age at diagnosis.



**Table 4. Comparison of Median Age at Diagnosis in Census Tract with Median Age for Delaware by Time Period**

Time Period	Delaware Median Age	Median Age Significantly Lower	Median Age not Significantly Different	Median Age Significantly Higher	TOTAL
2001–2005	67	1	7	1	9
2002–2006	66	1	9	0	10
2003–2007	66	1	8	0	9
2004–2008	66	3	5	0	8
2005–2009	65	0	7	0	7
2006–2010	66	1	5	0	6
<b>TOTAL</b>		<b>7</b>	<b>41</b>	<b>1</b>	<b>49</b>

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2014.

**Number of Significantly Elevated Cancer Types within Consistently-Elevated Census Tracts**

For each of the census tracts with a significantly elevated all-site cancer incidence rate, incidence rates were calculated for the 24 most-commonly diagnosed cancers. These analyses helped to determine which specific cancers, if any, contributed to the higher-than-expected overall cancer rate. Numbers of cancer types with elevated rates are shown in Table 5 by time period. Results for the 49 census tract/time period combinations are:

- Seven census tract/time period combinations (14.3%) did not have any cancer type that was elevated.
- Eleven census tract/time period combinations (22.4%) had **one** specific cancer type that was elevated.
- Twenty census tract/time period combinations (40.8%) had **two** specific cancer types that were elevated.
- Eight census tract/time period combinations (16.3%) had **three** specific cancer types that were elevated.
- One census tract/time period combination (2.0%) had **four** specific cancer types that were elevated.
- Two census tract/time period combinations (4.1%) had **five** specific cancer types that were elevated.

**Table 5. Number of Significantly Elevated Cancer Sites in Census Tracts by Time Period**

Time Period	0	1	2	3	4	5	TOTAL
2001–2005	1	2	4	2	0	0	9
2002–2006	1	3	5	1	0	0	10
2003–2007	2	0	3	3	0	1	9
2004–2008	1	1	3	1	1	1	8
2005–2009	1	2	4	0	0	0	7
2006–2010	1	3	1	1	0	0	6
<b>TOTAL</b>	<b>7</b>	<b>11</b>	<b>20</b>	<b>8</b>	<b>1</b>	<b>2</b>	<b>49</b>

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2014.

**Types of Cancers Elevated within Consistently-Elevated Census Tracts**

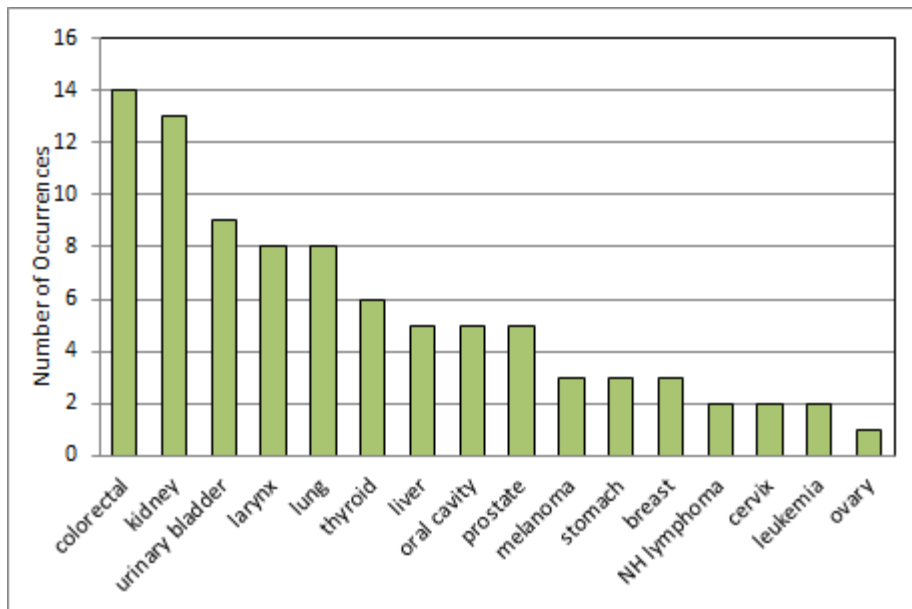
Cancer is a generic term used to describe more than 100 different diseases. Although 17 of Delaware’s 214 census tracts had significantly elevated all-site cancer incidence rates in two or more consecutive time periods, it is important to note that not every cancer type was elevated in any census tract. Rather, the higher-than-expected overall cancer incidence rates were usually attributable to a significant excess of one or more cancer types.

Figure 1 shows the specific cancer types that were most often elevated within the 17 consistently-elevated census tracts in the secondary analysis. Note that the frequencies in Figure 1 sum to more than 49 because,

as shown in Table 5, 30 of the 49 census tract/time period combinations had more than one cancer type that was significantly elevated.

The most frequently elevated cancer types are colorectal cancer and kidney cancer, which were elevated in 14 and 13 census tract/time period combinations, respectively. Colorectal cancer was elevated in five census tract/time period combinations for both sexes combined, in eight for males and one for females. Kidney cancer was elevated in two census tract/time period combinations for both sexes combined, in four for males and eight for females. The next four most frequently-occurring cancer types (with numbers of cases) are: cancers of the urinary bladder (nine), larynx (eight) and lung (eight). Thyroid cancer was elevated in six and cancers of the liver, oral cavity and prostate were each elevated in five census tract/time period combinations. Melanoma of the skin and cancers of the stomach and female breast were each elevated in three census tract/time period instances.

**Figure 1. Number of Occurrences of Elevated Cancer within Consistently-Elevated Census Tracts by Cancer Type: Delaware, all Time Periods Combined**



SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2014.

***Cancer sites with environmentally-suspected cause(s).***

The Delaware Cancer Consortium identified seven cancer types with substantiated environmental risk factors. These are:

- brain/central nervous system cancer
- Hodgkin lymphoma
- leukemia
- liver cancer
- non-Hodgkin lymphoma
- thyroid cancer
- urinary bladder cancer

It is important to note that while these seven malignancies have been known to be associated with environmental risk factors, they may also be related to modifiable risk factors. For example, in addition to chemical exposures in the manufacturing of dyes, rubber and leather, tobacco use is the primary risk factor for urinary bladder cancer.



Among the 49 occurrences of elevated census tract and time period, results related to these seven cancer types are (Table 6):

- One census tract/time period combination (2.0%) had a significantly elevated rate for **three** of the seven cancer types with substantiated environmental risk factors.
- Four census tracts (8.2%) had a significantly elevated rate for **two** of the seven cancer types with substantiated environmental risk factors.
- Thirteen census tract/time period combinations (26.5%) had a significantly elevated rate for **one** of the seven cancer types with substantiated environmental risk factors.
- Thirty-one census tract/time period combinations (63.3%) did not have a significantly elevated rate for any of the seven cancer types with substantiated environmental risk factors.

**Table 6. Census Tracts with Elevations in Environmentally-Linked (E-L) Cancer Types\*:  
Delaware, by Time Period**

Time Period	No E-L Sites	One E-L Site	Two E-L Sites	Three E-L Sites	TOTAL
2001–2005	7	1	1	0	9
2002–2006	7	3	0	0	10
2003–2007	5	2	1	1	9
2004–2008	4	2	2	0	8
2005–2009	4	3	0	0	7
2006–2010	4	2	0	0	6
<b>TOTAL</b>	<b>31</b>	<b>13</b>	<b>4</b>	<b>1</b>	<b>49</b>

\*\* – bladder, brain, Hodgkin lymphoma, leukemia, liver, non-Hodgkin lymphoma, thyroid.

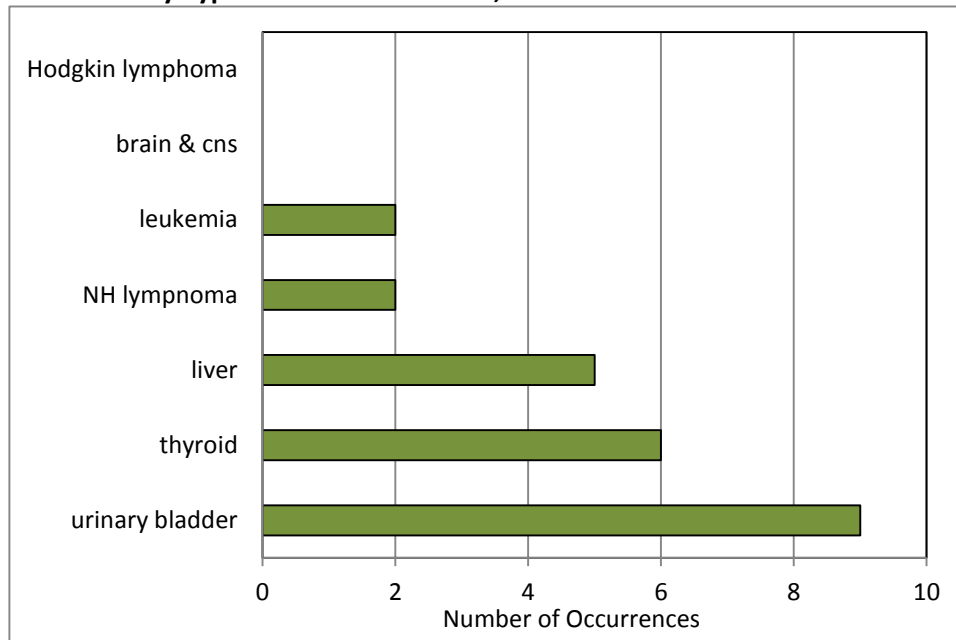
**SOURCE:** Delaware Cancer Registry, Delaware Division of Public Health, 2014.

Of the seven cancers with environmentally-suspected causes (Figure 2 and Table 6):

- Cancer of the urinary bladder was elevated nine times:
  - three times among males in 428.00 (04–08, 05–09 and 06–10),
  - twice among both sexes combined in 169.01 (03–07) and 421.00 (04–08),
  - three times in 506.02: among both males and females in 01–05 and among males in 02–06, and
  - among males in 513.05 (02–06).
- Liver cancer was elevated five times:
  - among females in: 139.01 (03–07 and 04–08) and 156.00 (03–07, 04–08 and 05–09).
- Thyroid cancer was elevated six times:
  - twice among females: 513.05 (01–05) and 149.06 (02–06),
  - twice among males in 421.00 (05–09 and 06–10) and
  - twice among females in 156.00 (03–07 and 04–08).
- Leukemia was elevated twice in 139.01:
  - for both sexes combined (03–07) and among females (04–08).
- Non-Hodgkin lymphoma was elevated twice:
  - in females in 156.00 (03–07) and
  - in males in 169.04 (03–07).
- None of the census tracts had an elevated incidence rate of Hodgkin lymphoma or brain cancer.



**Figure 2. Number of Occurrences of Environmentally-Suspected Cancers by Type of Cancer: Delaware, all Time Periods Combined**



**SOURCE:** Delaware Cancer Registry, Delaware Division of Public Health, 2014.

When a census tract has an elevated rate for a cancer with many risk factors, it is difficult to isolate a single causal factor. Rather, the elevated cancer rate is likely due to a mix of non-modifiable and modifiable risk factors. Adding to the complexity, the interaction of several risk factors may increase a person’s cancer risk more than the sum of the individual risk factors. For example, the American Cancer Society (ACS) cites 19 substantiated risk factors for breast cancer alone: 12 of these risk factors are non-modifiable (e.g., age, family history); the remaining seven are modifiable (e.g., lack of exercise, being overweight/obese). The impact of another seven potential breast cancer risk factors is still under scientific review.

While some of the elevated cancer types in these consistently-elevated census tracts were those with environmental risk factors, some other cancer types without these risk factors were also higher compared to the state average. Some of these excesses may simply be statistical aberrations resulting from the very small number of cancer cases in these communities, or, especially when combined with unusual sex and age distributions, there may be underlying occupational or environmental causes. Further investigation of these concerns cannot be conducted using only data routinely collected by DPH.

In Table 7 is the summary of analyses of the consistently-elevated census tracts. The table, which includes cancer types that are elevated and gender(s) for which these elevations occur, allows comparison of the elevated cancer types in for each census tract across two or more of the six time periods: 2001–2005, 2002–2006, 2003–2007, 2004–2008, 2005–2009 and 2006–2010.

Table 8 lists known or strongly suspected risk factors associated with each cancer type that was elevated in this report.

The Appendix provides details of the analysis results for each of the consistently-elevated census tracts by the time periods in which their all-site cancer rate was elevated. Included are areas of concern for cancer types that are listed.



**Table 7. Types of Cancer<sup>1</sup> Elevated in Census Tracts with Consistently-Elevated All Site Cancer Incidence: Delaware, by Time Period**

County	Census Tract	2001–2005	2002–2006	2003–2007	2004–2008	2005–2009	2006–2010
Kent	417.01					Prostate – M	None <sup>3</sup>
Kent	421.00				Kidney – F <i>Urinary Bladder–All</i>	Kidney – F <i>Thyroid – M</i>	<i>Thyroid – M</i>
Kent	428.00		Oral Cavity – M		Kidney – All <i>Urinary Bladder–M</i>	Larynx – All <i>Urinary Bladder–M</i>	Kidney – F Larynx – All <i>Urinary Bladder–M</i>
New Castle	6.02	Colorectal – M Larynx – M Prostate – M	Larynx – M Lung – All Prostate – M	Colorectal – M Larynx – M Prostate – M	Colorectal – M Larynx – M Lung – All Prostate – M		
New Castle	139.01	Colorectal– M Ovary – F	Colorectal – M	Colorectal – All <i>Leukemia – All</i> <i>Liver – F</i>	<i>Leukemia – F</i> <i>Liver – F</i>		
New Castle	149.06	Cervix – F	Cervix – F <i>Thyroid – F</i>				
New Castle	156.00			Kidney – F <i>Liver – F</i> Lung – M <i>NH Lymphoma–F</i> <i>Thyroid – F</i>	Kidney – F <i>Liver – F</i> <i>Thyroid – F</i>	Kidney – All <i>Liver – F</i>	
New Castle	159.00					Kidney – M	Kidney – M
New Castle	160.00	None <sup>3</sup>	None <sup>3</sup>	None <sup>3</sup>			
New Castle	163.01					None <sup>3</sup>	Oral Cavity – All
New Castle	169.01	Colorectal – All Stomach – M	Colorectal – M Stomach – M	<i>Urinary Bladder–All</i> Kidney – F			
New Castle	169.04	Colorectal – All Kidney – M	Colorectal – All Larynx – M	Larynx – M <i>NH Lymphoma–M</i>			
Sussex	501.05			Breast – F Oral Cavity – F	Breast – F	Breast – F Stomach – M	
Sussex	506.02	<i>Urinary Bladder–M</i> <i>Urinary Bladder–F</i> Lung – M	<i>Urinary Bladder–M</i> Lung – M				
Sussex	513.02	Colorectal – M Lung – All	Oral Cavity – All	None <sup>3</sup>	None <sup>3</sup>		
Sussex	513.05	<i>Thyroid – F</i>	Lung – M <i>Urinary Bladder–M</i>				
Sussex	517.01			Colorectal – All Kidney – M Melanoma – All	Colorectal – M Colorectal – F Kidney – M Lung – M Melanoma – F		Melanoma – F Oral Cavity – All

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2014.

<sup>1</sup> A cancer type in bold and italics represents one of seven cancer types considered by the Delaware Cancer Consortium to have environmentally-substantiated risk factors.

<sup>3</sup> “None” – No specific cancer type was significantly elevated.



### Types of Cancer<sup>4</sup> Elevated in Census Tracts with Consistently-Elevated All-Site Cancer Incidence: Delaware, by Time Period and County

Census Tract	NEW CASTLE COUNTY								
	6.02	139.01	149.06	156.00	159.00	160.00	163.01	169.01	169.04
2001–2005	Colorectal – M Larynx – M Prostate – M	Colorectal– M Ovary – F	Cervix – F			None <sup>5</sup>		Colorectal – All Stomach – M	Colorectal – All Kidney – M
2002–2006	Larynx – M Lung – All Prostate – M	Colorectal – M	Cervix – F <b>Thyroid – F</b>			None <sup>5</sup>		Colorectal – M Stomach – M	Colorectal – All Larynx – M
2003–2007	Colorectal – M Larynx – M Prostate – M	Colorectal – All <b>Leukemia – All</b> <b>Liver – F</b>		Kidney – F <b>Liver – F</b> Lung – M <b>NH Lymphoma–F</b> <b>Thyroid –F</b>		None <sup>5</sup>		<b>Urinary Bladder–All</b> Kidney – F	Larynx – M <b>NH Lymphoma–M</b>
2004–2008	Colorectal – M Larynx – M Lung – All Prostate – M	<b>Leukemia – F</b> <b>Liver – F</b>		Kidney – F <b>Liver – F</b> <b>Thyroid –F</b>					
2005–2009				Kidney – All <b>Liver – F</b>	Kidney – M		None <sup>5</sup>		
2006–2010					Kidney – M		Oral Cavity – All		
Census Tract	KENT COUNTY				SUSSEX COUNTY				
	417.01	421.00	428.00	501.05	506.02	513.02	513.05	517.01	
2001–2005					<b>Urinary Bladder–M</b> <b>Urinary Bladder–F</b> Lung – M	Colorectal – M Lung – All	<b>Thyroid – F</b>		
2002–2006			Oral Cavity – M		<b>Urinary Bladder–M</b> Lung – M	Oral Cavity – All	<b>Urinary Bladder–M</b> Lung – M		
2003–2007				Breast – F Oral Cavity – F		None <sup>5</sup>		Colorectal – All Kidney – M Melanoma – All	
2004–2008		Kidney – F <b>Urinary Bladder–All</b>	Kidney – All <b>Urinary Bladder–M</b>	Breast – F		None <sup>5</sup>		Colorectal – M Colorectal – F Kidney – M Lung – M Melanoma – F	
2005–2009	Prostate - M	Kidney – F <b>Thyroid – M</b>	Larynx – All <b>Urinary Bladder–M</b>	Breast – F Stomach – M					
2006–2010	None <sup>5</sup>	<b>Thyroid – M</b>	Kidney – F Larynx – All <b>Urinary Bladder–M</b>					Melanoma – F Oral Cavity – All	

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2014.

<sup>4</sup> A cancer type in bold and italics represents one of the seven cancer types considered by the Delaware Cancer Consortium to have environmentally-substantiated risk factors.

<sup>5</sup> “None” – No specific cancer type was significantly elevated.

**Table 8. Known Risk Factors by Cancer Type<sup>6</sup>**

Cancer Type	Known or Strongly Suspected Risk Factors
<b>breast</b>	age – increasing, alcohol abuse, benign breast conditions, diet high in fat, early menarche, family history, genetic mutations, hormone therapy, recent birth control pills, smoking secondhand smoke
<b>cervix</b>	Chlamydia infection, diet low in fruits and vegetables, ethnicity - Hispanic, family history (mother or sister with cervical cancer), human immunodeficiency virus (HIV), human papilloma virus (HPV), long-term use of oral contraceptives, race - African American or American Indian, sexual practices (intercourse at a young age, multiple partners, partner who has had many partners, intercourse with uncircumcised males), smoking cigarettes
<b>colon/rectum</b>	age - 50 and older, alcohol abuse, being obese or overweight, diabetes (type 2), diet high in fat, family history, history of bowel disease, physical inactivity, smoking (cigarettes, cigars or pipes)
<b>kidney</b>	advanced kidney disease with long-term dialysis,, being obese or overweight, certain medications, family history, gender - male, hypertension, smoking cigars or cigarettes, workplace exposures
<b>larynx</b>	alcohol abuse, combined alcohol and tobacco use, diet , gastroesophageal reflux disease, human papilloma virus (HPV), gender – male, genetic syndromes, poor nutrition, secondhand smoke, smoking (cigarettes, cigars or pipes),workplace exposure
<b>leukemia</b>	alcohol abuse, blood disorders, chemical exposure, chemotherapy, diet, genetic conditions, ionizing radiation, smoking cigarettes, ultraviolet light
<b>liver</b>	alcohol abuse, arsenic in drinking water, Asian American or Pacific Islander race, being obese or overweight, cirrhosis of liver, diabetes (type 2), genetics, infection with hepatitis B or hepatitis C virus, steroids, viral hepatitis, workplace exposures
<b>lung</b>	asbestos, diet low in fruits and vegetables, family history, radiation therapy, radon exposure, secondhand smoke, smoking (cigarettes, cigars or pipes), tuberculosis, workplace exposures
<b>melanoma</b>	age - increasing, excessive ultraviolet light, fair skin, family history, having many moles, history of sunburn before age 20, race - Caucasian, weakened immune system`
<b>non–Hodgkin lymphoma</b>	autoimmune diseases, certain infections, chemotherapy (alkylating agents), diet high in fat and meats, exposure to benzene, race – Caucasian, radiation, weakened immune system
<b>oral cavity</b>	alcohol abuse, combination of alcohol abuse and heavy smoking, diet low in fruits and vegetables, gender – male, genetic syndromes, human papilloma virus (HPV), poor nutrition, smoking (cigarettes, cigars or pipes), snuff or chewing tobacco, ultraviolet light (lip cancer)
<b>ovary</b>	age - increasing, being obese or overweight, early start to menses or late menopause, estrogen therapy after menopause, family history (ovarian, breast or colorectal cancer), inherited mutation in BRCA1 or BRCA2 genes, never giving birth, personal history of breast cancer
<b>prostate</b>	age - 50 and older, being obese or overweight, diet high in red meat and high-fat dairy, ethnicity - non-Hispanic, family history, gene mutations, inherited DNA changes, race - African American, workplace exposures
<b>stomach</b>	age - 50 and older, being obese or overweight, diet high in smoked foods and salted fish and meats, diet low in fruits and vegetables, family history, gender – male, infections, race - African American or Pacific Islander, residence (China, Japan, Eastern Europe, South and Central America), smoking (cigarettes, cigars or pipes)
<b>thyroid</b>	age - 40–50 in women and 60 and older in men, diet low in iodine, environmental and medical radiation, gender - female, genetic conditions, iodine deficiency, race - Caucasian
<b>urinary bladder</b>	age - 55 and older, arsenic in drinking water, chemotherapy (alkylating agents), ethnicity - Hispanic, family history, gender - male, genetic syndromes, race - Caucasian, radiation therapy to bladder, smoking cigarettes, workplace exposures

**SOURCES:** American Cancer Society ([www.cancer.org](http://www.cancer.org)) and National Cancer Institute ([www.cancer.gov](http://www.cancer.gov)).

<sup>6</sup> Listed in alphabetical order, not by priority or magnitude of impact.

**APPENDIX – Characteristics of Census Tracts with Consistently-Elevated All-Site Cancer Rates, by Time Period**

Time Period	Census Tract	Ave. # Cases per Year	All-Site Age-Adjusted Cancer Incidence Rates per 100,000 <sup>7</sup>			Significantly Elevated Cancer Site(s) & Sex <sup>8</sup>	Median Age at Diagnosis <sup>9</sup>		Areas of Concern
				All	Male		Female	DE	
2001–05	6.02	24		All	Male	Female	67	63	Sex distribution Screening Prevention
			DE	511.4	608.4	442.2			
			CT	<b>711.1</b>	<b>1047.4</b>	500.0			
2001–05	139.01	17		All	Male	Female	67	63	Sex distribution Screening Prevention
			DE	511.4	608.4	442.2			
			CT	<b>673.8</b>	766.4	<b>633.4</b>			
2001–05	149.06	15		All	Male	Female	67	<b>57</b>	Sex distribution Age distribution Screening Prevention
			DE	511.4	608.4	442.2			
			CT	<b>663.8</b>	551.5	<b>780.5</b>			
2001–05	160.00	19		All	Male	Female	67	64.5	Sex distribution
			DE	511.4	608.4	442.2			
			CT	<b>684.5</b>	<b>830.6</b>	550.2			
2001–05	169.01	16		All	Male	Female	67	65.5	Sex distribution Screening Prevention
			DE	511.4	608.4	442.2			
			CT	<b>718.0</b>	<b>909.8</b>	555.5			
2001–05	169.04	14		All	Male	Female	67	66	Sex distribution Screening Prevention
			DE	511.4	608.4	442.2			
			CT	<b>713.5</b>	<b>938.5</b>	504.5			
2001–05	506.02	39		All	Male	Female	67	69	Sex distribution Cancer type Prevention Screening
			DE	511.4	608.4	442.2			
			CT	<b>654.7</b>	<b>882.9</b>	518.2			
2001–05	513.02	23		All	Male	Female	67	69	Sex distribution Prevention Screening
			DE	511.4	608.4	442.2			
			CT	<b>679.4</b>	<b>818.8</b>	591.5			
2001–05	513.05	30		All	Male	Female	67	71	Sex distribution Cancer type
			DE	511.4	608.4	442.2			
			CT	<b>661.9</b>	<b>804.9</b>	542.7			
2002–06	6.02	24		All	Male	Female	66	68	Sex distribution Prevention Screening
			DE	512.00	505.0	518.6			
			CT	<b>740.3</b>	<b>1250.4</b>	423.4			

**SOURCE:** Delaware Cancer Registry, Delaware Division of Public Health, 2014.

<sup>7</sup> Age-adjusted incidence rate in bold and italics indicates that the census tract rate is significantly elevated compared to the state rate.

<sup>8</sup> A cancer type in bold and italics represents one of the seven cancer types considered by the Delaware Cancer Consortium to have environmentally-substantiated risk factors.

<sup>9</sup> A median age at diagnosis in bold and italics indicates that the census tract's median age at diagnosis is significantly lower than that of the state.

<sup>10</sup> "None" – No specific cancer type was significantly elevated.

Time Period	Census Tract	Ave. # Cases per Year	All-Site Age-Adjusted Cancer Incidence Rates per 100,000 <sup>7</sup>			Significantly Elevated Cancer Site(s) & Sex <sup>8</sup>	Median Age at Diagnosis <sup>9</sup>		Areas of Concern
				All	Male		Female	DE	
2002-06	139.01	18		All	Male	Female	66	63.5	Screening Prevention
			DE	512.00	505.0	518.6			
			CT	<b>696.7</b>	824.4	600.1			
2002-06	149.06	16		All	Male	Female	66	<b>57</b>	Sex distribution Age distribution Screening Prevention Cancer type
			DE	512.00	505.0	518.6			
			CT	<b>713.5</b>	532.8	<b>881.3</b>			
2002-06	160.00	20		All	Male	Female	66	65	Prevention
			DE	512.00	505.0	518.6			
			CT	<b>680.9</b>	774.7	613.0			
2002-06	169.01	16		All	Male	Female	66	69	Sex distribution Screening Prevention
			DE	512.00	505.0	518.6			
			CT	<b>659.7</b>	<b>886.9</b>	450.5			
2002-06	169.04	15		All	Male	Female	66	63	Sex distribution Screening Prevention
			DE	512.00	505.0	518.6			
			CT	<b>678.4</b>	<b>857.0</b>	459.8			
2002-06	428.00	39		All	Male	Female	66	63	Sex distribution Prevention
			DE	512.00	505.0	518.6			
			CT	<b>629.3</b>	<b>786.7</b>	498.4			
2002-06	506.02	39		All	Male	Female	66	70	Sex distribution Cancer type Prevention
			DE	512.00	505.0	518.6			
			CT	<b>633.9</b>	<b>780.7</b>	550.1			
2002-06	513.02	23		All	Male	Female	66	68	Screening Prevention
			DE	512.00	505.0	518.6			
			CT	<b>653.0</b>	784.6	563.3			
2002-06	513.05	29		All	Male	Female	66	71.5	Sex distribution Cancer type Prevention
			DE	512.00	505.0	518.6			
			CT	<b>627.6</b>	<b>798.7</b>	473.9			
2003-07	6.02	22		All	Male	Female	66	68	Sex distribution Screening Prevention
			DE	512.5	609.0	441.7			
			CT	<b>675.5</b>	<b>1073.6</b>	431.1			

**SOURCE:** Delaware Cancer Registry, Delaware Division of Public Health, 2014.

<sup>7</sup> Age-adjusted incidence rate in bold and italics indicates that the census tract rate is significantly elevated compared to the state rate.

<sup>8</sup> A cancer type in bold and italics represents one of the seven cancer types considered by the Delaware Cancer Consortium to have environmentally-substantiated risk factors.

<sup>9</sup> A median age at diagnosis in bold and italics indicates that the census tract's median age at diagnosis is significantly lower than that of the state.

<sup>10</sup> "None" – No specific cancer type was significantly elevated.

Time Period	Census Tract	Ave. # Cases per Year	All-Site Age-Adjusted Cancer Incidence Rates per 100,000 <sup>7</sup>			Significantly Elevated Cancer Site(s) & Sex <sup>8</sup>	Median Age at Diagnosis <sup>9</sup>		Areas of Concern	
				All	Male		Female	DE		CT
2003–07	139.01	18		All	Male	Female	Colorectal – All <b><i>Leukemia – All</i></b> <b><i>Liver – F</i></b>	66	63	Screening Prevention Cancer type
			DE	512.5	609.0	441.7				
			CT	<b><i>662.5</i></b>	776.6	575.9				
2003–07	156.00	20		All	Male	Female	Kidney – F <b><i>Liver – F</i></b> Lung – M	66	62	Sex distribution Cancer type Prevention
			DE	512.5	609.0	441.7				
			CT	<b><i>708.4</i></b>	751.0	<b><i>672.0</i></b>				
2003–07	160.00	19		All	Male	Female	None <sup>10</sup>	66	65	
			DE	512.5	609.0	441.7				
			CT	<b><i>670.5</i></b>	683.6	<b><i>662.0</i></b>				
2003–07	169.01	16		All	Male	Female	Kidney – F <b><i>Urinary Bladder – All</i></b>	66	69.5	Sex distribution Cancer type Prevention
			DE	512.5	609.0	441.7				
			CT	<b><i>658.1</i></b>	<b><i>910.6</i></b>	411.1				
2003–07	169.04	16		All	Male	Female	Larynx – M <b><i>NH Lymphoma–M</i></b>	66	62	Sex distribution Cancer type Prevention
			DE	512.5	609.0	441.7				
			CT	<b><i>674.5</i></b>	<b><i>860.9</i></b>	480.0				
2003–07	501.05	30		All	Male	Female	Breast – F Oral Cavity – F	66	67	Sex distribution Screening Prevention
			DE	512.5	609.0	441.7				
			CT	<b><i>641.2</i></b>	673.5	<b><i>629.0</i></b>				
2003–07	513.02	23		All	Male	Female	None <sup>10</sup>	66	68	
			DE	512.5	609.0	441.7				
			CT	<b><i>642.4</i></b>	748.5	567.9				
2003–07	517.01	26		All	Male	Female	Colorectal – All Kidney – M Melanoma – All	66	67	Screening Prevention
			DE	512.5	609.0	441.7				
			CT	<b><i>635.0</i></b>	729.5	563.8				
2004–08	6.02	21		All	Male	Female	Colorectal – M Larynx – M Lung – All Prostate – M	66	68	Sex distribution Screening Prevention
			DE	515.1	611.4	443.3				
			CT	<b><i>683.4</i></b>	<b><i>1070.7</i></b>	441.9				
2004–08	139.01	18		All	Male	Female	<b><i>Leukemia – F</i></b> <b><i>Liver – F</i></b>	66	62	Cancer type Prevention
			DE	515.1	611.4	443.3				
			CT	<b><i>668.6</i></b>	755.3	596.4				

**SOURCE:** Delaware Cancer Registry, Delaware Division of Public Health, 2014.

<sup>7</sup> Age-adjusted incidence rate in bold and italics indicates that the census tract rate is significantly elevated compared to the state rate.

<sup>8</sup> A cancer type in bold and italics represents one of the seven cancer types considered by the Delaware Cancer Consortium to have environmentally-substantiated risk factors.

<sup>9</sup> A median age at diagnosis in bold and italics indicates that the census tract's median age at diagnosis is significantly lower than that of the state.

<sup>10</sup> "None" – No specific cancer type was significantly elevated.

Time Period	Census Tract	Ave. # Cases per Year	All-Site Age-Adjusted Cancer Incidence Rates per 100,000 <sup>7</sup>			Significantly Elevated Cancer Site(s) & Sex <sup>8</sup>	Median Age at Diagnosis <sup>9</sup>		Areas of Concern	
				All	Male		Female	DE		CT
2004-08	156.00	19		All	Male	Female	Kidney – F <b><i>Liver – F</i></b> <b><i>Thyroid – F</i></b>	66	63	Sex distribution Cancer type Prevention
			DE	515.1	611.4	443.3				
			CT	<b>697.8</b>	743.1	<b>648.2</b>				
2004-08	421.00	29		All	Male	Female	Kidney – F <b><i>Urinary Bladder – All</i></b>	66	66	Prevention Cancer type
			DE	515.1	611.4	443.3				
			CT	<b>683.0</b>	<b>841.8</b>	<b>586.1</b>				
2004-08	428.00	44		All	Male	Female	Kidney – All <b><i>Urinary Bladder – M</i></b>	66	63.5	Prevention Cancer type
			DE	515.1	611.4	443.3				
			CT	<b>658.1</b>	<b>783.4</b>	<b>557.4</b>				
2004-08	501.05	30		All	Male	Female	Breast – F	66	66.5	Screening Prevention
			DE	515.1	611.4	443.3				
			CT	<b>622.4</b>	700.4	572.6				
2004-08	513.02	25		All	Male	Female	None <sup>10</sup>	66	68	Sex distribution
			DE	515.1	611.4	443.3				
			CT	<b>649.2</b>	<b>793.7</b>	530.2				
2004-08	517.01	28		All	Male	Female	Colorectal – M Colorectal – F Kidney – M	66	67	Screening Prevention
			DE	515.1	611.4	443.3				
			CT	<b>999.7</b>	<b>1418.9</b>	<b>750.5</b>				
2005-09	156.00	18		All	Male	Female	Kidney – All <b><i>Liver – F</i></b>	65	63	Prevention Cancer type
			DE	515.3	608.2	445.2				
			CT	<b>651.4</b>	716.7	590.7				
2005-09	159.00	24		All	Male	Female	Kidney – M	65	70	Prevention
			DE	515.3	608.2	445.2				
			CT	<b>637.5</b>	724.9	561.4				
2005-09	163.01	30		All	Male	Female	None <sup>10</sup>	65	63	
			DE	515.3	608.2	445.2				
			CT	<b>626.4</b>	704.2	566.4				
2005-09	417.01	41		All	Male	Female	Prostate– M	65	68	Screening Sex distribution Prevention
			DE	515.3	608.2	445.2				
			CT	<b>639.2</b>	<b>838.6</b>	481.3				

**SOURCE:** Delaware Cancer Registry, Delaware Division of Public Health, 2014.

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<sup>9</sup> A median age at diagnosis in bold and italics indicates that the census tract's median age at diagnosis is significantly lower than that of the state.

<sup>10</sup> "None" – No specific cancer type was significantly elevated.

Time Period	Census Tract	Ave. # Cases per Year	All-Site Age-Adjusted Cancer Incidence Rates per 100,000 <sup>7</sup>			Significantly Elevated Cancer Site(s) & Sex <sup>8</sup>	Median Age at Diagnosis <sup>9</sup>		Areas of Concern
				All	Male		Female	DE	
2005–09	421.00	29		All	Male	Female	65	66	Sex distribution Prevention Cancer type
			DE	515.3	608.2	445.2			
			CT	<b>660.7</b>	751.7	<b>602.1</b>			
2005–09	428.00	48		All	Male	Female	65	64	Cancer type Prevention
			DE	515.3	608.2	445.2			
			CT	<b>673.1</b>	<b>790.8</b>	<b>575.6</b>			
2005–09	501.05	32		All	Male	Female	65	66	Screening Prevention
			DE	515.3	608.2	445.2			
			CT	<b>635.5</b>	741.8	554.6			
2006–10	159.00	26		All	Male	Female	66	68	Sex distribution Prevention
			DE	511.1	599.8	443.5			
			CT	<b>685.6</b>	<b>816.1</b>	573.0			
2006–10	163.01	34		All	Male	Female	66	<b>64</b>	Sex distribution Prevention
			DE	511.1	599.8	443.5			
			CT	<b>661.9</b>	<b>804.0</b>	557.5			
2006–10	417.01	44		All	Male	Female	66	68	Sex distribution
			DE	511.1	599.8	443.5			
			CT	<b>631.4</b>	<b>760.3</b>	528.5			
2006–10	421.00	29		All	Male	Female	66	67	Sex distribution Prevention Cancer type
			DE	511.1	599.8	443.5			
			CT	<b>639.9</b>	721.3	<b>586.0</b>			
2006–10	428.00	49		All	Male	Female	66	<b>63</b>	Cancer type Prevention
			DE	511.1	599.8	443.5			
			CT	<b>670.9</b>	<b>768.8</b>	<b>591.2</b>			
2006–10	517.01	28		All	Male	Female	66	67	Prevention
			DE	511.1	599.8	443.5			
			CT	<b>629.2</b>	751.5	541.4			

SOURCE: Delaware Cancer Registry, Delaware Division of Public Health, 2014.

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