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South Carolina Department of Health and Environmental Control

Summary of Cancer Incidence and Mortality for Zip Code 29405 (North Charleston, SC)

South Carolina Central Cancer Registry
South Carolina Department of Health and Environmental Control

In order to determine if there are any unusual cancer patterns in an area the first step is to look at the number of new cancer cases (incidence) or deaths (mortality) occurring in the ZIP code and compare this to the number of cancer cases and deaths expected to occur by chance alone, given the corresponding South Carolina state rates (see Tables 1 & 2). The number of expected cases and deaths are determined by using South Carolina state cancer incidence and mortality rates and applying them to the population of the geographic area (29405). These observed and expected values allow for the calculation of a chi-square test statistic to look for statistically significant differences in incidence. Note that although some differences in incidence or mortality may be statistically significant, *they may still not meet all of the criteria to qualify as a significant cancer cluster*. When significant results are encountered, additional steps are taken to look at the data more closely (e.g., counts, type of cancers, age, etc.).

Cancer Incidence in ZIP Code 29405

Table 1 shows what types of cancer occurred in ZIP code 29405 from 2000-2004, and how many cancer cases were expected. Overall, there were higher cases of cancer observed than expected. A total of 737 new cases of cancer occurred in the ZIP code, while 686 cases were expected. The most common types of cancer were lung, prostate, female breast, and colon/rectum cancers. These four types of cancer are also the most common cancers occurring across all of South Carolina.

The analysis did reveal five specific types of cancer **(pancreas, stomach, larynx, uterine and liver)** where the number of cases was significantly higher than expected. A total of 24 pancreatic cancer cases occurred while 16 were expected. Most people with pancreatic cancer are over 60 years old when the cancer is found. Also, men get pancreatic cancer more often than women, and African-Americans are more likely to develop this cancer than white Americans. Pancreatic cancer is higher among smokers, and a diet high in meats and fat increase risk. Also, pancreatic cancer is more common among people with diabetes.

A total of 23 stomach cancer cases occurred while 11 were expected. Stomach cancer is twice as common in men as it is in women, and there is a sharp increase in stomach cancer after the age of 50. Smoking, alcohol use, and diets that contain large amounts of smoked foods, salted fish and meat, pickled vegetables, or certain foods high in starch/low in fiber can increase a person's risk of developing stomach cancer. Many studies are also showing that Heliobacter pylori infection is a major cause of stomach cancer.

A total of 17 laryngeal cancer cases occurred while 8 were expected. Laryngeal cancer is more common among men than women and occurs mostly in people over the age of 60. Laryngeal cancers are about 50% more common among African-American than whites. The main risk factor for laryngeal cancer is tobacco use. The risk of cancer is 5 to 35 times greater for smokers than nonsmokers. Also, heavy drinkers have a risk 2 to 5 times higher than nondrinkers. If a person both uses tobacco and drinks, the risk increases even more. Other risk factors include having gastroesophageal reflux and breathing wood dust, paint fumes, or asbestos.

A total of 17 uterine cancer cases occurred while 9 were expected. The risk of developing uterine cancer increases with age. Other risk factors include obesity, having diabetes, family history, and/or a personal history of breast or ovarian cancer. Also, having received prior pelvic radiation increases risk. Other risk factors for uterine cancer are related to hormone levels. For example, using certain types of estrogen replacement therapy, treatment with tamoxifen, infertility, starting menstrual periods before age 12, and entering menopause after age 50 all can increase a woman's risk of developing this cancer.

A total of 13 liver cancer cases occurred while 6 were expected. There are several risk factors that increase a person's risk for developing liver cancer. These risk factors include chronic infection with Hepatitis B or C or having cirrhosis. Also, occupational exposure to vinyl chloride has been shown to increase liver cancer risk.
(1,2).

Cancer Deaths in ZIP Code 29405

To assess cancer deaths in this ZIP code, cancer mortality data from 2000-2004 were used. The same process used to analyze new cancer cases was also used to analyze cancer deaths. Table 2 shows the number of cancer deaths that occurred and the number expected in the ZIP code. A total of 384 cancer deaths occurred in this ZIP code, while 297 deaths were expected. Therefore, higher cancer deaths occurred than expected. The analysis did reveal six specific types of cancer **(colon/rectum, pancreas, prostate, stomach, liver, and oral)** where the number of deaths was significantly higher than expected.

A total of 40 colorectal cancer deaths occurred while 29 were expected. The risk of developing colon/rectum cancer increases greatly after age 50. About 90% of people found to have colorectal cancer are older than 50. Obesity, a diet high in animal fat, physical inactivity and smoking also increase risk. Also a family history of polyposis or a personal history of colon/rectum cancer, intestinal polyps, or chronic inflammatory bowel disease increase the risk of developing colon/rectum cancer.

A total of 29 prostate cancer deaths occurred while 17 were expected. The causes of prostate cancer are not well known, however, researchers have determined a few risk factors that increase a man's chance of developing this disease. These risk factors include increasing age, a diet high in fat, a lack of physical activity, and family history of the disease. Also, prostate cancer occurs almost 70% more often in African-Americans as it does in white American men.

A total of 11 oral cancer deaths occurred while 5 were expected. Tobacco use is the main risk factor associated with oral/pharyngeal cancer. About 90% of people with oral/pharyngeal cancer use tobacco. The risk of developing these cancers increases with the amount smoked or chewed and the duration of the habit. Alcohol use also strongly increases a person's risk of developing oral/pharyngeal cancer. People who smoke and drink have a much higher risk of cancer than those using only alcohol or tobacco alone. Other risk factors for oral/pharyngeal cancer include vitamin A deficiency, exposure to ultraviolet light, and infection with the human papillomavirus (HPV).

Mesothelioma (pleural cancer)

As a general rule, cancer sites with less than 5 cases/deaths expected are not included in the analysis; however, we have included the observed, expected, ratio and chi-square values for mesothelioma in Tables 1& 2. In 1999, a cluster of pleural cancer was identified in ZIP code 29405. The excess of mesothelioma was found to be linked to occupational exposure to asbestos [4]. The risk of mesothelioma is accentuated by smoking, a common risk factor, and the risk to workers exposed to asbestos [4]. This overall high occurrence of mesothelioma cases and deaths persists in this ZIP code.

Conclusions

To summarize, higher cancer cases and deaths occurred in ZIP code 29405 than expected. There were several types of cancer where more cases and deaths occurred than expected. However, we know that these cancers have risk factors associated with a person's lifestyle (i.e. tobacco, alcohol, diets high in fat). Making adjustments in lifestyle can help to reduce the risk of developing these cancers. Also, none of the elevated cancers are clustered in time. There is a steady occurrence of cases or deaths per year over the time period.

In order for a true cancer cluster to exist, the number of cancers occurring must be more than would be expected by chance. Along with statistical testing, there are several other criteria that determine whether a true cancer cluster exists (see Cancer Assessment Investigation Guidelines for further information). First, a cancer cluster would more likely involve rarer types of cancer rather than more common cancers like lung or prostate cancers. Also, a cancer cluster would occur with one specific type of cancer rather than having excesses in several different types of cancer.

Unfortunately, cancer is a common occurrence. One in two men and one in three women will develop cancer at some point in their lives. Taking all these criteria into consideration, the South Carolina Central Cancer Registry determined there is no evidence of cancer clustering in ZIP code 29405.

For questions about this report, please contact Susan Bolick-Aldrich at the SC Central Cancer Registry.

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References:

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4. A Report of Cancer in ZIP code 29405 (Including Charleston Neck and North Charleston neighborhoods (May 13, 1999)
5. Washington State Department of Health, *Guidelines for Investigating Clusters of Chronic Disease and Adverse Birth Outcomes,* www.doh.wa.gov/EHSPHL/Epidemiology/NICE/publications/ClusterProt.pdf

Information on cancer incidence provided by the SC Central Cancer Registry, Office of Public Health Statistics and Information Services, SC Dept. of Health and Environmental Control.

Information on cancer mortality provided by the Divisions of Vital Registry, Biostatistics, and Public Health Informatics, SC Dept. of Health and Environmental Control.

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Table 1. Analysis of Cancer Cases in ZIP Code 29405, 2000-2004

Site	Observed No. of Cases	Expected No. of Cases	Observed/ Expected	Chi-Square Test*	Significance
Lung and Bronchus	113	108.5	1.04	0.19	NO
Prostate	112	104.4	1.07	0.56	NO
Female Breast	96	94.9	1.01	0.01	NO
Colon and Rectum	75	78.3	0.96	0.14	NO
Non-Hodgkin Lymphoma	28	25.0	1.12	0.35	NO
Kidney and Renal Pelvis	26	19.4	1.34	2.28	NO
Urinary Bladder	25	26.4	0.95	0.08	NO
Pancreas	**24**	**16.1**	**1.49**	**3.88**	**YES↑**
Oral Cavity and Pharynx	24	16.5	1.45	3.41	NO
Stomach	**23**	**10.7**	**2.15**	**14.08**	**YES↑**
Other, Unknown Ill-defined	22	N/A	N/A	N/A	N/A
Larynx	**17**	**7.7**	**2.20**	**11.10**	**YES↑**
Corpus and Uterus, NOS	**17**	**8.6**	**1.98**	**8.23**	**YES↑**
Leukemia	14	17.5	0.80	0.70	NO
Liver and Intrahepatic Bile Duct	**13**	**6.1**	**2.12**	**7.66**	**YES↑**
Myeloma	13	9.5	1.37	1.28	NO
Esophagus	12	7.8	1.55	2.33	NO
Melanoma of the Skin	11	26.6	0.41	9.11	YES↓
Ovary	10	5.9	1.70	2.86	NO
Thyroid	9	8.8	1.02	0.00	NO
Mesothelioma	**5**	**1.2**	**4.25**	**12.40**	**YES↑**
Brain and Other Nervous System	5	9.0	0.56	1.78	NO
All Cancer Sites	737	686.4	1.07	3.73	NO

Excludes in-situ cases of cancer, except bladder to allow for comparison.

Cancer sites with less than 5 cases of cancer expected are not analyzed due to the unreliability of statistical tests based on small numbers.

*** The Chi-square statistical test allows us to determine if the difference between what is observed and what is expected is significant. If the value is greater than 3.84, then we are 95% confident that the observed number of cases is significantly different from the expected number of cases.**

↑: Indicates that the observed number of cases is significantly higher than the expected number.

↓: Indicates that the observed number of cases is significantly lower than the expected number.

Table 2. Analysis of Cancer Deaths in ZIP Code 29405, 2000-2004

Cause of Death	Observed No. of Deaths	Expected No. of Deaths	Observed/ Expected	Chi-Square Test*	Significance
Lung and Bronchus	99	89.0	1.11	1.12	NO
Colon and Rectum	**40**	**28.8**	**1.39**	**4.39**	**YES↑**
Pancreas	**30**	**16.0**	**1.88**	**12.33**	**YES↑**
Prostate	**29**	**17.3**	**1.68**	**7.90**	**YES↑**
Other Unknown, Ill-defined	29	N/A	N/A	N/A	N/A
Female Breast	21	21.2	0.99	0.00	NO
Stomach	**20**	**6.9**	**2.89**	**24.75**	**YES↑**
Liver and Intrahepatic Bile Duct	**13**	**6.7**	**1.94**	**5.93**	**YES↑**
Esophagus	12	7.3	1.65	3.10	NO
Oral Cavity and Pharynx	**11**	**4.9**	**2.25**	**7.65**	**YES↑**
Kidney and Renal Pelvis	11	6.2	1.78	3.75	NO
Myeloma	10	7.0	1.43	1.31	NO
Leukemia	10	11.0	0.91	0.09	NO
Urinary Bladder	7	5.8	1.22	0.27	NO
Mesothelioma (ICD-10 only)	**5**	**1.1**	**4.70**	**14.55**	**YES↑**
Brain and Other Nervous System	5	6.6	0.76	0.38	NO
Non-Hodgkin Lymphoma	3	10.2	0.29	5.08	YES↓
All Malignant Cancers	**384**	**296.6**	**1.29**	**25.78**	**YES↑**

Cancer Sites with less than 5 cancer deaths expected are not analyzed due to the unreliability of statistical tests based on small numbers.

***The Chi-square statistical test allows us to determine if the difference between what is observed and what is expected is significant.**

If the value is greater than 3.84, then we are 95% confident that the observed number of deaths is significantly different from the expected number of deaths.

↑: Indicates that the observed number of deaths is significantly higher than the expected number.

↓: Indicates that the observed number of deaths is significantly lower than the expected number.