

Review of the Incidence of Cancer Cases Among Residents of Rowan County, North Carolina and Residents Living Near Industrial Facilities in Salisbury, North Carolina

The 1990 to 2000 cancer incidence among people living within one mile of industrial facilities on Jake Alexander Boulevard in Salisbury, North Carolina are similar to the expected incidence rates among people living in Rowan County, North Carolina, the state of North Carolina and the United States. The standardized incidence rates for oral cancers and all cancers in the Salisbury area were lower than the county rates (Table 1).

However, when the rates for two census blocks near the industrial site were assessed, the rates for lymphoma, brain, and all cancers were higher in the census blocks than the rates found for residents living within the one mile area (Table 1). Cancer rates were analyzed among residents of the two specific census block groups, 0513031 and 0513032, because of a request from a former resident of this neighborhood.

A former resident of Milford Hills, a neighborhood near the industrial facilities, noticed that many of the residents within the area had cancer (Figures 1&2). People thought that air and water pollution from a nearby industrial area on Jake Alexander Boulevard may cause these cancers. Gas fuel processing and shipping plants and an asphalt production and shipping plant are located on the area. Nearby residents complained of odors and polluted groundwater and expressed concern that this pollution caused their illnesses. To respond to this concern, staff from the North Carolina Central Cancer Registry examined the occurrence of cancers in the area and reported that the cancers were occurring at a greater rate than the rates for people living in other counties in North Carolina. However, because of the uncertainty of these results the petitioner asked staff of the Agency for Toxic Substances and Disease Registry (ATSDR) to review the cancer data.

ATSDR scientists obtained the number of people with cancer that lived within one mile of the industrial facilities on Jake Alexander Boulevard from the North Carolina Cancer Registry. Since the Cancer Registry provided cancer data by location, the number of cancers in the census block groups in the one mile region was examined. The census block groups are 0513031, 0513032, 0513033, 0513034, 505003, 504002, and 0512021 (Figure 2).

The number of new cancer cases diagnosed in Rowan County was used to estimate the expected number of the same cancers among the residents of the seven census block groups. The expected number of cases was estimated by multiplying the Rowan County rate to the estimated number of people living in the area. The number of people living in the area was estimated by applying the proportion of the census block group included within the one mile area to the average number of people living in the area as reported by the 1990 and 2000 United States Census Bureau. The expected number was then compared to the actual number of cases. This estimate is called a standardized incidence ratio (SIR). The expected number was adjusted for age, given that most cancers occur more frequently among older people than among younger people. The expected number of breast, cervix, corpus uteri, ovary, and prostate cases was also adjusted for gender.

When the number of cancer cases was less than 6, the actual number of cases is not reported so that people may not be known.

In addition to the United States Census Bureau data, tax parcel data were also reviewed to verify the appropriateness of applying the one mile boundary to the area. These housing data show that the majority of housing units of the census block groups of concern are included within the one mile boundary (Table 2). Overall, block groups 0513031, 0513032, and 0513034 account for 84% of the total number of homes within the one mile radius (Table 3).

From 1990 to 2000, there were 105 people diagnosed with cancer among residents living within one mile of the plants (Table 4). Lung, breast, prostate, and colon cancers were the most common cancers. This is similar to the frequency of cancers diagnosed in the state of North Carolina and the Nation.

A closer look at the data showed that within two block groups, 0513031 and 0513032, lymphomas were diagnosed among residents almost five times more than would be expected and brain cancers were also diagnosed six times more often (Table 1). However, these results are based upon estimates using a very few number of cases (6 cases of brain cancer and 7 cases of lymphoma).

While the rates of some cancers may be higher or lower than expected, facts about cancer risk factors for getting cancer, such as smoking, working with cancer causing chemicals, or knowing how much and what kinds of chemicals people may have been exposed to was not available. These behaviors and exposure can cause cancer and may explain the different rates.

The data from the North Carolina Central Cancer Registry is of good quality. As with all registry data, there is the potential for some missed cases. However, according to the North American Association of Central Cancer Registries, a professional group that develops and promotes uniform data standards for cancer registration, this registry collects between 90-95% of all cancers that are diagnosed (http://www.naacr.org/index.asp?Col_SectionKey=12&Col_ContentID=54).

The cancers diagnosed among the residents living within one mile of the industrial facility on Jake Alexander Boulevard may have been caused by exposures from the industrial facility or they may have been from exposure at the workplaces, or from locations of previous residence. The review of the cancer registry data was not designed to show that living here caused these cancers.

The results of this cancer data review suggest that people living within one mile of the industrial plants off of Jake Alexander Boulevard do not have any greater risk of getting cancer than other residents of Rowan County, the state of North Carolina, or other residents throughout the United States. The residents of census block groups 0513031 and 0513032 may have a higher risk of developing lymphoma and brain cancer than

people who live in Rowan County. For other types of cancers the residents have the same risk as people living in Rowan County.

ATSDR scientists are working to describe the different chemicals that may be in the air and the groundwater in the area. The North Carolina Cancer Registry also plans to continue to monitor the rates of new cancer cases.

Please contact Stephanie Foster or Alden Henderson at (404) 498-0105 for more information about this report.

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Figure 1.

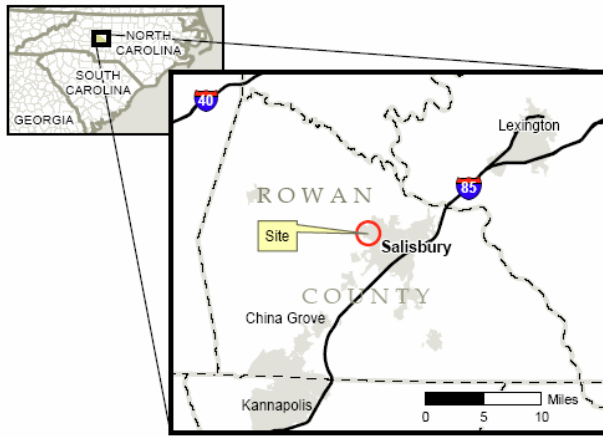
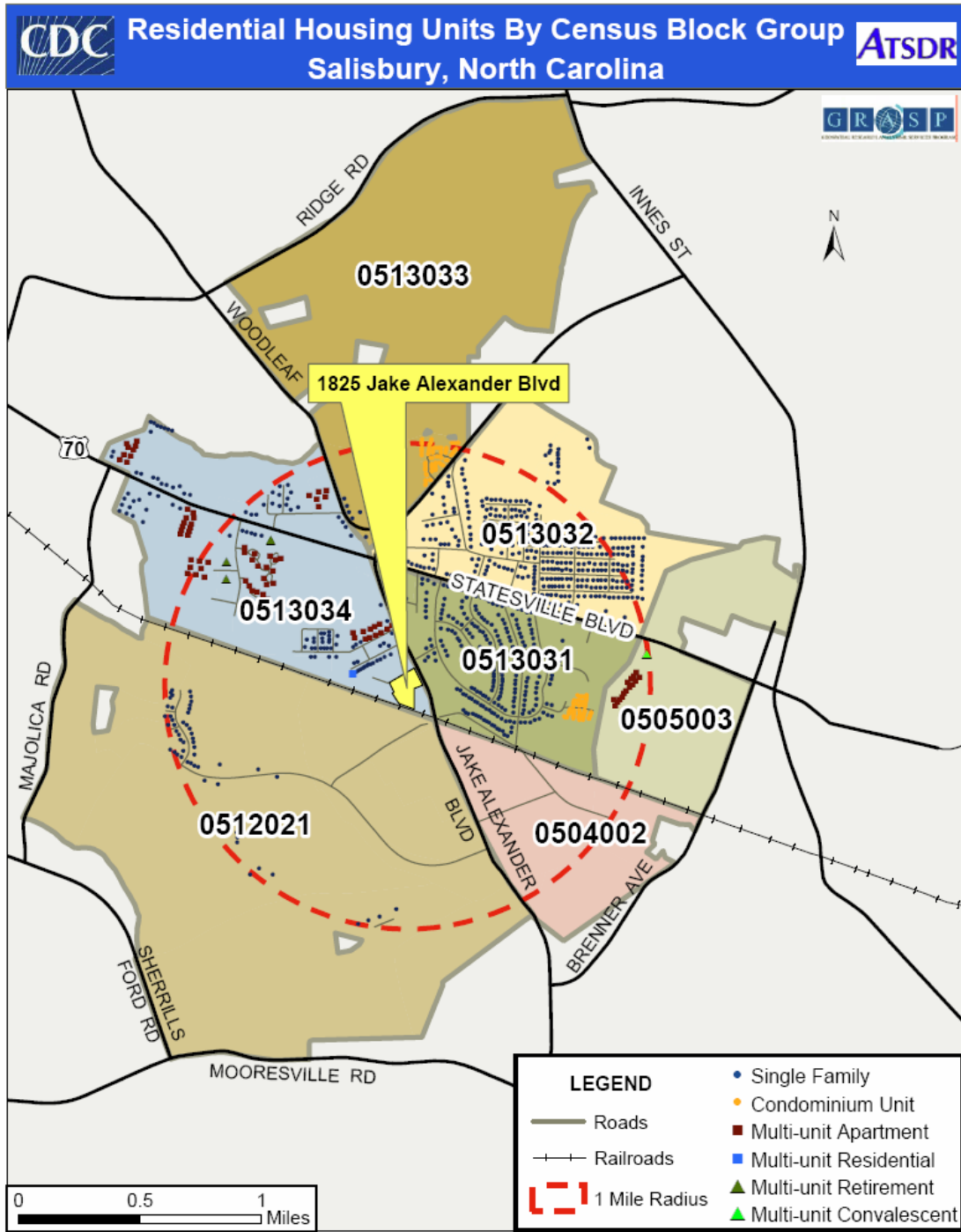


Figure 2.



DATA SOURCES
HOUSING UNITS: Rowan County, NC Interactive GIS
2000 BLOCK GROUPS: U.S. Census Bureau

Date of map: August 18, 2005.

Table 1. Age-Adjusted Standardized Cancer Incidence Rates, 1990-2000

Site	SIR Within one mile of asphalt plant	95% Confidence Interval	SIR Block Groups 0513031 & 0513032	95% Confidence Interval
Bladder	0.81	(0.30, 1.77)	2.32	(0.75, 5.42)
Brain	1.70	(0.45, 4.33)	6.16	(1.66, 15.78)*
Breast (Female)	1.13	(0.72, 1.70)	1.39	(0.82, 2.20)
Cervix	0.45	(0.01, 2.49)	0	--
Colon	0.57	(0.25, 1.13)	3.71	(0.76, 3.89)
Corpus Uteri	0.84	(0.17, 2.46)	1.31	(0.26, 3.82)
Esophagus	2.11	(0.24, 7.62)	3.30	(0.04, 18.38)
Hematopoietic	1.03	(0.33, 2.41)	2.20	(0.44, 6.43)
Hodgkin's Disease	1.68	(0.02, 9.33)	0	--
Kidney	0	--	0	--
Leukemia	0.89	(0.18, 2.60)	2.22	(0.25, 8.01)
Lung	0.57	(0.30, 1.00)	1.40	(0.64, 2.66)
Lymphoma	1.37	(0.55, 2.83)	4.94	(1.80, 10.76)*
Multiple Myeloma	0.85	(0.01, 4.70)	0	--
Non-Hodgkin's Lymphoma	0	--	0	--
Oral	0.12	(0.02,0.36)*	1.40	(0.02, 7.76)
Ovary	0.81	(0.09, 2.93)	0.64	(0.01, 3.56)
Pancreas	1.08	(0.22, 3.16)	2.35	(0.26, 8.50)
Prostate	0.54	(0.23, 1.06)	0.98	(0.42, 1.94)
Stomach	0.44	(0.01, 2.47)	0.44	(0.01, 2.47)
All Cancers	0.77	(0.62, 0.93)*	1.32	(1.07, 1.60)*

Table 2. Housing units by Block Group, Block Groups 0513031, 0513032, 0513034

Housing unit by Block Group	Number of housing units in Census Block Group	Estimated number of housing units in analysis Block Group	Percentage of housing units in analysis Block Group (%)
0513031	300	300	100%
single unit			
multiple units	0	0	0
total units	300	300	100%
0513032	365	306	84%
single unit			
multiple units	0	0	0
total units	365	306	84%
0513034	106	73	69%
single unit			
multiple units	70	45	64%
total units	176	118	67%

Table 3. Housing units by Block Group, one mile

Housing unit by Block Group	Estimated number of housing units in analysis Block Group	Percentage of housing units of Block Group in 1 mile
0504002	0	0%
0505003	16	2%
0512021	55	6%
0513031	300	32%
0513032	306	33%
0513033	77	8%
0513034	176	19%

Table 4 . Cancer by Primary Site and Location, 1990-2000

Primary Site of Cancer	Number of cases, Rowan County	Number of cases, within one mile of asphalt plant
	N (%)	N (%)
Bladder	237 (5.0)	6 (5.7)
Brain	100 (2.1)	6 (5.7)
Breast (Female)	724 (15.3)	23 (21.9)
Cervix	83 (1.7)	<5
Colon	440 (9.3)	8 (1.0)
Corpus Uteri	129 (2.7)	<5
Esophagus	33 (0.7)	<5
Hematopoietic	176 (3.7)	<5
Hodgkin's Disease	22 (0.5)	<5
Kidney	113 (2.4)	0
Leukemia	124 (2.6)	<5
Lung	727 (15.4)	12 (11.4)
Lymphoma	175 (3.7)	7 (6.7)
Multiple Myeloma	39 (0.8)	<5
Non-Hodgkin's Lymphoma	7 (0.2)	0
Oral	91 (1.9)	<5
Ovary	96 (2.0)	<5
Pancreas	93 (2.1)	<5
Prostate	487 (10.3)	8 (1.0)
Stomach	72 (1.5)	<5
All Cancers	4720	105