

Health Consultation

Analysis of Cancer Incidence in North Brunswick and the Census Tract Containing the North Brunswick Township High School Site

NORTH BRUNSWICK, MIDDLESEX COUNTY, NEW JERSEY

EPA FACILITY ID: NJD103805370

**Prepared by the
New Jersey Department of Health and Senior Services**

SEPTEMBER 29, 2009

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

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In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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Purpose

Previously, the New Jersey Department of Health and Senior Services prepared a public health assessment for the North Brunswick Township High School site. In public meetings regarding the site, numerous residents have expressed concern over the amount of cancer in the community. Consequently, at the request of residents of North Brunswick, cancer incidence was evaluated for the Township and the census tract where the former municipal dump is located. Total cancer incidence and 13 specific cancer types were evaluated in this investigation. The specific cancer types were selected because they represent cancer groupings that may be more sensitive to the effects of environmental exposure, though not necessarily related to site contaminants. This health consultation and the concurrent companion health consultation evaluating additional environmental data are being completed as follow up actions to the original public health assessment completed in January 2009.

Background and Statement of Issues

Prior to development of the North Brunswick Township High School and Veteran's Park, the area was historically used as a municipal dump and received disposed materials, including pharmaceutical/laboratory research wastes. Based on aerial photographs, the area appeared as a wooded lot prior to 1942. By 1967, Veteran's Park was developed as a recreational baseball field with the nearby Judd Elementary School under construction. Veteran's Park has been used by area residents for recreational purposes, including baseball, soccer and basketball until 2005 at which time the township closed the park due to the presence of contamination related to the municipal dump (ATSDR 2009). Construction of the high school was completed by 1972.

The municipal dump received various wastes, including pharmaceutical/laboratory research materials, dating back to the 1940s through approximately 1967. The waste material was partially discovered during school construction activities circa 1971/1972; however, the extent of the buried waste material was not fully encountered until 2003 during a school expansion project. The subsequent site investigations and remedial activities focused on the High School, Veteran's Park, and the nearby Judd Elementary School properties.

The primary contaminants of concern include arsenic in surface soil, lead in settled dust, and trichloroethylene (TCE) in indoor air for the high school; arsenic in surface soil for Judd Elementary School; lead and arsenic in surface soil at Veteran's Park; TCE in groundwater; and TCE in indoor air at six nearby residences. Completed exposure pathways include incidental ingestion of contaminated surface soil at the football field and unpaved building perimeter areas at the High School, Veteran's Park, and Judd Elementary School properties; incidental ingestion of lead contaminated settled dust on interior surfaces at High School; and inhalation of indoor air contaminated with TCE at six nearby residences (ATSDR 2009). Exposed individuals include area residents (children and adults), elementary and high school students (children and adults) and school employees (adults).

While past and present exposures to site contaminants for the residential population were not expected to harm people's health (ATSDR 2009), remediation was recommended and mitigation measures were implemented to prevent/reduce future exposures to contaminants in soil and indoor air. Because of continued concerns of cancer in the community, a descriptive evaluation of cancer incidence in North Brunswick was conducted.

Methods

Survey Area and Population

The North Brunswick survey area for the evaluation of cancer incidence consisted of the entire population residing in North Brunswick, Middlesex County. Population counts for the area were determined from the 1980, 1990, and 2000 U.S. Census data (Census 1980, 1990, 2000). In addition to the entire municipality, a separate evaluation was conducted for the population residing in census tract (CT) 6207, which contains the North Brunswick Township High School site. A map of the survey areas is presented in Figure 1.

Cancer Case Ascertainment and Survey Period

The New Jersey State Cancer Registry (NJSCR) was used to determine cancer cases. The cancer Registry is a population-based cancer incidence registry covering the entire state of New Jersey. By law, all cases of newly diagnosed cancer are reportable to the NJSCR, except for certain carcinomas of the skin. In addition, the NJSCR has reporting agreements with the states of New York, Pennsylvania, Delaware, Maryland, North Carolina, and Florida. Information on New Jersey residents who are diagnosed in those states is supplied to the New Jersey State Cancer Registry. The NJSCR has been in operation since October 1, 1978.

The survey period for this investigation was January 1, 1979, through December 31, 2006. A "case" was defined as an individual who was diagnosed with a new primary malignant cancer during the survey period while residing in the survey area. NJSCR cases identified only through search of death or autopsy records were excluded from this evaluation.

All cancer cases from the NJSCR identified as North Brunswick residents were reviewed to determine geographic location within the Township. Census tract location was determined using NJSCR data fields, the U.S. Census Bureau website (Americanfactfinder), Google Earth, and street maps.

Information on important cancer risk factors, such as genetics, personal behaviors (e.g., diet and smoking), or occupational history, is not available from the cancer NJSCR.

Data Analysis

Analyses were completed for all malignant cancer types combined and for select cancer types for the both the township and census tract of interest. The select cancer types analyzed include

bladder, brain and central nervous system (CNS), female breast, colorectal, esophageal, pancreas, lung, leukemia, non-Hodgkin lymphoma (NHL), liver, bone, stomach, and kidney. These cancer types were evaluated because they represent cancer groupings that may be more sensitive to the effects of environmental exposures. Males and females were evaluated separately. In addition, separate analyses were conducted for each of the survey areas for children (diagnosed under 20 years of age) and young adults (diagnosed from age 20 to age 39).

Standardized incidence ratios (SIRs) were used for the quantitative analysis of cancer incidence in the study area (Kelsey et al. 1986; Breslow and Day 1987). The SIR is calculated by dividing the observed number of cases (from the NJSCR) by an expected number for the surveyed population over the evaluation time period, 1979 to 2006.

The expected number was derived by multiplying a comparison population's age-sex-specific cancer incidence rates and the study area age-sex-specific population figures. The comparison rates used to derive the expected number of cases were the New Jersey average annual incidence rates for 1979 to 2006 for the total survey period.

The observed and expected numbers are evaluated by interpreting the ratio of these numbers. If the observed number of cases equals the expected number of cases, the SIR will equal 1.0. An SIR less than 1.0 indicates that fewer cases are observed than expected. An SIR greater than 1.0 indicates that more cases than expected are observed.

Random fluctuations may account for some SIRs being higher or lower than 1.0. The statistical significance of deviations from SIR equal to 1.0 was evaluated using a 95% confidence interval (CI). The 95% CI was used to evaluate the probability that the SIR may be greater or less than 1.0 due to chance alone, and was based on the Poisson distribution (Breslow and Day 1987; Checkoway et al. 1989). If the confidence interval includes 1.0, then the estimated SIR is not considered to be statistically significantly different than 1.0.

Results

Table 1 presents the average annual population estimates for the North Brunswick and CT 6207 survey areas. On average, just over 34,000 people lived in North Brunswick during the survey period. CT 6207 had an average population just over 6,300 representing about 19% of the Township.

For the period 1979 through 2006, a total 1,567 malignant incident cancer cases were diagnosed in North Brunswick residents. Table 2 presents the cancer cases in the survey area by sex and age group. A total of 254 cancer cases resided in CT 6207 survey area, representing 16.2% of the total cases in the Township. There were slightly more female cases than males. Nearly 65% of the North Brunswick cases were diagnosed at age 60 or older while only 56% of CT 6207 cases were diagnosed at age 60 or older. A similar percentage of children (under 20 years of age) were diagnosed for the Township (3.2%) and CT 6207 (3.8%).

Table 3 presents cancer incidence in the survey area by cancer type. The most frequently diagnosed cancer types include breast, colorectal, lung, and prostate, representing slightly over 50% of all incident cancers in each of the survey areas. The frequency of these cancer types is consistent with New Jersey statewide cancer incidence data.

North Brunswick SIR Analysis

Table 4 presents the SIR results for the North Brunswick survey area all ages combined by sex for the 28-year survey period. Based on average state rates, overall cancer incidence was found to be close to the expected for females but statistically significantly lower than expected for males (SIR=0.94; 95% CI=0.90, 0.99). Two SIRs were statistically significantly elevated: kidney cancer in females (SIR=1.40; 95% CI=1.03, 1.87) and bone/joint cancer in females (SIR=2.36; 95% CI=1.08, 4.49). Kidney cancer in males was slightly lower than expect. Bone/joint cancer in males was elevated in males (SIR=1.7), though not statistically significantly.

Table 5 presents the SIR results for North Brunswick children (diagnosed under 20 years of age). Overall childhood cancer in the Township was not statistically different from the expected. NHL in female children was statistically significantly higher than expected (SIR=7.20; 95% CI=2.63, 15.7). NHL in males was lower than expected, though not statistically significantly.

Table 6 presents the SIR results for North Brunswick young adults (diagnosed from age 20 to 39). Overall cancer incidence was statistically significantly lower than expected for both males (SIR=0.48; 95% CI=0.36, 0.64) and females (SIR=0.73; 95% CI=0.60, 0.88). None of the cancer types were either statistically significantly high or low.

CT 6207 SIR Analysis

Table 7 presents the SIR results for the CT 6207 survey area all ages combined by sex for the survey period. Overall cancer was statistically significantly elevated for females (SIR=1.17; 95% CI=1.04, 1.31) but close to the expected in males. Two cancer types were statistically significantly elevated: bladder cancer in males (SIR=1.59; 95% CI=1.07, 2.29) and female breast cancer (SIR=1.25; 95% CI=1.02, 1.51). No cancer types were statistically lower than expected.

Table 8 presents the SIR results for children residing in CT 6702. None of the SIR analyses for childhood cancer in CT 6702 were statistically different from the expected. There were no NHL cases diagnosed in the census tract over the 28-year period.

Table 9 presents the SIR results for CT 6702 young adults. Overall cancer incidence was lower than expected for both males and females, though not statistically significantly lower. None of the selected cancer types were either statistically significantly high or low.

Discussion

The purpose of this descriptive survey of cancer incidence was to evaluate whether cancer in North Brunswick and the area near the former municipal landfill (CT 6702) differ from average state rates for the period 1979 through 2006. The previous evaluation of health risks posed by the site after its development in 1967 (Veteran's Park) and 1972 (North Brunswick Township High School) indicated that past and present exposures to site contaminants for the residential population were considered to present no apparent public health hazard (ATSDR 2009). The previous evaluation also notes that potential exposures were not assessed prior to site development in 1967, since there are no environmental data to characterize surface soil when the area was operated as a landfill.

The current analysis of cancer incidence found the amount of observed cases for several cancer types significantly different than expected based on state rates. For North Brunswick Township, three SIRs were statistically significantly elevated (kidney cancer and bone/joint cancer in female, all ages combined; and non-Hodgkin lymphoma in female children) and three SIRs were statistically significantly low (all cancers combined for both males and females in young adults; and all cancers combined for males in all ages combined). For CT 6702, three SIRs were statistically significantly elevated (all cancers combined for females, all ages combined; bladder cancer in males, all ages combined; and female breast cancer, all ages combined).

Cancer is a group of more than 100 different diseases (i.e., cancer types and subtypes), each with their own set of risk factors. Consequently, any evaluation of potential risk factors and specific cancer types is complicated since most cancer types have more than one known cause or risk factor. All cancers combined were significantly higher than expected for females (all ages combined) in CT 6702. Much of the excess cancer found for females in the census tract appears to be from the significant excess found for female breast cancer (NJDHSS 2009). Breast cancer is the most common cancer in females in New Jersey and the United States, representing about 6,500 new cases in females each year in the state. About 5% to 10% of breast cancer cases are thought to be due to genetic mutations (ACS 2009a). Other known risk factors for breast cancer include a family history of breast cancer, reproductive factors (e.g., never having children or having one's first child after age 30, higher number of live births, and menstrual periods that start earlier or end later in life), high breast tissue density, post-menopausal hormone therapy, obesity, and alcohol consumption (Schottenfeld and Fraumeni 2006; ACS 2009). High-dose radiation to the chest from medical procedures have also been identified as a risk factor for breast cancer, but the affect of exposure to chemicals in the environment, while creating a great deal of public concern, does not show a clear link with breast cancer risk (ACS 2009a).

Bladder cancer is the fourth most common newly diagnosed cancer type in New Jersey males and the ninth most common type in females, representing respectively about 1,750 and 650 new cases each year (NJDHSS 2009). The greatest risk factor for bladder cancer is smoking (ACS 2009b). Smokers are more than twice as likely to get bladder cancer as nonsmokers. Smoking is estimated to be responsible for 48% of bladder cancer among males and 28% among females. Certain industries have been linked with increased bladder cancer including rubber, textile,

leather, and paint manufacturing (Monson 1996; ACS 2009b). Ingestion of high levels of arsenic in drinking water is associated with bladder cancer incidence (ACS 2009b).

Kidney cancer is the seventh most common newly diagnosed cancer type in New Jersey males and the tenth most common type in females, representing respectively about 800 and 500 new cases each year (NJDHSS 2009). Multiple epidemiologic studies have identified cigarette smoking as an established risk factor for kidney cancer (ACS 2009c; Schottenfeld and Fraumeni 2006). Other risk factors identified for kidney cancer include obesity, workplace exposures (asbestos, cadmium, some herbicides, benzene, and organic solvents, particularly TCE), hypertension, and genetic factors (ACS 2009c; Schottenfeld and Fraumeni 2006; Mayo Clinic 2009).

Non-Hodgkin lymphoma is the fourth most common newly diagnosed cancer type in New Jersey children (NJDHSS 2008). The rate of NHL in male children is double that for female children. NHL is both clinically and etiologically diverse group with a number of histologically different forms. A variety of risk factors have been suggested for NHL including certain infections, congenital immunodeficiency syndromes (such as ataxia-telangiectasia, Wiskott-Aldrich syndrome, X-linked lymphoproliferative disease), immunosuppressive drugs, high dose ionizing radiation, and exposure to certain chemicals (e.g., pesticides, insecticides) (ACS 2009d; Schottenfeld and Fraumeni 2006; NJDHSS 2008).

Bone/joint cancer is a very rare cancer type with about 90 newly diagnosed cases each year in New Jersey (NJDHSS 2009). Certain rare inherited conditions (e.g., Li-Fraumeni syndrome, Rothmund-Thompson syndrome, Bloom syndrome, Werner syndrome, and Paget disease) are associated with increased incidence of certain types of bone cancer (ACS 2009e; Schottenfeld and Fraumeni 2006). Very high doses of ionizing radiation are the main known environmental risk factor for bone cancer. Non-ionizing radiation, such as microwaves, electromagnetic fields from power lines, cellular phones, and household appliances, does not increase bone cancer risk (ACS 2009e).

A limitation of cancer studies of this type is the inability to assess past exposure levels in the population. Important information needed to assess a cause-effect relationship includes data on actual personal exposure to the contamination and other relevant risk factors over time. That is, who was exposed and who was not exposed and the magnitude of the exposure that did occur. Because personal exposure information does not exist, residential proximity near the former municipal dump was used as a surrogate measure for potential past environmental exposure. This was partially accomplished by analyzing the population living in a relatively small geographic area near the former municipal landfill. Although residential proximity may be a reasonable surrogate for past environmental potential exposures, it is also unlikely that all of the residents in this area were exposed to the contamination. This would result in misclassifying some of the study area as exposed when they are not. Additionally, the length of residence of each case is unknown, thereby potentially adding to exposure misclassification. The consequence of exposure misclassification would be to bias the results toward not finding an association (i.e., no exposure-health outcome relationship).

Another interpretation problem is that cancer is a chronic disease that takes many years after exposure to reveal itself as a clinical disease. The information supplied by the NJSCR provides only an address at time of diagnosis for each case. No information is available on length of time an individual may have lived at the address before diagnosis. It is possible that some cases are new, short-term residents with little or no exposure to the site. Furthermore, former residents who moved out of the study area before diagnosis are not available for analysis. Population mobility cannot be accounted for in this analysis.

Additionally, when researchers independently examine statistical associations for a large number of comparisons, it is likely that some number of statistically elevated or low SIRs will occur by chance alone. While it is possible to statistically correct for this concern, opinions differ on whether such corrections are needed. In this analysis, confidence intervals are presented without adjustment for multiple comparisons.

The approach used for this descriptive cancer investigation was census-based. The population of North Brunswick, CT 6207, and the State of New Jersey were reviewed in order to calculate age standardized incidence rate ratios for the study area. This census approach (ecologic design) is a practical surveillance or screening method for cancer incidence. Although this approach is well suited for providing a picture of cancer incidence in the specific localities, cause-effect relationships cannot be evaluated. Important information on potential risk factors (such as genetics, life style, environmental factors, occupation, etc.) that might explain the results were not available for analysis using this type of study design.

Conclusions and Recommendations

Three sex-age specific cancer types (kidney, bone/joint, and NHL) were significantly elevated for North Brunswick Township. Two sex-age specific cancer types (bladder and breast) were significantly elevated for CT 6702. Overall cancer incidence for females in CT 6702 was also significantly elevated, but appeared to be due to the elevation in breast cancer. While the incidence of these cancer types is higher than expected, the reasons for the elevations are unknown. The previous public health assessment (ATSDR 2009) indicated that past and present exposures to site-related contaminants after area development in 1967 (Veteran's Park) and 1972 (North Brunswick Township High School) were considered to present no apparent public health hazard to area residents. However, there are no environmental data to characterize potential exposures to surface soil when the area was operated as a landfill.

The NJDHSS and ATSDR will continue to meet with community representatives to determine the most appropriate health education materials and outreach strategies to inform the general population about the environmental issues related to this site.

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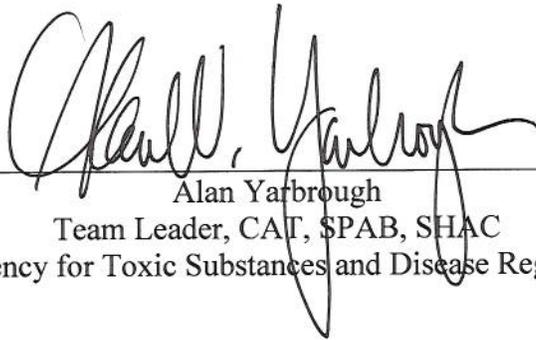
Certification

This health consultation was prepared by the New Jersey Department of Health and Senior Services under a cooperative agreement with the Agency for Toxic Substances and Disease Registry. This health consultation is in accordance with approved methodology and procedures existing at the time it was initiated.



Gregory V. Ulirsch, MS, PhD
Technical Project Officer, CAT, SPAB, SHAC
Agency for Toxic Substances and Disease Registry

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.



Alan Yarbrough
Team Leader, CAT, SPAB, SHAC
Agency for Toxic Substances and Disease Registry

Agency Information

Preparers of the Report

Michael Berry
Consumer and Environmental Health Services
New Jersey Department of Health and Senior Services

ATSDR Regional Representatives

Leah Escobar
Region 2, Regional Operations
Office of the Assistant Administrator

ATSDR Technical Project Officers

Mohammed Uddin
Technical Project Officer
Division of Health Studies

Gregory V. Ulirsch
Technical Project Officer
Division of Health Assessments and Consultations

Any questions concerning this document should be directed to

Site-Specific Health Studies
New Jersey Department of Health and Senior Services
Consumer and Environmental Health Services
P.O. Box 369
Trenton, New Jersey 08625-0369

Figure and Tables

Figure 1 North Brunswick and CT 6207 Survey Areas.

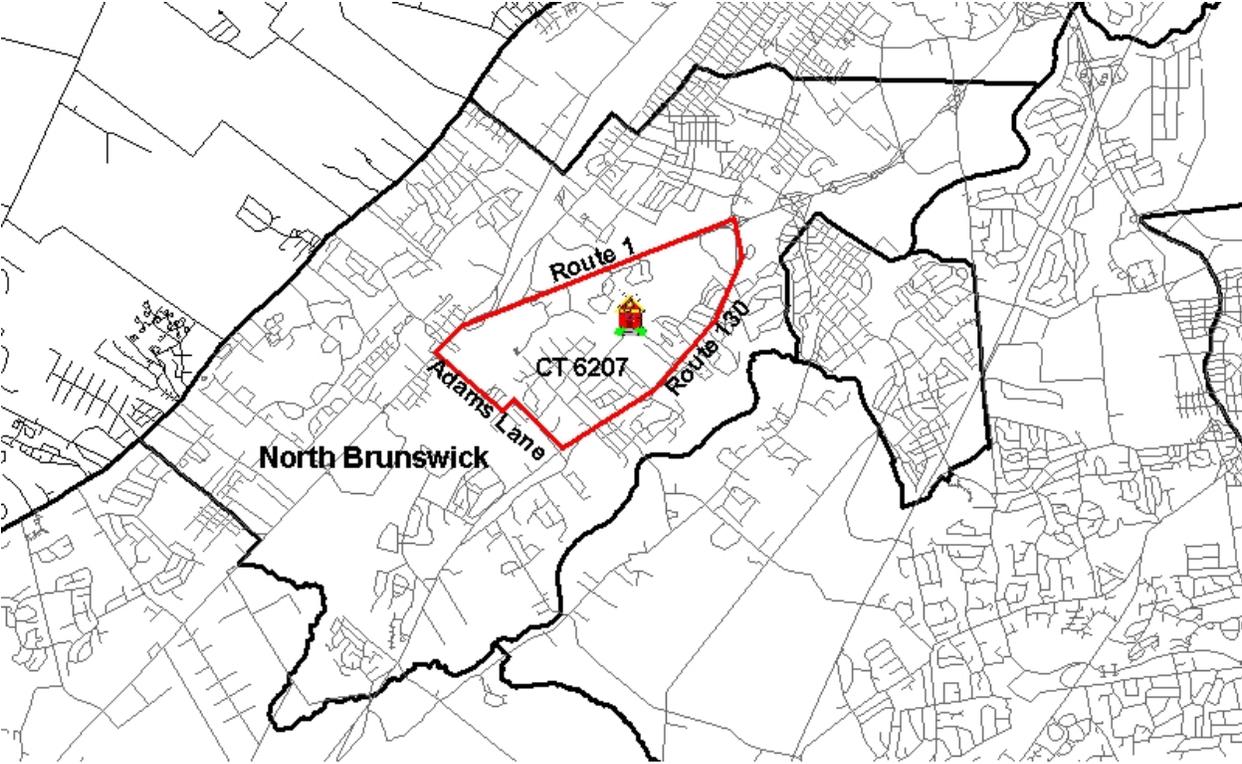


Table 1. North Brunswick Survey Area Populations from the U.S. Census Bureau.

Average Annual Population	North Brunswick Township	Census Tract 6207
Male	16,880	3,119
Female	<u>17,128</u>	<u>3,229</u>
Total	34,008	6,348

Table 2. North Brunswick Survey Areas, Malignant Cancer Incidence (1979-2006).

Characteristics*	North Brunswick Township	Census Tract 6207
Sex		
Male	1,723	274
Female	<u>1,816</u>	<u>301</u>
Total	3,539	575
Age at diagnosis		
0 – 19	49	10
20 – 29	63	12
30 – 39	156	36
40 – 49	359	76
50 – 59	615	119
60 – 69	941	146
70 – 79	911	124
80+	445	52

* Data are from the New Jersey State Cancer Registry, New Jersey Department of Health and Senior Services.

Table 3. North Brunswick Survey Areas, Malignant Cancer Incidence (1979-2006).

Cancer Type*	North Brunswick Township	Census Tract 6207
Oralpharynx	71	16
Esophagus	41	8
Stomach	76	9
Small Intestine	17	<5
Colorectal	448	72
Liver	17	<5
Pancreas	77	11
Other Digestive	35	7
Lung	463	73
Other Respiratory	40	7
Bones and Joints	17	5
Soft Tissue	17	6
Melanoma	103	14
Other Skin	8	<5
Breast	573	107
Cervix	44	5
Uterus	115	18
Ovary	64	10
Other Female Genital	13	<5
Prostate	410	62
Other Male Genital	30	<5
Bladder	166	35
Kidney	97	14
Other Urinary	6	<5
Eye	10	<5
Brain/CNS	48	6
Thyroid	77	13
Other Endocrine	5	0
Hodgkin Disease	27	9
Non-Hodgkin Lymphoma	145	20
Myeloma	41	<5
Leukemia	112	12
Miscellaneous/Other	107	15
Mesothelioma	11	<5
Kaposi's Sarcoma	8	<5

* Data are from the New Jersey State Cancer Registry, New Jersey Department of Health and Senior Services. Counts are suppressed when fewer than 5 cases to ensure confidentiality.

Table 4. North Brunswick SIR Analysis, All Ages Combined (1979-2006).

Cancer Type	Sex	Observed	Expected	SIR ¹	95% CI	
					Lower	Upper
All Cancer	Male	1,723	1,832.7	0.94 **	0.90	0.99
	Female	1,816	1,795.4	1.01	0.97	1.06
Bladder	Male	120	132.5	0.91	0.75	1.08
	Female	46	47.6	0.97	0.71	1.29
Brain/CNS	Male	22	30.2	0.73	0.46	1.10
	Female	26	23.9	1.09	0.71	1.60
Colorectal	Male	239	237.5	1.01	0.88	1.14
	Female	209	226.0	0.92	0.80	1.06
Esophageal	Male	26	27.9	0.93	0.61	1.37
	Female	15	9.6	1.56	0.87	2.57
Kidney	Male	50	55.2	0.91	0.67	1.20
	Female	47	33.5	1.40 *	1.03	1.87
Leukemia	Male	63	51.5	1.22	0.94	1.57
	Female	49	38.5	1.27	0.94	1.68
Liver	Male	13	18.4	0.71	0.38	1.21
	Female	<5	NR	0.55	0.15	1.40
NHL	Male	70	75.3	0.93	0.72	1.17
	Female	75	64.4	1.17	0.92	1.46
Stomach	Male	45	45.4	0.99	0.72	1.33
	Female	31	28.3	1.10	0.74	1.56
Lung	Male	271	289.4	0.94	0.83	1.05
	Female	192	199.1	0.96	0.83	1.11
Bone/joint	Male	8	4.8	1.68	0.72	3.31
	Female	9	3.8	2.36 *	1.08	4.49
Breast	Female	568	552.1	1.03	0.95	1.12
Pancreas	Male	43	39.6	1.09	0.79	1.46
	Female	34	40.4	0.84	0.58	1.18

¹ Note: *= statistically high, **= statistically low, NR= not reported because observed <5. Data are from the New Jersey State Cancer Registry, New Jersey Department of Health and Senior Services.

Table 5. North Brunswick SIR Analysis, Under 20 Years of Age (1979-2006).

Cancer Type	Sex	Observed	Expected	SIR ¹	95% CI	
					Lower	Upper
All Cancer	Male	23	21.6	1.07	0.68	1.60
	Female	26	17.3	1.50	0.98	2.20
Brain/CNS	Male	<5	NR	1.03	0.28	2.65
	Female	5	3.0	1.68	0.54	3.92
Leukemia	Male	9	5.6	1.62	0.74	3.08
	Female	7	4.1	1.71	0.68	3.52
NHL	Male	<5	NR	0.48	0.01	2.69
	Female	6	0.8	7.20 *	2.63	15.7
Bone/joint	Male	<5	NR	2.46	0.49	7.18
	Female	<5	NR	1.25	0.02	6.96

¹ Note: *= statistically high, **= statistically low, NR= not reported because observed <5.
Data are from the New Jersey State Cancer Registry, New Jersey Department of Health and Senior Services.

Table 6. North Brunswick SIR Analysis, Ages 20 to 39 (1979-2006).

Cancer Type	Sex	Observed	Expected	SIR ¹	95% CI	
					Lower	Upper
All Cancer	Male	49	101.9	0.48 **	0.36	0.64
	Female	107	146.4	0.73 **	0.60	0.88
Bladder	Male	<5	NR	0.70	0.08	2.53
	Female	0	1.2	0.00	-	-
Brain/CNS	Male	<5	NR	0.34	0.00	0.96
	Female	<5	NR	0.00	0.15	2.15
Colorectal	Male	<5	NR	1.01	0.04	1.22
	Female	0	5.2	0.92	-	-
Esophageal	Male	0	0.5	0.00	-	-
	Female	0	0.1	0.00	-	-
Kidney	Male	<5	NR	0.78	0.09	2.81
	Female	<5	NR	0.68	0.01	3.76
Leukemia	Male	<5	NR	0.73	0.20	1.87
	Female	<5	NR	0.88	0.18	2.57
Liver	Male	0	0.7	0.00	-	-
	Female	0	0.4	0.00	-	-
NHL	Male	6	11.3	0.53	0.19	1.15
	Female	<5	NR	0.65	0.17	1.66
Stomach	Male	0	1.6	0.00	-	-
	Female	<5	NR	1.84	0.21	6.63
Lung	Male	0	3.7	0.00	-	-
	Female	<5	NR	0.30	0.00	1.66
Bone/joint	Male	0	1.5	0.00	-	-
	Female	<5	NR	1.87	0.21	6.76
Breast	Female	40	45.6	0.92	0.66	1.25
Pancreas	Male	0	0.8	0.00	-	-
	Female	0	0.7	0.00	-	-

¹ Note: *= statistically high, **= statistically low, NR= not reported because observed <5. Data are from the New Jersey State Cancer Registry, New Jersey Department of Health and Senior Services.

Table 7. Census Tract 6207 SIR Analysis, All Ages Combined (1979-2006).

Cancer Type	Sex	Observed	Expected	SIR¹	95% CI	Lower	Upper
All Cancer	Male	274	264.5	1.04		0.92	1.17
	Female	301	258.2	1.17 *		1.04	1.31
Bladder	Male	29	18.2	1.59 *		1.07	2.29
	Female	6	6.0	1.01		0.37	2.19
Brain/CNS	Male	<5	NR	0.20		0.00	1.09
	Female	5	3.9	1.29		0.41	3.00
Colorectal	Male	35	33.0	1.06		0.74	1.47
	Female	37	27.9	1.33		0.93	1.83
Esophageal	Male	5	4.1	1.21		0.39	2.83
	Female	<5	NR	2.42		0.49	7.07
Kidney	Male	10	8.4	1.19		0.57	2.18
	Female	<5	NR	0.85		0.23	2.19
Leukemia	Male	5	8.0	0.63		0.20	1.46
	Female	7	5.5	1.26		0.51	2.61
Liver	Male	0	2.8	0.00		-	-
	Female	<5	NR	2.07		0.23	7.46
NHL	Male	11	11.8	0.93		0.47	1.67
	Female	9	9.0	1.00		0.46	1.89
Stomach	Male	<5	NR	0.62		0.17	1.59
	Female	5	3.5	1.43		0.46	3.35
Lung	Male	45	41.1	1.10		0.80	1.47
	Female	28	26.5	1.06		0.70	1.53
Bone/joint	Male	<5	NR	3.62		0.73	10.6
	Female	<5	NR	2.99		0.34	10.9
Breast	Female	105	84.1	1.25 *		1.02	1.51
Pancreas	Male	6	5.6	1.07		0.39	2.33
	Female	5	4.9	1.01		0.33	2.36

¹ Note: *= statistically high, **= statistically low, NR= not reported because observed <5. Data are from the New Jersey State Cancer Registry, New Jersey Department of Health and Senior Services.

Table 8. Census Tract 6207 SIR Analysis, Under 20 Years of Age (1979-2006).

Cancer Type	Sex	Observed	Expected	SIR ¹	95% CI	
					Lower	Upper
All Cancer	Male	5	4.3	1.15	0.37	2.70
	Female	5	3.6	1.38	0.44	3.22
Brain/CNS	Male	0	0.8	0.00	-	-
	Female	<5	NR	1.57	0.02	8.75
Leukemia	Male	<5	NR	1.71	0.19	6.18
	Female	<5	NR	1.13	0.01	6.31
NHL	Male	0	2.1	0.00	-	-
	Female	0	0.8	0.00	-	-
Bone/joint	Male	<5	NR	2.46	0.49	7.18
	Female	0	0.8	0.00	-	-

¹Note: *= statistically high, **= statistically low, NR= not reported because observed <5.
Data are from the New Jersey State Cancer Registry, New Jersey Department of Health and Senior Services.

Table 9. Census Tract 6207 SIR Analysis, Ages 20 to 39 (1979-2006).

Cancer Type	Sex	Observed	Expected	SIR ¹	95% CI	
					Lower	Upper
All Cancer	Male	13	19.1	0.66	0.36	1.17
	Female	23	30.0	0.77	0.49	1.15
Bladder	Male	<5	NR	3.70	0.42	13.4
	Female	0	0.3	0.00	-	-
Brain/CNS	Male	0	1.1	0.00	-	-
	Female	0	0.8	0.00	-	-
Colorectal	Male	0	1.1	0.00	-	-
	Female	0	1.1	0.00	-	-
Esophageal	Male	0	0.1	0.00	-	-
	Female	0	0.0	0.00	-	-
Kidney	Male	<5	NR	4.07	0.46	14.7
	Female	0	0.3	0.00	-	-
Leukemia	Male	<5	NR	0.99	0.01	5.53
	Female	<5	NR	1.44	0.02	8.04
Liver	Male	0	0.1	0.00	-	-
	Female	0	0.1	0.00	-	-
NHL	Male	<5	NR	0.47	0.01	2.61
	Female	<5	NR	1.58	0.18	5.70
Stomach	Male	0	0.3	0.00	-	-
	Female	<5	NR	4.46	0.06	24.8
Lung	Male	0	0.7	0.00	-	-
	Female	0	0.7	0.00	-	-
Bone/joint	Male	0	NR	0.00	-	-
	Female	0	NR	0.00	-	-
Breast	Female	11	9.0	1.23	0.61	2.20
Pancreas	Male	0	0.2	0.00	-	-
	Female	0	0.1	0.00	-	-

¹ Note: *= statistically high, **= statistically low, NR= not reported because observed <5. Data are from the New Jersey State Cancer Registry, New Jersey Department of Health and Senior Services.