SUMMARY

CHILDHOOD CANCER INCIDENCE HEALTH CONSULTATION:

A REVIEW AND ANALYSIS OF CANCER REGISTRY DATA, 1979-1995

FOR

DOVER TOWNSHIP (OCEAN COUNTY), NEW JERSEY

September 1997

Division of Environmental and Occupational Health Services
Consumer and Environmental Health Services

In consultation with the Agency for Toxic Substances and Disease Registry

Christine Todd Whitman
Governor

Len Fishman
Commissioner

SUMMARY

of the technical report on

CHILDHOOD CANCER INCIDENCE HEALTH CONSULTATION: A REVIEW AND ANALYSIS OF CANCER REGISTRY DATA, 1979-1995, FOR DOVER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

In the spring of 1995, the New Jersey Department of Health (now the New Jersey Department of Health and Senior Services or NJDHSS) was requested to evaluate childhood cancer incidence in the Toms River section of Dover Township by the federal Agency for Toxic Substances and Disease Registry (ATSDR).

The State Cancer Registry (SCR), under State regulation, systematically collects information on all newly diagnosed cases of cancer in New Jersey. To evaluate cancer in Toms River, the NJDHSS initially reviewed data from the SCR from 1979 through 1991. The results of the 1995 NJDHSS cancer evaluation indicated that Ocean County as a whole and the Toms River section of Dover (see Figure 1) had an excess of childhood brain and central nervous system (CNS) cancer relative to the entire State.

In response to community concerns about the level of cancer in the Dover area, NJDHSS and ATSDR developed a Public Health Response Plan (PHRP) detailing the course of action the agencies would follow to further evaluate childhood cancer. The Citizens Action Committee on Childhood Cancer Cluster was formed by concerned parents and other citizens of Dover Township to serve as a liaison between the agencies and the community during these activities. One component of the PHRP was to update the SCR information through 1995 and conduct a reanalysis of the statistics *(Childhood Cancer Incidence Health Consultation*). The reasons for

the reanalysis were to validate and enhance the results of the 1995 cancer evaluation and to find out which cancer types were elevated in order to better develop approaches to understanding these elevations.

The study period for the *Childhood Cancer Incidence Health Consultation* was 1979 through 1995, 17 years of information from the SCR. Included in the study was any Ocean County resident under age 20 who was diagnosed with a new cancer during the study period. All childhood cancers combined and groupings of selected childhood cancer types (leukemia, brain and central nervous system cancer, lymphomas, soft tissue sarcomas, sympathetic nervous system cancer, bone cancer, and kidney cancer) were evaluated for Ocean County, Dover Township, and the Toms River section of Dover Township. For purposes of analysis, the Toms River section of Dover Township was defined as the population residing within four census tracts (see Figure 1). Variation in the amount of childhood cancer over time for each study area was also evaluated. Table 1 presents the observed number of cases for the study areas by cancer grouping.

In order to know whether an area has high cancer incidence, the observed number of cases for that area must be compared with something else, called the expected number. The expected rate is the number of cases that would be expected to occur in the study area population over the study period if the study area had a cancer incidence rate similar to a comparison population. The comparison population incidence rates used in this study were the State of New Jersey.

The observed and expected numbers are compared to each other by computing a ratio of observed to expected cases. If this ratio is less than one, then there were fewer cases observed than expected. Should the ratio be greater than one, more cases than expected were observed. Since random fluctuations may account for ratios higher or lower than one, a statistical test was

used to evaluate the likelihood that the ratio differed from one due to chance alone. These tests evaluate the statistical significance of the ratio and help us to focus on the unusual events which are most likely not due to chance alone.

Ocean County had a total of 358 newly diagnosed childhood cancers over the 17 year study period. Figure 2 presents the observed and expected number of total cancer cases for Ocean County by sex. Overall, total childhood cancer incidence in the County was similar to the expected number for both males and females. Figure 3 presents the observed and expected number of cases for the County by major cancer group. Sympathetic nervous system cancer (predominantly neuroblastoma) incidence was the only cancer group for the County that was notably higher than expected (27 observed and 15.9 expected). Brain and central nervous system cancer was elevated but the difference was not statistically significant. This elevation appeared to be due to an excess of one type of brain cancer, astrocytoma (35 observed and 23.9 expected), which was significantly higher than expected.

Dover Township was the only municipality in Ocean County (see Table 2) in which overall childhood cancer incidence was significantly elevated (90 observed and 67 expected). Figure 4 presents the observed and expected number of total cancer cases for Dover Township by sex. Figure 5 presents the observed and expected number of female cases for the Township by major cancer group and age group (ages 0-4 and ages 5-19). Leukemia incidence was elevated in females, particularly in females under age five (7 observed and 2.7 expected).

Toms River had a total of 24 cases of cancer diagnosed over the study period. Figure 6 presents the observed and expected number of total cancer cases for Toms River by sex and age group. There was a statistically significant difference between the observed and expected

numbers in Toms River (24 observed and 14.1 expected). This elevation in total childhood cancer was most noted in females under age five (10 observed and 1.6 expected). Figure 7 presents the observed and expected number of female cases for Toms River by major cancer group for female children under age five. Brain and CNS cancer and leukemia accounted for the increased total cancer rate among females under age five (3 observed and 0.3 expected for brain/CNS cancer and 4 observed and 0.5 expected for leukemia).

Cancer incidence by year of diagnosis was examined for New Jersey, Ocean County, Dover Township, and Toms River to look for time trends. Both the State and County had similar and slightly increasing total cancer rates during the study period. Dover Township had higher incidence for all cancers combined, leukemia, and brain and central nervous system cancers during the mid to late 1980s. The Toms River rates displayed the most variability over the 17 years (due to the small number of cases in any given year) with a defined peak during the 1988 through 1990 period. Eight of the 24 Toms River cases were diagnosed during this time period.

In conclusion, the *Childhood Cancer Incidence Health Consultation* confirmed the elevation found in the earlier NJDHSS evaluation of childhood cancer incidence in the Dover area. The elevations were particular noted for leukemia and brain and CNS cancer, especially in the youngest female age group (0 to 4 years). The time trend analysis provided limited evidence of periods of time when rates were higher than expected. These results will serve to help focus future epidemiological studies of childhood cancer in Dover Township.

Recommendations from this Consultation are:

1. Further epidemiological evaluation of significantly elevated childhood cancer groupings is

warranted for this area. The New Jersey Department of Health and Senior Services, in consultation with the Agency for Toxic Substances and Disease Registry, will, therefore, be conducting a case-control study to identify possible disease risk factors.

2. For significantly elevated SIRs, more sophisticated tools for analyzing space-time clustering of cases will be explored in conjunction with more complete residential histories and any identified environmental exposure pathways in the community.

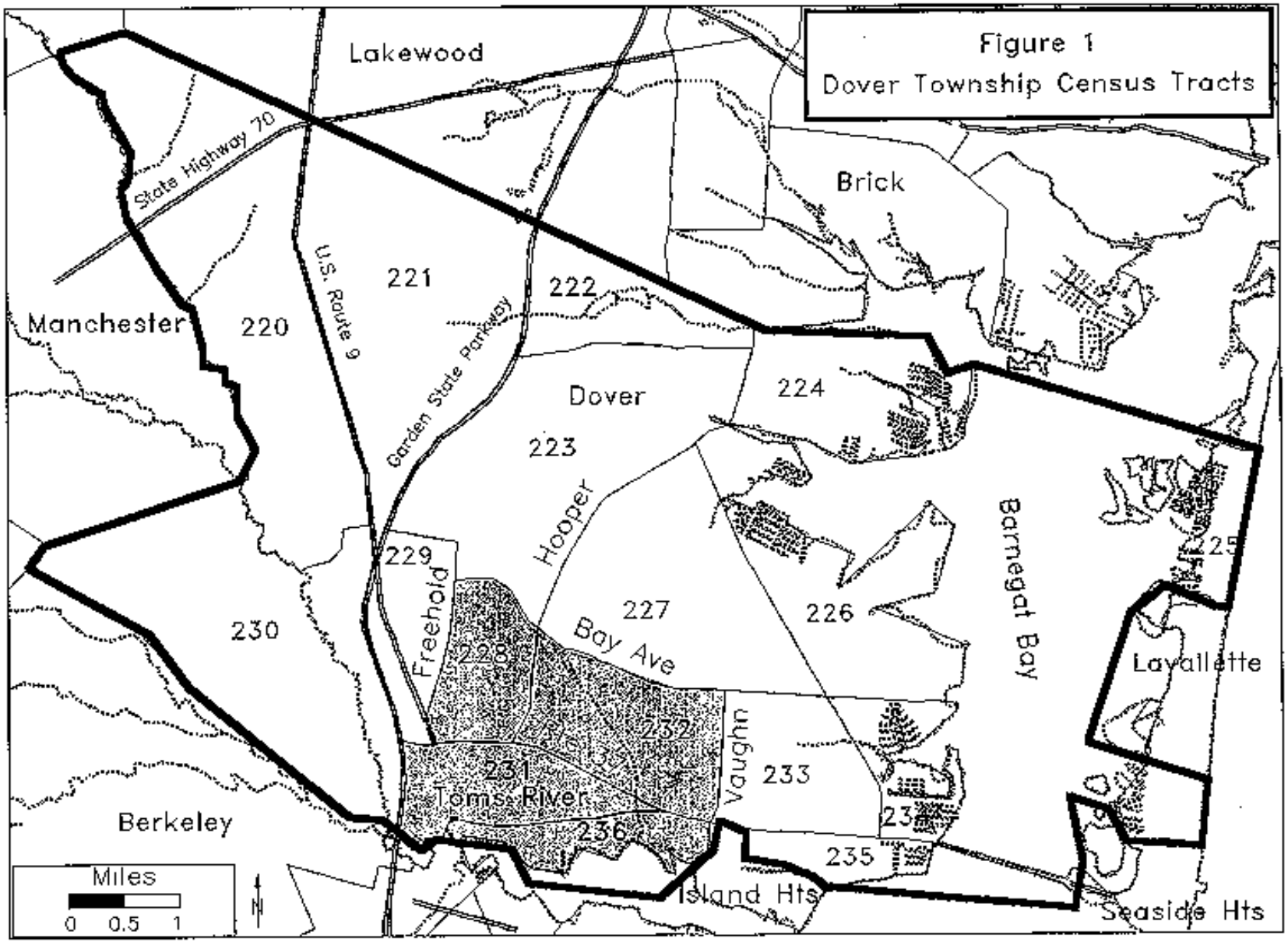
Figure 1
Dover Township Census Tracts
Lakewood
Brick
Manchester
Dover
Berkeley
Toms River
Island Hts
Seaside Hts
Layallette
State Highway 70
U.S. Route 9
Garden State Parkway
Hooper
Freehold
Bay Ave
Vaughn
Barnegat Bay
220
221
222
223
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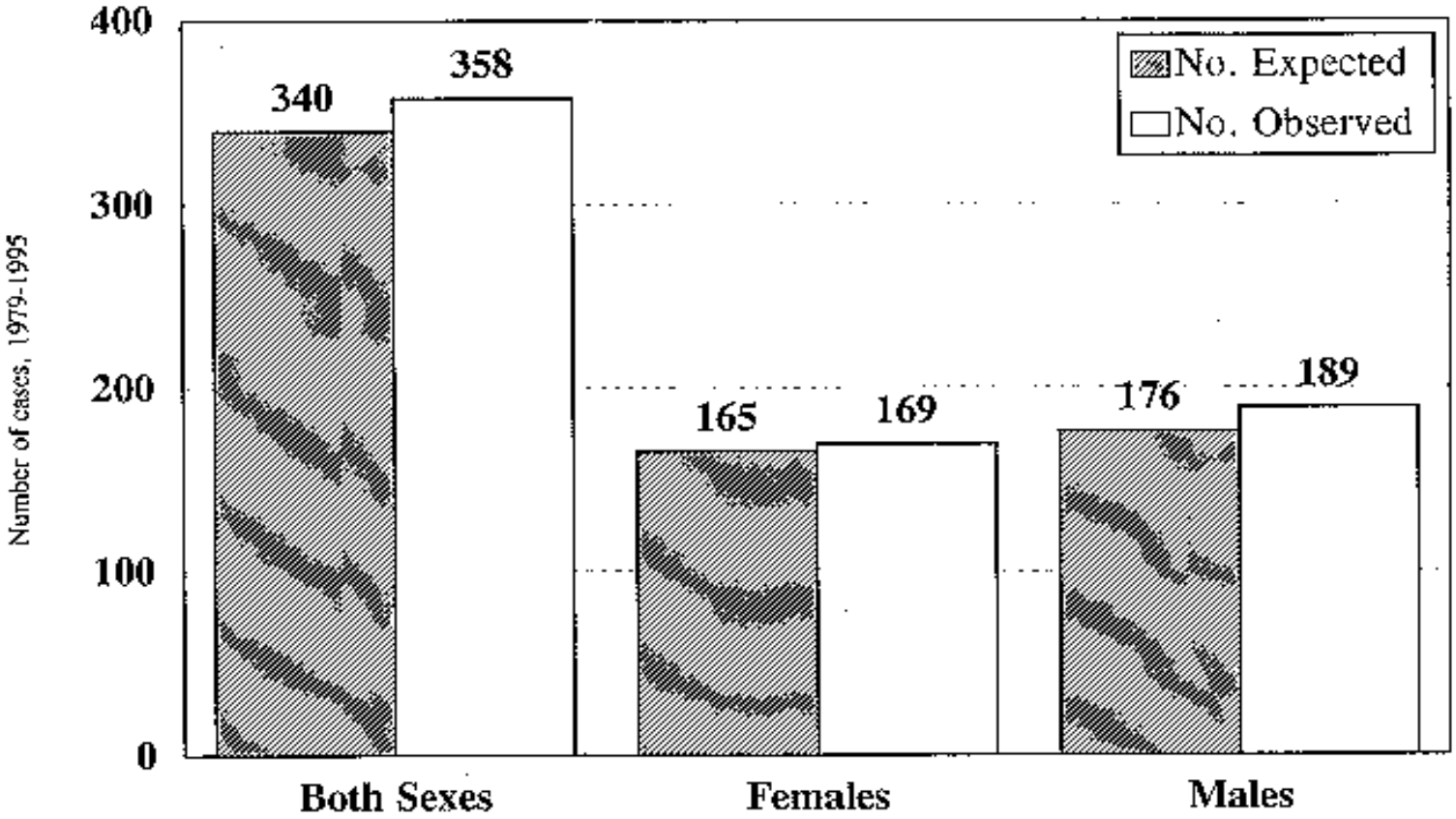
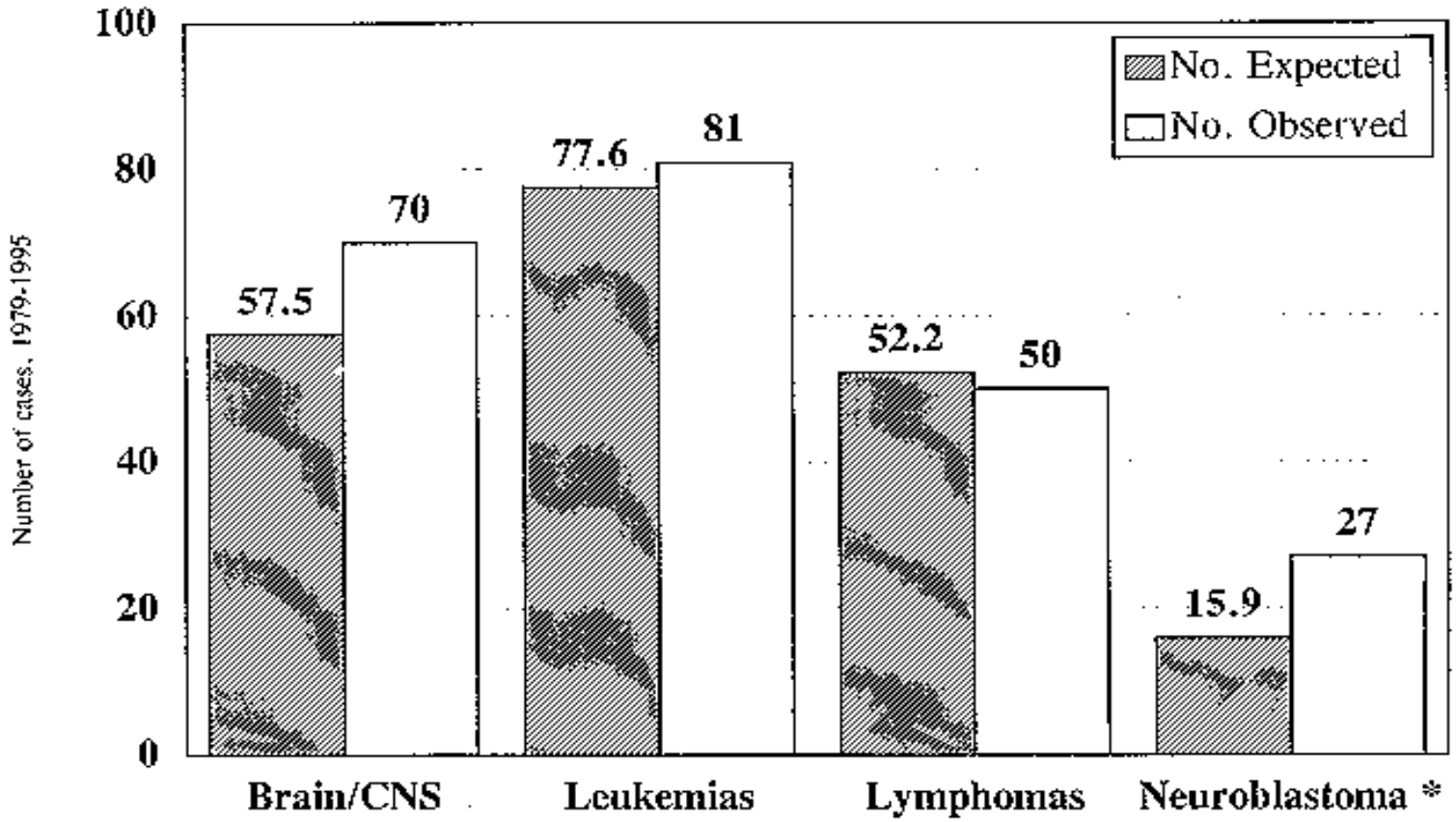
Figure 2. Ocean County childhood cancer incidence by sex.



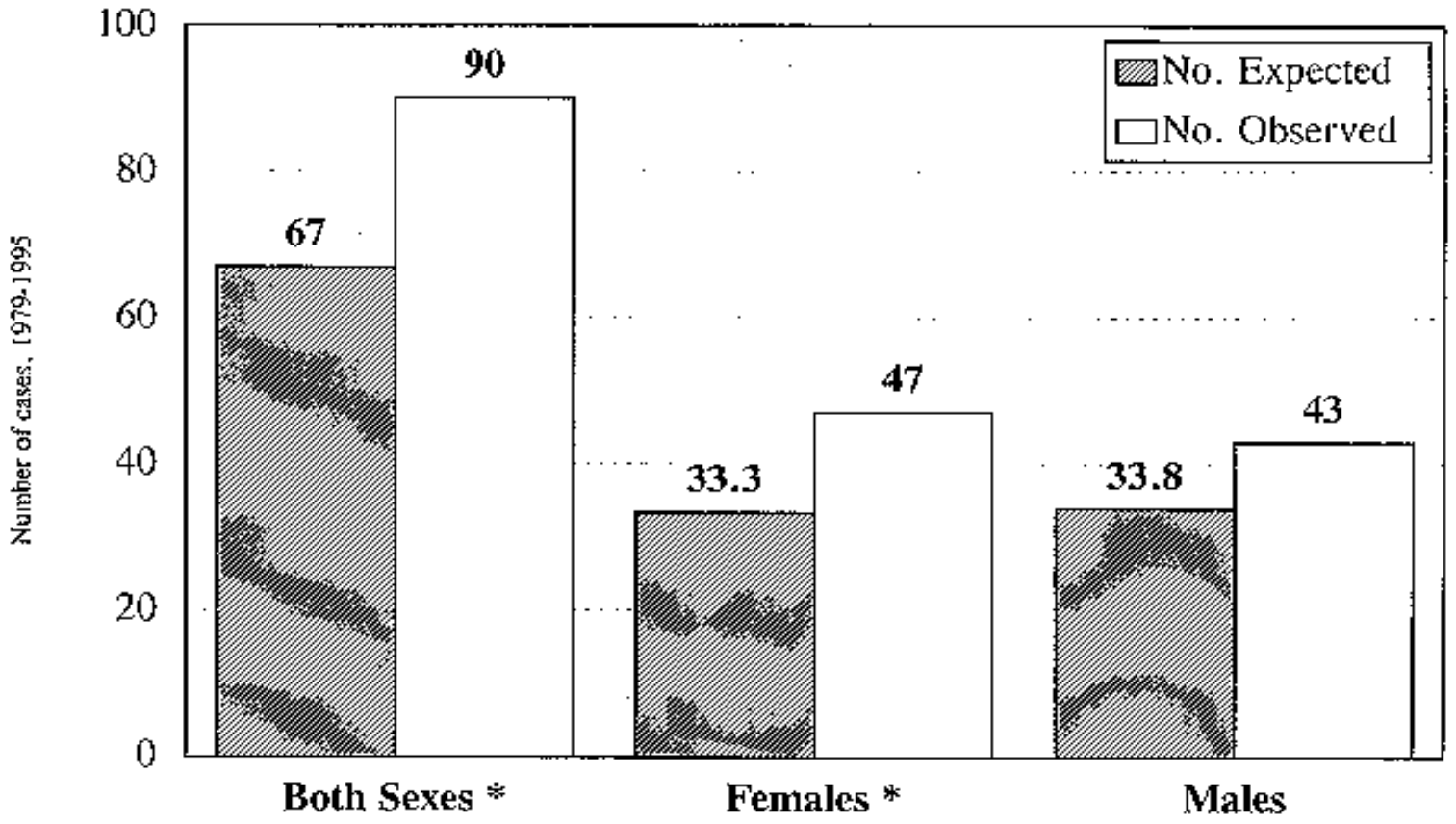
No statistical difference between observed and expected.

Figure 3. Ocean County childhood cancer incidence for both sexes, ages 0-19.



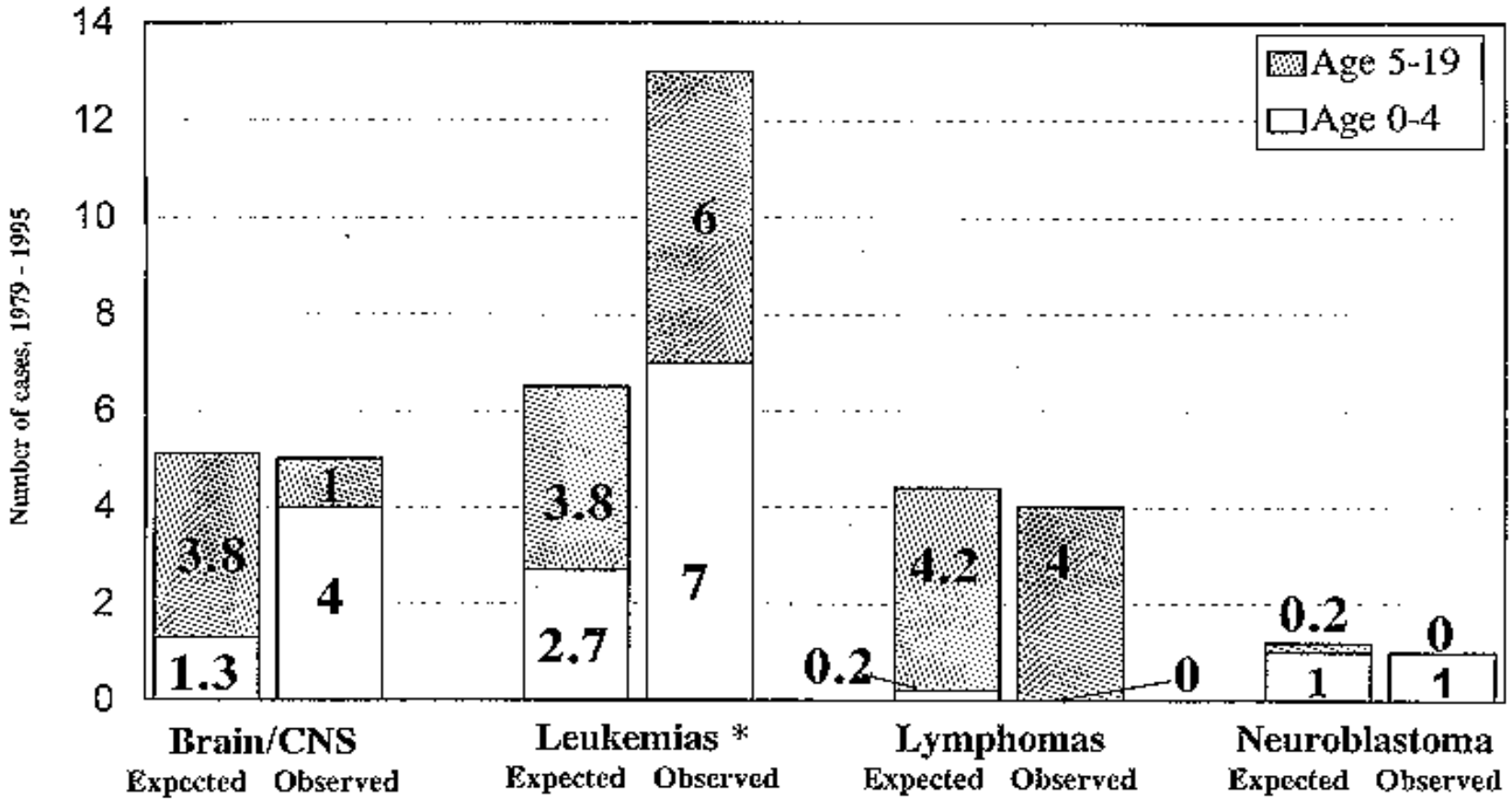
*** The only statistically significant difference was seen in the neuroblastoma category.**

Figure 4. Dover Township total childhood cancer incidence by sex.



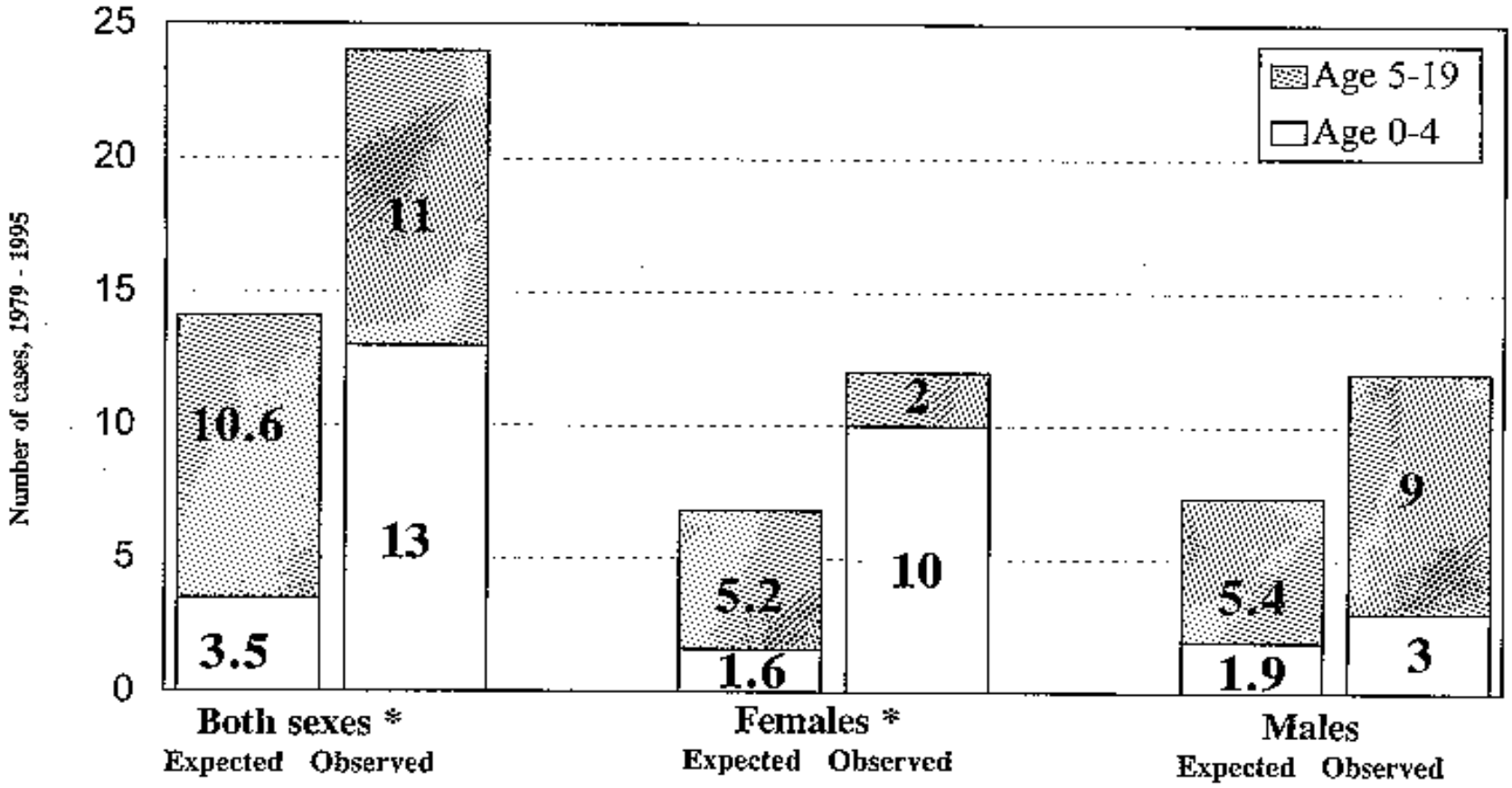
*** In addition to <u>overall</u> statistical significance there is a statistically significant difference for females.**

Figure 5. Dover Township childhood cancer incidence for females by age group.



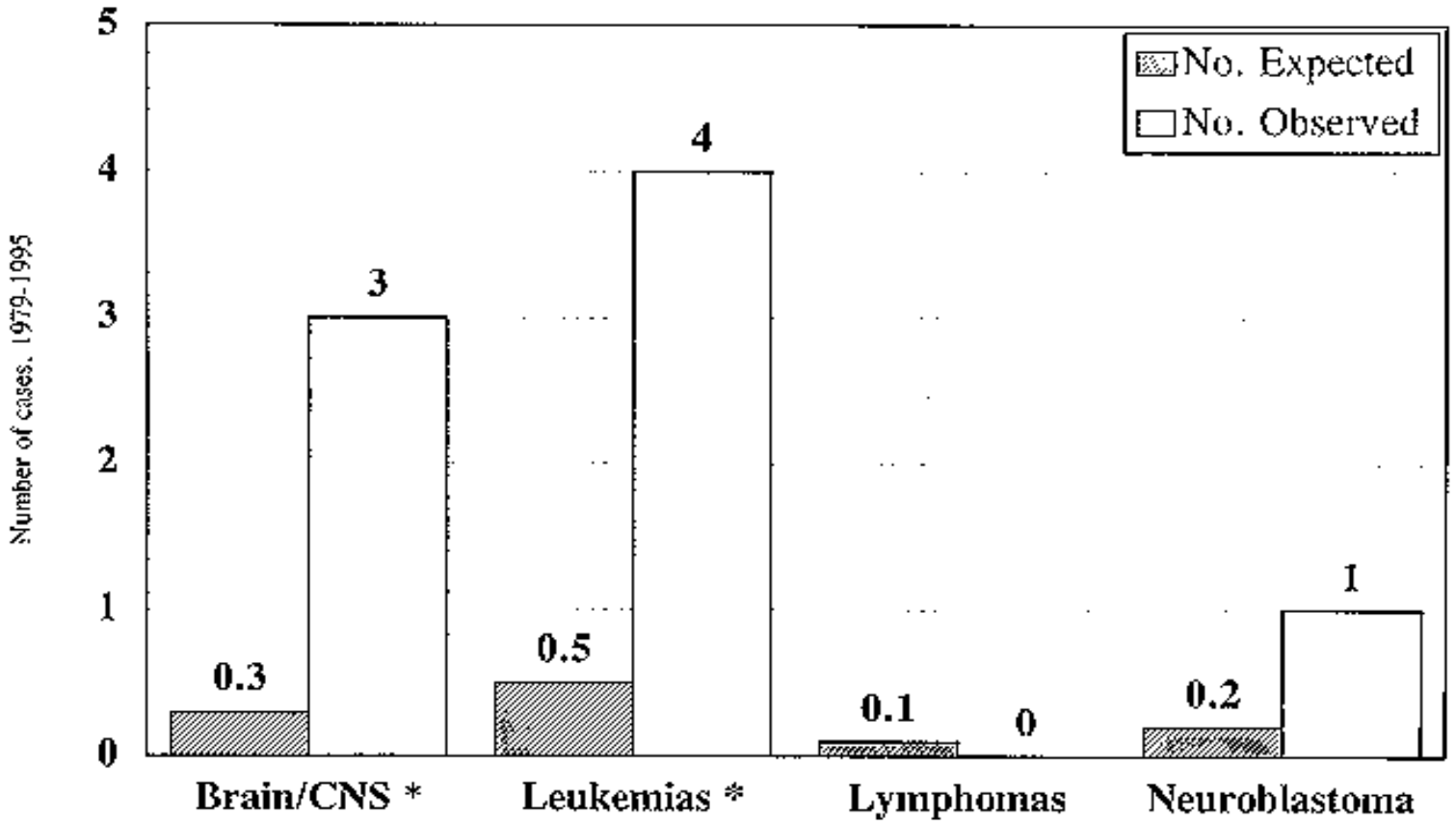
* There was a statistically significant difference between the observed and expected for leukemia in younger females.

Figure 6. Toms River total childhood cancer incidence by sex and age group.



*** There was a statistically significant difference between the observed and expected among females and both sexes combined, age 0-4 years.**

Figure 7. Toms River childhood cancer incidence for females under age five.



* Brain/CNS cancers and leukemias accounted for the increased rates among females 0-4 years.

Table 1. Total childhood cancer incidence from 1979 through 1995 by cancer group for all race-sex groups combined, ages 0-19.

Disease Group	Ocean County	Dover Township	Toms River
Leukemias	81	22	6
Brain/CNS	70	13	6
Lymphomas	50	13	2
Soft Tissue Sarcomas	24	7	2
Neuroblastoma	27	4	2
Bone Cancer	10	3	0
Renal Cancer	14	3	0
Other	82	25	6
All Childhood Cancers	358	90	24

Table 2. Ocean County municipal childhood cancer incidence, ages 0 - 19 years, 1979 through 1995.

Municipality	Number Observed	Number Expected	Statistically Significant
Barnegat Twp	9	11.9	No
Barnegat Light Boro	1	0.3	No
Bay Head Boro	0	0.8	No
Beach Haven Boro	2	1.0	No
Beachwood Boro	16	9.3	No
Berkeley Twp	9	15.1	No
Brick Twp	55	55.3	No
Dover Twp	90	67.0	**YES ***
Eagleswood Twp	1	1.3	No
Harvey Cedars Boro	0	0.2	No
Island Heights Boro	1	1.3	No
Jackson Twp	29	31.5	No
Lacey Twp	23	17.8	No
Lakehurst Boro	5	3.5	No
Lakewood Twp	40	41.6	No
Lavallette Boro	2	1.3	No
Little Egg Harbor Twp	6	10.4	No
Long Beach Twp	2	1.7	No
Manchester Twp	15	14.4	No
Mantoloking Boro	0	0.2	No
Ocean Twp	4	4.1	No
Ocean Gate Boro	0	1.6	No
Pine Beach Boro	2	1.5	No
Plumsted Twp	6	5.6	No
Point Pleasant Boro	17	15.0	No
Point Pleasant Beach Boro	5	3.8	No
Seaside Heights Boro	2	2.0	No
Seaside Park Boro	1	1.2	No
Ship Bottom Boro	0	0.8	No
South Toms River Boro	1	4.9	No
Stafford Twp	12	10.8	No
Surf City Boro	1	0.8	No
Tuckerton Boro	1	2.4	No

*** Dover Township was the only statistically significantly elevated town in the county.**