CHILDHOOD CANCER IN NEW JERSEY 1979-2013

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PUBLIC HEALTH SERVICES BRANCH
NEW JERSEY DEPARTMENT OF HEALTH

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Childhood Cancer in New Jersey 1979-2013

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Introduction

Cancer in children is rare, accounting for about 1% of all cancers[1]. Despite its rarity and significant improvements in treatment and supportive care, cancer is still a leading cause of death in children ages 5-14 years old, second only to accidents[1]. In New Jersey, childhood cancer accounts for about 465 new cancer cases and about 50 deaths each year[2]. The American Cancer Society (ACS) estimates 1 in 285 children in the U.S. will be diagnosed with cancer before the age of 20[1] and that there will be about 10,380 new cases of cancer among children ages 0-14 in 2016.

Fortunately, childhood cancer survival rates have improved greatly over the past several decades. Nationally, the five-year survival rate for all childhood cancers combined has increased from 60% to 86%[3]. The improvement in survival is largely attributable to better treatments and to the high proportion of pediatric patients participating in clinical trials[3]. Additionally, this report demonstrates that despite increasing incidence rates in both New Jersey and the U.S., the mortality rates have continued to decline.

Cancers diagnosed among children differ from those diagnosed among adults. In New Jersey and the U.S., leukemias, lymphomas, cancers of the central nervous system and neuroblastomas account for over half of all childhood cancers diagnosed each year, while the most common cancers among adults include lung, colorectal, female breast and prostate. Additionally, childhood cancers, unlike many adult cancers, are not related to modifiable risk factors such as behavior or lifestyle choices[2].

Despite extensive research conducted over the past several decades, the causes of most childhood cancers are still unknown. Research indicates that about 5% of childhood cancers are due to known inherited mutations (a genetic mutation that can be passed from parents to their children)[3]. Exposure to ionizing radiation is a significant risk factor for childhood leukemia and possibly other cancers[1]. According to the National Cancer Institute, "Studies of other possible environmental risk factors, including parental exposure to cancer-causing chemicals, prenatal exposure to pesticides, childhood exposure to common infectious agents, and living near a nuclear power plant, have so far produced mixed results" [3].

This report presents cancer incidence and mortality data from 1990-2013 as well as long term trends from 1979-2013 for children ages 0-19 who resided in New Jersey at the time of diagnosis and/or death. Included in the report are data by type of cancer, sex, race, ethnicity and age group as well as comparisons of incidence and mortality data between New Jersey and the U.S. New to this report is the race category of Asian/Pacific Islanders (API) along with Hispanic ethnicity.

Additional New Jersey cancer incidence, mortality, survival and prevalence data are available from the Cancer Epidemiology Services website at http://www.state.nj.us/health/ces/reports.shtml.

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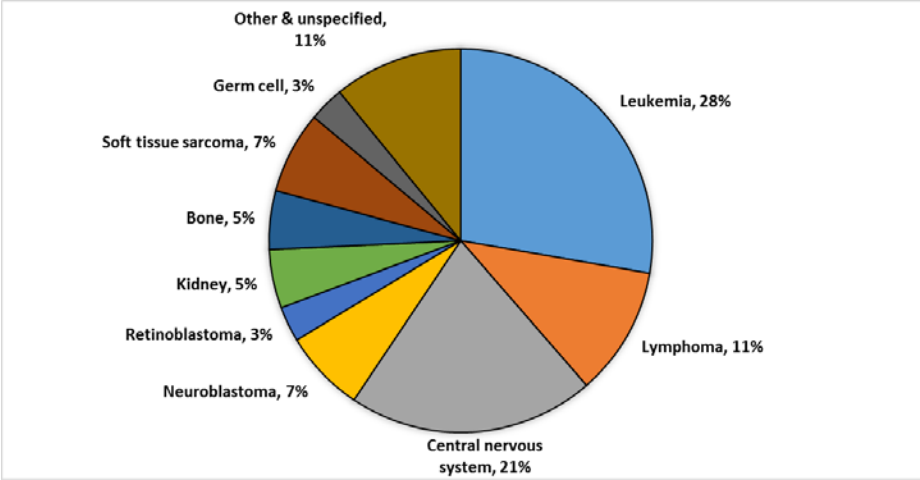
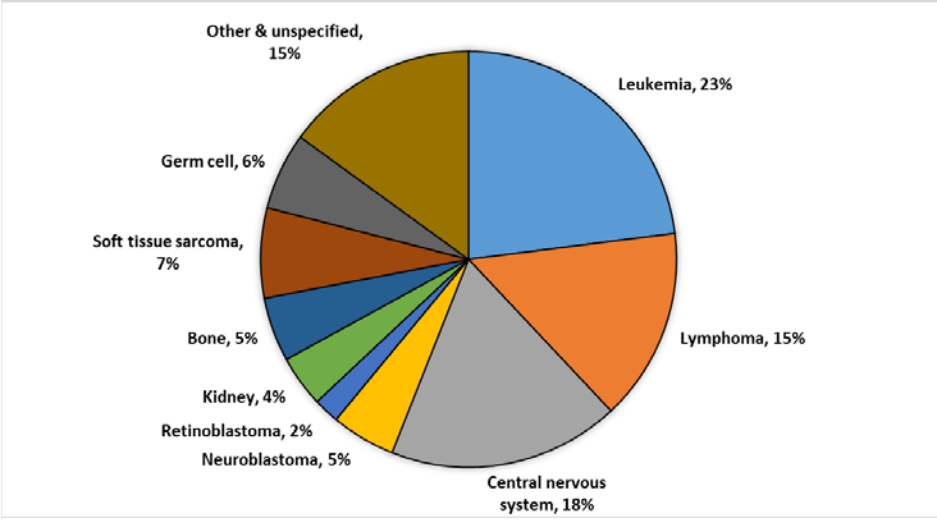
Chapter 1- All Childhood Cancer Combined

Figure 1.1-Incidence Distribution by Cancer Type in New Jersey, Ages 0-14, 1990-2013, N=6,860



- In New Jersey from 1990 to 2013, 6,860 cases of cancer were diagnosed among children 0-14 years of age.
- The most common cancers among children 0-14 years of age were the same as children 0-19 but in different proportions – leukemia (28%), central nervous system (21%), and lymphoma (11%).

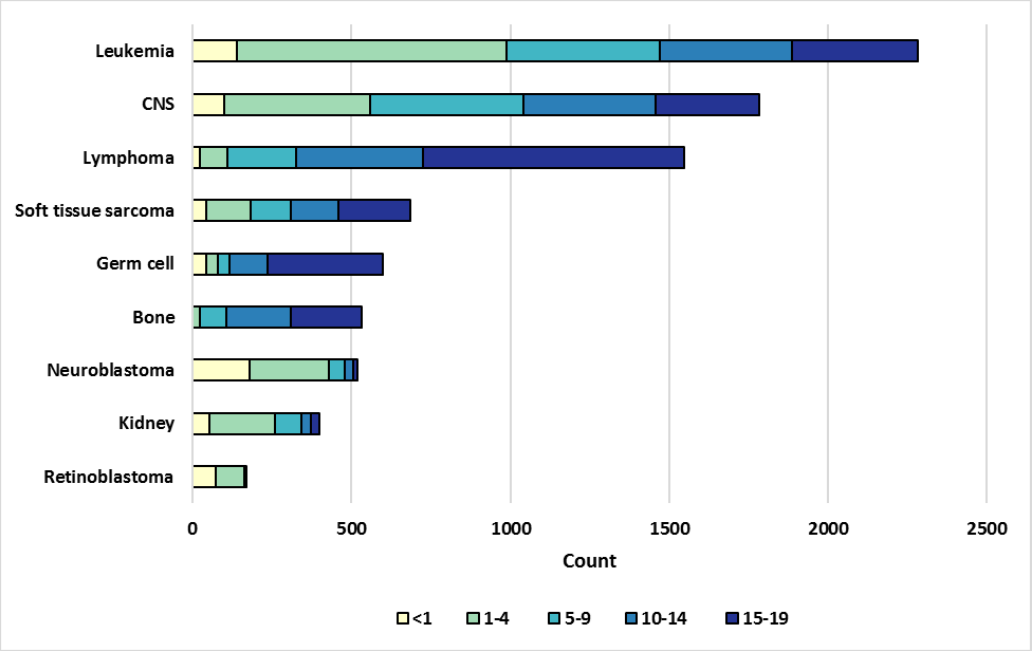
Figure 1.2- Incidence Distribution by Cancer Type in New Jersey, Ages 0-19, 1990-2013, N=10,028



Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. Data source: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health. Link to Table A.1

- In New Jersey from 1990 to 2013, 10,028 cases of cancer were diagnosed among children 0-19 years of age.
- The most common cancers among children 0-19 years of age were the same as children 0-14, but in different proportions – leukemia (23%), central nervous system (18%), and lymphoma (15%).

Figure 1.3- Age Distribution of Incident Cases by Cancer Type and Age Group in New Jersey, 1990-2013, N=10,028



Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. Data source: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health. Link to Table A.1

- Among infants (<1), the most common cancers were neuroblastoma (25%), leukemia (19%) and central nervous system (14%).

- The three most common cancers among children 1-4 were the same as infants but in very different proportions; leukemia (36%), central nervous system (20%) and neuroblastoma (11%).

- Like children 1-4, the two most common cancers in children 5-9 were leukemia and central nervous system, both at 28%. However, lymphoma (13%) was the third most common cancer, rather than neuroblastoma.

- In children 10-14, leukemia, lymphoma and central nervous system cancers had similar proportions of around 20%.

- The most common cancers among children 15-19 were lymphoma (26%), leukemia (13%), and germ cell cancer (12%).

Table 1.1- Childhood Cancers Incidence Rates by Gender and Age Group

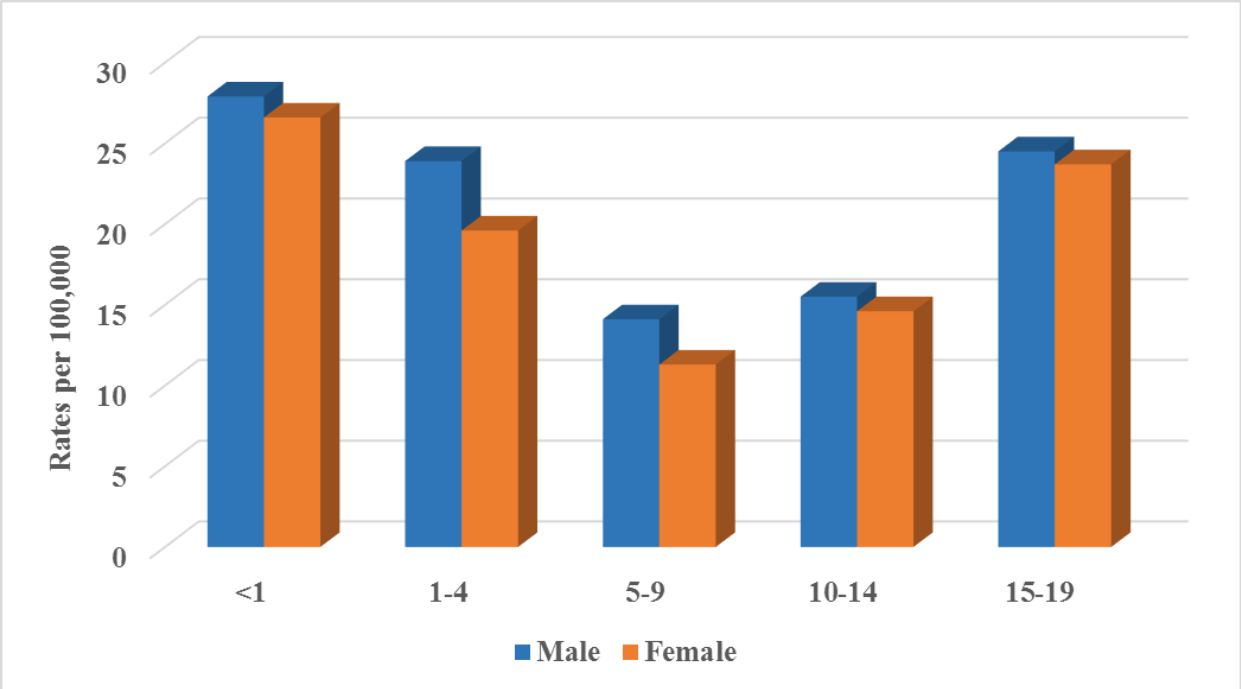
ICCC Category	New Jersey - 1990-2013		US (SEER) - 1990-2013	
	0-14	0-19	0-14	0-19
Both genders	**16.8**	**18.6**	**15.1**	**16.7**
Male	17.9	19.6	16.0	17.5
Female	15.6	17.6	14.2	15.9

Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health; U.S. SEER Program, National Cancer Institute (see technical notes). Link to Table A.2

- New Jersey childhood cancer **incidence** rates were higher than the U.S. rates in each gender and age group.

- Male children had higher **incidence** rates of childhood cancer than female children in each age group in both New Jersey and the U.S.

Figure 1.4- Childhood Cancer Incidence Rates by Gender and Age Group, New Jersey, 1990-2013, N=10,028

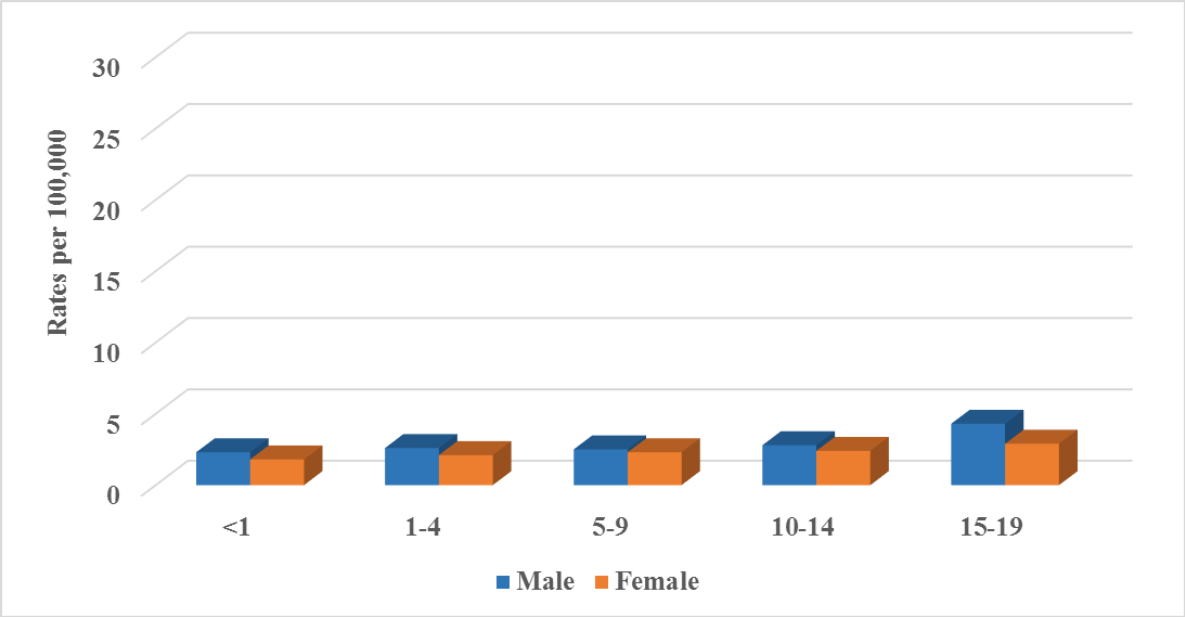


Average annual rates are per 100,000. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data source: New Jersey State Cancer Registry, New Jersey Department of Health. Link to Table A.8 Link to Table A.9

- Infants (< 1 year old) had the highest **incidence** rates for all childhood cancers, about 28 cases per 100,000 children a year. The rates decreased through the 5-9 year age group and then increased in the two oldest age groups.

- In each age group the male **incidence** rates were higher than the female rates.

Figure 1.5- Childhood Cancer Mortality Rates by Gender and Age Group, New Jersey, 1990-2013, N=1459

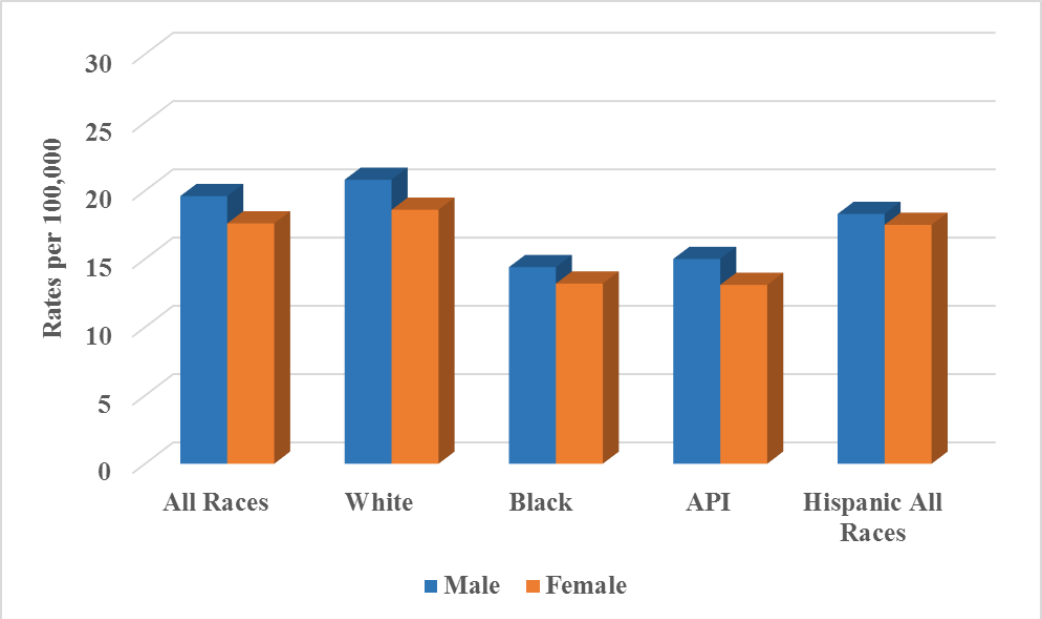


Average annual rates are per 100,000. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data source: National Center for Health Statistics. Link to Table A.12 Link to Table A.13

- The **mortality** rates for all childhood cancers were much lower than the incidence rates, ranging from about 2 to 4 deaths per 100,000 children a year.

- Overall, the **mortality** rates rose slightly with increasing age and male **mortality** rates were higher than female rates in each age group.

Figure 1.6- Childhood Cancer Incidence Rates by Gender and Race/Ethnicity, New Jersey, 1990-2013, Ages 0-19, N=10,028



Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. API=Asian/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races. Data source: New Jersey State Cancer Registry, New Jersey Department of Health. Link to Table A.4 Link to Table A.5

- Childhood cancer **incidence** rates were higher in males than in females across all race/ethnicity groups in children ages 0-19.
- Childhood cancer **incidence** rates were higher in Whites and Hispanics for both genders compared to other races in this same age group.

Note- Bar charts for childhood cancer mortality by Race/Ethnicity group were not produced because small numbers would not produce reliable results.

Figure 1.7- Time Trends in Childhood Cancer Incidence and Mortality Rates, New Jersey and U.S., Ages 0-14, 1979-2013

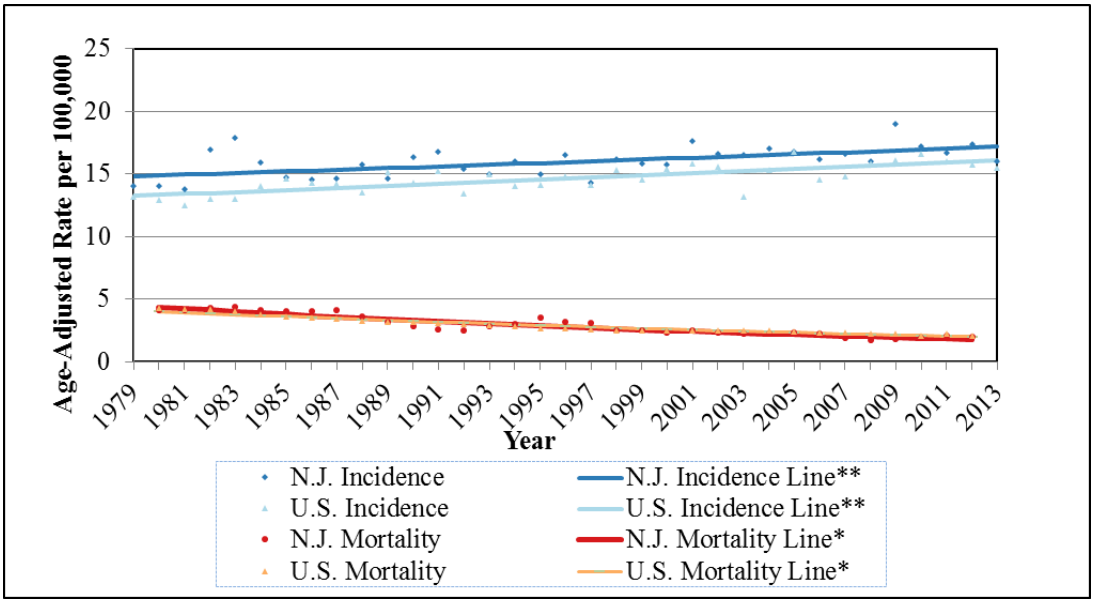
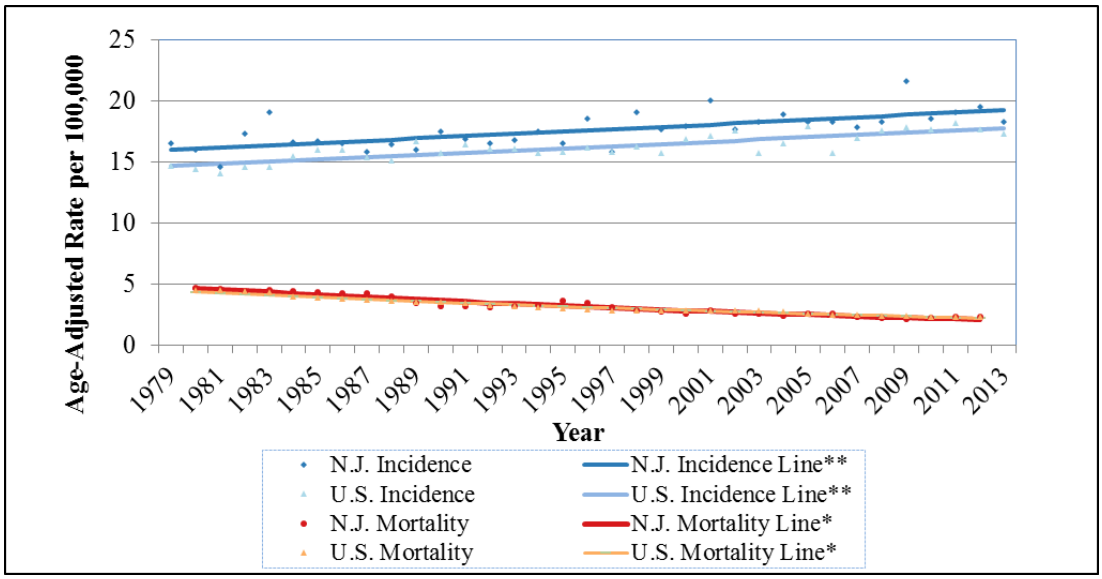


Figure 1.8- Time Trends in Childhood Cancer Incidence and Mortality Rates, New Jersey and U.S., Ages 0-19, 1979-2013



Rates are per 100,000 and age-adjusted to the 2000 US population standard. Mortality rates were calculated using 3 year averages to reduce the likelihood of suppression and yield more stable estimates. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008.Data sources: incidence - New Jersey State Cancer Registry, New Jersey Department of Health; mortality- National Center for Health Statistics. * Statistically significant decrease in rates over time, p<0.05, ** Statistically significant increase in rates over time, p<0.05

Link to Table A.14 Link to Table A.15

- For both New Jersey and the U.S., childhood cancer **incidence** and **mortality** rates have significantly increased and decreased, respectively, from 1979 to 2013, among ages 0-14 and when older adolescents were included in the 0-19 age group.

Figure 1.9- Time Trends in Childhood Cancer Incidence Rates by Race/Ethnicity, New Jersey, Ages 0-14, 1979-2013

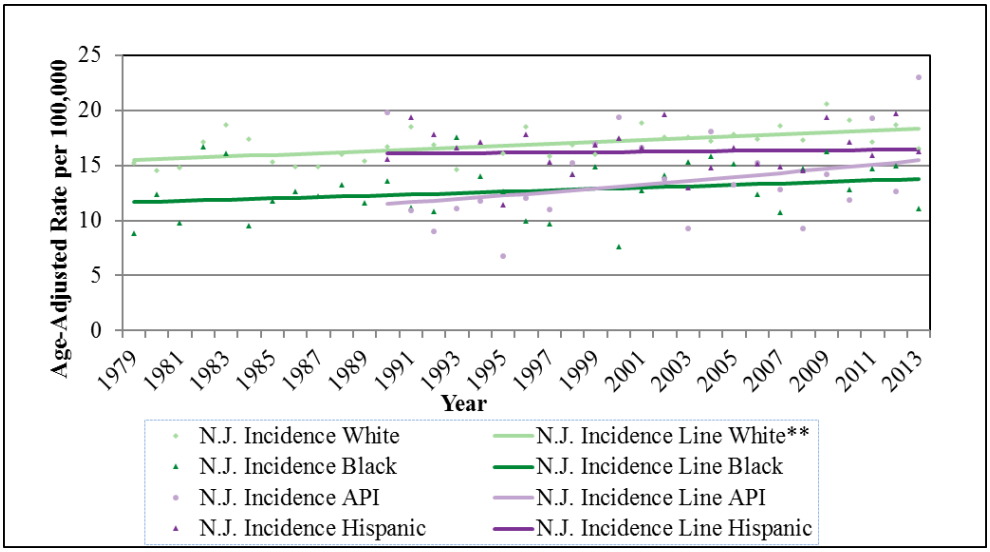
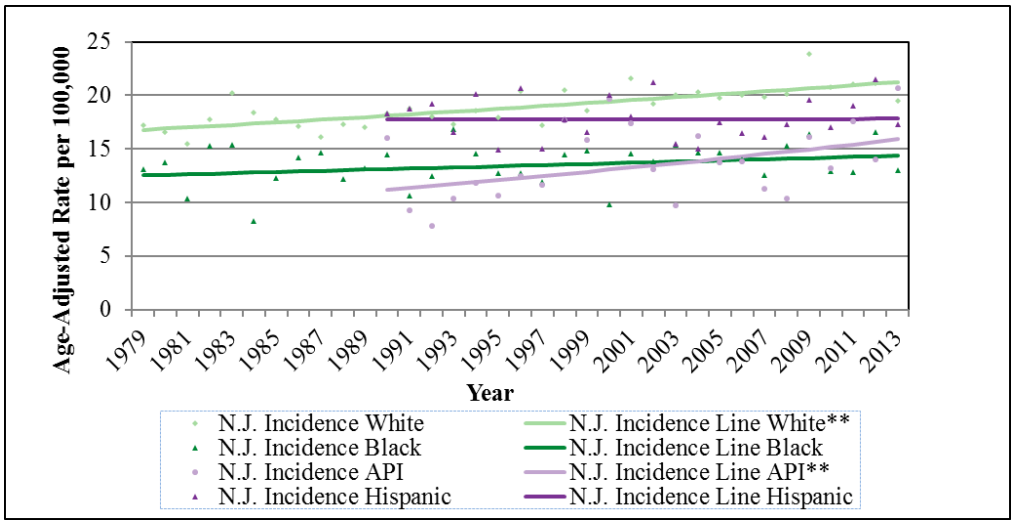


Figure 1.10- Time Trends in Childhood Cancer Incidence Rates by Race/Ethnicity, New Jersey, Ages 0-19 1979-2013



Rates are per 100,000 and age-adjusted to the 2000 US population standard. Mortality rates were calculated using 3 year averages to reduce the likelihood of suppression and yield more stable estimates. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. API=Asian/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races. Data sources: Incidence - New Jersey State Cancer Registry, New Jersey Department of Health. ** Statistically significant increase in rates over time, $p<0.05$

Link to Table A.14

- White children ages 0-14 and 0-19 showed a statistically significant increase in **incidence** rates and a statistically significant decrease in **mortality** for the time period 1990 to 2013.

- Asian/Pacific Islander (API) children ages 0-19 showed a statistically significant increase in **incidence** rates for the time period 1990 to 2013.

Figure 1.11- Time Trends in Childhood Cancer Mortality Rates by Race/Ethnicity, New Jersey, Ages 0-14, 1979-2013

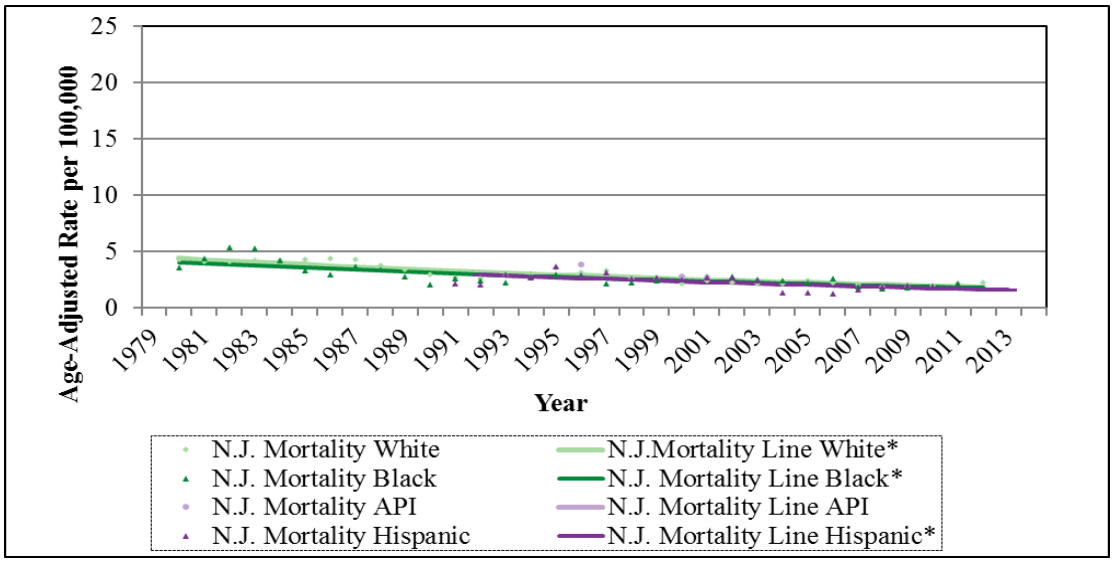
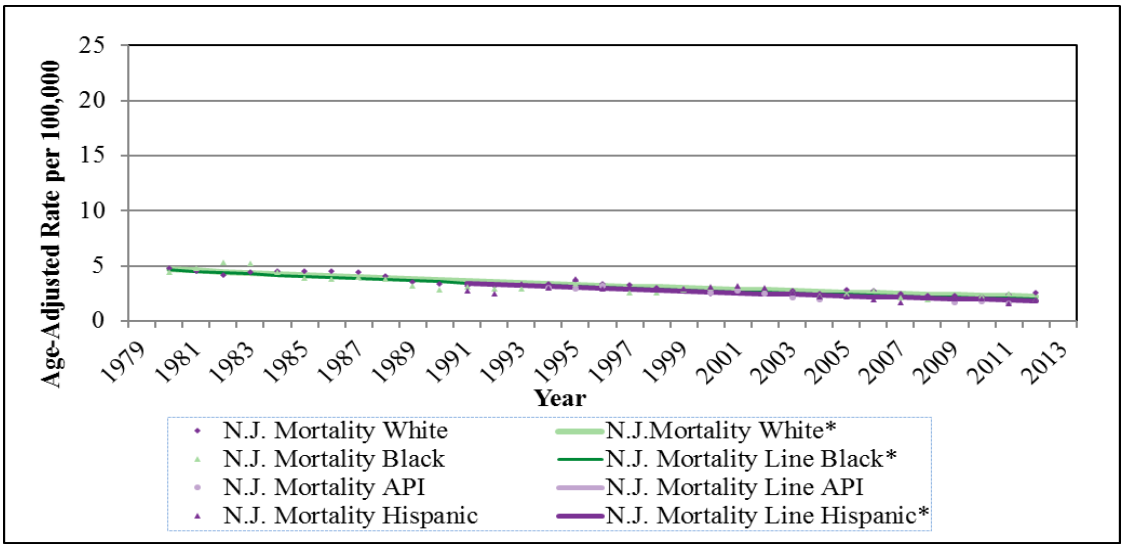


Figure 1.12- Time Trends in Childhood Cancer Mortality Rates by Race/Ethnicity, New Jersey, Ages 0-19 1979-2013



Rates are per 100,000 and age-adjusted to the 2000 US population standard. Mortality rates were calculated using 3 year averages to reduce the likelihood of suppression and yield more stable estimates. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008.
A mortality regression line was not calculated for API because the rate was zero for more than one year. API=Asians/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races. Data source: mortality- National Center for Health Statistics. * Statistically significant decrease in rates over time, $p<0.05$. A trend line could not be produced for NJ API mortality because the rate was zero for more than one year. Link to Table A.15

- White, Black and Hispanic children showed a statistically significant decrease in **mortality** rates for the time period 1990 to 2013.

Chapter 2- Leukemia

Background and Risk Factors

- Leukemias are cancers of the blood, and are designated as acute or chronic. The 4 major subtypes of leukemia are Acute Myeloid (AML), Chronic Myeloid (CML), Acute Lymphocytic (ALL), and Chronic Lymphocytic (CLL)[1].

- Leukemias are the most common childhood cancer accounting for approximately 30% of all cancers in children and teens[2]. ALL is the most common subtype of leukemia, comprising 78% of leukemia cases in childhood; most remaining cases are AML (16 %)[3]. Chronic leukemias are rare in children[2].

- The five-year survival rate for childhood ALL is greater than 85% overall[4]. In most cases, it is now greater than 90%[5]. The overall 5-year survival rate for AML is between 60-70%[4], but survival rates are higher for certain subtypes of AML. The biological diversity of AML makes five-year survival rates less predictable[4].

- There are still few known risk factors for childhood leukemia[6]. Down syndrome (Trisomy 21), Li-Fraumeni syndrome, neurofibromatosis and Fanconi anemia, Ataxia-telangiectasia, Wiskott-Aldrich syndrome, Bloom syndrome, and Schwachman-Diamond syndrome are inherited syndromes and genetic disorders which possibly increase a child's risk of developing leukemia[6].

- Having a sibling with leukemia slightly increases a child's risk of developing leukemia, especially in twins, and if the leukemia occurred in the sibling during the first year of life[6]. However, the overall risk associated with having a sibling with leukemia is still very low. Having a parent who develops leukemia as an adult does not seem to raise a child's risk of developing leukemia[6].

- Only two environmental risk factors [ionizing radiation and benzene] have been significantly associated with the risk of developing acute leukemia, especially AML[7]. Exposure to electromagnetic fields (EMFs) are not a major factor in the development of childhood leukemia[8].

- Other factors which *may* contribute to acute leukemia development include maternal alcohol use[6], maternal marijuana use[7], and possibly maternal and/or paternal cigarette smoking before or during pregnancy[7]. Breastfeeding appears to reduce the risk of developing ALL[7].

- Overall, it is thought that exposure to infection, especially in early childhood, is associated with a reduced risk of ALL[9]. Human movements which lead to "population mixing" and exposure to infection in previously unexposed individuals[8] further supports this idea, and offers a plausible argument for how immune system development may impact the risk associated with leukemia development.

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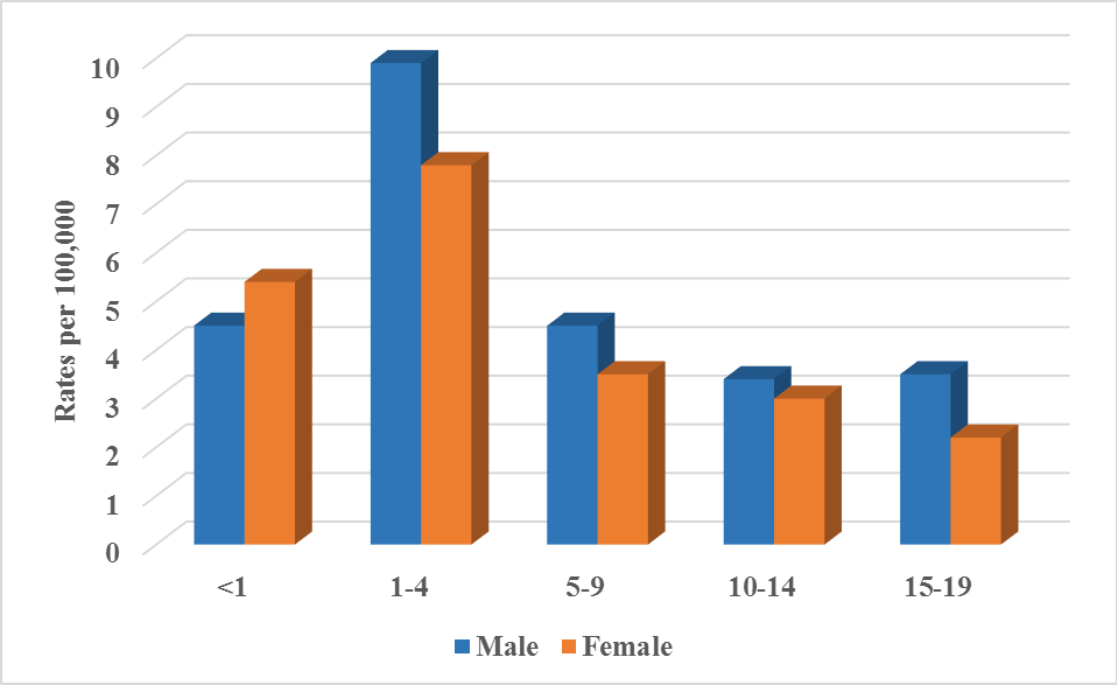
Table 2.1- Childhood Leukemia Incidence Rates by Gender and Age Group, New Jersey and the U.S.

ICCC Category	New Jersey - 1990-2013		U.S. (SEER) - 1990-2013	
	0-14	0-19	0-14	0-19
Total Leukemias	**5.2**	**4.7**	**4.6**	**4.1**
Male	5.7	5.2	5.0	4.5
Female	4.7	4.1	4.2	3.7
Lymphoid leukemias	**4.0**	**3.4**	**3.7**	**3.1**
Male	4.3	3.8	3.9	3.4
Female	3.6	3.0	3.3	2.8
Acute myeloid leukemias (AML)	**0.8**	**0.8**	**0.7**	**0.8**
Male	0.9	0.9	0.8	0.8
Female	0.7	0.7	0.7	0.8

Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health; U.S. SEER Program, National Cancer Institute (see technical notes). Link to Table A.2

- New Jersey childhood total leukemia **incidence** rates were higher than the U.S. rates in each gender and age group.
- **Incidence** rates for New Jersey lymphoid only leukemias (99% of which are the lymphoid subtype ALL) were also higher than the U.S. rates in each gender and age group.
- New Jersey males had slightly higher AML **incidence** rates in both age groups compared to the U.S.
- Overall, for leukemia, male **incidence** rates were higher than female **incidence** rates in both New Jersey and the U.S.

Figure 2.1 – Childhood Leukemia Incidence Rates by Gender and Age Group, New Jersey, 1990-2013, N=2,444



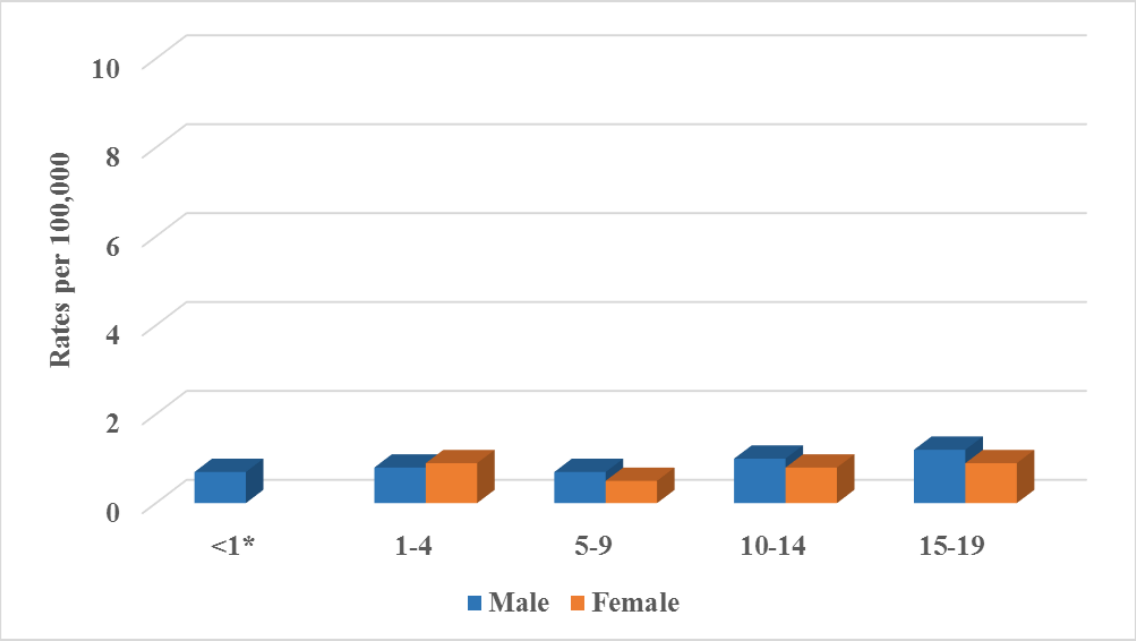
Average annual rates are per 100,000. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008.
Data sources: New Jersey State Cancer Registry, New Jersey Department of Health. Link to Table A.8 Link to Table A.9

- The leukemia **incidence** rates peaked in the 1-4 year age group, at almost 10 cases per 100,000 children a year for males, and almost 8 cases per 100,000 children a year for females.

- Females in the 15-19 year age group had the lowest **incidence** rate at about 2 per 100,000 children a year.

- Males had higher leukemia **incidence** rates than females in every age group except infants (<1).

Figure 2.2 – Childhood Leukemia Mortality Rates by Gender and Age Group, New Jersey, 1990-2013, N=445



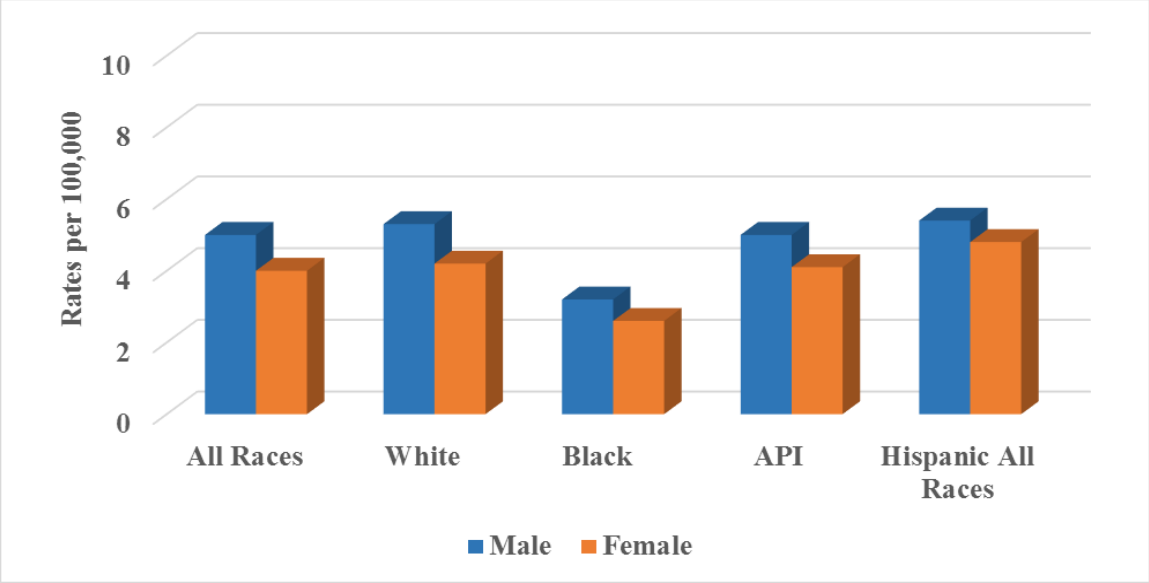
Average annual rates are per 100,000. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. *Mortality rates are not shown for the <1 age group because the number of cases was fewer than 5.
Data source: National Center for Health Statistics. Link to Table A.12 Link to Table A.13

- Overall, **mortality** rates were higher in males than in females, except for the 1-4 year age group, in which the female **mortality** rate was marginally higher than the **mortality** rate for males.

- In general, leukemia **mortality** rates increased with increasing age.

- Leukemia **morality** rates have declined since the previous childhood cancer report (1979-2005), especially in males aged 5-9 years; the **mortality** rate has halved in this group from over 1 death per 100,000 children a year (data not shown), to less than 1 death per 100,000 children a year.

Figure 2.3- Childhood Leukemia Incidence Rates by Gender and Race/Ethnicity, New Jersey, 1990-2013, Ages 0-19, N=2,444



Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. API=Asian/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races.
Data sources: New Jersey State Cancer Registry, New Jersey Department of Health.
Link to Table A.4 Link to Table A.5

- Leukemia **incidence** rates were higher in males across all races in children aged 0-19 years.

- **Incidence** rates for leukemia were highest in Hispanic children aged 0-19 years at 5.4 and 4.8 per 100,00 children per year for males and females, respectively. White children aged 0-19 years had the next highest **incidence** rates of 5.3 and 4.2 for males and females, respectively, followed by children who were Asians or Pacific Islanders. Black females experienced the lowest **incidence** rate at 2.6 per 100,000 children per year.

Note- Bar charts for childhood cancer mortality by Race/Ethnicity group were not produced because small numbers would not produce reliable results.

Figure 2.4- Time Trends in Childhood Leukemia Incidence and Mortality Rates, New Jersey and U.S., Ages 0-14, 1979-2013

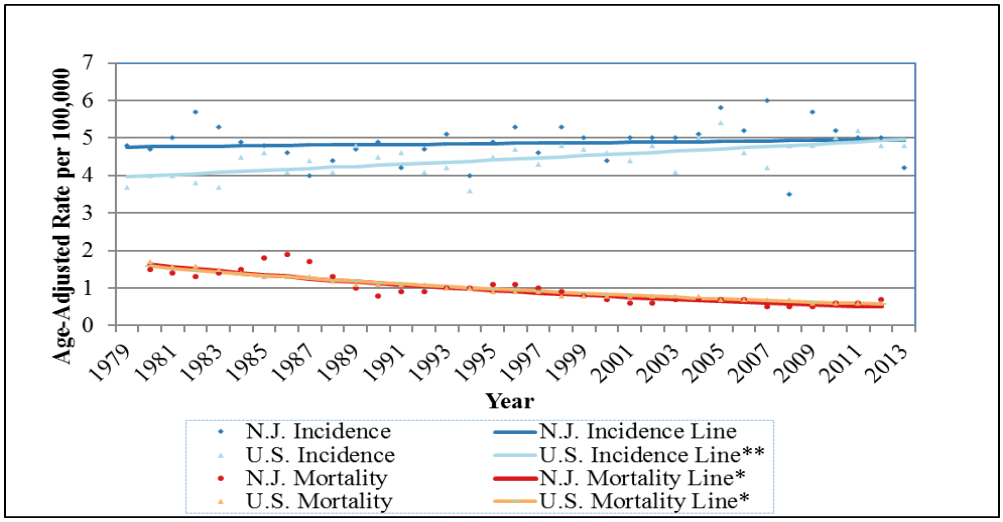
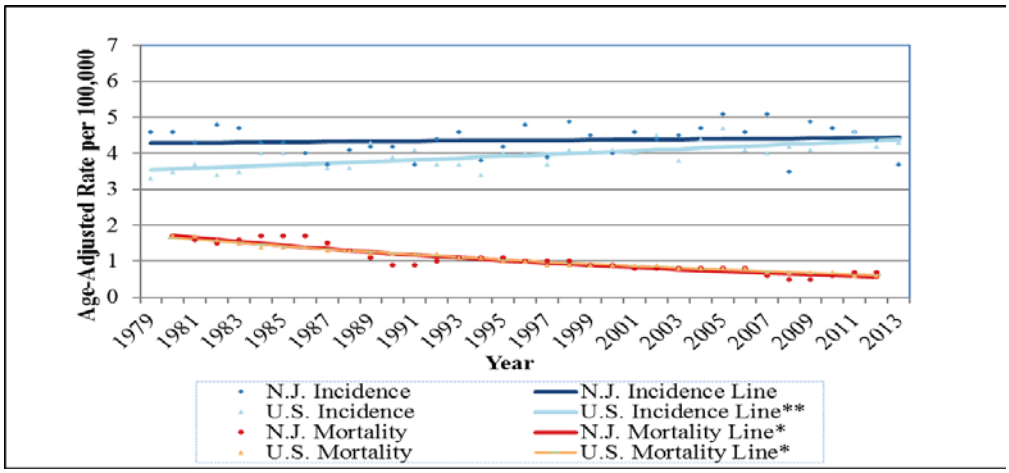


Figure 2.5- Time Trends in Childhood Leukemia Incidence and Mortality Rates, New Jersey and U.S., Ages 0-19, 1979-2013



Rates are per 100,000 and age-adjusted to the 2000 US population standard. Mortality rates were calculated using 3 year averages to reduce the likelihood of suppression and yield more stable estimates. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data sources: incidence - New Jersey State Cancer Registry, New Jersey Department of Health; mortality- National Center for Health Statistics. *Statistically significant decrease in rates over time, $p<0.05$, ** Statistically significant increase in rates over time, $p<0.05$. Link to Table A.16 ,Link to Table A.17

- Unlike the U.S., New Jersey has not had a statistically significant increase in leukemia **incidence** from 1979 to 2013.
- However, New Jersey **incidence** rates for leukemia have remained higher than the U.S. **incidence** rates for both age groups. In recent years, the U.S. incidence rates have been rising towards the New Jersey **incidence** rates for leukemia. This could be a function of better reporting.
- Conversely, childhood leukemia **mortality** rates for both New Jersey and the U.S. have declined significantly from 1979 to 2013. Overall, New Jersey **mortality** rates for leukemia have declined annually by 3.5% for ages 0-14 and 3.4% for ages 0-19. The U.S. **mortality rates** for leukemia have declined overall by 3.1% and 3.0% annually in the 0-14 and 0-19 age groups, respectively.

Chapter 3- Central Nervous System

Background and Risk Factors

- The central nervous system (CNS) is made up of the brain and spinal cord.[1] Cancers that originate in other intracranial sites such as the pituitary or pineal glands are also included in this ICCC category[2].

- Cancers of the CNS are the second most common type of childhood cancer (ages 0-14) after the leukemias, representing about 26% of all cancers diagnosed among children in this age group[3]. These cancers occur primarily in the cerebellum (part of the brain) or brain stem[3]. The most common form of CNS cancers are gliomas, which account for over half of CNS cancers in children (ages 0-14), followed by primitive neuroectodermal cancers (PNET), which account for over a fifth of CNS cancers in children. Gliomas comprise several different types of cancers, including astrocytomas.[4] The five-year relative survival from CNS cancers is about 72%[5].

- The risk factors listed below explain only a small proportion of the CNS cancers in children. Certain inherited conditions such as Li-Fraumeni syndrome, neurofibromatosis, tuberous sclerosis, Von Hippel-Lindau disease, and Turcot syndrome are associated with CNS cancers[4]. Therapeutic radiation to the head results in an increased risk, but accounts for a very small proportion of CNS childhood cancers today[4,6]. Maternal consumption of cured meats and use of nitrosatable drugs may be risk factors for CNS childhood cancers. Infection with polyoma viruses including Simian virus 40 (SV40), BK, and JC may also cause CNS cancer in children, as may living on a farm or parental occupation as a farmworker[4].

- Other factors that have been studied with no associations or uncertain results are pesticides, epilepsy, brain injury, electromagnetic fields, and aspartame[4,6].

- Consumption of vitamins in fruits, vegetables, and supplements by pregnant women may reduce the risk of CNS cancer in their children[4].

Note- Cancers coded using International Classification of Childhood Cancer ICCC site recode ICD-O-3/WHO 2008 are defined as Central Nervous System (CNS) and cancers coded using the Site Recode ICD-O-3/WHO 2008 are referred to as Brain and Other Nervous System. The Site Recode ICD-O-3/WHO 2008 is used when comparisons are made between incidence and mortality. Please see the Technical Notes for additional information.

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Table 3.1- Childhood Central Nervous System Cancer Incidence Rates by Gender and Age Group, New Jersey and U.S.

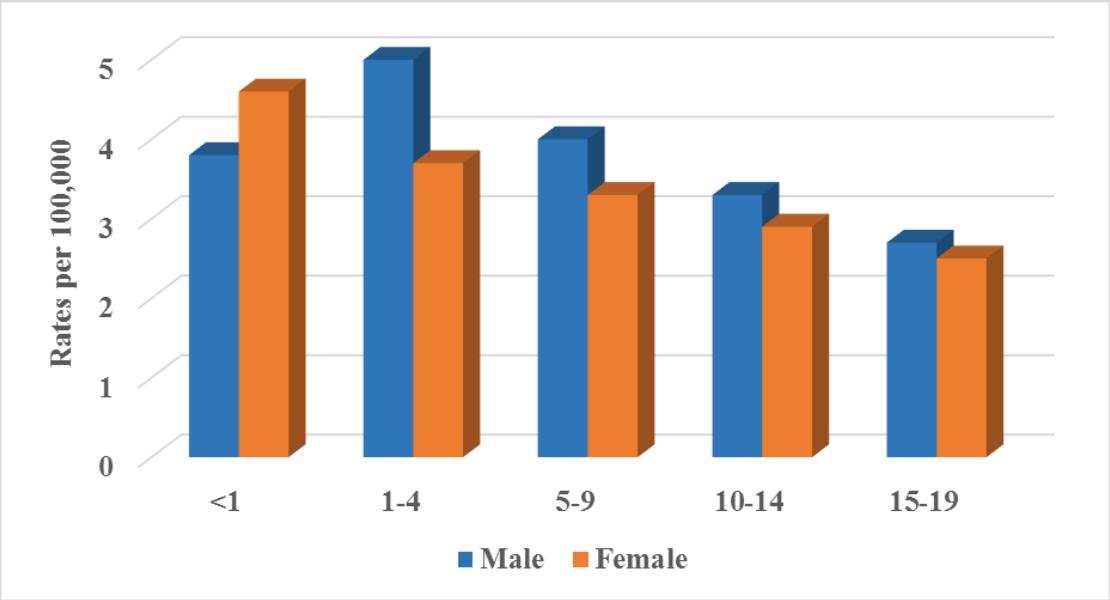
ICCC Category	New Jersey - 1990-2013		U.S. (SEER) - 1990-2013	
	0-14	0-19	0-14	0-19
Total central nervous system (CNS)	**3.6**	**3.3**	**3.3**	**3.0**
Male	3.8	3.5	3.6	3.3
Female	3.3	3.1	3.1	2.8
Astrocytomas	**1.8**	**1.7**	**1.6**	**1.5**
Male	1.8	1.7	1.6	1.6
Female	1.7	1.6	1.6	1.5
Intracranial & intraspinal embryonal tumors	**0.8**	**0.6**	**0.7**	**0.6**
Male	0.9	0.8	0.9	0.7
Female	0.6	0.5	0.6	0.5

Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. *International Classification of Childhood Cancer ICCC site recode ICD-O-3/WHO 2008. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health; U.S. SEER Program, National Cancer Institute (see technical notes). Link to Table A.2

- For New Jersey childhood central nervous system cancers, **incidence** rates were higher than the U.S. rates in each gender and age group.

- Male children had higher central nervous system cancer and astrocytoma **incidence** rates than female children in both age groups in New Jersey and the U.S., except the astrocytoma **incidence** rates were the same for males and females in the U.S. 0-14 age group.

Figure 3.1- Childhood Brain and Other Nervous System Cancer Incidence Rates by Gender and Age Group, New Jersey, 1990-2013, N=1,841

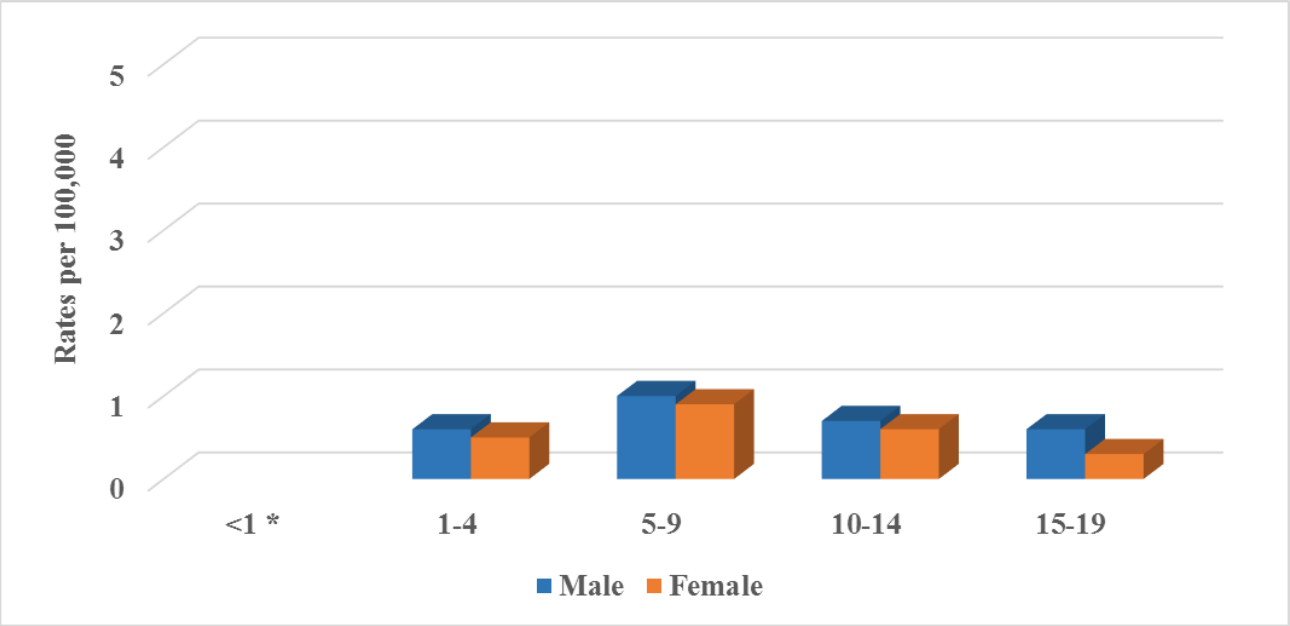


Average annual rates are per 100,000. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008.
Data sources: New Jersey State Cancer Registry, New Jersey Department of Health. Link to Table A.8 Link to Table A.9

- After peaking in age group 1-4, childhood brain and other nervous system cancer **incidence** rates decreased in a stepwise fashion starting at ages 5-9 through 10-14 and 15-19.

- Males had higher brain and other nervous system cancer **incidence** rates than females in every age group except infants (< 1 year).

Figure 3.2- Childhood Brain and Other Nervous System Cancer Mortality Rates by Gender and Age Group, New Jersey, 1990-2013, N=338

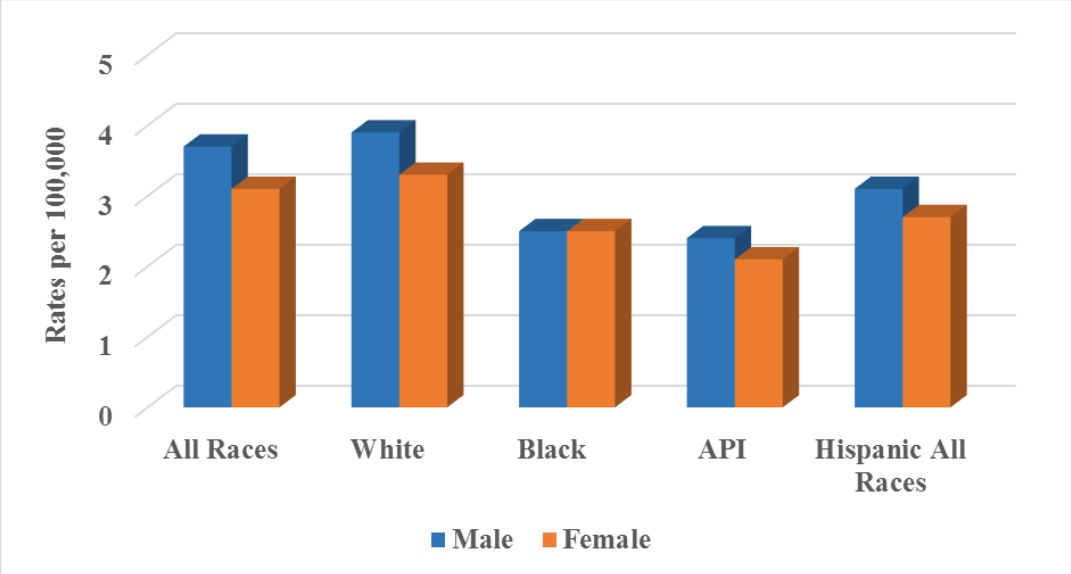


Average annual rates are per 100,000. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO
Data source: National Center for Health Statistics.
*Mortality rates are not shown for the <1 age group because the number of cases was fewer than 5. Link to Table A.12 Link to Table A.13

- Childhood central nervous system cancer **mortality** was low, with less than 1 death per 100,000 occurring each year.

- Males had slightly higher central nervous system cancer **mortality** rates than females in each age group except for infants.

Figure 3.3- Childhood Brain and Other Nervous System Cancer Incidence Rates by Gender and Race/Ethnicity, New Jersey, 1990-2013, Ages 0-19, N=1,841



Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. API=Asians/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races. Data source: New Jersey State Cancer Registry, New Jersey Department of Health.
Link to Table A.4 Link to Table A.5

- Childhood central nervous system cancer **incidence** was higher in Whites for both genders than any other race.
- Childhood central nervous system cancer **incidence** was lower in Asian/Pacific Islanders for both genders than any other race.

Note- Bar charts for childhood cancer mortality by Race/Ethnicity group were not produced because small numbers would not produce reliable results.

Figure 3.4-Time Trends in Childhood Brain and Other Nervous System Cancer Incidence and Mortality Rates, New Jersey and U.S., Ages 0-14, 1979-2013

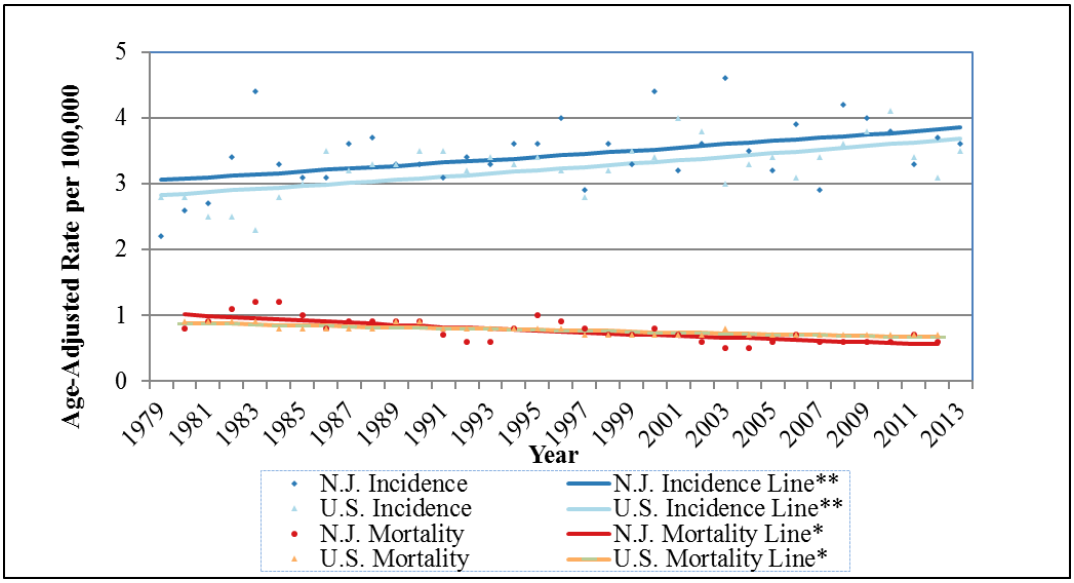
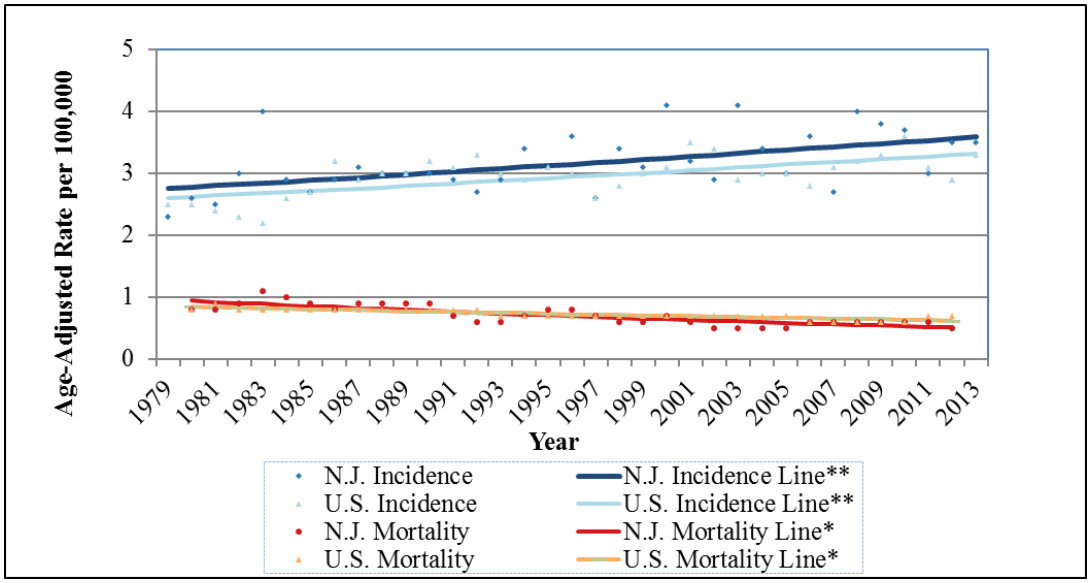


Figure 3.5-Time Trends in Childhood Brain and Other Nervous System Cancer Incidence and Mortality Rates, New Jersey and U.S., Ages 0-19, 1979-2013



Rates are per 100,000 and age-adjusted to the 2000 US population standard. Mortality rates were calculated using 3 year averages to reduce the likelihood of suppression and yield more reliable estimates. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data sources: incidence - New Jersey State Cancer Registry, New Jersey Department of Health; mortality-National Center for Health Statistics. * Statistically significant decrease in rates over time, $p<0.05$, ** Statistically significant increase in rates over time, $p<0.05$.

Link to Table A.18 Link to Table A.19

- Childhood brain and other nervous system cancer **incidence** rates for New Jersey and the U.S. have increased significantly from 1979 to 2013.

- Brain and other nervous system cancer **mortality** rates have declined significantly from 1979 to 2013 for both New Jersey and the U.S.

Chapter 4- Lymphoma

Background and Risk Factors

- Lymphomas are a group of blood cancers which arise in the lymphatic system[1]. This system is a network of thin vessels which stretch throughout the body carrying a colorless liquid ("lymph")[2]. In lymphomas, defective white cells (known as T-lymphocytes and B-lymphocytes) clump together and form tumors, most commonly in lymph nodes, but these tumors can arise in any part of the body where lymphoid tissue is found, such as in bone marrow and the spleen[1].
- The two main types of lymphomas are Hodgkin lymphoma (HL or "Hodgkin's Disease") and non-Hodgkin lymphoma (NHL)[1].
- HL is most common in adolescents (15-19 years), accounting for approximately 15% of cancers in this age group[3]. It is rare in children under the age of 5[4]. NHL is most common in childhood (0-14 years), and comprises about 6% of all childhood cancers[3], but it is rare children under the age of 3[4].
- The five-year survival rate for HL has increased over time from 81% to more than 95% for both children and adolescents[5]. The five-year survival rate for children and adolescents diagnosed with NHL has dramatically improved over time; increasing from 45% and 48% in 1975 to 87% and 82% in 2010[5], respectively.
- Both HL and NHL are associated with Epstein-Barr virus (EBV)[6,7], Human immunodeficiency virus (HIV)[6,7], as well as a family history of lymphomas and related cancers[8,9].
- The childhood form of HL occurs in children (aged 14 years and younger). The young adult form is relevant to adolescents, occurring between ages 15 and 34 years[8].
- An increased risk of childhood HL is seen with larger family size and lower socioeconomic status (SES)[8]. HL in young adults is seen more often in higher SES families in industrialized countries, as well as in adolescents with more biological siblings, and an earlier birth order[7]. The lower risk of HL in adolescents with older, but not younger siblings, is consistent with the idea that immune system maturity is important in HL development[8]. This is supported by findings which show exposure to common childhood infections appears to decrease the risk of childhood HL, presumably because of increased immune system maturity[7].
- NHL risk factors include immunodeficiency from congenital (present at birth) problems, such as Wiskott-Aldrich syndrome, ataxia-telangiectasia, severe combined immunodeficiency syndrome (SCID), common variable immunodeficiency, Bloom syndrome, X-linked lymphoproliferative syndrome, as well as a history of transplant surgery, past cancer treatment and other immunosuppression[8]. Exposure to high doses of ionizing radiation can lead to the development of NHL, although not as aggressively as it leads to leukemia[10].
- Prolonged breastfeeding may offer a protective effect against lymphoma malignancies[10].

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Table 4.1- Childhood Lymphoma Incidence Rates by Gender and Age Group, New Jersey and U.S.

ICCC Category	New Jersey - 1990-2013		U.S. (SEER) - 1990-2013	
	0-14	0-19	0-14	0-19
Total lymphomas	**1.9**	**3.1**	**1.6**	**2.5**
Male	2.4	3.5	2.0	2.8
Female	1.4	2.6	1.2	2.1
Hodgkin lymphomas (HL)	**0.7**	**1.5**	**0.6**	**1.2**
Male	0.8	1.5	0.6	1.2
Female	0.6	1.6	0.5	1.2
Non-Hodgkin lymphomas (NHL)	**0.7**	**1.0**	**0.7**	**0.9**
Male	0.9	1.3	0.9	1.1
Female	0.5	0.7	0.5	0.7

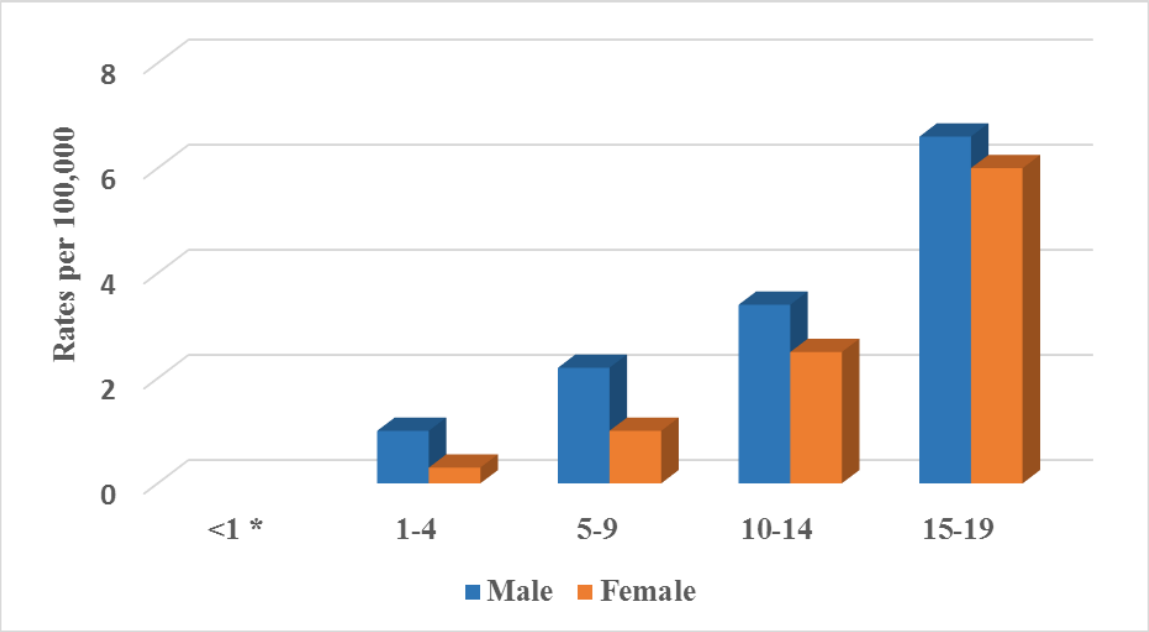
Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health; U.S. SEER Program, National Cancer Institute (see technical notes). ** NHL does not include Burkitt lymphoma Link to Table A.2

- Total childhood lymphomas, and HL-specific **incidence** rates were higher in New Jersey than the U.S. across every gender and age group.

- For NHL, when New Jersey adolescent males (0-19 age group) were included in the analysis, the NHL **incidence** rate was higher than the U.S.; otherwise, the New Jersey **incidence** rates for NHL were equal to the U.S. rates across every gender and age group.

- Overall, total childhood lymphomas, HL-specific and NHL-specific **incidence** rates were higher in males than in females in both New Jersey and the U.S. for each age group. However, when male adolescents were included in the analysis (age group 0-19), the HL-specific **incidence** rate for New Jersey males became slightly lower than the HL-specific **incidence** rate for New Jersey females 0-19 years (adolescents included).

Figure 4.1- Childhood Lymphoma Incidence Rates by Gender and Age Group, New Jersey, 1990-2013, N=1,523

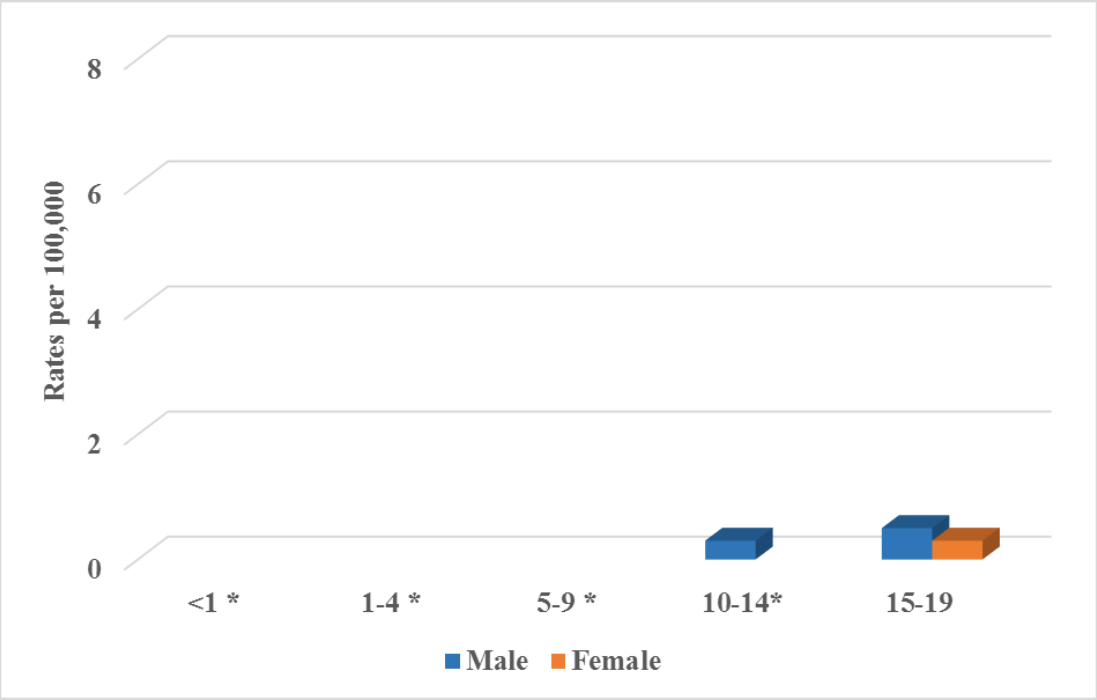


Average annual rates are per 100,000. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008.
Data sources: New Jersey State Cancer Registry, New Jersey Department of Health. *Mortality rates are not shown for the <1 age group because the number of cases was fewer than 5. Link to Table A.8 Link to Table A.9

- Childhood lymphoma **incidence** rates increased with each successive older age group, with the highest rates of approximately 6 cases per 100,000 children per year in the 15-19 age group.

- In each age group, males had a higher lymphoma **incidence** rate than females, but the difference between the two genders decreased with each older age group.

Figure 4.2- Childhood Lymphoma Mortality Rates by Gender and Age Group, New Jersey, 1990-2013, N=99

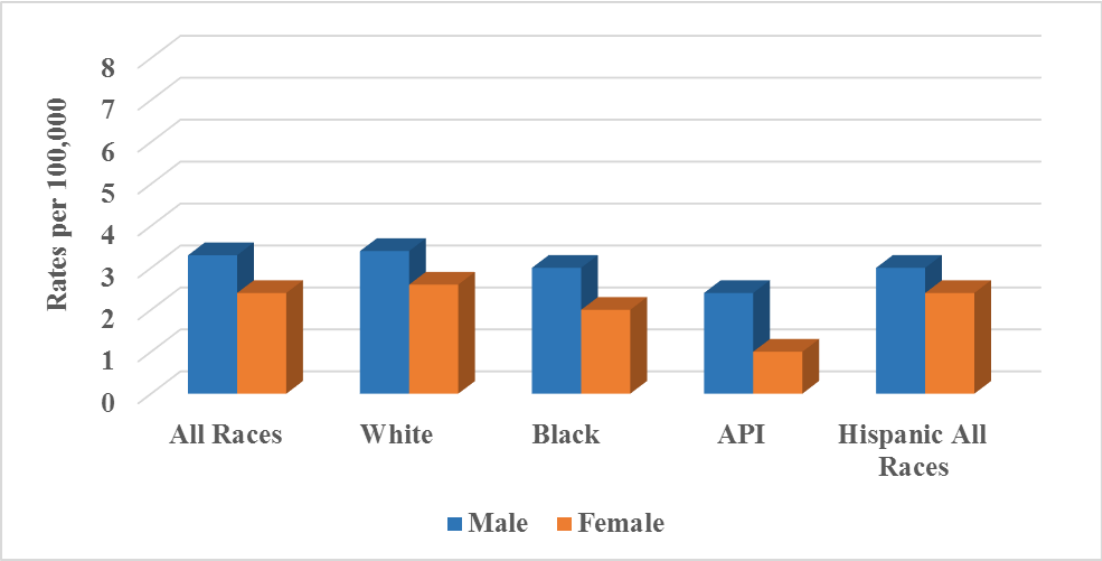


Average annual rates are per 100,000. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data source: National Center for Health Statistics. *Mortality rates are not shown for the <1,1-4 and 5-9 age groups because the number of cases was fewer than 5.
Link to Table A.12 Link to Table A.13

- The lymphoma **mortality** rates were lower than the **incidence** rates with much less than 1 death per 100,000 children a year across all age groups. **Mortality** rates for adolescents especially have almost halved since the previous childhood cancer report[17].

- Lymphoma **mortality** rates were higher in males than in females in the older age groups; however, because of the low number of deaths and consequent rate suppression in all but the 15-19 age group, comparisons by gender should be interpreted with caution. The differences in **mortality** may also be in part due to the higher **incidence** in males.

Figure 4.3- Childhood Lymphoma Incidence Rates by Gender and Race/Ethnicity, New Jersey, 1990-2013, Ages 0-19, N=1,523



Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. API=Asians/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races.
Data source: New Jersey State Cancer Registry, New Jersey Department of Health. Link to Table A.4 Link to Table A.5

- Lymphoma **incidence** rates are higher in males across all races in children aged 0-19 years.

- **Incidence** rates for lymphoma are higher in White children aged 0-19 years, with White males experiencing the highest incidence rate at 3.4 per 100,000 children.

Note- Bar charts for childhood cancer mortality by Race/Ethnicity group were not produced because small numbers would not produce reliable results.

Figure 4.4- Time Trends in Childhood Lymphoma Incidence and Mortality Rates, New Jersey and U.S., Ages 0-14, 1979-2013

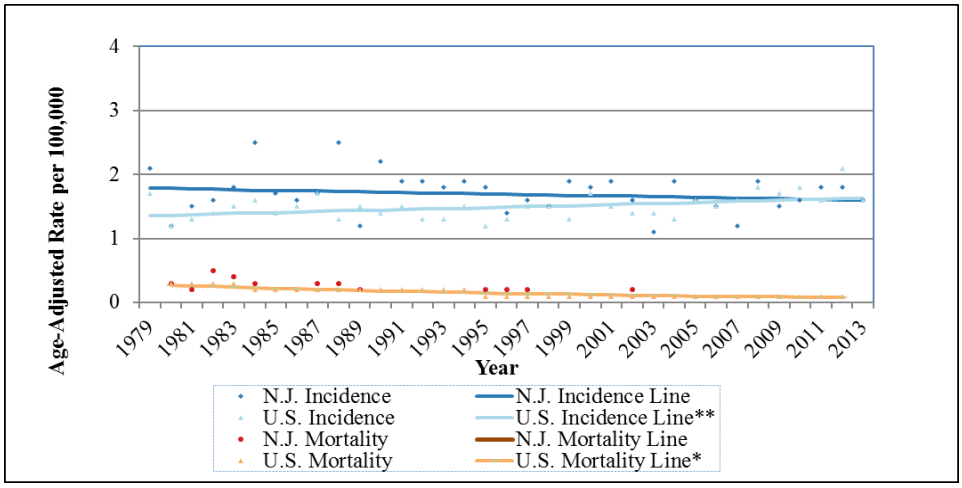
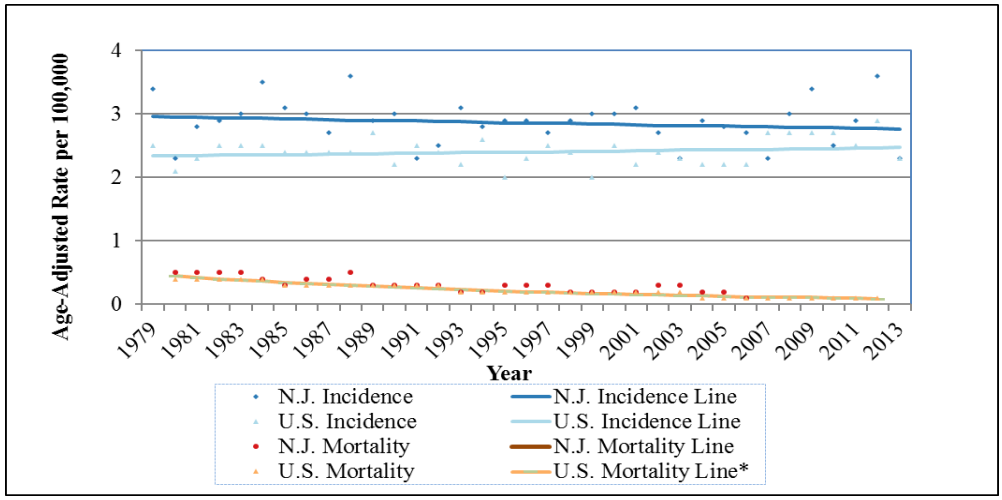


Figure 4.5- Time Trends in Childhood Lymphoma Incidence and Mortality Rates, New Jersey and U.S., Ages 0-19, 1979-2013



Rates are per 100,000 and age-adjusted to the 2000 US population standard. Mortality rates were calculated using 3 year averages to reduce the likelihood of suppression and yield more reliable estimates. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data sources: Incidence - New Jersey State Cancer Registry, New Jersey Department of Health; mortality- National Center for Health Statistics. * Statistically significant decrease in rates over time, $p<0.05$, ** Statistically significant increase in rates over time, $p<0.05$. A trend line could not be produced for NJ mortality because rate was zero for more than one year. Link to Table A.20 Link to Table A.21

- Between 1979 and 2013, the childhood lymphoma **incidence** rates declined in New Jersey in both age groups. In the U.S., **incidence** rates for childhood lymphoma marginally increased for both age groups; this increase was statistically significant in the 0-14 age group.
- From 1979 through 2013, New Jersey lymphoma **incidence** rates generally were higher than the U.S. rates in the 0-14 age group, and even more so in the 0-19 age group, although in recent years the differences between New Jersey and U.S. incidence rates has narrowed.
- Childhood lymphoma **mortality** rates for the U.S. have declined significantly from 1979 to 2013 for ages 0-14 and 0-19.
- The childhood lymphoma **mortality** rates in New Jersey closely resemble the U.S. mortality rates for both age groups throughout 1979 to 2013.

Chapter 5- Neuroblastoma

Background and Risk Factors

- The sympathetic nervous system (SNS) is the part of the nervous system that controls the vital functions of the body that are not consciously regulated. It includes the activity of the heart, the smooth muscles (such as digestive muscles), and glands[3].

- The great majority of cancers of the SNS are neuroblastomas which are most often diagnosed in infants (less than one-year old) and are the most common cancer of infancy[1]. Neuroblastoma is a cancer that begins in pregnancy; it arises from primordial neural crest cells that form the adrenal medulla and sympathetic nervous system[2]. Neuroblastomas can occur anywhere on the body but usually are found in the abdomen[3]. The data presented in this section are limited to neuroblastoma.

- The five-year relative survival for neuroblastoma is about 78%[4]. Little is known about what causes neuroblastoma.

- A small percentage of childhood neuroblastoma cases have a genetic predisposition. Germ-line mutations in the anaplastic lymphoma kinase (ALK) gene have been identified as the cause of most hereditary neuroblastomas. Genetic conditions that may also play a role in development are neurofibromatosis, Turner syndrome, and Beckwith-Wiedemann syndrome[5]. A few studies have also found associations with neuroblastoma due to farm residence, parental employment in agriculture, and pesticide use in the garden and home[2].

- Recent studies have explored maternal use of oral contraceptives or infertility drugs, medications such as amphetamines, diuretics, and tranquilizers, and alcohol and tobacco use before or during pregnancy as potential risk factors. Both low birth weight and increased birth weight also have been associated with neuroblastoma. Maternal vitamin use during pregnancy and breastfeeding may be associated with a reduced risk of neuroblastoma[2].

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Table 5.1- Childhood Neuroblastoma Incidence Rates by Gender and Age Group, New Jersey and U.S.

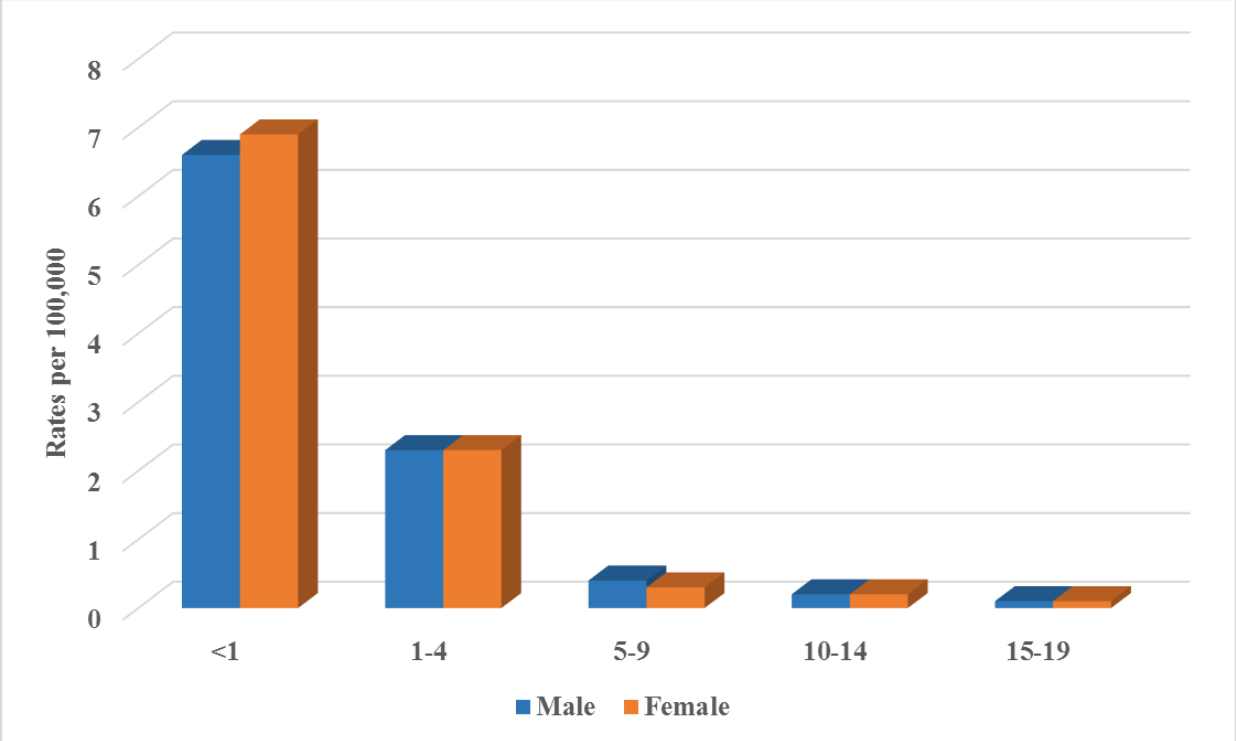
ICCC Category	New Jersey - 1990-2013		U.S. (SEER) - 1990-2013	
	0-14	0-19	0-14	0-19
Neuroblastoma	**1.2**	**0.9**	**1.1**	**0.9**
Male	1.2	0.9	1.1	0.9
Female	1.2	0.9	1.1	0.9

Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health; U.S. SEER Program, National Cancer Institute (see technical notes). Link to Table A.2

- The New Jersey neuroblastoma **incidence** rates were slightly higher than the U.S. rates in the 0-14 age group.

- The New Jersey and U.S. neuroblastoma **incidence** rates were the same when older adolescents were included (0-19 age group).

Figure 5.1- Childhood Neuroblastoma Incidence Rates by Gender and Age Group, New Jersey, 1990-2013, Ages 0-19, N=519



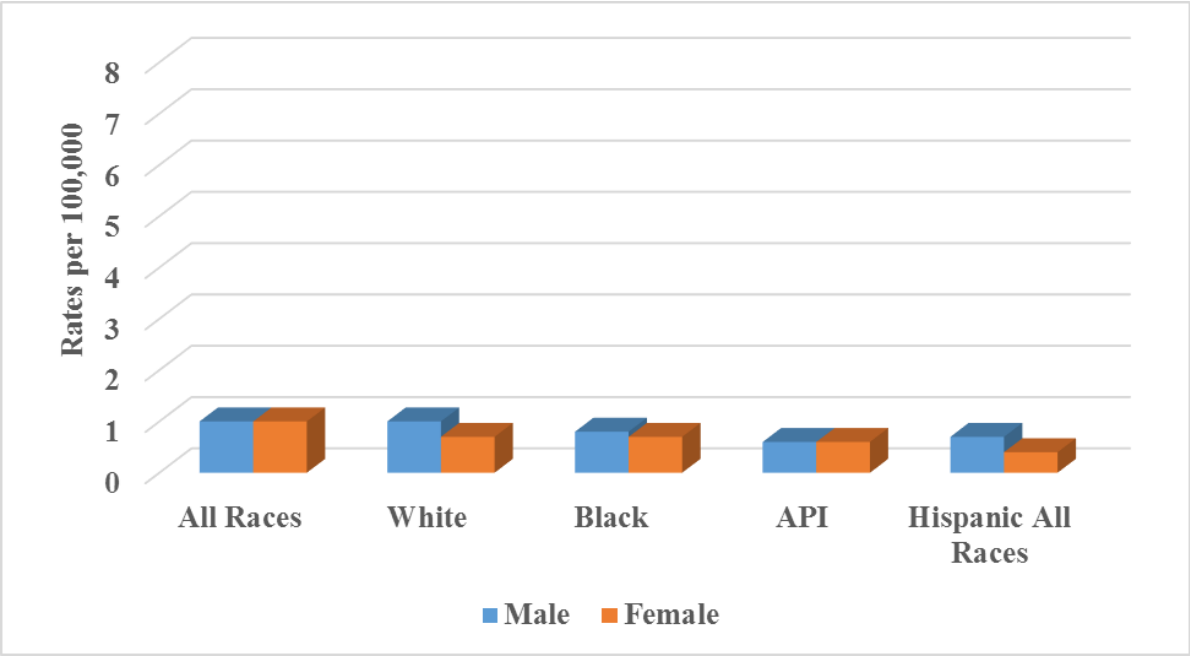
Average annual rates are per 100,000. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. Data source: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health. Link to Table A.10 Link to Table A.11

Note- Mortality data could not be produced because this site grouping is not defined in the cause of death recode (see technical notes).

- The neuroblastoma rates in males and females were highest in infants (<1 year), at just under 7 cases per 100,000 children per year, with a significant decrease in the subsequent age groups.

- The neuroblastoma rates in males and females were similar in each age group.

Figure 5.2- Childhood Neuroblastoma Incidence Rates by Gender and Race/Ethnicity, New Jersey, 1990-2013, Ages 0-19, N=519



Average annual rates are per 100,000. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. API=Asians/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races. Data source: New Jersey State Cancer Registry, New Jersey Department of Health. Link to Table A.10 Link to Table A.11

Note- Bar charts for childhood cancer mortality by Race/Ethnicity group were not produced because small numbers would not produce reliable results.

- The neuroblastoma incidence rates were slightly higher among White, Black and Hispanic males compared to females.

Chapter 6- Soft Tissue Sarcoma

Background and Risk Factors

- Soft tissue sarcomas (STS) form in the soft tissues of the body such as muscle, tendons, fat, blood vessels, synovial tissue (tissue surrounding joints), nerves, and cartilage[1,2,3]. Approximately 7% of all childhood cancers are soft tissue sarcomas[4].
- The most common soft tissue sarcoma among children 0-14 years of age is rhabdomyosarcoma (cancer of striated muscles), representing about half of all childhood STS[4]. Two-thirds of rhabdomyosarcoma cases occur in children less than 10 years of age with a median age at diagnosis of 5 years[5]. Five-year relative survival rates are 72% for STS overall and 66% for rhabdomyosarcoma[6].
- A small proportion of STS cases have known risk factors. These include heredity as well as nonhereditary risk factors[1,5,7,8]. Inherited conditions associated with STS include Li-Fraumeni syndrome (with Germ-line P53 mutations), Beckwith-Wiedemann syndrome, Costello syndrome, Noonan syndrome, neurofibromatosis type 1, pleuropulmonary blastoma (with Germ-line DICER1 mutations), and others[1,3,5,7,8].
- Environmental factors that may be related to soft tissue sarcoma in children include high birth weight and accelerated fetal growth, advanced maternal age, prenatal exposure to radiation, low socioeconomic status, having Epstein-Barr virus infection and AIDS at the same time, and parental use of marijuana and cocaine, among others[1,3,5,7,8,9].

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Table 6.1- Childhood Soft Tissue Sarcoma Incidence Rates by Gender and Age Group, New Jersey and U.S.

ICCC Category	New Jersey - 1990-2013		U.S.(SEER) - 1990-2013	
	0-14	0-19	0-14	0-19
Total Soft Tissue Sarcomas	**1.1**	**1.3**	**1.1**	**1.2**
Male	1.2	1.4	1.1	1.3
Female	1.0	1.1	1.0	1.1
Rhabdomyosarcomas	**0.6**	**0.5**	**0.5**	**0.5**
Male	0.7	0.6	0.6	0.5
Female	0.4	0.4	0.4	0.4

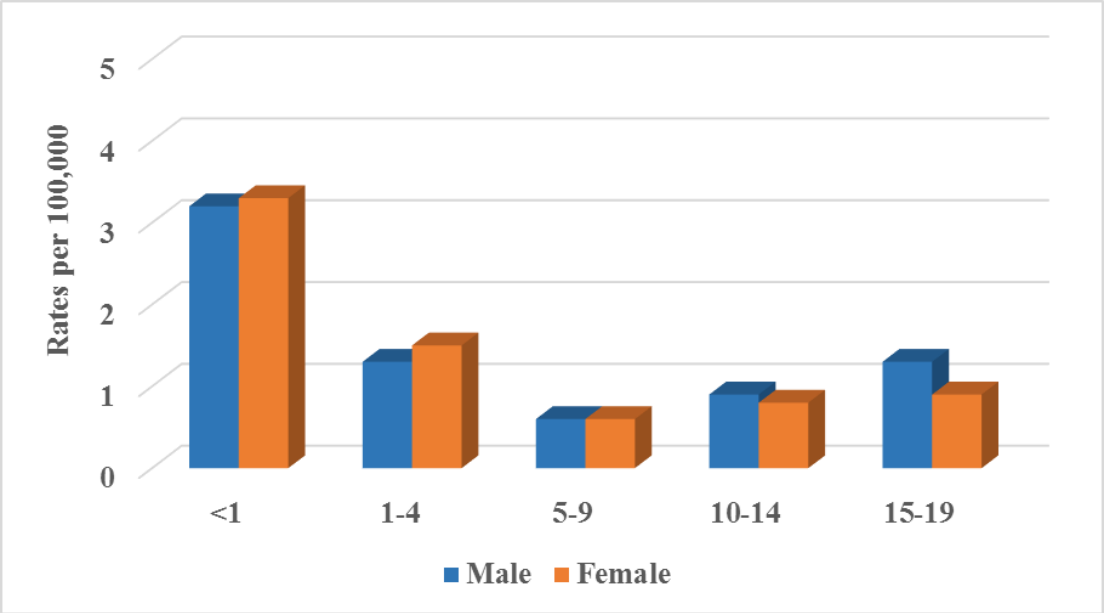
Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health; U.S. SEER Program, National Cancer Institute (see technical notes). Link to Table A.2

- The female childhood soft tissue sarcoma **incidence** rates were the same in New Jersey and the U.S. for each age group, while the male childhood soft tissue sarcoma incidence rates were slightly higher in New Jersey than in the U.S.

- Similarly, for childhood rhabdomyosarcoma, the **incidence** rates for females were the same in New Jersey and the U.S. for each age group, while the male **incidence** rates were slightly higher in New Jersey than in the U.S. The female **incidence** rates are also the same for each age group.

- In each age group, New Jersey and U.S. males had slightly higher **incidence** rates of soft tissue sarcoma and rhabdomyosarcoma than females.

Figure 6.1- Childhood Soft Tissue Sarcoma Incidence Rates by Gender and Age Group, New Jersey, 1990-2013, N=587

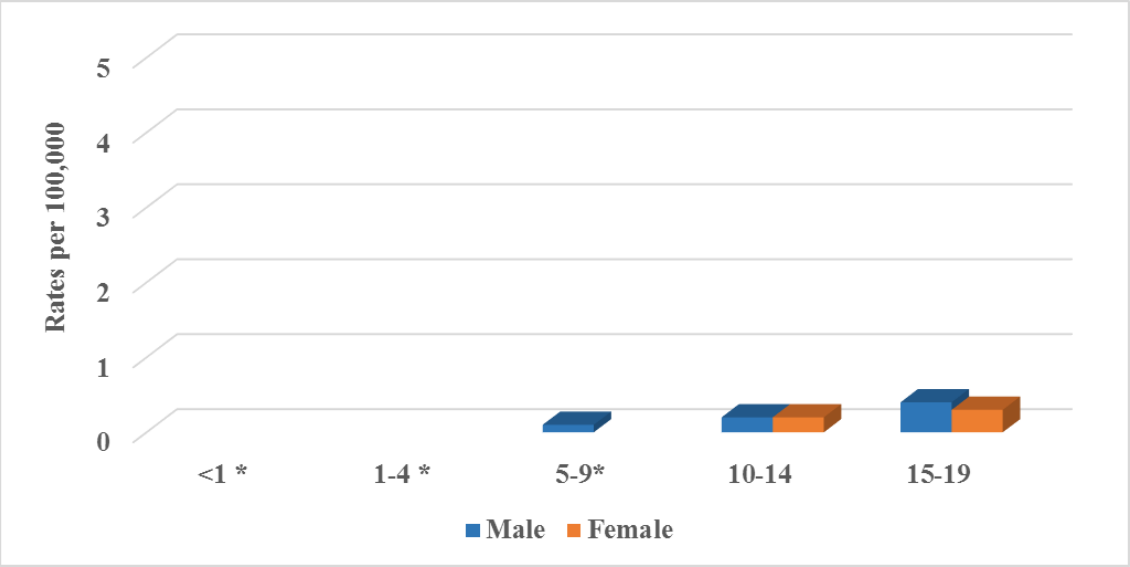


Average annual rates are per 100,000. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008.
Data source: New Jersey State Cancer Registry, New Jersey Department of Health. Link to Table A.8 Link to Table A.9

- Infants (<1) had the highest childhood soft tissue sarcoma **incidence** rates, 3 cases per 100,000 children per year. **Incidence** rates in all other age groups were much lower, ranging from less than 1 to 1.5 cases per 100,000 children per year.

- Female childhood soft tissue sarcoma **incidence** rates were higher than male rates for children less than 5 years of age, while **incidence** rates were higher for males in both the 10-14 and 15-19 age groups.

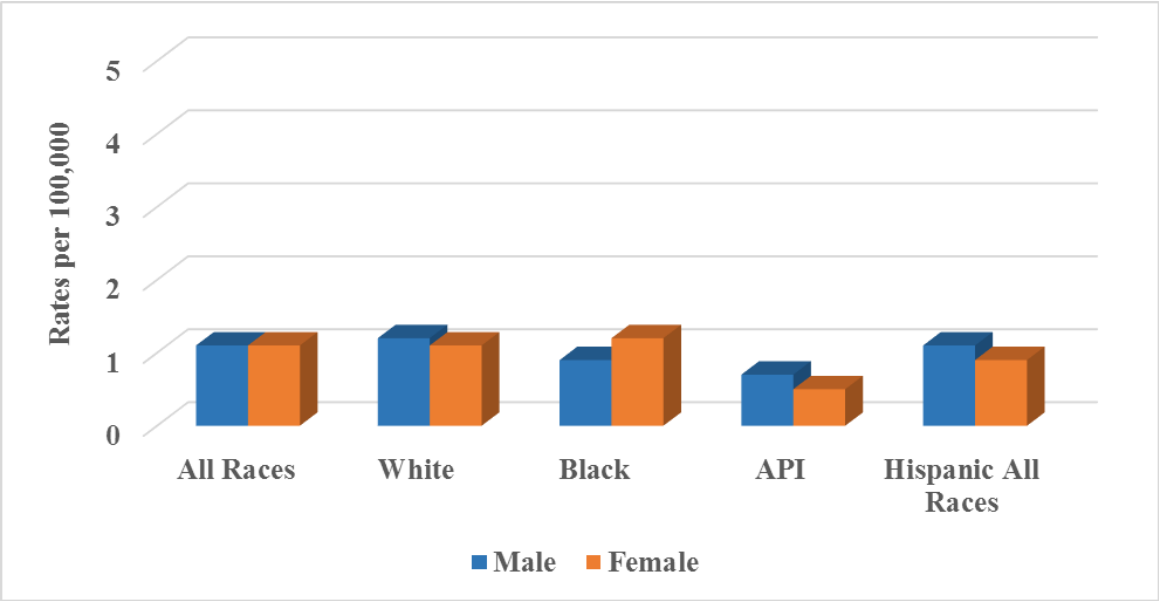
Figure 6.2- Childhood Soft Tissue Sarcoma Mortality Rates by Gender and Age Group, New Jersey, 1990-2013, N=109



Average annual rates are per 100,000. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data source: National Center for Health Statistics. *Mortality rates are not shown for the <1 and the 1-4 age groups because the number of cases was fewer than 5.
Link to Table A.12 Link to Table A.13

- Childhood soft tissue sarcoma **mortality** rates were very low, far less than 1 death per 100,000 children per year.
- The soft tissue sarcoma **mortality** rates were less than 10 deaths per 100,000 per year for children less than 5 years of age, and increased with each older age group beginning with the 5-9 age group.
- Males had higher soft tissue sarcoma **mortality** rates than females for the 5-9 and 15-19 age groups.

Figure 6.3- Childhood Soft Tissue Incidence Rates by Gender and Race/Ethnicity, New Jersey, 1990-2013, Ages 0-19, N=587



Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. API=Asians/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races. Data source: New Jersey State Cancer Registry, New Jersey Department of Health. Link to Table A.4 Link to Table A.5

- Childhood soft tissue sarcoma **incidence** rates for males were higher than female rates among Whites, Asian/Pacific Islanders, and those of Hispanic ethnicity, and lower than female rates among Blacks.

- Childhood soft tissue sarcoma **incidence** rates were highest among Whites and lowest among Asian/Pacific Islanders for males and females.

Note- Bar charts for childhood cancer mortality by Race/Ethnicity group were not produced because small numbers would not produce reliable results.

Chapter 7- Kidney

Background and Risk Factors

- About 95% of the kidney (renal) cancers that occur in children in the 0-14 age group (90% of children 0-19) are Wilms tumors (or nephroblastomas), which are believed to arise from primitive metanephric blastema (the tissue from which the normal kidney develops)[1]. Wilms tumor usually affects just one kidney, but can affect both, and most often occurs in children between 3 and 4 years old[2].
- The five-year relative survival rate for all childhood kidney cancers is 89% and 91% for Wilms tumor[3].
- Risk factors for Wilms tumor (nephroblastomas), include certain inherited conditions and congenital anomalies such as aniridia, genitourinary abnormalities, and mental retardation (WAGR) syndrome; Denys-Drash syndrome; Frasier syndrome; Beckwith-Wiedemann syndrome; aniridia; hemihypertrophy; cryptorchidism; hypospadias; and a family history of Wilms tumor[2,4,5,6]. Less often, Wilms tumor is associated with Perlman syndrome, Sotos syndrome, and Simpson-Global-Behmel syndrome[2,4,5].
- Other possible risk factors for Wilms tumor are paternal occupational exposure to hydrocarbons, lead, or other metals before conception, high birth weight, parental exposure to pesticides, and maternal use of coffee or tea, hair dye, and medications during pregnancy[4,7].

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Table 7.1- Childhood Kidney Cancer Incidence Rates by Gender and Age Group, New Jersey and U.S.

ICCC Category	New Jersey - 1990-2013		U.S. (SEER) - 1990-2013	
	0-14	0-19	0-14	0-19
Total Kidney cancers	**0.9**	**0.7**	**0.8**	**0.7**
Male	0.8	0.7	0.8	0.6
Female	1.0	0.8	0.9	0.7
Nephroblastoma & other nonepithelial renal tumors *	**0.9**	**0.7**	**0.8**	**0.6**
Male	0.8	0.6	0.8	0.6
Female	0.9	0.7	0.8	0.6

*includes Wilms tumor (nephroblastomas) which is about 95% of the kidney cancer among ages 0-14 and 90% of kidney cancers among ages 0-19 in New Jersey. Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health; U.S. SEER Program, National Cancer Institute (see technical notes). Link to Table A.2

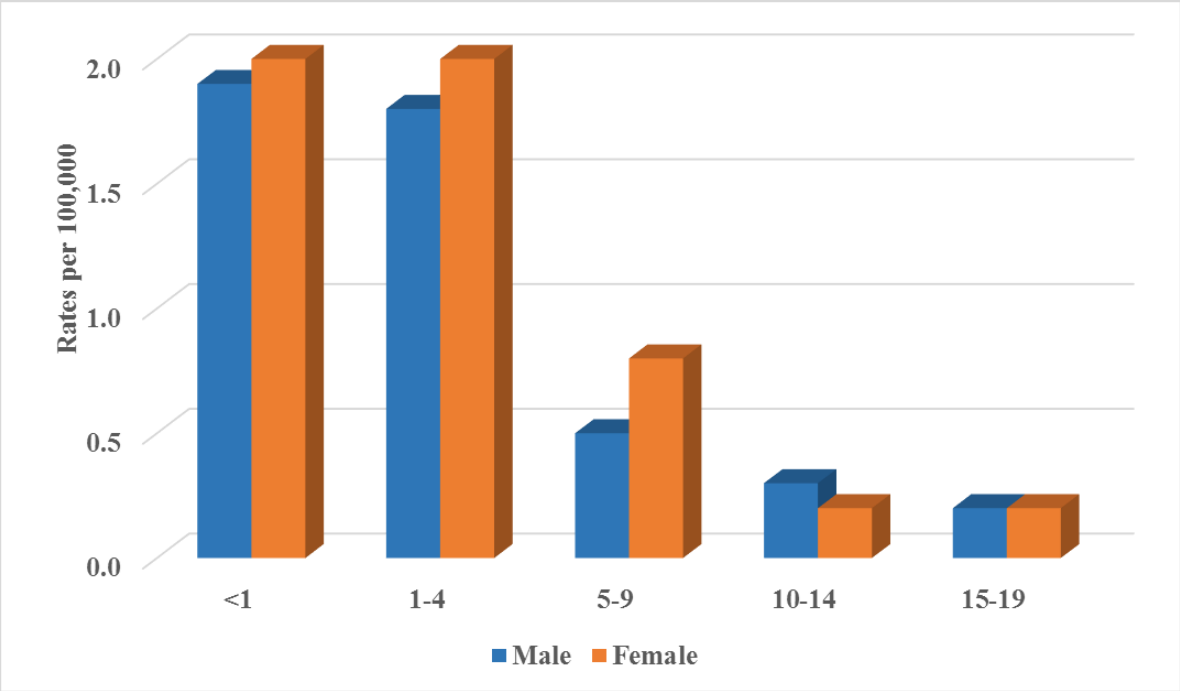
- When New Jersey adolescents (0-19 age group) were included in the analysis, the kidney cancer **incidence** rate decreased slightly compared to children in the 0-14 age group for both males and females, in New Jersey and the U.S. In each age group, the New Jersey female kidney cancer **incidence** rate was slightly higher than the U.S. female rate.

- The **incidence** rates of nephroblastoma and other nonepithelial renal tumors were the same in New Jersey and the U.S. for males in each age group, whereas for females, the New Jersey **incidence** rates were slightly higher than the U.S. rates in each age group.

- The female **incidence** rates of nephroblastoma and other nonepithelial renal tumors in each age group was higher than the male rates in New Jersey, whereas, in the U.S. the female and male rates were the same in each age group.

- The overall kidney cancer **incidence** rates among females were higher than the male rates, unlike most other childhood cancers for which the male rates were higher than the female rates.

Figure 7.1- Childhood Kidney Cancer Incidence Rates by Gender and Age Group, New Jersey, 1990-2013, N=405



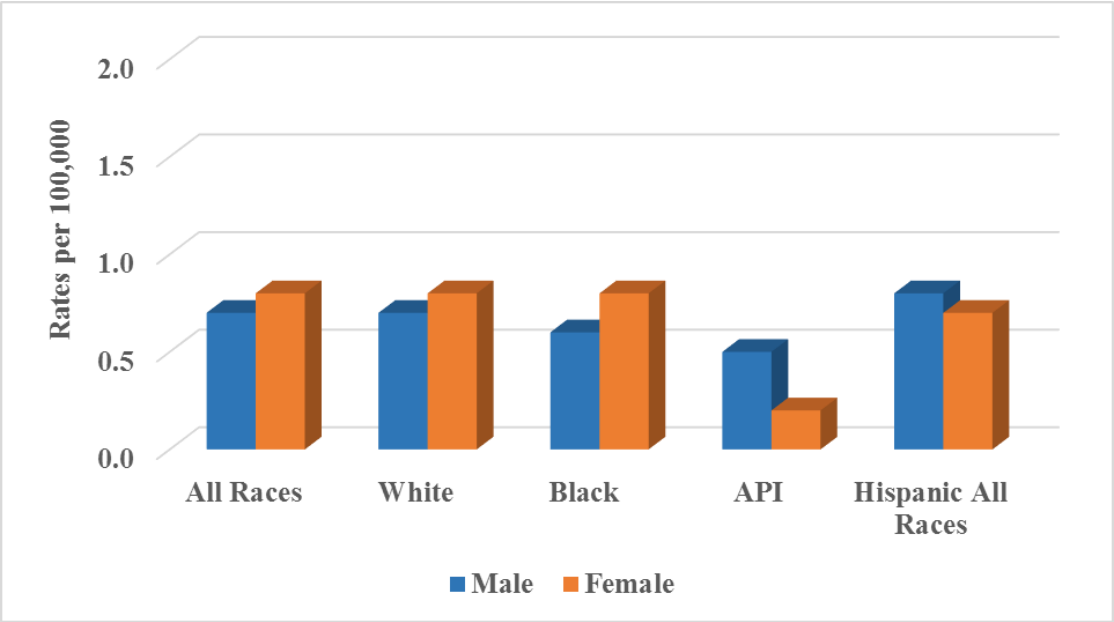
Wilms tumor is about 95% of the kidney cancer among ages 0-14 and 90% of kidney cancers among ages 0-19 in New Jersey.
Average annual rates are per 100,000. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008.
Data source: New Jersey State Cancer Registry, New Jersey Department of Health. Link to Table A.8 Link to Table A.9

- Childhood kidney cancer **incidence** rates were highest in infants (< 1 year) and the 1-4 age group, at just under 2 cases per 100,000 children per year.

- Females had higher childhood kidney cancer **incidence** rates than males in each age group under 10 years of age, while males had higher **incidence** rates in the 10-14 age group and rates were the same for ages 15-19.

Note- Childhood Kidney Cancer Mortality by Age Group, New Jersey, 1990-2013, N=39 could not be produced due to suppression (<10 deaths per 100,000 per year).

Figure 7.2- Childhood Kidney Cancer Incidence Rates by Gender and Race/Ethnicity, New Jersey, 1990-2013, Ages 0-19, N=405



Wilms tumor is about 90% of kidney cancers among ages 0-19 in New Jersey.
Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. API=Asians/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races. Data source: New Jersey State Cancer Registry, New Jersey Department of Health.
Link to Table A.4 Link to Table A.5

- Childhood kidney cancer **incidence** rates for females were higher than male rates among Whites and Blacks, and lower than male rates among Asian/Pacific Islanders and those of Hispanic ethnicity.

- Childhood kidney cancer **incidence** rates were lowest among Asian/Pacific Islanders for both males and females.

Note- Bar charts for childhood cancer mortality by Race/Ethnicity group were not produced because small numbers would not produce reliable results.

Chapter 8- Germ Cell

Background and Risk Factors

- Germ cell tumors originate from the primordial germ cells during fetal development, and include gonadal and non-gonadal tumors[1,2]. Germ cell tumors in infancy and early childhood have different biological characteristics in those that occur in older children and adolescents[2].
- Incidence rates for germ cell tumors are elevated in infancy and then decline until about age 10, then rapidly rise in the older ages.[1] The 5-year survival for children diagnosed with a germ cell tumor is about 90%[1,2].
- Cryptorchidism (undescended testis) is one of the few known risk factors for testicular germ cell tumors.[1,2] High maternal hormone levels during pregnancy may also be associated with testicular germ cell tumors[1,2].
- Other possible risk factors for germ cell tumors are radiation exposure during pregnancy, pre-term birth, congenital malformation, viral infections such as mumps, and parental exposures to chemicals and solvents[1,2]. High birth weight, prolonged breast feeding, and maternal urinary tract infection during pregnancy may also be associated with germ cell tumors[1,2].

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Table 8.1- Childhood Germ Cell Cancer Incidence Rates by Gender and Age Group New Jersey and U.S.

ICCC Category	New Jersey - 1990-2013		U.S. (SEER) - 1990-2013	
	0-14	0-19	0-14	0-19
Germ cell & tropoblastic tumors & neoplasms of gonads	**0.6**	**1.1**	**0.5**	**1.1**
Male	0.5	1.4	0.5	1.4
Female	0.6	0.9	0.6	0.9

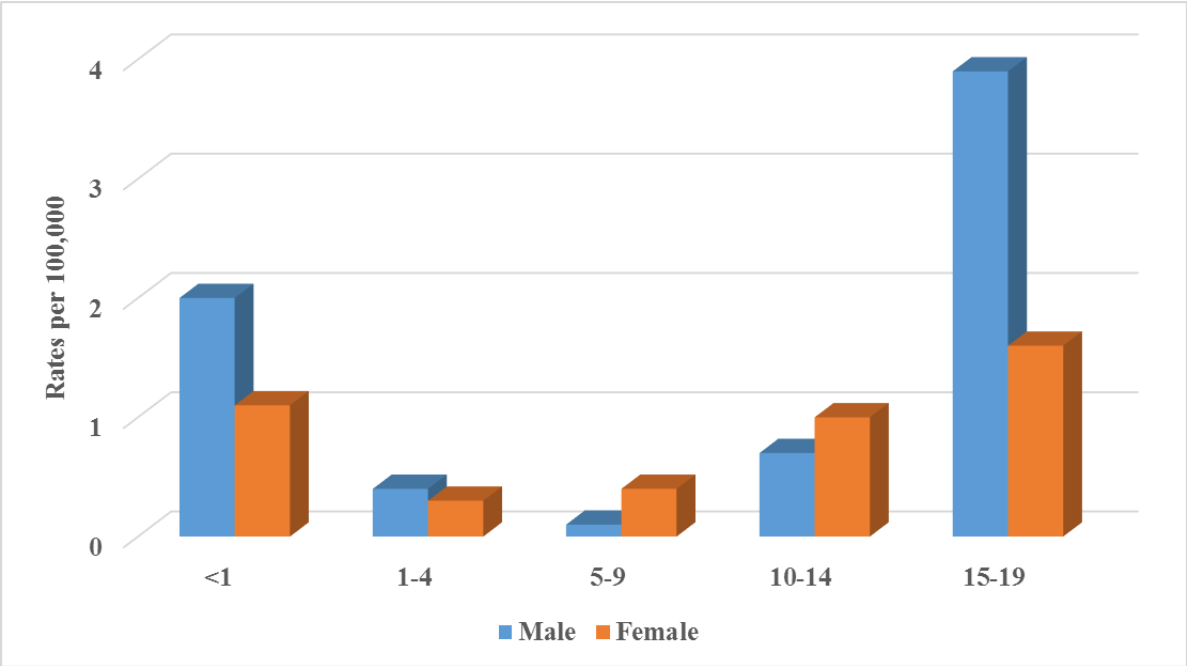
Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health; U.S. SEER Program, National Cancer Institute (see technical notes). Link to Table A.2

• The New Jersey **incidence** rates for childhood germ cell tumors were similar to the U.S. incidence rates for both genders and age groups.

• In the 0-14 age group, females had slightly higher **incidence** rates of germ cell tumors than males in both New Jersey and the U.S.

• Although males in the 0-19 age group had higher **incidence** rates of germ cell tumors than females in the same age group, the rates for females were higher when restricted to younger children 0-14.

Figure 8.1- Childhood Germ Cell Cancer Incidence Rates by Gender and Age Group, New Jersey, 1990-2013, Ages 0-19, N=600



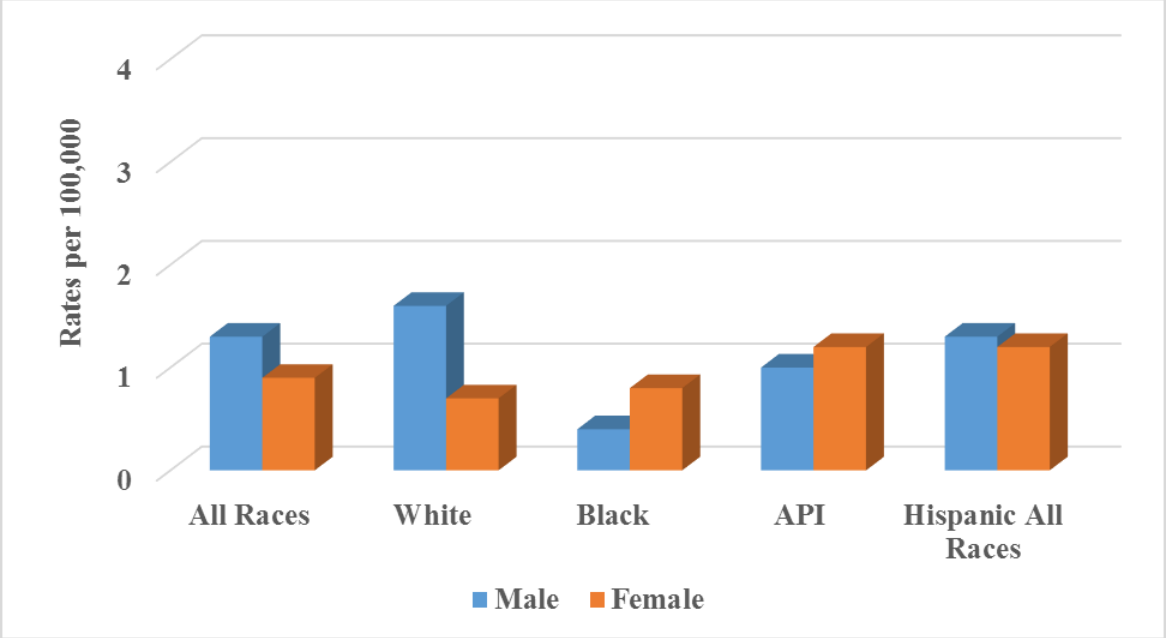
Average annual rates are per 100,000. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. Data source: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health. Link to Table A.10 Link to Table A.11

- In New Jersey, **incidence** rates for childhood germ cell tumors were higher in children <1 and those in the 15-19 age group.

- Males had higher **incidence** rates than females in the <1, 1-4 and 15-19 age groups. Females had higher **incidence** rates than males in the 5-9 and 10-14 age groups.

Note- Mortality data could not be produced because this site grouping is not defined in the cause of death recode (see technical notes).

Figure 8.2- Childhood Germ Cell Cancer Incidence Rates by Gender and Race/Ethnicity, New Jersey, 1990-2013, Ages 0-19, N=600



Average annual rates are per 100,000. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. API=Asians/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races. Data source: New Jersey State Cancer Registry, New Jersey Department of Health. Link to Table A.10 Link to Table A.11

- From 1990 to 2013, males had higher **incidence** rates of childhood germ cell tumors in Whites and Hispanics; while females had higher **incidence** rates in Blacks and Asian/Pacific Islanders.

Note- Mortality data could not be produced because this site grouping is not defined in the cause of death recode (see technical notes).

Chapter 9- Bone

Background and Risk Factors

- Bone cancers account for about 3% of all childhood cancers. The incidence and mortality of these cancers is slightly higher in males compared to females[1].

- The two main classifications of bone cancers in children are osteosarcoma, which is more common and occurs frequently in the actively growing end of the long bones of the legs and arms, and Ewing sarcoma, which is less common and often develops in the bones of the chest wall, middle of the long leg bones and hip[1].

- The five-year relative survival from bone cancer is not as high compared to other childhood cancers, and ranges from 60%-80% for localized tumors[2,3].

- The fact that the incidence of osteosarcoma increases with childhood growth, increasing steadily among 5-9 year olds and peaking among 15-19 year olds, suggests an etiology (cause) linked with bone development[4].

- Children have a higher risk of developing osteosarcoma if they have been exposed to radiation treatments or if they have an inherited a rare cancer syndrome such as Li-Fraumeni syndrome, hereditary retinoblastoma, and Rothmund-Thomson syndrome, but these conditions account for few cases[5].

- Ewing sarcoma mostly occurs among White children and rarely occurs among Black or Asian children. Some evidence indicates that Ewing sarcoma may result from genetic changes after birth but a definitive cause is still unknown.

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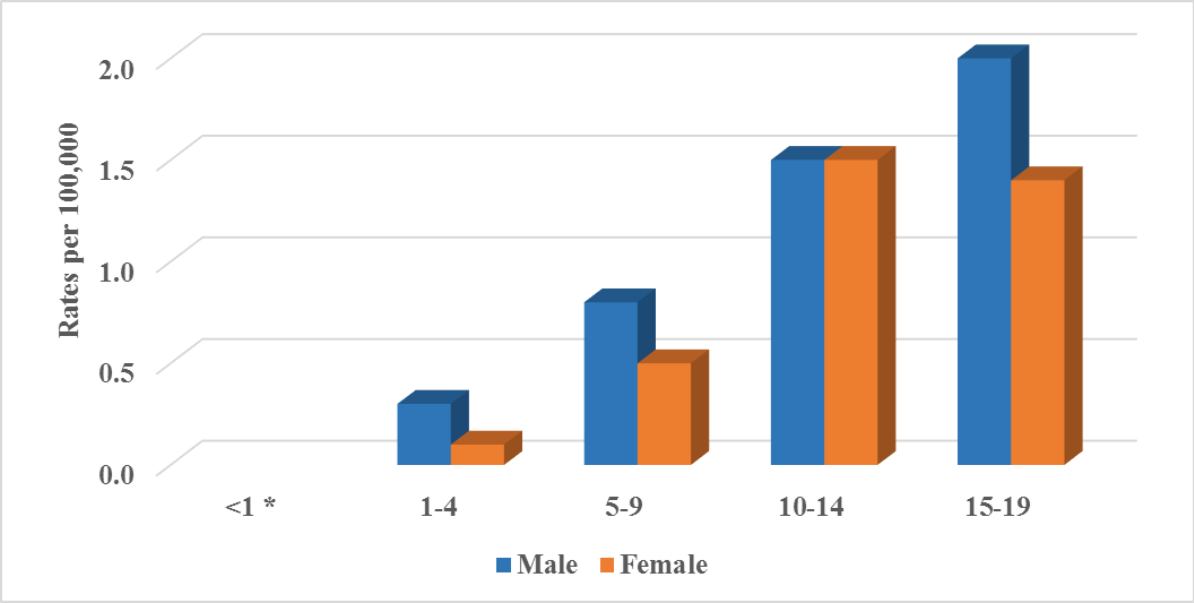
Table 9.1- Childhood Bone Cancer Incidence Rates by Gender and Age Group, New Jersey and U.S.

ICCC Category	New Jersey - 1990-2013		U.S. (SEER) - 1990-2013	
	0-14	0-19	0-14	0-19
Bone cancer	**0.8**	**1.0**	**0.7**	**0.9**
Male	0.8	1.1	0.7	1.0
Female	0.7	0.9	0.6	0.7
Osteosarcoma	**0.4**	**0.5**	**0.4**	**0.5**
Male	0.4	0.6	0.4	0.6
Female	0.4	0.5	0.4	0.4
Ewing tumor & related sarcomas	**0.3**	**0.3**	**0.2**	**0.3**
Male	0.3	0.3	0.2	0.3
Female	0.2	0.3	0.2	0.2

Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health; U.S. SEER Program, National Cancer Institute (see technical notes). Link to Table A.2

- New Jersey **incidence** rates for all childhood bone cancers, osteosarcoma and Ewing tumors are very similar to those for the U.S.
- For both New Jersey and the U.S., the male **incidence** rates for bone cancers, osteosarcoma, and Ewing tumor are slightly higher than or the same as the female rates.

Figure 9.1- Childhood Bone Cancer Incidence Rates by Gender and Age Group, New Jersey, 1990-2013, N=534



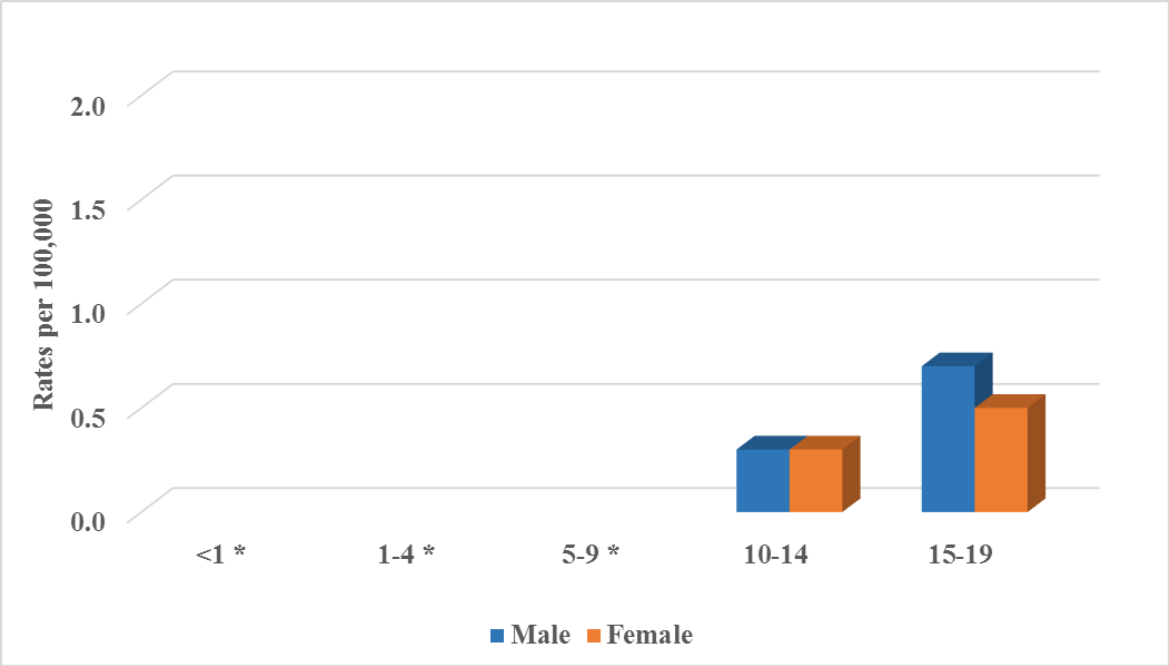
Average annual rates are per 100,000. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 200Data source API=Asian/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races. New Jersey State Cancer Registry, New Jersey Department of Health. * Incidence rates are not shown for the <1 age group because the number of cases was fewer than 5.

Link to Table A.8 Link to Table A.9

- The childhood bone cancer **incidence** rates increased with age up to nearly 2 cases per 100,000 children a year in the 15-19 age group. Among females, the **incidence** rate peaked by age 10-14 at nearly 1.5 cases per 100,000 children per year.

- In each age group, except 10-14, the male childhood bone cancer **incidence** rates were higher than the female rates.

Figure 9.2- Childhood Bone Cancer Mortality Rates by Gender and Age Group, New Jersey, 1990-2013, N=129



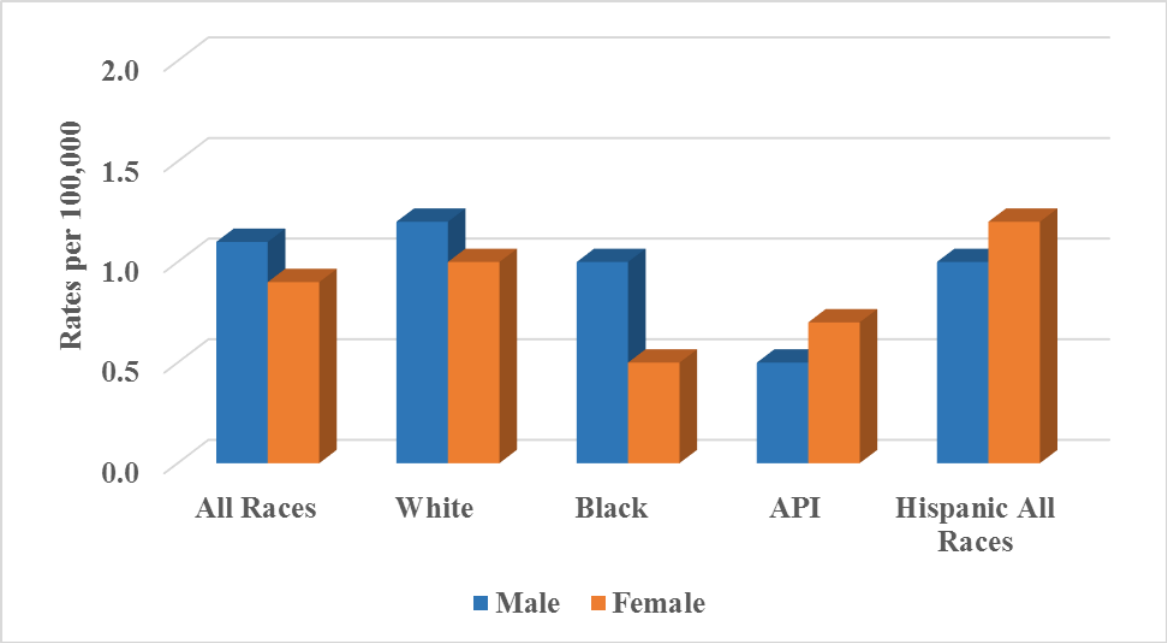
Average annual rates are per 100,000. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data source: National Center for Health Statistics. * Mortality rates are not shown for the <1, 1-4 and 5-9 age groups because the number of cases was fewer than 5.
Link to Table A.12 Link to Table A.13

- The childhood bone cancer **mortality** rates were very low, fewer than 1 death per 100,000 children per year in each age group.

- The bone cancer mortality rates increased in each succeeding older age group and the male **mortality** rate was higher than female mortality rate for the 15-19 age group.

Note- Bar charts for childhood cancer mortality by age group were not produced because small numbers would not produce reliable results.

Figure 9.3- Childhood Bone Cancer Incidence Rates by Gender and Race/Ethnicity, New Jersey, 1990-2013, N=534



Average annual rates are per 100,000. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 200Data source – New Jersey State Cancer Registry, New Jersey Department of Health. Link to Table A.4 Link to Table A.5

- Childhood bone cancer **incidence** rates were highest among Whites compared to Blacks and Asian/Pacific Islanders.

- Childhood bone cancer **incidence** rates were higher among White and Black males, but were higher among female Asian/Pacific Islanders and those of Hispanic ethnicity compared to males of the same race and ethnicity.

Note- Bar charts for childhood cancer mortality by Race/Ethnicity group were not produced because small numbers would not produce reliable results.

Chapter 10- Retinoblastoma

Background and Risk Factors

• Retinoblastoma is a tumor that arises from the primitive neuroectodermal cells in the retina of the eye[1,2]. Retinoblastomas are commonly diagnosed in infants and young children than in older children[3]. The five-year survival for children diagnosed with retinoblastomas is about 97%[4].

• There are two types of retinoblastomas, hereditary retinoblastomas and sporadic (non-hereditary) retinoblastomas[3]. Hereditary retinoblastomas occur in about 1 in 3 children diagnosed with retinoblastomas[3]. Hereditary retinoblastomas usually develop in both eyes and are diagnosed during the first year of life[1,2]. Sporadic retinoblastomas occur in about 2 in 3 children diagnosed with retinoblastomas.[3] Sporadic retinoblastomas usually develop in one eye and are diagnosed at an older age[1,2].

• Hereditary retinoblastomas are divided into two groups. Familial retinoblastoma refers to tumors that arise in children who carry the retinoblastoma gene inherited from one of their parents[1,2]. Sporadic heritable retinoblastoma refers to tumors which result from a retinoblastoma gene mutation in the germ cells of one of their parents[1,2].

• Possible risk factors for sporadic (non-hereditary) retinoblastomas include paternal occupations as welders and machinists, maternal morning sickness medication, and fetal exposure to x-rays[1].

References

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2. Ries LAG, Smith MA, Gurney JG, et al., editors. *Cancer Incidence and Survival among Children and Adolescents: United States SEER Program 1975-1995*. Bethesda, MD: National Cancer Institute, SEER Program, 1999.

3. *Cancer in Children*. American Cancer Society. Available at: http://www.cancer.org/acs/groups/cid/documents/webcontent/003135-pdf.pdf. Accessed June, 2016.

4. *Cancer Facts & Figures 2016*. American Cancer Society. Available at: http://www.cancer.org/acs/groups/content/@research/documents/document/acspc-047079.pdf. Accessed June, 2016.

Table 10.1- Childhood Retinoblastoma Incidence Rates by Gender and Age Group, New Jersey and U.S.

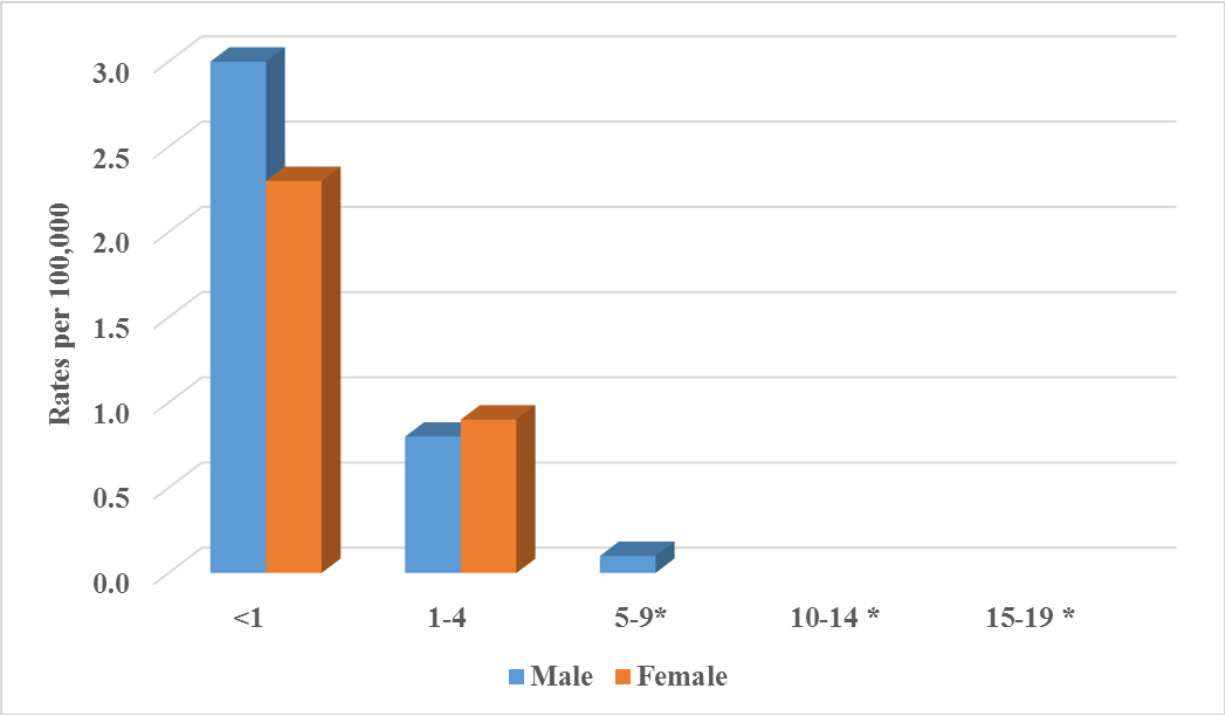
ICCC Category	New Jersey - 1990-2013		U.S. (SEER) - 1990-2013	
	0-14	0-19	0-14	0-19
Retinoblastoma	**0.4**	**0.3**	**0.4**	**0.3**
Male	0.4	0.3	0.4	0.3
Female	0.4	0.3	0.4	0.3

Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health; U.S. SEER Program, National Cancer Institute (see technical notes).
Link to Table A.2

• The New Jersey **incidence** rates for childhood retinoblastomas were similar to the U.S. **incidence** rates for both males and females.

• However, when restricted to younger children (0-14), retinoblastomas **incidence** rates for males and females were slightly higher.

Figure 10.1- Childhood Retinoblastoma Incidence Rates by Age Group, New Jersey, 1990-2013, Ages 0-19, N=170

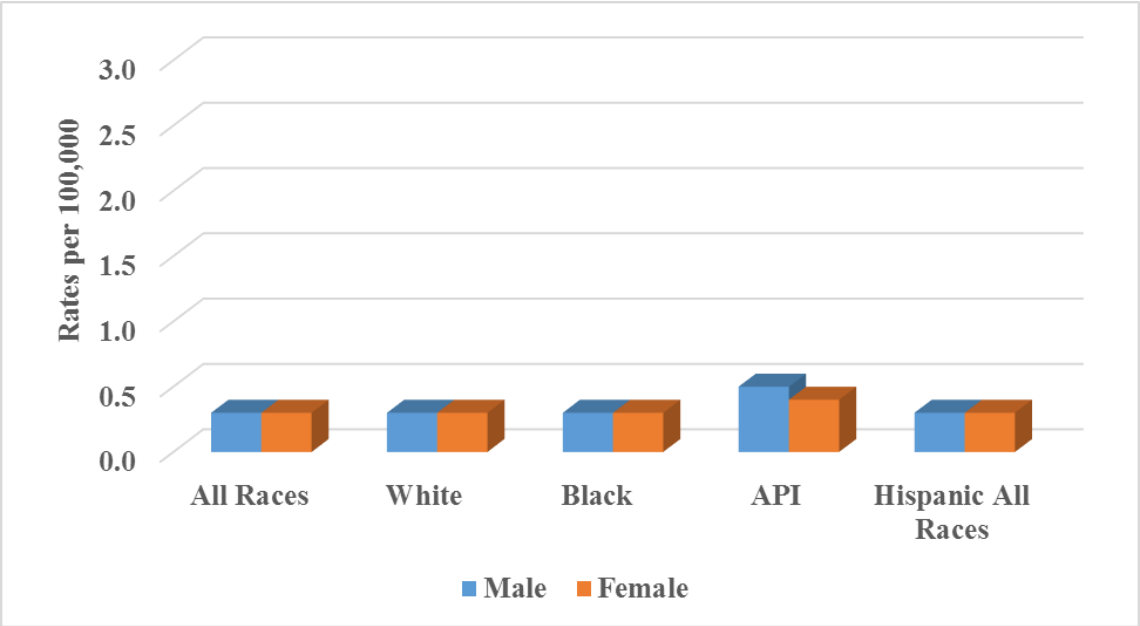


Average annual rates are per 100,000. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. Data source: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health. * Incidence rates are not shown for the 10-14 and 15-19 age groups because the number of cases was fewer than 5. Link to Table A.10 Link to Table A.11

Note- Mortality data could not be produced because this site grouping is not defined in the cause of death recode (see technical notes).

- In New Jersey, incidence rates for childhood retinoblastomas were higher in children less than 10 years old.

Figure 10.2- Childhood Retinoblastoma Incidence Rates by Gender and Race/Ethnicity New Jersey, 1990-2013, Ages 0-19, N=170



Average annual rates are per 100,000. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. API=Asian/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races. Data source: New Jersey State Cancer Registry, New Jersey Department of Health. Link to Table A.10 Link to Table A.11

Note- Mortality data could not be produced because this site grouping is not defined in the cause of death recode (see technical notes).

- Among Asian/Pacific Islanders, males had slightly higher **incidence** rates of childhood retinoblastomas than females.

Technical Notes

New Jersey State Cancer Registry (NJSCR)

Overview

The objectives of the NJSCR are to:

- Monitor cancer trends in New Jersey;
- Promote scientific research;
- Educate the public;
- Provide information for planning and evaluating cancer prevention and control activities;
- Share and compare cancer data with other states and the nation; and,
- Participate in population-based investigations of cancer etiology, prevention, treatment and outcomes.

The NJSCR is a population-based cancer registry that serves the entire state of New Jersey, which has a current estimated population of over 8.9 million people (U.S. Census Bureau). The NJSCR was established by legislation (N.J.S.A. 26:2-104 et seq.) and includes all cases of cancer diagnosed in New Jersey residents since October 1, 1978. New Jersey regulations (N.J.A.C. 8:57A) require the reporting of all newly diagnosed cancer cases to the NJSCR within three months of hospital discharge or six months of diagnosis, whichever is sooner. Reports are filed by hospitals, diagnosing physicians, dentists, and independent clinical laboratories. Every hospital in New Jersey reports cancer cases electronically. In addition, the NJSCR maintains reporting agreements with New York, Pennsylvania, and other surrounding states, as well as other state cancer registries that are enrolled in the North American Association of Central Cancer Registries (NAACCR) interstate data exchange program so that New Jersey residents diagnosed with cancer outside the state can be identified. Legislation passed in 1996 strengthened the NJSCR by requiring electronic reporting, requiring abstracting by certified tumor registrars, and establishing penalties for late or incomplete reporting.

All primary invasive and *in situ* neoplasms are reportable to the NJSCR, except cervical cancer *in situ* diagnosed after 1994 and certain carcinomas of the skin. Benign and borderline brain tumors diagnosed on or after January 1, 2004 are reportable according to Public Law 107-260, the Benign Brain Tumor Cancer Registries Act, which was signed in October 2002. The information collected by the NJSCR includes patient identifiers, demographic characteristics of the patient, medical information on each cancer diagnosis (such as the anatomic site, histologic type and stage of disease), first course of treatment and vital status (alive or deceased). For deceased cases, the underlying cause of death is also included. The primary site, behavior, grade, and histology of each cancer are coded according to the *International Classification of Diseases for Oncology (ICD-O), 3rd edition* for cancers diagnosed after 2000. The NJSCR follows the data standards promulgated by NAACCR and the use of the Surveillance, Epidemiology, and End Results (SEER) multiple primary rules. Because an individual may develop more than one cancer, patients could therefore be counted more than once if they were diagnosed with two or more primary cancers. The NJSCR has been a participant of the National Program of Cancer Registries (NPCR) sponsored by the Centers for Disease Control and Prevention (CDC) since it began in 1994 and is a member of the National Cancer Institute's (NCI) SEER Program.

NJSCR Data Quality

The NJSCR is a member of NAACCR, an organization that sets standards for cancer registries, facilitates data exchange, and publishes cancer data. NAACCR has awarded the Gold Standard, the highest standard possible for the NJSCR's quality of the data for each diagnosis year from 1995 through 2010 and 2012 through 2013, and the Silver Standard for the 2011 diagnosis year. The criteria used to judge the quality of the data are completeness of cancer case ascertainment, completeness of certain information on the cancer cases, % of death certificate-only cases, % of duplicate cases, passing an editing program, and timeliness.

Completeness of reporting to the NJSCR was estimated by comparing New Jersey and U.S. incidence to mortality rate ratios for Whites and Blacks, standardized for age, gender, and cancer site. The data used to generate these ratios were the cancer incidence rates for all SEER registries combined. Using these standard formulas, it is possible for the estimation of completeness to be greater than 100%. For 2013 data, the completeness of case reporting was estimated as 99.45% at the time this report was prepared.

While our estimates of completeness are very high, some cases of cancer among New Jersey residents who were diagnosed and/or treated in out-of-state facilities may not yet have been reported to the NJSCR by other state registries. This should be considered in interpreting the results for the more recent years of diagnosis. The most recent year of data, in this case 2013, may be considered preliminary.

Additional information on NJSCR data quality indicators can be obtained from previous NJSCR Cancer Incidence and Mortality reports. These reports can be viewed from http://www.state.nj.us/health/ces/reports.shtml.

Data Sources

New Jersey cancer incidence data were obtained from the January 2016 analytic file of the NJSCR. U.S. incidence data were obtained from the SEER*Stat public use files 'Incidence SEER 9 Regs Research Data, Nov 2015 Sub (1973-2013) Katrina/Rita Population Adjustment for all races combined' and 'SEER 13 Regs Research Data, Nov 2015 Sub (1992-2013) Katrina/Rita Population Adjustment for extended race and ethnicity variables'.

New Jersey and U.S. mortality data were obtained from the SEER*Stat public use files Mortality 'All COD, Aggregated with State, Total U.S. (1969-2013) Katrina/Rita Population Adjusted for all races combined' and 'Mortality All COD, Aggregated With State, Total U.S. (1990-2013) Katrina/Rita Population Adjustment for extended race and ethnicity variables'.

All the counts and rates were tabulated using SEER*Stat version 8.3.2 (http://www.seer.cancer.gov/seerstat/), a statistical software package distributed by the National Cancer Institute. All rates are age-adjusted to the 2000 U.S. Standard Population (19 age groups-Census P25-1130).

Data Specifications

Cases were limited to children whose age at diagnosis was from birth to age nineteen (0-19). The age at diagnosis in the NJSCR was derived from the date of birth and the date of diagnosis information in the medical records. The data are presented for two age categories – 0-14 and 0-19 – as well as smaller 5-year age groups. These age groupings are commonly used in childhood cancer literature and reports from SEER and other organizations.

Out-of-state residents and cases whose residence in New Jersey at the time of diagnosis could not be confirmed (unknown county) were excluded from the New Jersey incidence rates and counts, as were persons of unknown age and/or gender. All invasive cancers plus bladder cancer *in situ* were included in the incidence data.

Two classification systems were used for cancer incidence in this report. The International Classification of Childhood Cancer (ICCC) and *International Classification of Diseases for Oncology, 3rd edition* (ICD-O-3). The use of these two coding schemes to classify childhood cancer is necessary as explained in the following paragraphs. We caution readers that for certain cancer types, the counts will be different depending on which coding scheme is used.

The ICCC classification system for childhood cancer is based on tumor histology rather than, as for adults, the site of the tumor, as histology is often more relevant than site for childhood cancers. For additional information on the translation from cancer site and histology to the ICCC visit http://seer.cancer.gov/iccc/iccc-who2008.html

The ICD-O-3 coding system was used for incidence data that is compared with mortality data because the ICD-O-3 coding system is more consistent with the cause of death classification system used for mortality data. For additional information on ICD-O-3 site codes visit http://seer.cancer.gov/siterecode/icdo3_dwhoheme/index.html

Mortality data were grouped by cancer site according to the revised SEER Cause of Death Recode 1969+ (4/16/2012). The detailed information can be found on the SEER website http://seer.cancer.gov/codrecode/1969+_d04162012/index.html. Unfortunately, several of the site codings in the ICCC, do not exist in the cause of death coding. For this reason, mortality rates for neuroblastoma, germ cell cancer and retinoblastoma could not be displayed.

Population Data

The 1979-2013 New Jersey population estimates for this report were provided by the NCI's SEER Program released in January 2016 and downloaded from the SEER website (http://www.seer.cancer.gov/popdata/download.html). The population estimates represent a modification of the intercensal and Vintage 2014 annual time series of July 1 county population estimates by age, sex, race, and Hispanic origin produced by the US Census Bureau's Population Estimates Program, in collaboration with the National Center for Health Statistics, and with support from the NCI through an interagency agreement. The bridged single-race estimates and a description of the methodology used to develop them are available on the National Center for Health Statistics (NCHS) website (http://www.cdc.gov/nchs/nvss/bridged_race.htm).

Description of Algorithm for Designating Hispanic Ethnicity

In 2003, the NJSCR adopted the NAACCR Hispanic Identification Algorithm (NHIA) to assign Hispanic ethnicity to cases. This method uses data on birthplace, marital status, gender, race and surname match to the 1990 Hispanic surname list to augment the number of cases and decedents reported as Hispanic in the registry.

Since 2005, NAACCR made several revisions to the NHIA algorithm, now NHIA version 2. The most significant change in NHIA version 2 was the two additional options for registries to apply the algorithm to counties in which the Hispanic population is less than 5%. The NJSCR applied the algorithm to all records from patients residing in all New Jersey counties (option 0 of the NHIA algorithm) diagnosed during the years 1990-2013.

As a result of applying the NHIA algorithm, the number of cases who were coded as Hispanic increased by 22% for this time period, thereby correcting an under-identification of Hispanics. A more complete description of the NHIA version 2 is available at the following link to the NAACCR website:
http://www.naaccr.org/LinkClick.aspx?fileticket=6E20OT41TcA%3d&tabid=118&mid=458.

Caution should be used when comparing rates among Hispanics with the rates in the different race groups (e.g., Black, White) because ethnicity and race are not mutually exclusive. In New Jersey, the majority of Hispanics identify themselves as White. The Hispanics who identify themselves as White, Black, or API are included in the White, Black, or API race category, as well as the 'all races' category.

Race

Race information in the NJSCR database is collected from medical records and is not always complete and accurate. The impact of missing race for a relatively small proportion of cases results in slightly lower race-specific cancer incidence rates and counts. A small percentage of cases diagnosed in previous years were reported to the NJSCR with missing information on race at the time of the completion of last year's report, *Cancer Incidence and Mortality in New Jersey 2008-2012*, and later had their race updated after the publication of the report. This resulted in a slight increase in the race-specific cancer incidence rates and counts during 2009-2012 in the current report as compared to previous reports.

The All Races category includes White, Black, Asian/Pacific Islander, American Indian/Alaska Native and Unknown or Unspecified.

Asians and Pacific Islanders

Asians and Pacific Islanders account for only 3.7% of the total cancer cases in New Jersey, and missing race or misclassification of race may have a relatively greater effect on API cancer rates than rates for other racial groups. For total cancer cases diagnosed during 2009-2013, 2% were reported to be of other or unknown race. The NJSCR applied the NAACCR Asian/Pacific Islander

Identification Algorithm (NAPIIA) version 1 using the birthplace and name fields (first, last, and maiden names) to classify cases directly or indirectly as Asian/Pacific Islander for analytic purposes. The NAPIIA algorithm is focused on coding cases with a race code of other Asian or other Pacific Islander to a more specific Asian or Pacific Islander race category, and the total API case count did not change after applying the algorithm. A more complete description of the NAPIIA version 1 is available at the following link to the NAACCR website: http://www.naaccr.org/LinkClick.aspx?fileticket=3HnBhlmhkBs%3d&tabid=118&mid=458.

Data Presentation

Suppression of Rates and Counts under 5

It should also be noted that the annual rates for relatively uncommon cancers tend to fluctuate substantially from year to year because of small numbers of cases, particularly in minority populations. Rates generated from small numbers should be interpreted with caution. For this report, incidence rates and counts were suppressed where counts were fewer than five as a way to ensure statistical reliability and patient confidentiality. The mortality data were provided through NCI's SEER program in the SEER*Stat database and the data were suppressed by default where counts were fewer than ten.

Rate Calculation Formulas

A cancer incidence rate is defined as the number of new cases of cancer diagnosed during a specified time period in a specified population. Cancer rates are most commonly expressed as cases per 100,000 population. In this report, rates were rounded to the nearest tenth. Cancer occurs at different rates in different age groups, and population subgroups defined by gender and race have different age distributions. Therefore, before a valid comparison can be made between rates, it is necessary to standardize the rates to the age distribution of a standard population. In this report, the 2000 U.S. Standard Population (19 age groups-Census P25-1130) was used. Records that were missing gender or age were not included in the rates presented in this report. Since the number of records so affected was very small, the rates were virtually unaffected by the non-inclusion of these records.

The first step in the age-standardization procedure is to determine the age-specific rates. For each age group for a given time interval (within each race-gender group, for the entire state), the following formula is applied:

$$r_a = \frac{n_a}{t \; x \; P_a}$$

where

r_a = the age-specific rate for age group a,
n_a = the number of events (cancer diagnoses) in the age group during the time interval,
t = the length of the time interval (in years), and
P_a = average size of the population in the age group during the time interval (mid-year population or average of mid-year population sizes).

In order to determine the age-adjusted rate, a weighted average of the age-specific rates is calculated, using the age distribution of the standard population to derive the age-specific weighting factors.[16] This is the technique of direct standardization which uses the following formula:

$$R = \frac{\sum_{a=1}^{n} r_a \, x \, Std.P_a}{\sum_{a=1}^{n} Std.P_a}$$

where

R = the age-adjusted rate,
r_a = the age-specific rate for age group a, and
$Std.P_a$ = the size of the standard population in each age group a.

While age standardization facilitates the comparison of rates among different populations, there can be important age-specific differences in disease occurrence, which are not apparent in comparisons of the age-adjusted rates.[17]

Analogous definitions and calculations apply for the cancer mortality rates.

Other Statistical Methods

Joinpoint Regression Modeling for Time Trends in Rates

Joinpoint software from NCI was used to determine if any significant changes in childhood incidence or mortality rate trends occurred in New Jersey and the U.S. from 1979 to 2013 for all races combined, White and Black races, and from 1990 to 2013 for Asian/Pacific Islanders (API) and Hispanic ethnicity. The Joinpoint software uses regression modeling to analyze trend data (e.g. annual cancer incidence rates) by identifying points (joinpoints) where the rate of change significantly changes and by providing the estimated annual percent change (APC) for each line segment between joinpoints. It fits the simplest joinpoint model to the data, such that if one more joinpoint is added it does not statistically significantly improve the model.

For this report, the regression models with zero joinpoints were used to compare New Jersey and U.S. incidence and mortality, and to compare incidence and mortality between Whites and Blacks in New Jersey. For New Jersey all except one type of cancer had zero joinpoints, i.e. no changes in the time trends. The APCs and their 95 % confidence intervals from the zero joinpoint models were used to determine if the annual rates significantly increased or decreased during the time period 1979-2013. Additional statistical details on joinpoint regression may be found in an article by Kim, et al.[19]

The APC is calculated by first fitting a regression line to the natural logarithms of the rates [ln(r)] using calendar year (x) as a regressor variable. For this report the method of weighted least squares was used to calculate the regression equation. If $\ln(r) = mx + b$ is the resulting regression equation (with slope m), then the $APC = 100(e^m - 1)$. A positive APC corresponds to an increasing trend and a negative APC to a decreasing trend. To determine the statistical significance of the APC, the null

hypothesis that APC = 0 is tested, which is equivalent to testing the hypothesis that m = 0. A t-test is used and the hypothesis is rejected at $p < 0.05$. The APC was not calculated if the rate for more than one year within the time period was 0.

Mortality rate trends were calculated based on three year average rates to reduce the likelihood of suppression. The public use mortality files supplied by National Cancer Institute (NCI) through SeerStat now suppress statistics for counts less than 10 which has greatly increased the likelihood of suppression.

Statistical Significance

The Joinpoint analysis conducted for the time trend analysis included a measure of statistical significance using a 95% confidence interval. If a measure is statistically significantly different from the null we can be 95% confident that the difference is not due to chance. The likelihood of obtaining a statistically significant result increases as the number of cases increases.

NJSCR Investigation into Childhood Leukemia decline in 2008

NJSCR staff trained in the identification and collection of reportable cancer cases conducted a thorough investigation of the apparent decline in the number of childhood leukemia cases reported to the NJSCR for the 2008 diagnosis year. Link to Figures 2.4 and 2.5

Hospital Underreporting

Case-finding audits for 2008 and 2009 records reported by all New Jersey hospitals were performed in 2011 and 2012. These audits included a thorough review of hospital records, including pathology and cytology, chemotherapy and radiation services. All previously unreported cases identified by audit were subsequently submitted to the NJSCR and are included in this report.

Coding Errors

Cancer reports received by the NJSCR were carefully reviewed for coding or misclassification errors that may have resulted in their being excluded from pediatric case counts. NJSCR staff reviewed cases for unspecified or incorrect age at diagnosis, cancer site or histology, year of diagnosis, and state of residence at the time of diagnosis. No coding or misclassification errors were identified.

Software Conversion

In 2013, the NJSCR underwent a conversion of its cancer registry database software. NJSCR staff compared data from the pre- and post-conversion databases to identify cases which may have failed to migrate. No discrepancies were identified.

Hospital Discharge Data

NJSCR conducted a data linkage with hospital uniform billing (UB) available from the New Jersey Hospital Discharge Data Collection System (NJDDCS). This data contains information on all hospital inpatients and emergency room outpatients in New Jersey. This linkage did not identify any new leukemia or other reportable cases.

Changes in Physician Reporting
NJSCR staff conducted a review of physicians that treat pediatric leukemia cases diagnosed from 2007 to 2009, seeking to identify possible changes in physician reporting that would be responsible for the decline. This investigation did not lead to the discovery of any missing cases, and, in fact, showed that physicians in New Jersey report childhood leukemia cases consistently over time.

Interstate Data
Many New Jersey residents choose to receive cancer treatment in neighboring states. The NJSCR has interstate data exchange agreements with neighboring states and also participates in the NAACCR National Interstate Data Exchange Agreement. These agreements allow states to provide NJSCR with data reported to them for residents of NJ who are diagnosed and/or treated out of state. From 2007 through 2010, the NJSCR exchanged data with New York (NY), Pennsylvania (PA), Delaware (DE), Maryland (MD), Florida (FL), Connecticut (CT) and North Carolina (NC).

The Pennsylvania Cancer Registry (PCR) also showed a significant drop in childhood leukemia cases in 2008. Discussions with the PCR revealed that this drop was generally consistent among all PA reporting facilities. According to the PCR, annual case-finding audits of PA hospitals are conducted by PCR to ensure complete case ascertainment. In 2012, PCR retransmitted all reports of cancer for NJ residents, which they received from PA reporting sources. The retransmitted data was compared to the NJSCR. No additional 2008 pediatric leukemia cases were identified.

To assess whether the drop in leukemia case counts was a unique phenomenon to NJ and PA, the NJSCR looked at counts for other states, especially in the northeast region. Based on NAACCR data, New Jersey, Vermont, and Pennsylvania had the largest declines in incidence of leukemia from 2007 to 2008 at 66%, 67%, and 79%, respectively. There was also a dramatic increase in a neighboring state, Delaware (213%) for the same time period. NJSCR worked with large children's hospitals based in both Delaware and Pennsylvania to verify that all cancers among New Jersey residents diagnosed and/or treated at those facilities had been reported to the NJSCR.

Summary
After a thorough investigation of multiple data sources, the NJSCR has concluded that the decline in 2008 diagnoses of pediatric leukemia is not due to under-reported.

Appendix - Tables

Table A.1- Childhood Cancer Incidence Cases and Percent Distribution by Type and Age Group, New Jersey, All Races, 1990-2013

ICCC Category	Age Group													
	0-14		0-19		<1		1-4		5-9		10-14		15-19	
	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent
All Cancers	6,860	100%	10,028	100%	727	100%	2,356	100%	1,725	100%	2,052	100%	3,168	100%
I Leukemias, myeloproliferative & myelodysplastic diseases	1,886	27.5%	2,282	22.8%	139	19.1%	848	36.0%	485	28.1%	414	20.2%	396	12.5%
I(a) Lymphoid leukemias	1,398	20.4%	1,594	15.9%	51	7.0%	692	29.4%	396	23.0%	259	12.6%	196	6.2%
I(b) Acute myeloid leukemias	323	4.7%	444	4.4%	52	7.2%	104	4.4%	59	3.4%	108	5.3%	121	3.8%
I(c) Chronic myeloproliferative diseases	54	0.8%	107	1.1%	16	2.2%	9	0.4%	5	0.3%	24	1.2%	53	1.7%
I(d) Myelodysplastic syndrome & other myeloproliferative	43	0.6%	56	0.6%	12	1.7%	16	0.7%	7	0.4%	8	0.4%	13	0.4%
I(e) Unspecified & other specified leukemias	68	1.0%	81	0.8%	8	1.1%	27	1.1%	18	1.0%	15	0.7%	13	0.4%
II Lymphomas & reticuloendothelial neoplasms	724	10.6%	1,547	15.4%	23	3.2%	86	3.7%	215	12.5%	400	19.5%	823	26.0%
II(a) Hodgkin lymphomas	271	4.0%	799	8.0%	-	-	10	0.4%	64	3.7%	197	9.6%	528	16.7%
II(b) Non-Hodgkin lymphomas (except Burkitt lymphoma)	279	4.1%	514	5.1%	-	-	34	1.4%	98	5.7%	144	7.0%	235	7.4%
II(c) Burkitt lymphoma	116	1.7%	152	1.5%	-	-	25	1.1%	47	2.7%	44	2.1%	36	1.1%
II(d) Miscellaneous lymphoreticular neoplasms	39	0.6%	43	0.4%	20	2.8%	13	0.6%	-	-	-	-	-	-
II(e) Unspecified lymphomas	19	0.3%	39	0.4%	-	-	-	-	-	-	12	0.6%	20	0.6%
III CNS & miscellaneous intracranial & intraspinal neoplasms	1,458	21.3%	1,783	17.8%	98	13.5%	459	19.5%	483	28.0%	418	20.4%	325	10.3%
III(a) Ependymomas & choroid plexus tumor	128	1.9%	149	1.5%	9	1.2%	58	2.5%	30	1.7%	31	1.5%	21	0.7%
III(b) Astrocytomas	714	10.4%	893	8.9%	48	6.6%	213	9.0%	227	13.2%	226	11.0%	179	5.7%
III(c) Intracranial & intraspinal embryonal tumors	309	4.5%	347	3.5%	27	3.7%	108	4.6%	92	5.3%	82	4.0%	38	1.2%
III(d) Other gliomas	236	3.4%	305	3.0%	7	1.0%	57	2.4%	117	6.8%	55	2.7%	69	2.2%
III(e) Other specified intracranial/intraspinal neoplasms	24	0.3%	31	0.3%	-	-	8	0.3%	5	0.3%	9	0.4%	7	0.2%
III(f) Unspecified intracranial & intraspinal neoplasms	47	0.7%	58	0.6%	5	0.7%	15	0.6%	12	0.7%	15	0.7%	11	0.3%

Table A.1: (cont'd) Childhood Cancer Incidence Cases and Percent Distribution by Type and Age Group, New Jersey, All Races, 1990-2013

ICCC Category	Age Group													
	0-14		0-19		<1		1-4		5-9		10-14		15-19	
	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent
IV Neuroblastoma & other peripheral nervous cell tumors	505	7.4%	519	5.2%	180	24.8%	249	10.6%	49	2.8%	27	1.3%	14	0.4%
IV(a) Neuroblastoma & ganglioneuroblastoma	496	7.2%	504	5.0%	180	24.8%	245	10.4%	48	2.8%	23	1.1%	8	0.3%
IV(b) Other peripheral nervous cell tumors	9	0.1%	15	0.1%	-	-	-	-	-	-	-	-	6	0.2%
V Retinoblastoma	170	2.5%	170	1.7%	71	9.8%	93	3.9%	6	0.3%	-	-	-	-
VI Renal tumors	371	5.4%	399	4.0%	52	7.2%	207	8.8%	83	4.8%	29	1.4%	28	0.9%
VI(a) Nephroblastoma & other nonepithelial renal tumors	353	5.1%	359	3.6%	52	7.2%	203	8.6%	80	4.6%	18	0.9%	6	0.2%
VI(b) Renal carcinomas	16	0.2%	38	0.4%	-	-	-	-	-	-	11	0.5%	22	0.7%
VI(c) Unspecified malignant renal tumors	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VII Hepatic tumors	90	1.3%	106	1.1%	34	4.7%	40	1.7%	7	0.4%	9	0.4%	16	0.5%
VII(a) Hepatoblastoma	73	1.1%	73	0.7%	33	4.5%	38	1.6%	-	-	-	-	-	-
VII(b) Hepatic carcinomas	16	0.2%	32	0.3%	-	-	-	-	6	0.3%	8	0.4%	16	0.5%
VII(c) Unspecified malignant hepatic tumors	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VIII Malignant bone tumors	312	4.5%	533	5.3%	-	-	22	0.9%	84	4.9%	204	9.9%	221	7.0%
VIII(a) Osteosarcomas	173	2.5%	286	2.9%	-	-	9	0.4%	48	2.8%	116	5.7%	113	3.6%
VIII(b) Chondrosarcomas	7	0.1%	34	0.3%	-	-	-	-	-	-	5	0.2%	27	0.9%
VIII(c) Ewing tumor & related sarcomas of bone	108	1.6%	167	1.7%	-	-	10	0.4%	28	1.6%	69	3.4%	59	1.9%
VIII(d) Other specified malignant bone tumors	16	0.2%	31	0.3%	-	-	-	-	-	-	10	0.5%	15	0.5%
VIII(e) Unspecified malignant bone tumors	8	0.1%	15	0.1%	-	-	-	-	-	-	-	-	7	0.2%
IX Soft tissue & other extraosseous sarcomas	460	6.7%	684	6.8%	44	6.1%	137	5.8%	129	7.5%	150	7.3%	224	7.1%
IX(a) Rhabdomyosarcomas	227	3.3%	280	2.8%	15	2.1%	96	4.1%	66	3.8%	50	2.4%	53	1.7%
IX(b) Fibrosarcomas, peripheral nerve & other fibrous	52	0.8%	75	0.7%	13	1.8%	10	0.4%	9	0.5%	20	1.0%	23	0.7%
IX(c) Kaposi sarcoma	-	-	5	0.1%	-	-	-	-	-	-	-	-	-	-
IX(d) Other specified soft tissue sarcomas	140	2.0%	257	2.6%	14	1.9%	19	0.8%	45	2.6%	62	3.0%	117	3.7%
IX(e) Unspecified soft tissue sarcomas	40	0.6%	67	0.7%	-	-	11	0.5%	9	0.5%	18	0.9%	27	0.9%

Table A.1: (cont'd) Childhood Cancer Incidence Cases and Percent Distribution by Type and Age Group, New Jersey, All Races, 1990-2013

ICCC Category	Age Group													
	0-14		0-19		<1		1-4		5-9		10-14		15-19	
	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent
X Germ cell & trophoblastic tumors & neoplasms of gonads	235	3.4%	600	6.0%	42	5.8%	37	1.6%	38	2.2%	118	5.8%	365	11.5%
X(a) Intracranial & intraspinal germ cell tumors	52	0.8%	88	0.9%	-	-	-	-	12	0.7%	36	1.8%	36	1.1%
X(b) Extracranial & extragonadal germ cell tumors	62	0.9%	91	0.9%	24	3.3%	22	0.9%	-	-	12	0.6%	29	0.9%
X(c) Malignant gonadal germ cell tumors	109	1.6%	372	3.7%	14	1.9%	14	0.6%	19	1.1%	62	3.0%	263	8.3%
X(d) Gonadal carcinomas	5	0.1%	30	0.3%	-	-	-	-	-	-	5	0.2%	25	0.8%
X(e) Other & unspecified malignant gonadal tumors	7	0.1%	19	0.2%	-	-	-	-	-	-	-	-	12	0.4%
XI Other malignant epithelial neoplasms & melanomas	276	4.0%	960	9.6%	5	0.7%	15	0.6%	46	2.7%	210	10.2%	684	21.6%
XI(a) Adrenocortical carcinomas	10	0.1%	14	0.1%	-	-	5	0.2%	-	-	-	-	-	-
XI(b) Thyroid carcinomas	115	1.7%	443	4.4%	-	-	-	-	16	0.9%	96	4.7%	328	10.4%
XI(c) Nasopharyngeal carcinomas	9	0.1%	30	0.3%	-	-	-	-	-	-	9	0.4%	21	0.7%
XI(d) Malignant melanomas	74	1.1%	240	2.4%	-	-	-	-	16	0.9%	54	2.6%	166	5.2%
XI(e) Skin carcinomas	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XI(f) Other & unspecified carcinomas	65	0.9%	230	2.3%	-	-	-	-	12	0.7%	47	2.3%	165	5.2%
XII Other & unspecified malignant neoplasms	63	0.9%	92	0.9%	15	2.1%	13	0.6%	16	0.9%	19	0.9%	29	0.9%
XII(a) Other specified malignant tumors	19	0.3%	21	0.2%	-	-	6	0.3%	-	-	9	0.4%	-	-
XII(b) Other unspecified malignant tumors	44	0.6%	71	0.7%	12	1.7%	7	0.3%	15	0.9%	10	0.5%	27	0.9%
Not classified by ICCC or *in situ*	310	4.5%	353	3.5%	22	3.0%	150	6.4%	84	4.9%	54	2.6%	43	1.4%

Count and percent are suppressed as '-' when fewer than 5 cases to ensure confidentiality and statistical reliability. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008.
Data source: New Jersey State Cancer Registry, New Jersey Department of Health.

Table A.2- Childhood Cancer Cases and Incidence Rates by Type and Gender, New Jersey and the U.S., All Races, Ages 0-14

ICCC Category	New Jersey 1990-2013				U.S. (SEER) 1990-2013		
	Total Cases	Total Rate	Male Rate	Female Rate	Total Rate	Male Rate	Female Rate
All Cancers	**6,860**	**16.8**	**18.0**	**15.6**	**15.1**	**16.0**	**14.2**
I Leukemias, myeloproliferative & myelodysplastic diseases	**2,125**	**5.2**	**5.7**	**4.7**	**4.6**	**5.0**	**4.2**
I(a) Lymphoid leukemias	1,629	4.0	4.3	3.6	3.7	3.9	3.3
I(b) Acute myeloid leukemias	324	0.8	0.9	0.7	0.7	0.8	0.7
I(c) Chronic myeloproliferative diseases	54	0.1	0.1	0.1	0.1	0.1	0.1
I(d) Myelodysplastic syndrome and other myeloproliferative	43	0.1	0.1	0.1	<0.05	0.1	<0.05
I(e) Unspecified and other specified leukemias	75	0.2	0.2	0.2	0.1	0.1	0.1
II Lymphomas and reticuloendothelial neoplasms	**786**	**1.9**	**2.4**	**1.4**	**1.6**	**2.0**	**1.2**
II(a) Hodgkin lymphomas	271	0.7	0.8	0.6	0.6	0.6	0.5
II(b) Non-Hodgkin lymphomas (except Burkitt lymphoma)	293	0.7	0.9	0.5	0.7	0.9	0.5
II(c) Burkitt lymphoma	116	0.3	0.4	0.1	0.3	0.4	0.1
II(d) Miscellaneous lymphoreticular neoplasms	87	0.2	0.2	0.2		0.1	0.1
II(e) Unspecified lymphomas	19	<0.05	0.1	-	<0.05	<0.05	<0.05
III CNS and miscellaneous intracranial and intraspinal neoplasms	**1,458**	**3.6**	**3.8**	**3.3**	**3.3**	**3.6**	**3.1**
III(a) Ependymomas and choroid plexus tumor	128	0.3	0.3	0.3	0.3	0.3	0.3
III(b) Astrocytomas	714	1.8	1.8	1.7	1.6	1.6	1.6
III(c) Intracranial and intraspinal embryonal tumors	309	0.8	0.9	0.6	0.7	0.9	0.6
III(d) Other gliomas	236	0.6	0.6	0.6	0.6	0.6	0.6
III(e) Other specified intracranial/intraspinal neoplasms	24	0.1	0.1	0.1	<0.05	<0.05	<0.05
III(f) Unspecified intracranial and intraspinal neoplasms	47	0.1	0.1	0.1	<0.05	<0.05	<0.05
IV Neuroblastoma and other peripheral nervous cell tumors	**505**	**1.2**	**1.2**	**1.2**	**1.1**	**1.1**	**1.1**
IV(a) Neuroblastoma and ganglioneuroblastoma	496	1.2	1.2	1.2	1.1	1.1	1.1
IV(b) Other peripheral nervous cell tumors	9	<0.05	<0.05	-	<0.05	<0.05	<0.05
V Retinoblastoma	**170**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**
VI Renal tumors	**371**	**0.9**	**0.8**	**1.0**	**0.8**	**0.8**	**0.9**
VI(a) Nephroblastoma and other nonepithelial renal tumors	353	0.9	0.8	0.9	0.8	0.8	0.8
VI(b) Renal carcinomas	16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VI(c) Unspecified malignant renal tumors	-	-	-	-	-	-	-
VII Hepatic tumors	**90**	**0.2**	**0.3**	**0.2**	**0.3**	**0.3**	**0.2**
VII(a) Hepatoblastoma	73	0.2	0.2	0.1	0.2	0.2	0.2
VII(b) Hepatic carcinomas	16	<0.05	0.1	<0.05	<0.05	0.1	<0.05
VII(c) Unspecified malignant hepatic tumors	-	-	-	-	<0.05	-	-

Table A.2: (cont'd) Childhood Cancer Cases and Incidence Rates by Type and Gender, New Jersey and the U.S., All Races, Ages 0-14

ICCC Category	New Jersey 1990-2013				U.S. (SEER) 1990-2013		
	Total Cases	Total Rate	Male Rate	Female Rate	Total Rate	Male Rate	Female Rate
VIII Malignant bone tumors	**312**	**0.8**	**0.8**	**0.7**	**0.7**	**0.7**	**0.6**
VIII(a) Osteosarcomas	173	0.4	0.4	0.4	0.4	0.4	0.4
VIII(b) Chondrosarcomas	7	<0.05	<0.05	-	<0.05	<0.05	<0.05
VIII(c) Ewing tumor and related sarcomas of bone	108	0.3	0.3	0.2	0.2	0.2	0.2
VIII(d) Other specified malignant bone tumors	16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VIII(e) Unspecified malignant bone tumors	8	<0.05	<0.05	-	<0.05	<0.05	<0.05
IX Soft tissue and other extraosseous sarcomas	**460**	**1.1**	**1.2**	**1.0**	**1.1**	**1.1**	**1.0**
IX(a) Rhabdomyosarcomas	227	0.6	0.7	0.4	0.5	0.6	0.4
IX(b) Fibrosarcomas, peripheral nerve & other fibrous neoplasms	52	0.1	0.1	0.1	0.1	0.1	0.1
IX(c) Kaposi sarcoma	-	-	-	-	-	-	-
IX(d) Other specified soft tissue sarcomas	140	0.3	0.4	0.3	0.3	0.4	0.3
IX(e) Unspecified soft tissue sarcomas	40	0.1	0.1	0.1	0.1	0.1	0.1
X Germ cell & trophoblastic tumors & neoplasms of gonads	**235**	**0.6**	**0.5**	**0.6**	**0.5**	**0.5**	**0.6**
X(a) Intracranial & intraspinal germ cell tumors	52	0.1	0.2	0.1	0.2	0.2	0.1
X(b) Extracranial & extragonadal germ cell tumors	62	0.2	0.1	0.2	0.2	0.1	0.2
X(c) Malignant gonadal germ cell tumors	109	0.3	0.2	0.4	0.2	0.2	0.3
X(d) Gonadal carcinomas	5	<0.05	-	-	<0.05	-	<0.05
X(e) Other and unspecified malignant gonadal tumors	7	<0.05	-	-	<0.05	-	<0.05
XI Other malignant epithelial neoplasms and melanomas	**276**	**0.7**	**0.5**	**0.9**	**0.6**	**0.5**	**0.8**
XI(a) Adrenocortical carcinomas	10	<0.05	-	<0.05	<0.05	<0.05	<0.05
XI(b) Thyroid carcinomas	115	0.3	0.2	0.4	0.2	0.1	0.3
XI(c) Nasopharyngeal carcinomas	9	<0.05	-	<0.05	<0.05	<0.05	<0.05
XI(d) Malignant melanomas	74	0.2	0.2	0.2	0.2	0.2	0.2
XI(e) Skin carcinomas	-	-	-	<0.05	<0.05	-	<0.05
XI(f) Other and unspecified carcinomas	65	0.2	0.1	0.2	0.2	0.2	0.2
XII Other & unspecified malignant neoplasms	**63**	**0.2**	**0.1**	**0.2**	**<0.05**	**<0.05**	**0.1**
XII(a) Other specified malignant tumors	19	<0.05	<0.05	0.1	<0.05	<0.05	<0.05
XII(b) Other unspecified malignant tumors	44	0.1	0.1	0.1	<0.05	<0.05	<0.05
Not classified by ICCC or in situ	**9**	**<0.05**	**<0.05**	**-**	**<0.05**	**<0.05**	**<0.05**

Rates are suppressed as '-' when fewer than 5 cases to ensure confidentiality and statistical reliability and as <.05 when count is five or more. Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health; U.S. - Surveillance, Epidemiology, and End Results (SEER) Program, SEER 9 registries, National Cancer Institute.

Table A.3- Childhood Cancer Cases and Incidence Rates by Type and Gender, New Jersey and the U.S., All Races, Ages 0-19

ICCC Category	New Jersey 1990-2013				U.S.(SEER) 1990-2013		
	Total Cases	Total Rate	Male Rate	Female Rate	Total Rate	Male Rate	Female Rate
All Cancers	**10,028**	**18.6**	**19.6**	**17.6**	**16.7**	**17.5**	**15.9**
I Leukemias, myeloproliferative & myelodysplastic diseases	**2,540**	**4.7**	**5.2**	**4.1**	**4.1**	**4.5**	**3.7**
I(a) Lymphoid leukemias	1,841	3.4	3.8	3.0	3.1	3.4	2.8
I(b) Acute myeloid leukemias	445	0.8	0.9	0.7	0.8	0.8	0.8
I(c) Chronic myeloproliferative diseases	107	0.2	0.2	0.2	0.1	0.1	0.1
I(d) Myelodysplastic syndrome and other myeloproliferative	56	0.1	0.1	0.1	<0.05	<0.05	<0.05
I(e) Unspecified and other specified leukemias	91	0.2	0.2	0.2	0.1	0.1	0.1
II Lymphomas and reticuloendothelial neoplasms	**1,621**	**3.1**	**3.5**	**2.6**	**2.5**	**2.8**	**2.1**
II(a) Hodgkin lymphomas	799	1.5	1.5	1.6	1.2	1.2	1.2
II(b) Non-Hodgkin lymphomas (except Burkitt lymphoma)	536	1.0	1.3	0.7	0.9	1.1	0.7
II(c) Burkitt lymphoma	152	0.3	0.5	0.1	0.2	0.4	0.1
II(d) Miscellaneous lymphoreticular neoplasms	95	0.2	0.2	0.1	<0.05	<0.05	<0.05
II(e) Unspecified lymphomas	39	0.1	0.1	<0.05	<0.05	0.1	<0.05
III CNS and miscellaneous intracranial and intraspinal neoplasms	**1,783**	**3.3**	**3.5**	**3.1**	**3.0**	**3.3**	**2.8**
III(a) Ependymomas and choroid plexus tumor	149	0.3	0.3	0.3	0.3	0.3	0.2
III(b) Astrocytomas	893	1.7	1.7	1.6	1.5	1.6	1.5
III(c) Intracranial and intraspinal embryonal tumors	347	0.6	0.8	0.5	0.6	0.7	0.5
III(d) Other gliomas	305	0.6	0.6	0.6	0.6	0.6	0.5
III(e) Other specified intracranial/intraspinal neoplasms	31	0.1	0.1	0.1	<0.05	<0.05	<0.05
III(f) Unspecified intracranial and intraspinal neoplasms	58	0.1	0.1	0.1	<0.05	<0.05	<0.05
IV Neuroblastoma and other peripheral nervous cell tumors	**519**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**
IV(a) Neuroblastoma and ganglioneuroblastoma	504	0.9	0.9	0.9	0.8	0.9	0.8
IV(b) Other peripheral nervous cell tumors	15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
V Retinoblastoma	**170**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**
VI Renal tumors	**399**	**0.7**	**0.7**	**0.8**	**0.7**	**0.6**	**0.7**
VI(a) Nephroblastoma and other nonepithelial renal tumors	359	0.7	0.6	0.7	0.6	0.6	0.6
VI(b) Renal carcinomas	38	0.1	0.1	0.1	0.1	<0.05	0.1
VI(c) Unspecified malignant renal tumors	-	-	-	-	-	-	-
VII Hepatic tumors	**106**	**0.2**	**0.2**	**0.2**	**0.2**	**0.3**	**0.2**
VII(a) Hepatoblastoma	73	0.1	0.2	0.1	0.2	0.2	0.1
VII(b) Hepatic carcinomas	32	0.1	0.1	0.1	0.1	0.1	<0.05
VII(c) Unspecified malignant hepatic tumors	-	-	-	-	<0.05	-	-

Table A.3: (cont'd) Childhood Cancer Cases and Incidence Rates by Type and Gender, New Jersey and the U.S., All Races, Ages 0-19

ICCC Category	New Jersey 1990-2013				U.S. (SEER) 1990-2013		
	Total Cases	Total Rate	Male Rate	Female Rate	Total Rate	Male Rate	Female Rate
VIII Malignant bone tumors	**533**	**1.0**	**1.1**	**0.9**	**0.9**	**1.0**	**0.7**
VIII(a) Osteosarcomas	286	0.5	0.6	0.5	0.5	0.6	0.4
VIII(b) Chondrosarcomas	34	0.1	0.1	<0.05	<0.05	0.1	<0.05
VIII(c) Ewing tumor and related sarcomas of bone	167	0.3	0.3	0.3	0.3	0.3	0.2
VIII(d) Other specified malignant bone tumors	31	0.1	0.1	0.1	<0.05	<0.05	<0.05
VIII(e) Unspecified malignant bone tumors	15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IX Soft tissue and other extraosseous sarcomas	**684**	**1.3**	**1.4**	**1.1**	**1.2**	**1.3**	**1.1**
IX(a) Rhabdomyosarcomas	280	0.5	0.6	0.4	0.5	0.5	0.4
IX(b) Fibrosarcomas, peripheral nerve & other fibrous neoplasms	75	0.1	0.1	0.1	0.1	0.1	0.1
IX(c) Kaposi sarcoma	5	<0.05	-	-	<0.05	<0.05	-
IX(d) Other specified soft tissue sarcomas	257	0.5	0.5	0.4	0.5	0.5	0.5
IX(e) Unspecified soft tissue sarcomas	67	0.1	0.1	0.1	0.1	0.1	0.1
X Germ cell & trophoblastic tumors & neoplasms of gonads	**600**	**1.1**	**1.4**	**0.9**	**1.1**	**1.4**	**0.9**
X(a) Intracranial & intraspinal germ cell tumors	88	0.2	0.3	0.1	0.2	0.3	0.1
X(b) Extracranial & extragonadal germ cell tumors	91	0.2	0.1	0.2	0.2	0.1	0.2
X(c) Malignant gonadal germ cell tumors	372	0.7	0.9	0.5	0.7	1.0	0.5
X(d) Gonadal carcinomas	30	0.1	-	0.1	<0.05	<0.05	0.1
X(e) Other and unspecified malignant gonadal tumors	19	<0.05	-	0.1	<0.05	<0.05	<0.05
XI Other malignant epithelial neoplasms and melanomas	**960**	**1.8**	**1.2**	**2.5**	**1.8**	**1.2**	**2.4**
XI(a) Adrenocortical carcinomas	14	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
XI(b) Thyroid carcinomas	443	0.8	0.4	1.3	0.7	0.3	1.2
XI(c) Nasopharyngeal carcinomas	30	0.1	0.1	<0.05	<0.05	0.1	<0.05
XI(d) Malignant melanomas	240	0.5	0.3	0.6	0.6	0.4	0.7
XI(e) Skin carcinomas	-	-	-	-	<0.05	<0.05	<0.05
XI(f) Other and unspecified carcinomas	230	0.4	0.3	0.5	0.4	0.4	0.5
XII Other & unspecified malignant neoplasms	**92**	**0.2**	**0.1**	**0.2**	**0.1**	<0.05	**0.1**
XII(a) Other specified malignant tumors	21	<0.05	<0.05	0.1	<0.05	<0.05	<0.05
XII(b) Other unspecified malignant tumors	71	0.1	0.1	0.1	<0.05	<0.05	<0.05
Not classified by ICCC or in situ	**21**	**<0.05**	**0.1**	**<0.05**	**<0.05**	**<0.05**	**<0.05**

Rates are suppressed as '-' when fewer than 5 cases to ensure confidentiality and statistical reliability and as <.05 when count is five or more. Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health; U.S. - Surveillance, Epidemiology, and End Results (SEER) Program, SEER 9 registries, National Cancer Institute.

Table A.4- Childhood Cancer Incidence by Type, Age Group and Race/Ethnicity, Males, New Jersey and the U.S., 1990/1992-2013

Primary Cancer Site	Race/Ethnicity	NJ 1990-2013				US (SEER) 1992-2013	
		00-14 years		00-19 years		00-14 years	00-19 years
		Rate	Cases	Rate	Cases	Rate	Rate
All Sites	All Races	18.0	3,755	19.6	5,415	16.0	17.6
	White	18.7	2,900	20.8	4,267	16.9	18.8
	Black	14.1	523	14.4	716	12.5	13.0
	API	15.1	231	15.0	297	13.7	14.5
	Hispanic All Races	16.6	636	18.3	919	15.7	16.9
Leukemia	All Races	5.5	1,154	5.0	1,393	5.4	4.9
	White	5.8	912	5.3	1,104	5.8	5.3
	Black	3.5	129	3.2	160	3.2	2.8
	API	5.6	86	5.0	100	5.0	4.5
	Hispanic All Races	5.6	217	5.4	277	6.4	6.1
Acute Lymphocytic Leukemia	All Races	4.3	893	3.7	1,034	4.3	3.7
	White	4.6	713	4.0	832	4.7	4.2
	Black	2.6	96	2.2	108	2.2	1.8
	API	4.0	62	3.5	70	3.8	3.2
	Hispanic All Races	4.1	159	3.8	194	5.3	4.9
Lymphoma	All Races	2.2	454	3.3	898	1.9	2.7
	White	2.1	320	3.4	683	1.9	2.8
	Black	2.6	94	3.0	150	1.7	2.3
	API	2.0	30	2.4	46	1.7	2.1
	Hispanic All Races	2.0	72	3.0	143	1.8	2.3
Hodgkin Lymphoma	All Races	0.8	156	1.5	403	0.6	1.2
	White	0.7	109	1.6	318	0.7	1.3
	Black	0.8	30	1.1	55	0.6	1.0
	API	0.9	13	1.2	23	0.5	0.8
	Hispanic All Races	0.7	25	1.4	69	0.8	1.1
Non-Hodgkin Lymphoma	All Races	1.4	298	1.8	495	1.2	1.5
	White	1.4	211	1.8	365	1.3	1.5
	Black	1.7	64	1.9	95	1.1	1.3
	API	1.1	17	1.2	23	1.2	1.3
	Hispanic All Races	1.3	47	1.5	74	1.0	1.2
Brain and Other Nervous System	All Races	4.0	832	3.7	1,012	3.4	3.1
	White	4.3	662	3.9	814	3.6	3.3
	Black	2.8	105	2.5	122	2.6	2.4
	API	2.7	42	2.4	48	2.6	2.4
	Hispanic All Races	3.2	121	3.1	154	2.8	2.5
Kidney and Renal Pelvis	All Races	0.9	180	0.7	196	0.7	0.6
	White	0.9	138	0.7	150	0.8	0.6
	Black	0.7	26	0.6	28	0.9	0.8
	API	0.7	10	0.5	11	0.3	0.3
	Hispanic All Races	0.9	37	0.8	41	0.5	0.4
Bones and Joints	All Races	0.8	175	1.1	307	0.7	1.0
	White	0.9	139	1.2	243	0.7	1.1
	Black	0.7	27	1.0	49	0.5	0.8
	API	-	-	0.5	9	0.5	0.8
	Hispanic All Races	0.8	28	1.0	47	0.7	0.9
Soft Tissue including Heart	All Races	1.0	219	1.1	309	1.0	1.0
	White	1.1	173	1.2	244	1.0	1.1
	Black	0.8	29	0.9	45	1.0	1.1
	API	0.8	12	0.7	14	0.7	0.8
	Hispanic All Races	1.1	44	1.1	57	0.8	0.9

Rates are suppressed as - when fewer than 5 cases to ensure confidentiality and statistical reliability. Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health; U.S. - Surveillance, Epidemiology, and End Results (SEER) Program, SEER 9 registries, National Cancer Institute. API=Asian/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races.

Table A.5- Childhood Cancer Incidence by Type, Age Group and Race/Ethnicity, Females, New Jersey and the U.S., 1990/1992-2013

Primary Cancer Site	Race/Ethnicity	NJ 1990-2013				US (SEER) 1992-2013	
		00-14 years		00-19 years		00-14 years	00-19 years
		Rate	Cases	Rate	Cases	Rate	Rate
All Sites	All Races	15.6	3,105	17.6	4,613	14.2	15.8
	White	16.1	2,384	18.6	3,602	15.1	16.7
	Black	12.3	440	13.2	633	11.4	12.2
	API	13.2	195	13.1	248	11.7	13.0
	Hispanic All Races	16.1	583	17.5	824	14.1	14.8
Leukemia	All Races	4.5	910	4.0	1,051	4.5	4.0
	White	4.8	717	4.2	825	4.9	4.3
	Black	2.9	106	2.6	127	2.5	2.3
	API	4.7	70	4.1	80	4.0	3.5
	Hispanic All Races	5.5	200	4.8	233	5.4	4.8
Acute Lymphocytic Leukemia	All Races	3.6	719	2.9	780	3.6	3.0
	White	3.9	586	3.2	634	4.0	3.3
	Black	1.9	69	1.6	78	1.6	1.4
	API	3.6	54	2.9	57	3.0	2.4
	Hispanic All Races	4.1	150	3.5	168	4.5	3.8
Lymphoma	All Races	1.2	243	2.4	625	1.1	1.9
	White	1.3	185	2.6	494	1.1	2.1
	Black	1.2	43	2.0	96	1.1	1.8
	API	0.7	10	1.0	18	0.8	1.4
	Hispanic All Races	1.4	45	2.4	105	1.0	1.5
Hodgkin Lymphoma	All Races	0.6	115	1.6	396	0.5	1.2
	White	0.6	92	1.7	325	0.5	1.3
	Black	0.4	15	1.0	48	0.5	1.0
	API	0.4	5	0.6	10	0.2	0.5
	Hispanic All Races	0.5	18	1.3	58	0.5	0.9
Non-Hodgkin Lymphoma	All Races	0.7	128	0.9	229	0.6	0.8
	White	0.6	93	0.9	169	0.6	0.7
	Black	0.8	28	1.0	48	0.6	0.8
	API	0.4	5	0.4	8	0.6	0.9
	Hispanic All Races	0.8	27	1.1	47	0.6	0.7
Brain and Other Nervous System	All Races	3.4	668	3.1	829	3.1	2.7
	White	3.5	513	3.3	641	3.3	2.9
	Black	2.7	98	2.5	120	2.5	2.2
	API	2.5	38	2.1	42	2.3	2.1
	Hispanic All Races	2.9	106	2.7	129	2.6	2.2
Kidney and Renal Pelvis	All Races	1.0	195	0.8	209	0.9	0.7
	White	1.0	150	0.8	160	0.9	0.7
	Black	1.0	36	0.8	40	1.2	1.0
	API	0.3	5	0.2	5	0.5	0.4
	Hispanic All Races	0.8	32	0.7	34	0.8	0.6
Bones and Joints	All Races	0.7	139	0.9	227	0.6	0.7
	White	0.8	113	1.0	186	0.7	0.8
	Black	0.4	13	0.5	25	0.5	0.6
	API	0.9	12	0.7	13	0.5	0.6
	Hispanic All Races	1.1	38	1.2	54	0.6	0.7
Soft Tissue including Heart	All Races	1.1	219	1.1	278	1.0	1.0
	White	1.1	156	1.1	206	1.0	1.0
	Black	1.4	52	1.2	59	0.9	0.9
	API	0.5	8	0.5	9	0.8	0.9
	Hispanic All Races	0.9	34	0.9	43	0.8	0.8

Rates are suppressed as - when fewer than 5 cases to ensure confidentiality and statistical reliability. Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health; U.S. - Surveillance, Epidemiology, and End Results (SEER) Program, SEER 9 registries, National Cancer Institute. API=Asian/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races.

Table A.6- Childhood Cancer Mortality by Type, Age Group and Race/Ethnicity, Males, New Jersey and the U.S., 1990/1992-2013

		NJ 1990-2013				U.S. 1990-2013	
Primary Cancer Site	**Race/Ethnicity**	**0-14 years**		**0-19 years**		**0-14 years**	**0-19 years**
		Rate	**Count**	**Rate**	**Count**	**Rate**	**Rate**
All Sites	All Races	2.6	540	3.0	828	2.7	3.0
	White	2.6	409	3.1	642	2.8	3.1
	Black	2.7	99	2.9	144	2.5	2.9
	API	2.0	31	2.1	41	2.5	2.7
	Hispanic All Races	2.2	83	2.7	132	2.6	3.0
Leukemia	All Races	0.8	173	0.9	251	0.9	1.0
	White	0.9	136	1.0	199	0.9	1.0
	Black	0.6	23	0.7	33	0.7	0.8
	API	0.9	14	1.0	19	1.0	1.0
	Hispanic All Races	0.9	32	1.0	49	1.1	1.2
Acute Lymphocytic Leukemia	All Races	0.4	83	0.4	107	0.4	0.4
	White	0.4	64	0.4	83	0.4	0.5
	Black	0.3	12	0.3	15	0.3	0.3
	API	-	-	-	-	0.4	0.4
	Hispanic All Races	0.4	16	0.4	20	0.6	0.7
Lymphoma	All Races	0.1	29	0.2	66	0.1	0.2
	White	0.1	20	0.3	54	0.1	0.2
	Black	-	-	0.2	12	0.1	0.2
	API	-	-	-	-	0.1	0.2
	Hispanic All Races	-	-	0.2	12	0.1	0.2
Hodgkin Lymphoma	All Races	-	-	0.1	16	< 0.05	< 0.05
	White	-	-	0.1	15	< 0.05	< 0.05
	Black	-	-	-	-	< 0.05	< 0.05
	API	-	-	-	-	-	-
	Hispanic All Races	-	-	-	-	< 0.05	< 0.05
Non-Hodgkin Lymphoma	All Races	0.1	26	0.2	50	0.1	0.2
	White	0.1	18	0.2	39	0.1	0.2
	Black	-	-	0.2	11	0.1	0.2
	API	-	-	-	-	0.1	0.1
	Hispanic All Races	-	-	0.2	10	0.1	0.1
Brain and Other Nervous System	All Races	0.7	152	0.7	192	0.8	0.7
	White	0.8	122	0.8	155	0.8	0.8
	Black	0.5	20	0.5	25	0.7	0.6
	API	-	-	0.6	11	0.7	0.6
	Hispanic All Races	0.5	20	0.5	27	0.7	0.6
Kidney and Renal Pelvis	All Races	0.1	18	0.1	23	0.1	0.1
	White	0.1	13	0.1	16	0.1	0.1
	Black	-	-	-	-	0.1	0.1
	API	-	-	-	-	0.1	< 0.05
	Hispanic All Races	-	-	-	-	0.1	< 0.05
Bones and Joints	All Races	0.1	27	0.3	74	0.1	0.2
	White	0.1	19	0.3	61	0.1	0.3
	Black	-	-	0.2	11	0.1	0.2
	API	-	-	-	-	0.1	0.2
	Hispanic All Races	-	-	0.2	10	0.1	0.3
Soft Tissue including Heart	All Races	0.1	30	0.2	60	0.2	0.2
	White	0.1	19	0.2	41	0.2	0.2
	Black	0.3	11	0.4	19	0.2	0.2
	API	-	-	-	-	0.1	0.1
	Hispanic All Races	-	-	-	-	0.1	0.2

Rates are suppressed as '-' when fewer than 10 cases to ensure confidentiality and statistical reliability and as <.05 when count is 10 or more. Rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data source: Mortality - National Center for Health Statistics. API=Asian/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races.

Table A.7- Childhood Cancer Mortality by Type, Age Group and Race/Ethnicity, Females, New Jersey and the U.S., 1990/1992-2013

		NJ 1990-2013				U.S. 1990-2013	
Primary Cancer Site	**Race/Ethnicity**	**0-14 years**		**0-19 years**		**0-14 years**	**0-19 years**
		Rate	**Count**	**Rate**	**Count**	**Rate**	**Rate**
All Sites	All Races	2.2	444	2.4	631	2.3	2.4
	White	2.4	352	2.5	490	2.3	2.5
	Black	2.0	71	2.3	109	2.2	2.4
	API	1.4	21	1.7	32	1.9	2.0
	Hispanic All Races	2.1	75	2.2	104	2.3	2.5
Leukemia	All Races	0.7	137	0.7	194	0.7	0.7
	White	0.8	115	0.8	160	0.7	0.8
	Black	0.3	12	0.4	20	0.6	0.6
	API	0.7	10	0.7	14	0.7	0.7
	Hispanic All Races	0.8	28	0.8	39	0.9	1.0
Acute Lymphocytic Leukemia	All Races	0.3	61	0.3	85	0.3	0.3
	White	0.4	58	0.4	79	0.3	0.3
	Black	-	-	-	-	0.2	0.2
	API	-	-	-	-	0.2	0.2
	Hispanic All Races	0.5	16	0.5	21	0.5	0.5
Lymphoma	All Races	0.1	15	0.1	33	0.1	0.1
	White	0.1	12	0.1	22	0.1	0.1
	Black	-	-	-	-	0.1	0.1
	API	-	-	-	-	0.1	0.1
	Hispanic All Races	-	-	-	-	0.1	0.1
Hodgkin Lymphoma	All Races	-	-	< 0.05	11	< 0.05	< 0.05
	White	-	-	-	-	< 0.05	< 0.05
	Black	-	-	-	-	< 0.05	< 0.05
	API	-	-	-	-	-	< 0.05
	Hispanic All Races	-	-	-	-	< 0.05	< 0.05
Non-Hodgkin Lymphoma	All Races	0.1	11	0.1	22	0.1	0.1
	White	-	-	0.1	16	0.1	0.1
	Black	-	-	-	-	0.1	0.1
	API	-	-	-	-	0.1	0.1
	Hispanic All Races	-	-	-	-	0.1	0.1
Brain and Other Nervous System	All Races	0.6	128	0.6	146	0.7	0.6
	White	0.7	105	0.6	118	0.7	0.7
	Black	0.6	20	0.5	24	0.7	0.6
	API	-	-	-	-	0.5	0.5
	Hispanic All Races	0.7	24	0.5	26	0.7	0.6
Kidney and Renal Pelvis	All Races	0.1	13	0.1	16	0.1	0.1
	White	0.1	11	0.1	13	0.1	0.1
	Black	-	-	-	-	0.1	0.1
	API	-	-	-	-	< 0.05	< 0.05
	Hispanic All Races	-	-	-	-	0.1	0.1
Bones and Joints	All Races	0.1	21	0.2	54	0.1	0.2
	White	0.1	13	0.2	41	0.1	0.2
	Black	-	-	0.2	10	0.1	0.2
	API	-	-	-	-	0.1	0.1
	Hispanic All Races	-	-	0.2	10	0.1	0.2
Soft Tissue including Heart	All Races	0.2	30	0.2	49	0.1	0.2
	White	0.2	23	0.2	40	0.1	0.2
	Black	-	-	-	-	0.1	0.2
	API	-	-	-	-	0.1	0.2
	Hispanic All Races	-	-	-	-	0.1	0.2

Rates are suppressed as '-' when fewer than 10 cases to ensure confidentiality and statistical reliability and as <.05 when count is 10 or more. Rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data source: Mortality - National Center for Health Statistics. API=Asian/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races.

Table A.8- Childhood Cancer Incidence by Type (Primary Site), Age Group and Race/Ethnicity, Males, New Jersey, 1990-2013

Primary Cancer Site	Age Groups													
	0-14 years		0-19 years		<1 years		01-04 years		05-09 years		10-14 years		15-19 years	
	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases
All Sites	**18.0**	**3755**	**19.6**	**5415**	**27.9**	**380**	**23.9**	**1,319**	**14.1**	**977**	**15.5**	**1,079**	**24.5**	**1,660**
White	18.7	2900	20.8	4267	28.8	288	25.6	1,051	14.6	753	15.5	808	27.1	1,367
Black	14.1	523	14.4	716	20.0	49	15.7	153	12.1	148	13.7	173	15.6	193
API	15.1	231	15.0	297	26.6	29	19.7	82	11.7	59	12.8	61	15.0	66
Hispanic All Races	16.6	636	18.3	919	25.3	73	23.4	250	12.1	145	14.4	168	23.0	283
Leukemia	5.5	1154	5.0	1393	4.5	61	9.9	546	4.5	311	3.4	236	3.5	239
Acute Lymphocytic Leukemia	4.3	893	3.7	1034	1.8	24	8.4	462	3.7	259	2.1	148	2.1	141
Lymphoma	2.2	454	3.3	898	-	-	1.0	57	2.2	155	3.4	240	6.6	444
Hodgkin Lymphoma	0.8	156	1.5	403	-	-	0.1	8	0.6	45	1.5	103	3.6	247
Non-Hodgkin Lymphoma	1.4	298	1.8	495	-	-	0.9	49	1.6	110	2.0	137	2.9	197
Brain and Other Nervous System	4.0	832	3.7	1012	3.8	52	5.0	275	4.0	274	3.3	231	2.7	180
Kidney and Renal Pelvis	0.9	180	0.7	196	1.9	26	1.8	102	0.5	33	0.3	19	0.2	16
Bones and Joints	0.8	175	1.1	307	-	-	0.3	16	0.8	53	1.5	104	2.0	132
Soft Tissue including Heart	1.0	219	1.1	309	3.2	43	1.3	71	0.6	44	0.9	61	1.3	90

Table A.9- Childhood Cancer Incidence by Type (Primary Site), Age Group and Race/Ethnicity, Females, New Jersey, 1990-2013

Primary Cancer Site	Age Groups													
	0-14 years		0-19 years		<1 years		01-04 years		05-09 years		10-14 years		15-19 years	
	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases
All Sites	**15.6**	**3105**	**17.6**	**4613**	**26.6**	**347**	**19.6**	**1,037**	**11.3**	**748**	**14.6**	**973**	**23.7**	**1,508**
White	16.1	2384	18.6	3602	28.5	273	20.5	800	11.5	565	15.1	746	25.9	1,218
Black	12.3	440	13.2	633	14.8	35	15.0	141	10.4	123	11.6	141	16.0	193
API	13.2	195	13.1	248	23.9	25	16.5	67	8.2	40	13.7	63	12.8	53
Hispanic All Races	16.1	583	17.5	824	24.2	67	18.9	193	13.4	153	15.3	170	21.5	241
Leukemia	4.5	910	4.0	1051	5.4	70	7.8	414	3.5	229	3.0	197	2.2	141
Acute Lymphocytic Leukemia	3.6	719	2.9	780	2.5	32	6.7	354	3.0	196	2.1	137	1.0	61
Lymphoma	1.2	243	2.4	625	-	-	0.3	17	1.0	63	2.5	163	6.0	382
Hodgkin Lymphoma	0.6	115	1.6	396	-	-	-	-	0.3	19	1.4	94	4.4	281
Non-Hodgkin Lymphoma	0.7	128	0.9	229	-	-	0.3	15	0.7	44	1.0	69	1.6	101
Brain and Other Nervous System	3.4	668	3.1	829	4.6	60	3.7	195	3.3	218	2.9	195	2.5	161
Kidney and Renal Pelvis	1.0	195	0.8	209	2.0	26	2.0	107	0.8	51	0.2	11	0.2	14
Bones and Joints	0.7	139	0.9	227	-	-	0.1	5	0.5	32	1.5	102	1.4	88
Soft Tissue including Heart	1.1	219	1.1	278	3.3	43	1.5	81	0.6	43	0.8	52	0.9	59

Rates are suppressed as - when fewer than 5 cases to ensure confidentiality and statistical reliability. Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health. API=Asian/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races.

Table A.10- Childhood Cancer Incidence by Type (ICCC) Age Group and Race/Ethnicity, Males, New Jersey, 1990-2013

ICCC Category	0-19		<1		1-4		5-9		10-14		15-19	
	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count
Neuroblastoma												
All Races	1.0	265	6.6	90	2.3	126	0.4	29	0.2	12	0.1	8
White	1.0	215										
Black	0.8	38										
API	0.6	11										
Hispanic	0.7	37										
Retinoblastoma												
All Races	0.3	92	3.0	41	0.8	46	0.1	5	-	-	-	-
White	0.3	64										
Black	0.3	15										
API	0.5	9										
Hispanic	0.3	14										
Germ cell												
All Races	1.3	368	2.0	27	0.4	20	0.1	10	0.7	50	3.9	261
White	1.6	324										
Black	0.4	20										
API	1.0	20										
Hispanic	1.3	63										

Table A.11- Childhood Cancer Incidence by Type (ICCC), Age Group and Race/Ethnicity, Females, New Jersey, 1990-2013

ICCC Category	0-19		<1		1-4		5-9		10-14		15-19	
	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count
Neuroblastoma												
All Races	1.0	254	6.9	90	2.3	123	0.3	20	0.2	15	0.1	6
White	1.0	202										
Black	0.7	33										
API	0.6	11										
Hispanic	0.4	21										
Retinoblastoma												
All Races	0.3	78	2.3	30	0.9	47	-	-	-	-	-	-
White	0.3	55										
Black	0.3	14										
API	0.4	7										
Hispanic	0.3	15										
Germ cell												
All Races	0.9	232	1.1	15	0.3	17	0.4	28	1.0	68	1.6	104
White	0.8	161										
Black	0.8	40										
API	1.2	22										
Hispanic	1.2	54										

Rates are suppressed as '-' when fewer than 5 cases to ensure confidentiality and statistical reliability. Average annual rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - ICCC site recode ICD-O-3/WHO 2008. API=Asian/ Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races. Data source: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health.

Table A.12- Childhood Cancer Mortality by Type, Age Group and Race/Ethnicity, Males, New Jersey, 1990-2013

Primary Cancer Site	Age Groups													
	0-14		0-19		<1		1-4		5-9		10-14		15-19	
	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count
All Sites	**2.6**	**540**	**3.0**	**828**	**2.3**	**31**	**2.6**	**141**	**2.5**	**173**	**2.8**	**195**	**4.3**	**288**
White	2.6	409	3.1	642	2.7	27	2.6	107	2.6	135	2.7	140	4.6	233
Black	2.7	99	2.9	144	-	-	2.4	23	2.4	30	3.5	44	3.6	45
API	2.0	31	2.1	41	-	-	2.6	11	-	-	2.3	11	2.3	10
Hispanic All Races	2.2	83	2.7	132	-	-	2.2	24	1.9	23	2.4	28	4.0	49
Bones and Joints	0.1	27	0.3	74	-	-	-	-	-	-	0.3	21	0.7	47
Brain and Other Nervous System	0.7	152	0.7	192	-	-	0.6	34	1.0	67	0.7	49	0.6	40
Lymphoma	0.1	29	0.2	66	-	-	-	-	-	-	0.3	19	0.5	37
Non-Hodgkin Lymphoma	0.1	26	0.2	50	-	-	-	-	-	-	0.2	17	0.4	24
Hodgkin Lymphoma	-	-	0.1	16	-	-	-	-	-	-	-	-	0.2	13
Kidney and Renal Pelvis	0.1	18	0.1	23	-	-	-	-	-	-	-	-	-	-
Leukemia	0.8	173	0.9	251	0.7	10	0.8	44	0.7	50	1.0	69	1.2	78
Acute Lymphocytic Leukemia	0.4	83	0.4	107	-	-	0.3	16	0.3	23	0.6	43	0.4	24
Soft Tissue including Heart	0.1	30	0.2	60	-	-	-	-	0.1	10	0.2	11	0.4	30

Rates are suppressed as '-' when fewer than 10 cases to ensure confidentiality and statistical reliability and as <.05 when count is 10 or more. Rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data source: Mortality - National Center for Health Statistics. API=Asian/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races.

Table A.13- Childhood Cancer Mortality by Type, Age Group and Race/Ethnicity, Females, New Jersey, 1990-2013

Primary Cancer Site	Age Groups													
	0-14		0-19		<1		1-4		5-9		10-14		15-19	
	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count
All Sites	**2.2**	**444**	**2.4**	**631**	**1.8**	**23**	**2.1**	**113**	**2.3**	**150**	**2.4**	**158**	**2.9**	**187**
White	2.4	352	2.5	490	1.8	17	2.3	91	2.4	120	2.5	124	2.9	138
Black	2.0	71	2.3	109	-	-	1.4	13	2.3	27	2.2	27	3.2	38
API	1.4	21	1.7	32	-	-	-	-	-	-	-	-	2.6	11
Hispanic All Races	2.1	75	2.2	104	-	-	2.5	26	2.3	26	1.8	20	2.6	29
Bones and Joints	0.1	21	0.2	54	-	-	-	-	-	-	0.3	17	0.5	33
Brain and Other Nervous System	0.6	128	0.6	146	-	-	0.5	27	0.9	60	0.6	38	0.3	18
Lymphoma	0.1	15	0.1	33	-	-	-	-	-	-	-	-	0.3	18
Non-Hodgkin Lymphoma	0.1	11	0.1	22	-	-	-	-	-	-	-	-	0.2	11
Hodgkin Lymphoma	-	-	< 0.05	11	-	-	-	-	-	-	-	-	-	-
Kidney and Renal Pelvis	0.1	13	0.1	16	-	-	-	-	-	-	-	-	-	-
Leukemia	0.7	137	0.7	194	-	-	0.9	45	0.5	30	0.8	55	0.9	57
Acute Lymphocytic Leukemia	0.3	61	0.3	85	-	-	0.3	15	0.3	20	0.4	24	0.4	24
Soft Tissue including Heart	0.2	30	0.2	49	-	-	-	-	-	-	0.2	15	0.3	19

Rates are suppressed as '-' when fewer than 10 cases to ensure confidentiality and statistical reliability and as <.05 when count is 10 or more. Rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data source: Mortality - National Center for Health Statistics. API=Asian/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races.

Table A.14- Childhood Cancer Incidence Annual Percent Change (APC) and Rates by Race, Age Group and Year, New Jersey and the U.S., 1979-2013

Year	New Jersey										U.S.									
	00-14					00-19					00-14					00-19				
	All races	White	Black	API	Hispanic	All races	White	Black	API	Hispanic	All races	White	Black	API	Hispanic	All races	White	Black	API	Hispanic
APC	0.4*	0.5*	0.5	1.3	0.1	0.5*	0.7*	0.4	1.5*	0	0.6*	0.6*	0.5*	0.3	0.5*	0.6*	0.6*	0.4*	0.4	0.8*
Rate																				
1979	14.0	15.2	8.8	-	-	16.5	17.2	13.1	-	-	13.2	13.9	10.7	-	-	14.7	15.4	12.8	-	-
1980	14.0	14.5	12.4	-	-	16.0	16.6	13.7	-	-	12.9	13.2	11.1	-	-	14.4	14.9	10.9	-	-
1981	13.8	14.8	9.8	-	-	14.6	15.5	10.4	-	-	12.5	12.5	13.2	-	-	14.1	14.4	13.0	-	-
1982	16.9	17.1	16.7	-	-	17.3	17.8	15.3	-	-	13.0	13.2	11.8	-	-	14.6	15.2	11.8	-	-
1983	17.9	18.7	16.1	-	-	19.1	20.2	15.4	-	-	13.0	13.8	10.0	-	-	14.6	15.5	11.5	-	-
1984	15.9	17.4	9.5	-	-	16.6	18.4	8.3	-	-	14.0	14.6	10.5	-	-	15.5	16.2	12.3	-	-
1985	14.7	15.3	11.8	-	-	16.7	17.8	12.3	-	-	14.6	15.6	10.2	-	-	16.0	17.1	10.6	-	-
1986	14.5	14.9	12.6	-	-	16.5	17.1	14.2	-	-	14.3	15.0	11.2	-	-	16.0	16.7	12.8	-	-
1987	14.6	14.9	12.2	-	-	15.8	16.1	14.7	-	-	14.2	14.7	11.6	-	-	15.4	16.3	11.3	-	-
1988	15.7	16.0	13.2	-	-	16.4	17.3	12.2	-	-	13.5	14.0	11.9	-	-	15.1	15.6	13.0	-	-
1989	14.6	15.4	11.6	-	-	16.0	17.0	13.2	-	-	15.1	15.6	13.7	-	-	16.7	17.4	14.0	-	-
1990	16.3	16.7	13.6	19.8	15.6	17.5	18.3	14.5	16.0	18.3	14.3	14.4	12.3	-	-	15.7	16.0	13.3	-	-
1991	16.8	18.5	11.2	10.9	19.4	16.9	18.8	10.6	9.3	18.8	15.2	16.2	11.9	-	-	16.4	17.5	12.5	-	-
1992	15.4	16.9	10.8	9.0	17.8	16.5	18.0	12.5	7.8	19.2	13.4	13.9	12.0	11.8	14.9	16.1	16.9	12.3	13.8	15.0
1993	15.0	14.6	17.6	11.1	16.6	16.8	17.3	16.8	10.4	16.6	15.0	15.3	12.5	13.6	14.9	16.1	16.7	13.1	13.6	15.8
1994	16.0	16.8	14.0	11.8	17.1	17.5	18.6	14.6	11.8	20.1	14.0	14.5	12.0	11.4	14.0	15.7	16.3	12.9	13.5	14.8
1995	15.0	16.1	12.6	6.8	11.4	16.5	17.9	12.7	10.6	14.9	14.1	14.9	11.8	11.3	12.8	15.8	16.7	12.4	13.0	13.3
1996	16.5	18.5	10.0	12.0	17.8	18.5	20.4	12.7	12.5	20.7	14.8	15.0	11.6	14.8	14.6	16.2	16.6	12.6	15.5	14.9
1997	14.3	15.8	9.7	11.0	15.3	15.8	17.2	11.9	11.6	15.0	14.1	14.7	11.2	12.4	13.3	15.8	16.9	11.1	12.8	13.7
1998	16.2	16.9	14.2	15.2	14.2	19.1	20.5	14.5	17.7	17.8	15.3	16.1	10.3	14.9	14.7	16.3	17.3	11.5	14.4	15.7
1999	15.8	16.0	14.9	17.0	16.9	17.7	18.6	14.8	15.8	16.6	14.5	15.6	10.7	13.3	14.2	15.7	16.7	11.4	13.8	15.2
2000	15.7	17.4	7.6	19.4	17.5	17.9	19.8	9.8	19.7	20.0	15.4	16.7	12.1	9.4	14.5	16.9	18.3	12.9	10.5	15.5
2001	17.6	18.9	12.7	16.6	16.6	20.0	21.6	14.6	17.4	18.0	15.8	17.1	11.0	13.6	14.9	17.1	18.5	11.7	14.3	15.6
2002	16.6	17.6	14.1	13.8	19.6	17.7	19.2	13.8	13.1	21.2	15.6	17.0	11.6	12.6	15.1	17.6	19.5	11.4	13.2	16.6
2003	16.5	17.6	15.3	9.3	13.0	18.3	20.0	15.4	9.7	15.5	13.2	14.0	10.3	10.9	13.5	15.7	16.8	11.7	12.4	14.5
2004	17.0	17.2	15.8	18.1	14.8	18.9	20.3	14.7	16.2	15.0	15.3	16.2	13.3	11.5	16.0	16.5	17.8	13.2	12.0	16.9
2005	16.8	17.8	15.1	13.2	16.6	18.3	19.8	14.7	13.7	17.5	16.8	17.7	13.0	11.9	16.7	17.9	19.2	13.2	13.7	17.4
2006	16.2	17.4	12.4	15.2	15.1	18.3	20.0	14.0	13.8	16.5	14.5	15.3	11.7	12.4	13.5	15.7	16.7	12.4	13.2	14.6
2007	16.6	18.6	10.7	12.8	14.9	17.8	19.9	12.6	11.3	16.1	14.8	15.7	12.0	14.6	14.7	17.0	18.3	13.0	15.2	16.1
2008	16.0	17.3	14.7	9.3	14.5	18.3	20.1	15.3	10.4	17.3	15.8	16.2	15.3	12.4	16.0	17.6	18.4	15.2	14.4	16.8
2009	19.0	20.6	16.3	14.2	19.4	21.6	23.9	16.4	16.1	19.6	16.1	16.8	13.2	13.9	15.8	17.8	19.1	13.1	15.0	17.8
2010	17.2	19.1	12.8	11.9	17.1	18.5	20.8	12.9	13.2	17.0	16.6	17.4	13.3	14.4	17.1	17.7	18.5	14.3	15.3	18.1
2011	16.7	17.1	14.7	19.3	15.9	19.1	21.0	12.8	17.6	19.0	16.0	17.0	13.0	12.1	15.3	18.2	19.9	13.2	13.2	16.9
2012	17.4	18.7	15.0	12.6	19.7	19.5	21.1	16.6	14.0	21.5	15.7	16.1	15.7	13.1	14.8	17.7	18.5	15.8	15.0	15.7
2013	16.0	16.5	11.1	23.0	16.3	18.3	19.5	13.0	20.7	17.3	15.5	16.1	12.0	13.4	15.2	17.3	18.1	13.3	14.7	16.6

Rates are suppressed as '-' when fewer than 5 cases to ensure confidentiality and statistical reliability. Rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health; U.S. - Surveillance, Epidemiology, and End Results (SEER) Program, SEER 9 registries, National Cancer Institute. API=Asian\Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races. * Statistically significantly different than zero over time, p<0.05.

Table A.15- Childhood Cancer Mortality Annual Percent Change (APC) and 3 Year Average Rates by Race, Age Group and Year, New Jersey and the U.S., 1979-2013

	New Jersey										U.S.									
3 Year	00-14					00-19					00-14					00-19				
Average	All races	White	Black	API	Hispanic	All races	White	Black	API	Hispanic	All races	White	Black	API	Hispanic	All races	White	Black	API	Hispanic
APC	-2.8*	-2.6*	-2.5*	-	-2.9*	-2.5*	-2.3*	-2.6	-	-2.9*	-2.2*	-2.1*	-2.1*	-2.1*	-1.7*	-2.1*	-2.0*	-2.0*	-1.8*	-1.5*
Rate																				
1979-1981	4.1	4.3	3.6	-	-	4.7	4.8	4.4	-	-	4.3	4.4	4.0	-	-	4.5	4.6	4.3	-	-
1980-1982	4.1	4.1	4.4	-	-	4.6	4.5	4.8	-	-	4.2	4.3	4.0	-	-	4.5	4.6	4.3	-	-
1981-1983	4.3	4.1	5.4	-	-	4.4	4.2	5.3	-	-	4.2	4.2	4.0	-	-	4.4	4.5	4.2	-	-
1982-1984	4.4	4.2	5.3	-	-	4.5	4.4	5.2	-	-	4.0	4.1	3.8	-	-	4.3	4.3	4.0	-	-
1983-1985	4.1	4.2	4.2	-	-	4.4	4.5	4.4	-	-	3.8	3.8	3.5	-	-	4.0	4.1	3.7	-	-
1984-1986	4.0	4.3	3.3	-	-	4.3	4.5	3.9	-	-	3.6	3.7	3.4	-	-	3.9	3.9	3.6	-	-
1985-1987	4.0	4.4	3.0	-	-	4.2	4.5	3.8	-	-	3.5	3.6	3.2	-	-	3.8	3.8	3.6	-	-
1986-1988	4.1	4.3	3.7	-	-	4.2	4.4	4.0	-	-	3.4	3.5	3.2	-	-	3.7	3.7	3.6	-	-
1987-1989	3.6	3.8	3.4	-	-	4.0	4.1	3.8	-	-	3.3	3.4	3.1	-	-	3.6	3.6	3.5	-	-
1988-1990	3.2	3.4	2.8	-	-	3.4	3.5	3.2	-	-	3.2	3.3	3.1	-	-	3.5	3.5	3.5	-	-
1989-1991	2.8	3.0	2.1	-	-	3.2	3.4	2.8	-	-	3.2	3.2	3.1	-	-	3.5	3.5	3.4	-	-
1990-1992	2.6	2.7	2.6	-	2.2	3.2	3.2	3.1	-	2.7	3.1	3.1	2.9	2.7	3.1	3.4	3.4	3.2	2.9	3.4
1991-1993	2.5	2.6	2.4	-	2.1	3.1	3.2	2.9	-	2.5	3.0	3.1	2.8	2.6	3.1	3.3	3.4	3.1	2.9	3.4
1992-1994	2.8	2.9	2.3		3.0	3.2	3.3	2.9	-	3.4	2.9	3.0	2.7	2.7	3.0	3.2	3.3	3.1	2.9	3.3
1993-1995	3.0	3.1	2.8	-	2.7	3.3	3.4	3.0	3.0	3.0	2.8	2.9	2.8	2.8	2.9	3.1	3.1	3.1	3.0	3.2
1994-1996	3.5	3.6	3.0	-	3.7	3.6	3.7	3.4	2.9	3.8	2.7	2.7	2.7	2.6	2.8	3.0	3.0	3.1	2.7	3.1
1995-1997	3.2	3.2	2.9	3.9	2.9	3.4	3.4	3.3	3.2	2.9	2.7	2.7	2.6	2.6	2.7	2.9	2.9	3.0	2.7	2.9
1996-1998	3.1	3.3	2.2	-	3.2	3.1	3.3	2.6	-	3.1	2.6	2.6	2.4	2.3	2.5	2.8	2.9	2.8	2.5	2.8
1997-1999	2.5	2.6	2.3	-	2.6	2.8	3.0	2.6	-	2.8	2.5	2.6	2.4	2.4	2.6	2.8	2.8	2.8	2.7	2.7
1998-2000	2.5	2.6	2.4	-	2.7	2.7	2.8	2.8	-	2.9	2.5	2.5	2.4	2.3	2.6	2.8	2.8	2.8	2.6	2.8
1999-2001	2.3	2.2	2.5	2.8	2.5	2.6	2.5	3.0	2.6	3.1	2.5	2.6	2.4	2.4	2.6	2.8	2.8	2.8	2.5	2.9
2000-2002	2.5	2.4	2.8	2.7	2.7	2.8	2.7	3.1	2.7	3.2	2.5	2.6	2.4	2.4	2.6	2.8	2.8	2.8	2.5	3.0
2001-2003	2.3	2.3	2.8	-	2.7	2.6	2.7	2.7	2.5	3.0	2.5	2.6	2.4	2.3	2.7	2.8	2.8	2.6	2.3	3.0
2002-2004	2.2	2.2	2.5	-	2.4	2.6	2.7	2.6	2.1	2.6	2.5	2.6	2.5	2.3	2.7	2.8	2.8	2.7	2.3	2.9
2003-2005	2.2	2.2	2.4	-	1.4	2.4	2.5	2.3	1.9	2.2	2.5	2.5	2.4	2.1	2.5	2.7	2.8	2.6	2.2	2.8
2004-2006	2.3	2.4	2.3	-	1.4	2.6	2.8	2.5	-	2.2	2.4	2.4	2.4	2.0	2.3	2.6	2.7	2.6	2.2	2.6
2005-2007	2.2	2.3	2.6	-	1.3	2.6	2.7	2.7	-	1.9	2.3	2.4	2.3	1.8	2.3	2.5	2.6	2.4	2.1	2.6
2006-2008	1.9	2.1	1.9	-	1.6	2.3	2.5	2.1	-	1.7	2.3	2.3	2.2	1.7	2.3	2.5	2.5	2.4	1.9	2.6
2007-2009	1.7	1.9	1.7	-	1.9	2.2	2.3	1.9	-	2.1	2.2	2.3	2.1	1.7	2.3	2.4	2.5	2.3	1.9	2.6
2008-2010	1.8	1.9	1.8	-	2.0	2.1	2.3	1.9	1.7	2.0	2.2	2.2	2.1	1.9	2.2	2.4	2.4	2.3	2.1	2.5
2009-2011	1.9	2.0	1.9	-	1.9	2.2	2.2	2.3	1.8	2.0	2.1	2.2	2.0	2.0	2.2	2.3	2.4	2.2	2.2	2.4
2010-2012	2.1	2.2	2.2	-	1.8	2.3	2.4	2.5	1.6	1.6	2.2	2.2	2.1	2.1	2.2	2.3	2.4	2.2	2.3	2.5
2011-2013	2.0	2.3	1.7	-	1.7	2.3	2.6	1.9	-	1.9	2.1	2.2	2.0	1.8	2.1	2.3	2.4	2.2	2.2	2.4

Rates are suppressed as '-' when fewer than 10 cases to ensure confidentiality and statistical reliability. Rates are per 100,000 and age-adjusted to the 2000 US population standard. Mortality rates were calculated using 3 year averages to reduce the likelihood of suppression and yield more reliable estimates. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data sources: Incidence - New Jersey State Cancer Registry, New Jersey Department of Health; Mortality- National Center for Health Statistics. API=Asian/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races. * Statistically significantly different than zero over time, $p<0.05$.

Table A.16- Childhood Leukemia Incidence Annual Percent Change (APC) and Rates by Age Group and Year, New Jersey and the U.S., 1979-2013

	New Jersey		U.S.	
Year	**00-14**	**00-19**	**00-14**	**00-19**
1979-2013 APC	**0.1**	**0.1**	**0.7***	**0.6***
Year				
1979	4.8	4.6	3.7	3.3
1980	4.7	4.6	4.0	3.5
1981	5.0	4.3	4.0	3.7
1982	5.7	4.8	3.8	3.4
1983	5.3	4.7	3.7	3.5
1984	4.9	4.3	4.5	4.0
1985	4.8	4.3	4.6	4.0
1986	4.6	4.0	4.1	3.7
1987	4.0	3.7	4.4	3.6
1988	4.4	4.1	4.1	3.6
1989	4.7	4.2	4.8	4.3
1990	4.9	4.2	4.5	3.9
1991	4.2	3.7	4.6	4.1
1992	4.7	4.4	4.1	3.7
1993	5.1	4.6	4.2	3.7
1994	4.0	3.8	3.6	3.4
1995	4.9	4.2	4.5	4.0
1996	5.3	4.8	4.7	4.0
1997	4.6	3.9	4.3	3.7
1998	5.3	4.9	4.8	4.1
1999	5.0	4.5	4.7	4.1
2000	4.4	4.0	4.6	4.1
2001	5.0	4.6	4.4	4.0
2002	5.0	4.4	4.8	4.5
2003	5.0	4.5	4.1	3.8
2004	5.1	4.7	5.0	4.4
2005	5.8	5.1	5.4	4.7
2006	5.2	4.6	4.6	4.1
2007	6.0	5.1	4.2	4.0
2008	3.5	3.5	4.8	4.2
2009	5.7	4.9	4.8	4.1
2010	5.2	4.7	5.0	4.3
2011	5.0	4.6	5.2	4.6
2012	5.0	4.4	4.8	4.2
2013	4.2	3.7	4.8	4.3

Rates are suppressed as '-' when fewer than 5 cases to ensure confidentiality and statistical reliability. Rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health; U.S. - Surveillance, Epidemiology, and End Results (SEER) Program, SEER 9 registries, National Cancer Institute. API=Asian/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races. * Statistically significantly different than zero over time, $p<0.05$.

Table A.17- Childhood Leukemia Mortality Annual Percent Change (APC) and 3 Year Average Rates by Age Group and Year, New Jersey and the U.S., 1979-2013

	New Jersey		U.S.	
Year	**00-14**	**00-19**	**00-14**	**00-19**
1979-2013 APC	**-3.5***	**-3.4***	**-3.1***	**-3.0***
3 Year Average Rate				
1979-1981	1.5	1.7	1.7	1.7
1980-1982	1.4	1.6	1.6	1.7
1981-1983	1.3	1.5	1.6	1.6
1982-1984	1.4	1.6	1.5	1.5
1983-1985	1.5	1.7	1.4	1.4
1984-1986	1.8	1.7	1.3	1.4
1985-1987	1.9	1.7	1.3	1.4
1986-1988	1.7	1.5	1.3	1.3
1987-1989	1.3	1.3	1.2	1.3
1988-1990	1.0	1.1	1.1	1.2
1989-1991	0.8	0.9	1.1	1.2
1990-1992	0.9	0.9	1.1	1.2
1991-1993	0.9	1.0	1.1	1.2
1992-1994	1.0	1.1	1.0	1.1
1993-1995	1.0	1.1	1.0	1.1
1994-1996	1.1	1.1	0.9	1.0
1995-1997	1.1	1.0	0.9	1.0
1996-1998	1.0	1.0	0.9	0.9
1997-1999	0.9	1.0	0.8	0.9
1998-2000	0.8	0.9	0.8	0.9
1999-2001	0.7	0.9	0.8	0.9
2000-2002	0.6	0.8	0.8	0.9
2001-2003	0.6	0.8	0.8	0.9
2002-2004	0.7	0.8	0.8	0.8
2003-2005	0.7	0.8	0.8	0.8
2004-2006	0.7	0.8	0.7	0.8
2005-2007	0.7	0.8	0.7	0.8
2006-2008	0.5	0.6	0.7	0.7
2007-2009	0.5	0.5	0.7	0.7
2008-2010	0.5	0.5	0.6	0.7
2009-2011	0.6	0.6	0.6	0.7
2010-2012	0.6	0.7	0.6	0.6
2011-2013	0.7	0.7	0.6	0.6

Rates are suppressed as '-' when fewer than 10 cases to ensure confidentiality and statistical reliability. Rates are per 100,000 and age-adjusted to the 2000 US population standard. Mortality rates were calculated using 3 year averages to reduce the likelihood of suppression and yield more reliable estimates. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data sources: Mortality- National Center for Health Statistics. API=Asian/Pacific Islanders; Persons of Hispanic ethnicity may be of any race or combination of races. * Statistically significantly different than zero over time, $p<0.05$.

Table A.18- Childhood Brain and Other Nervous System Cancer Incidence Annual Percent Change (APC) and 3 Year Average Rates by Age Group and Year, New Jersey and the U.S., 1979-2013

	New Jersey		U.S.	
Year	**00-14**	**00-19**	**00-14**	**00-19**
1979-2013 APC	**0.7***	**0.8***	**0.8***	**0.7***
Year				
1979	2.2	2.3	2.8	2.5
1980	2.6	2.6	2.8	2.5
1981	2.7	2.5	2.5	2.4
1982	3.4	3.0	2.5	2.3
1983	4.4	4.0	2.3	2.2
1984	3.3	2.9	2.8	2.6
1985	3.1	2.7	3.0	2.7
1986	3.1	2.9	3.5	3.2
1987	3.6	3.1	3.2	2.9
1988	3.7	3.0	3.3	3.0
1989	3.3	3.0	3.3	3.0
1990	3.3	3.0	3.5	3.2
1991	3.1	2.9	3.5	3.1
1992	3.4	2.7	3.2	3.3
1993	3.3	2.9	3.4	3.0
1994	3.6	3.4	3.3	2.9
1995	3.6	3.1	3.4	3.1
1996	4.0	3.6	3.2	3.0
1997	2.9	2.6	2.8	2.6
1998	3.6	3.4	3.2	2.8
1999	3.3	3.1	3.5	3.0
2000	4.4	4.1	3.4	3.1
2001	3.2	3.2	4.0	3.5
2002	3.6	2.9	3.8	3.4
2003	4.6	4.1	3.0	2.9
2004	3.5	3.4	3.3	3.0
2005	3.2	3.0	3.4	3.0
2006	3.9	3.6	3.1	2.8
2007	2.9	2.7	3.4	3.1
2008	4.2	4.0	3.6	3.2
2009	4.0	3.8	3.8	3.3
2010	3.8	3.7	4.1	3.6
2011	3.3	3.0	3.4	3.1
2012	3.7	3.5	3.1	2.9
2013	3.6	3.5	3.5	3.3

Rates are suppressed as '-' when fewer than 5 cases to ensure confidentiality and statistical reliability. Rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health; U.S. - Surveillance, Epidemiology, and End Results (SEER) Program, SEER 9 registries, National Cancer Institute. * Statistically significantly different than zero over time, $p<0.05$.

Table A.19- Childhood Brain and Other Nervous System Cancer Mortality Annual Percent Change (APC) and 3 Year Average Rates by Age Group and Year, New Jersey and the U.S., 1979-2013

	New Jersey		U.S.	
Year	**00-14**	**00-19**	**00-14**	**00-19**
1979-2013 APC	**-1.8***	**-1.9***	**-0.9***	**-0.9***
3 Year Average Rate				
1979-1981	0.8	0.8	0.9	0.8
1980-1982	0.9	0.8	0.9	0.9
1981-1983	1.1	0.9	0.9	0.8
1982-1984	1.2	1.1	0.9	0.8
1983-1985	1.2	1.0	0.8	0.8
1984-1986	1.0	0.9	0.8	0.8
1985-1987	0.8	0.8	0.8	0.8
1986-1988	0.9	0.9	0.8	0.8
1987-1989	0.9	0.9	0.8	0.8
1988-1990	0.9	0.9	0.9	0.8
1989-1991	0.9	0.9	0.9	0.8
1990-1992	0.7	0.7	0.8	0.8
1991-1993	0.6	0.6	0.8	0.8
1992-1994	0.6	0.6	0.8	0.7
1993-1995	0.8	0.7	0.8	0.7
1994-1996	1.0	0.8	0.8	0.7
1995-1997	0.9	0.8	0.8	0.7
1996-1998	0.8	0.7	0.7	0.7
1997-1999	0.7	0.6	0.7	0.7
1998-2000	0.7	0.6	0.7	0.7
1999-2001	0.8	0.7	0.7	0.7
2000-2002	0.7	0.6	0.7	0.7
2001-2003	0.6	0.5	0.7	0.7
2002-2004	0.5	0.5	0.8	0.7
2003-2005	0.5	0.5	0.7	0.7
2004-2006	0.6	0.5	0.7	0.7
2005-2007	0.7	0.6	0.7	0.6
2006-2008	0.6	0.6	0.7	0.6
2007-2009	0.6	0.6	0.7	0.6
2008-2010	0.6	0.6	0.7	0.6
2009-2011	0.6	0.6	0.7	0.6
2010-2012	0.7	0.6	0.7	0.7
2011-2013	0.6	0.5	0.7	0.7

Rates are suppressed as '-' when fewer than 10 cases to ensure confidentiality and statistical reliability. Rates are per 100,000 and age-adjusted to the 2000 US population standard. Mortality rates were calculated using 3 year averages to reduce the likelihood of suppression and yield more reliable estimates. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data source; Mortality- National Center for Health Statistics. * Statistically significantly different than zero over time, $p<0.05$.

Table A.20- Childhood Lymphoma Incidence Annual Percent Change (APC) and Rates by Age Group and Year, New Jersey and the U.S., 1979-2013

	New Jersey		U.S.	
Year	**00-14**	**00-19**	**00-14**	**00-19**
1979-2013 APC	**-0.3**	**-0.2**	**0.5***	**0.2**
Year				
1979	2.1	3.4	1.7	2.5
1980	1.2	2.3	1.2	2.1
1981	1.5	2.8	1.3	2.3
1982	1.6	2.9	1.4	2.5
1983	1.8	3.0	1.5	2.5
1984	2.5	3.5	1.6	2.5
1985	1.7	3.1	1.4	2.4
1986	1.6	3.0	1.5	2.4
1987	1.7	2.7	1.7	2.4
1988	2.5	3.6	1.3	2.4
1989	1.2	2.9	1.5	2.7
1990	2.2	3.0	1.4	2.2
1991	1.9	2.3	1.5	2.5
1992	1.9	2.5	1.3	2.4
1993	1.8	3.1	1.3	2.2
1994	1.9	2.8	1.5	2.6
1995	1.8	2.9	1.2	2.0
1996	1.4	2.9	1.3	2.3
1997	1.6	2.7	1.5	2.5
1998	1.5	2.9	1.5	2.4
1999	1.9	3.0	1.3	2.0
2000	1.8	3.0	1.7	2.5
2001	1.9	3.1	1.5	2.2
2002	1.6	2.7	1.4	2.4
2003	1.1	2.3	1.4	2.3
2004	1.9	2.9	1.3	2.2
2005	1.6	2.8	1.6	2.2
2006	1.5	2.7	1.5	2.2
2007	1.2	2.3	1.6	2.7
2008	1.9	3.0	1.8	2.7
2009	1.5	3.4	1.7	2.7
2010	1.6	2.5	1.8	2.7
2011	1.8	2.9	1.6	2.5
2012	1.8	3.6	2.1	2.9
2013	1.6	2.3	1.6	2.3

Rates are suppressed as '-' when fewer than 5 cases to ensure confidentiality and statistical reliability. Rates are per 100,000 and age-adjusted to the 2000 US population standard. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data sources: New Jersey - New Jersey State Cancer Registry, New Jersey Department of Health; U.S. - Surveillance, Epidemiology, and End Results (SEER) Program, SEER 9 registries, National Cancer Institute. * Statistically significantly different than zero over time, $p<0.05$.

Table A.21- Childhood Lymphoma Mortality Annual Percent Change (APC) and 3 Year Average Rates by Age Group and Year, New Jersey and the U.S., 1979-2013

	New Jersey		U.S.	
Year	**00-14**	**00-19**	**00-14**	**00-19**
1979-2013 APC	-	-	**-3.8***	**-4.8***
3 Year Average Rate				
1979-1981	0.3	0.5	0.3	0.4
1980-1982	0.2	0.5	0.3	0.4
1981-1983	0.5	0.5	0.3	0.4
1982-1984	0.4	0.5	0.3	0.4
1983-1985	0.3	0.4	0.2	0.4
1984-1986	-	0.3	0.2	0.3
1985-1987	-	0.4	0.2	0.3
1986-1988	0.3	0.4	0.2	0.3
1987-1989	0.3	0.5	0.2	0.3
1988-1990	0.2	0.3	0.2	0.3
1989-1991	-	0.3	0.2	0.3
1990-1992	-	0.3	0.2	0.3
1991-1993	-	0.3	0.2	0.3
1992-1994	-	0.2	0.2	0.2
1993-1995	-	0.2	0.2	0.2
1994-1996	0.2	0.3	0.1	0.2
1995-1997	0.2	0.3	0.1	0.2
1996-1998	0.2	0.3	0.1	0.2
1997-1999	-	0.2	0.1	0.2
1998-2000	-	0.2	0.1	0.2
1999-2001	-	0.2	0.1	0.2
2000-2002	-	0.2	0.1	0.2
2001-2003	0.2	0.3	0.1	0.2
2002-2004	-	0.3	0.1	0.2
2003-2005	-	0.2	0.1	0.1
2004-2006	-	0.2	0.1	0.1
2005-2007	-	0.1	0.1	0.1
2006-2008	-	-	0.1	0.1
2007-2009	-	-	0.1	0.1
2008-2010	-	-	0.1	0.1
2009-2011	-	-	0.1	0.1
2010-2012	-	-	0.1	0.1
2011-2013	-	-	0.1	0.1

Rates are suppressed as '-' when fewer than 10 cases to ensure confidentiality and statistical reliability. Rates are per 100,000 and age-adjusted to the 2000 US population standard. Mortality rates were calculated using 3 year averages to reduce the likelihood of suppression and yield more reliable estimates. Classification of Childhood Cancer - Site Recode ICD-O-3/WHO 2008. Data source: Mortality- National Center for Health Statistics. *Statistically significantly different than zero over time, $p<0.05$.