

Introduction

Over the past two decades, childhood cancer mortality in the United States has declined dramatically. To present a comprehensive picture of childhood cancer occurrence and outcome, it would be ideal to include cancer-specific data on incidence, survival, and mortality within each individual chapter of the monograph. The available data on mortality, however, are obtained from death certificates and collected by the National Center for Health Statistics (NCHS) for the entire United States. In addition to the difference in geographic coverage between NCHS and SEER areas, the cancer classification used by NCHS for mortality is less specific than that used by SEER areas. Therefore, we are presenting this separate chapter on cancer mortality and have included incidence [1,2] comparisons based on comparable definitions to the mortality data [3]. A further explanation on differences between the incidence definitions used in the

Figure XIV.1: Trends in childhood cancer age-adjusted* rates, all races, both sexes, age <20 SEER incidence & US mortality, 1975-95

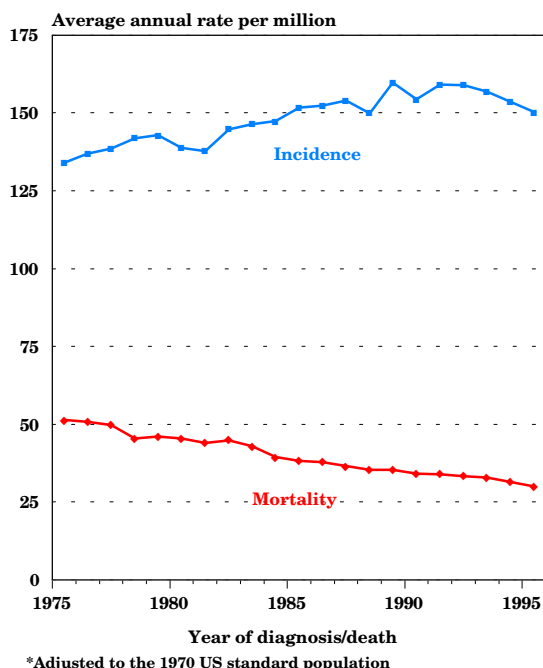
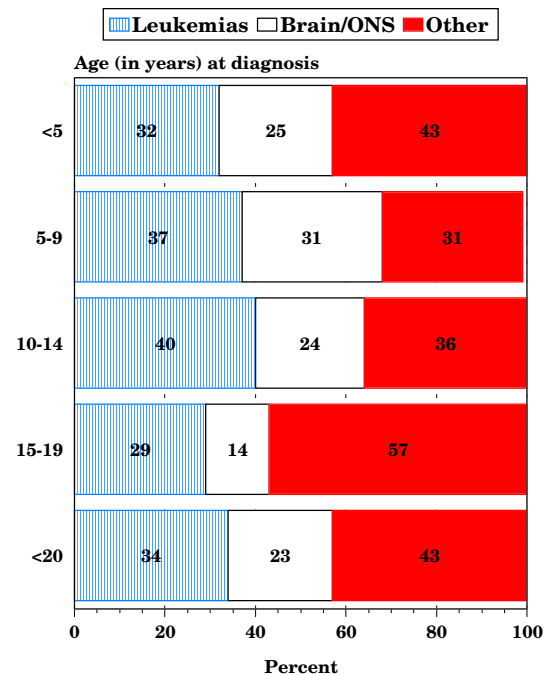


Figure XIV.2: Percent distribution of childhood cancer mortality by type and age group, age <20 all races, both sexes, United States, 1995

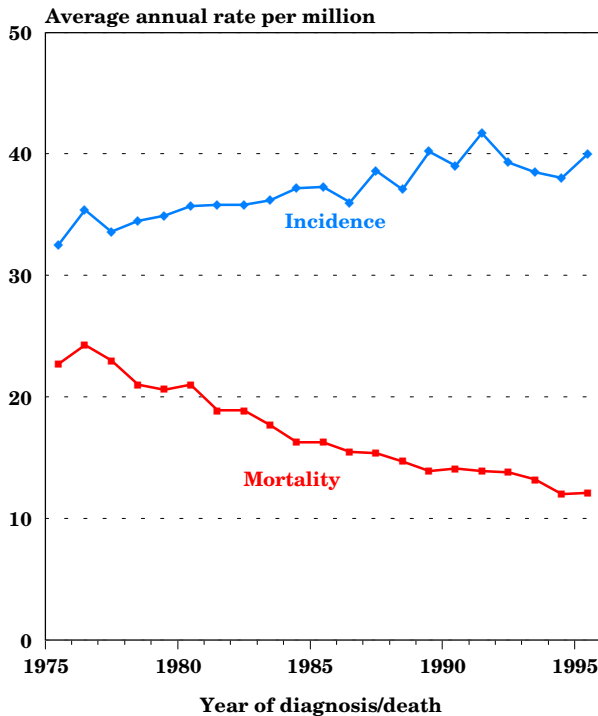


other chapters and mortality is included at the end of this chapter. The mortality data are provided by the National Center for Health Statistics to the National Cancer Institute on public-use tapes.

All Sites

In contrast to incidence rates, cancer mortality declined substantially between 1975 and 1995 (Figure XIV.1). There were statistically significant declines in mortality for each of the five-year age groups (<5, 5-9, 10-14, and 15-19) for cancers combined. The declines by age group ranged from 2.0 to 3.2 percent per year. The overall decline in mortality was nearly 40 percent between 1975 and 1995, a statistically significant decrease of 2.6 percent per year. The overall incidence increased 0.8 percent per year. There were 2,275 cancer deaths among children in 1995. Except for those 15-19, leukemia and brain/other nervous system comprised more than 50 percent of the deaths due to cancer (Figure XIV.2). The relative difference for

Figure XIV.3: Trends in childhood leukemia age-adjusted* rates, age <20, all races, both sexes SEER incidence, and US mortality, 1975-95



*Adjusted to the 1970 US standard population

the 15-19 year olds was due to deaths from lymphoma (14%), bone (13%), and soft tissue sarcomas (9%). Leukemias and brain cancer, however, accounted for 57% of cancer deaths for all children combined.

Leukemia

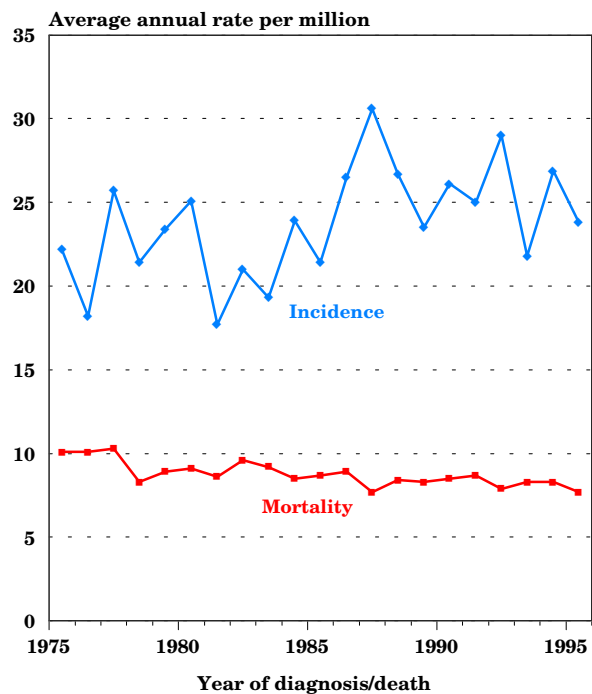
In 1995, thirty-four percent of the childhood cancer deaths were due to leukemia. The death rate from leukemia fell nearly 50 percent between 1975 and 1995 (Figure XIV.3), a statistically significant decline of 3.4 percent per year while the incidence increased between 1975 and 1995. Mortality rates declined significantly for each of the age groups (<5, 5-9,10-14, 15-19, <20) and for both males and females.

Brain/other central nervous system (brain/CNS)

In 1995, nearly one-fourth of childhood cancer deaths were due to invasive malignancies of the central nervous system, primarily the brain. Mortality from brain and other CNS cancer declined an average of 1.1 percent per year. This was an overall decline of 23 percent between 1975 and 1995 (Figure XIV.4). This mortality decline occurred while the incidence rate increased mainly in the mid-1980s [4].

Unlike most benign tumors, noninvasive tumors of the brain/CNS have the potential to be fatal. Figure XIV.5 illustrates mortality rates for brain tumors classified as invasive, unspecified or uncertain, and benign. If the behavior of the

Figure XIV.4: Trends in brain/other nervous system cancer age-adjusted* rates, all races, both sexes age <20, SEER incidence & US mortality, 1975-95



*Adjusted to the 1970 US standard population

tumor is not clear from the death certificate, it is considered “unspecified or uncertain”. Some of these tumors will be invasive and some will not. Although mortality from invasive tumors has declined somewhat over the past decade, there appears to be no change over time in the rates of death from brain tumors classified as either “benign” or “unspecified or uncertain”. Thus, the reduction in mortality from invasive brain cancer does not appear to be an artifact due to changes in the reporting of the other categories of brain tumors. To avoid changes in death classification between 1978 and 1979, this figure begins in 1979.

Ages 0-4

From 1975 to 1995, death rates from cancer declined 2.9 percent per year among children younger than 5 years of age. The Figure XIV.6 shows the mortality rates for

Figure XIV.6: Trends in age-specific cancer mortality rates by type, age <5, all races, both sexes United States, 1975-95

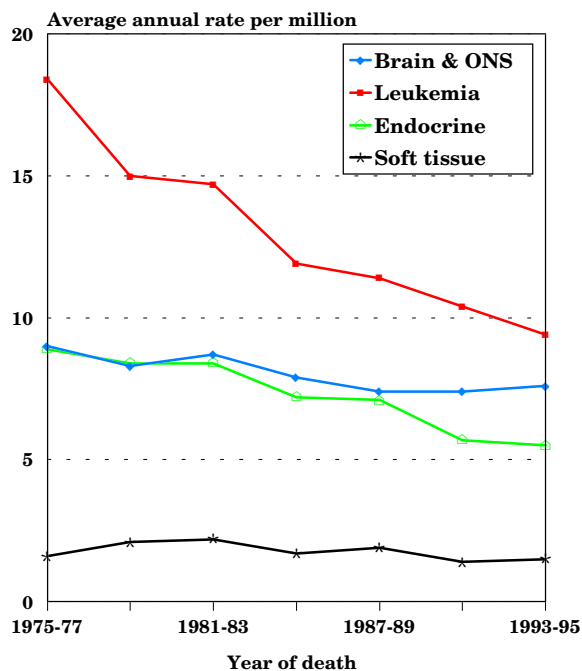
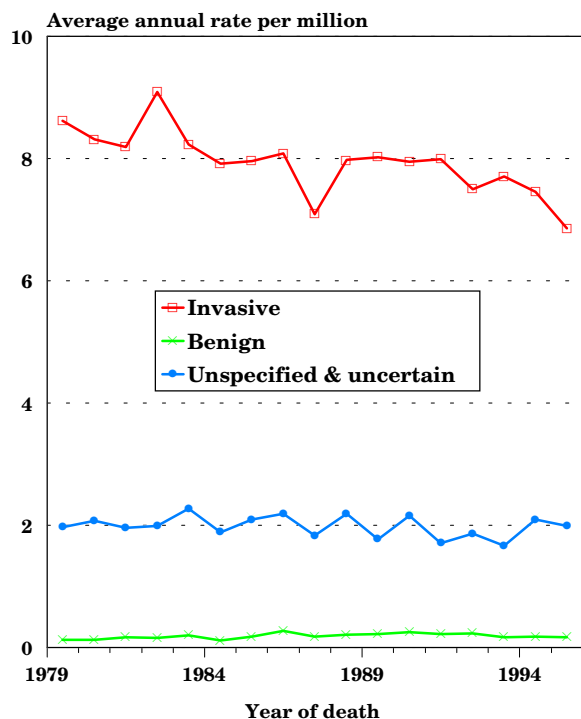


Figure XIV.5: Trends in age-adjusted* brain tumor mortality rates by behavior, age <20, United States, 1979-95



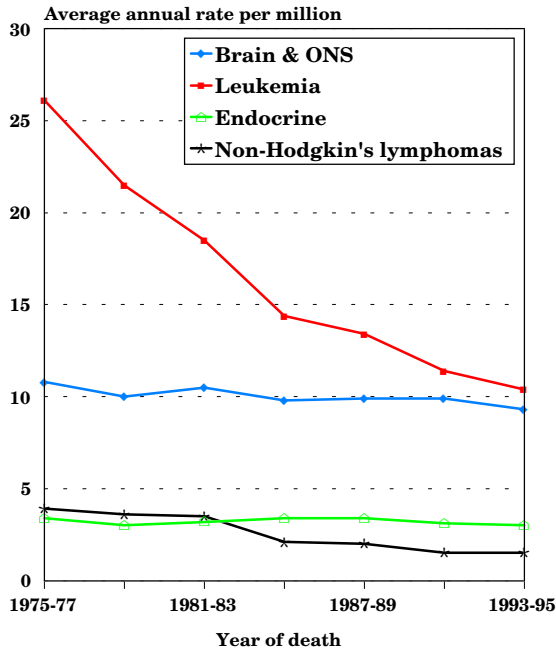
*Adjusted to the 1970 US standard population

the four leading causes of cancer death among young children. The death rates have declined for each. For leukemias, the death rates declined by an average of 3.5 percent each year or more than 50 percent between 1975 and 1995. After leukemia and brain/CNS cancer, endocrine malignancies were responsible for the most cancer deaths. Most of the cancers classified as “endocrine” in this age group were neuroblastomas. In 1995, there were 558 deaths due to cancer among children younger than 5 years of age in the entire United States.

Ages 5-9

There were 523 deaths due to cancer among children 5-9 years of age in the entire United States in 1995. The age group 5-9 years of age had the largest decline in cancer mortality. The top four mortality sites were leukemia, brain/CNS, endocrine and non-Hodgkin’s lymphoma.

Figure XIV.7: Trends in age-specific cancer mortality rates by type, age 5-9, all races, both sexes United States, 1975-95



The decline in leukemia deaths was 5 percent per year (Figure XIV.7).

Ages 10-14

There were 503 deaths due to cancer among children 10-14 years of age in the entire United States in 1995. The death rate declined 2.5 percent per year. The decline for leukemias was 3 percent per year. The top four mortality sites were leukemia, brain/CNS, bone/joints, and non-Hodgkin's lymphoma (Figure XIV.8).

Ages 15-19

There were 691 deaths due to cancer among children 15-19 in the entire United States in 1995. The overall cancer death rate declined 2 percent per year. The top five cancer mortality sites are shown for this age group since the death rates for soft tissue and non-Hodgkin's lymphoma were similar for the most recent time period (Figure XIV.9).

Recent cancer mortality (1990-1995) by race/ethnicity

The cancer mortality rates for all races combined and for white children declined 2.4 and 3.0 percent per year, respectively. The mortality rates for black and for Hispanic children declined 0.5 percent per year between 1990 and 1995. For American Indian children and Asian Pacific Islander children, the death rates increased slightly at 0.5 percent per year. The cancer death rates for American Indian children (23.8 per million) and for Asian Pacific Islander children (29.2 per million) were less than those for white children (32.9), black children (32.5) or Hispanic children (33.5 per million children). The mortality data are for the whole United States except for Hispanics for which four states (New Hampshire, Oklahoma, Connecticut and Louisiana) are excluded. Hispanics can be of any race and are therefore, not mutually exclusive from the other categories.

Figure XIV.8: Trends in age-specific cancer mortality rates by type, age 10-14, all races both sexes, United States, 1975-95

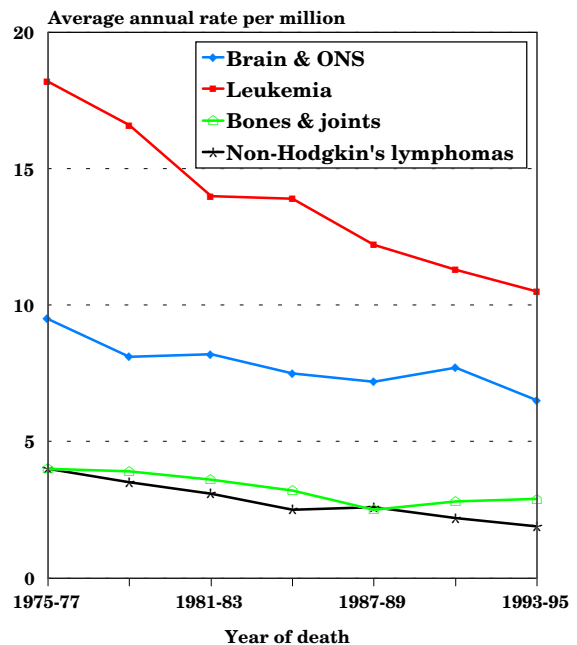
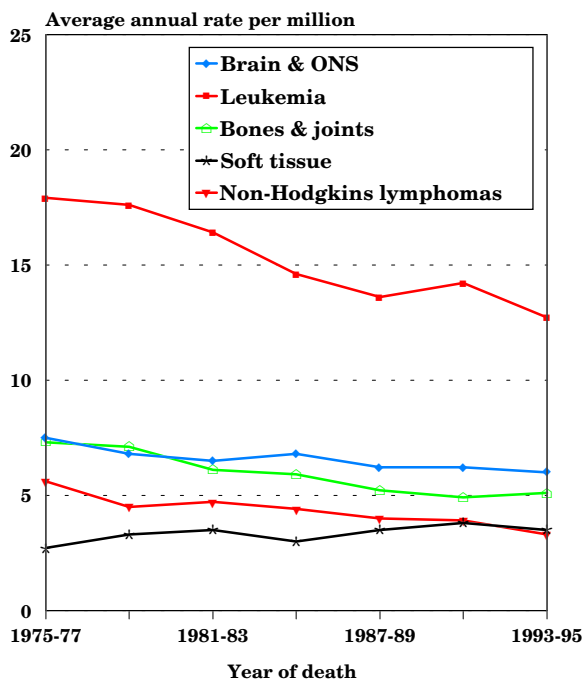


Figure XIV.9: Trends in age-specific cancer mortality rates by type, age 15-19, all races both sexes, United States, 1975-95



Problems comparing incidence to mortality

The histology site groupings presented in other chapters of this monograph are based on the International Childhood Cancer Classification (ICCC) [5]. While they are useful groupings for incidence, there are problems when comparing incidence to mortality. The ICCC uses histology as its main criteria and secondarily primary site. The underlying cause of death, on the other hand, is coded by the International Classification of Diseases, which is based primarily on site of origin rather than histology especially for solid tumors [3]. For example, mortality data would use kidney cancer but the ICCC grouping would be Wilms' tumor. Therefore, all of the incidence rates presented in this chapter are based primarily on site rather than histology. Note, that this does not effect non-solid tumors such as leukemia which would have comparable groups in each. More incidence and mortality rates using comparable categories can

be found in the SEER Cancer Statistics Review: 1973-1996 [6].

Summary

Cancer mortality has declined dramatically for children. In the United States today few children die from cancer in comparison to other causes of death. In 1995, for children younger than 20 years of age, the major causes of death were:

- conditions from the perinatal period (13,449);
- accidents (13,234);
- congenital anomalies (7,949);
- homicides (4,617);
- SIDS (3,397);
- cancer (2,275);
- suicides (2,227 deaths).

Of the nearly 60,000 deaths among children younger than 20 years of age, less than 4% were due to neoplasms (cancer). If infants are excluded, the number one cause of death was accidents followed by homicides, suicides and then cancer.

Reference List

1. World Health Organization, International Classification of Diseases for Oncology, First Edition, Geneva, 1976.
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4. Smith MA, et al: Trends in reported incidence of primary malignant brain tumors in children in the United States. *J Natl Cancer Inst.* 90:1269-77, 1998.
5. Kramarova E, Stiller CA: The international classification of childhood cancer. *Int J Cancer:* 68:759-65, 1996.
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