HHS Public Access

Author manuscript

Pediatrics. Author manuscript; available in PMC 2015 October 01.

Published in final edited form as:

Pediatrics. 2014 October ; 134(4): e945–e955. doi:10.1542/peds.2013-3926.

Cancer Incidence Rates and Trends Among Children and Adolescents in the United States, 2001–2009

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Abstract

OBJECTIVES—Cancer continues to be the leading disease-related cause of death among children and adolescents in the United States. More current information is needed to describe recent cancer trends and identify demographic and geographic variations.

METHODS—We analyzed data from the National Program of Cancer Registries and Surveillance, Epidemiology, and End Results statewide registries representing 94.2% of the US population to identify cancers diagnosed among persons aged 0 to 19 years during 2001–2009. Age-adjusted rates and annual percentage change for trends were calculated. Data were stratified by age, gender, race, ethnicity, and geography.

RESULTS—We identified 120 137 childhood and adolescent cancer cases during 2001–2009 with an age-adjusted incidence rate of 171.01 per million. The overall rate of all cancers combined remained stable over time (annual percent change [APC], 0.3%; 95% confidence interval [CI], −0.1 to 0.7). There was an increase in the overall cancer trend among African American children and adolescents (APC, 1.3%; 95% CI, 0.2 to 2.5). An increasing trend for thyroid cancer was

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Dr Siegel contributed to study design, carried out the initial analyses, drafted the initial manuscript, and edited the final manuscript as submitted; Ms King conceptualized changes made in revision, contributed to study design, carried out data analysis, and critically reviewed the manuscript; Dr Li brought in the research idea, conceptualized and designed the study, oversaw this study, carried out initial data analysis, and critically reviewed the manuscript; Drs Tai, Buchanan, and Ajani conceptualized and designed the study and critically reviewed the manuscript; and all authors approved the final manuscript as submitted.

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

FINANCIAL DISCLOSURE: The authors have indicated they have no financial relationships relevant to this article to disclose.

POTENTIAL CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

observed among both genders (APC, 4.9%; 95% CI, 3.2 to 6.6) and specifically among adolescents and those in the Northeast, South, and West regions of the United States. Renal carcinoma incidence was increasing significantly overall (APC, 5.4%; 95% CI, 2.8 to 8.1). Extracranial and extragonadal germ cell tumors and melanoma were both significantly decreasing.

CONCLUSIONS—This study reports the novel finding that renal carcinoma rates are increasing among children and adolescents. This study confirms that thyroid cancer rates are increasing and further describes rising cancer rates among African Americans.

Keywords

adolescent; cancer; children; incidence; pediatric

Although cancer continues to be the leading disease-related cause of death among children and adolescents in the United States, it is difficult to describe its incidence accurately without national cancer data.[1,2] Using 2001–2003 National Program of Cancer Registries (NPCR) and Surveillance, Epidemiology, and End Results (SEER) data, Li et al[3] demonstrated regional differences in the incidence of childhood cancer and that the incidence varied by age, gender, and race. Additional studies have looked at recent childhood cancer trends by using smaller data sets, or have included the overall childhood cancer rates without detailing the specific types of cancer.[4–8] Although several of these studies have examined trends in overall cancer incidence rates among children and adolescents, study findings vary partially because of differing time range and population coverage.[4–6,9,10] By focusing analysis on specific cancers and subgroups among individuals aged 0 to 19 years, Linabery and Ross[4] reported increases in incidence rates of leukemia (acute lymphoblastic leukemia, in particular), hepatoblastoma, and melanoma from 1992 to 2004 and concluded that ongoing population-based evaluation is needed to further understand these dynamic and subgroup-based trends.

Although the diagnosis, age, gender, and race characteristics of pediatric cancer are well reported, the change of these characteristics over time is less defined. Determining recent cancer-specific trends is important in identifying high-risk populations and in developing research hypotheses. However, information about pediatric cancers and cancer subtypes by demographic and temporal factors across the nation is lacking.[3] This study aimed to describe cancer rates and trends among children and adolescents by demographic characteristics by using data for more than 90% of the US population.

METHODS

Data Source

We analyzed data from 47 population-based state cancer registries affiliated with the Centers for Disease Control and Prevention's NPCR and the National Cancer Institute's SEER Program. These data met US Cancer Statistics publication criteria for 2001–2009. Case ascertainment is 90% or more complete, with a margin of error of +/−5% per the quality standards for these registries (www.cdc.gov/cancer/npcr/uscs/technical_notes/criteria.htm). Data from Mississippi, Tennessee, Virginia, and Washington, DC, were excluded from our study. The 47 registries included in the study covered 94.2% of the US

population. All cases in this study were collected by NPCR and SEER programs by using medical records as the source of information for tumor and demographic characteristics.[11,12]

Case Definition

Cases were restricted to children (aged 0–14 years) and adolescents (aged 15–19 years) who were diagnosed with a primary neoplasm in the United States during 2001–2009. Diagnoses were grouped by histology and primary site according to the International Classification of Childhood Cancer (ICCC), third edition. The ICCC-3 applied the rules, nomenclature, and topographic, morphologic, and behavioral codes of the *International Classification of Diseases for Oncology, Third Edition*.[13] Race was categorized as white, African American, American Indian/Alaskan Native, or Asian/Pacific Islander. We first analyzed ethnicity grouped by Hispanic or non-Hispanic, which was not mutually exclusive from race. We then analyzed the data by race and ethnicity by using the following groupings: non-Hispanic white, non-Hispanic black, and Hispanic. Results were not displayed for American Indian/Alaska Natives or Asian/Pacific Islanders because of small sample sizes.

Analyses

New cases in the ICCC-3 groups were presented by age, gender, race, ethnicity, and geography. We calculated rates with SEER*Stat Software, version 8.1.2 by using annual population estimates as our denominator (www.seer.cancer.gov/seerstat).[14] All rates were expressed per million persons and were age-adjusted to the 2000 US standard population. Incidence trends were quantified by using annual percent change (APC). The APC and corresponding 95% confidence intervals (CIs) were calculated with SEER*Stat. The APC was calculated by fitting a straight line to the data, in which the dependent variable was the natural logarithm of the data, and calendar year was the independent variable. Statistical significance was determined if the 95% CI of APC did not include zero ($P < .05$). We compared childhood and adolescent cancer incidence rates and trends according to ICCC-3 group, subgroup, gender, age, race, ethnicity, and US Census region. Rates were not displayed if there were <16 cases total from 2001 to 2009. APC for the study interval was not calculated if there were <16 cases per year in any 1 calendar year, which is consistent with previous studies using SEER*Stat.[5,6]

RESULTS

During 2001–2009, there were 120 137 childhood and adolescent cancer cases diagnosed in the United States. Overall incidence rates and APC according to ICCC-3 group, subgroup, and gender are presented in Table 1. The overall age-adjusted cancer incidence rate was 171.01 per million persons, and boys had a higher childhood cancer rate than girls. Adolescents aged 15 to 19 years had a higher rate than children aged 0 to 14 years, white children had a higher rate than African American children, and the Northeast had the highest incidence rate among US regions (data not shown). Rates for leukemias were the highest, followed by rates for central nervous system (CNS) neoplasms, and then rates for lymphomas (45.36, 30.28, and 24.91 per 1 000 000 persons aged 0–19 years, respectively). Overall and age-specific cancer rates are presented in Fig 1. The overall cancer incidence rates were stable (APC, 0.3%; 95% CI, −0.1 to 0.7) from 2001 to 2009. Of all cancers and

among all children and adolescents, thyroid carcinoma rates (APC, 4.9%; 95% CI, 3.2 to 6.6) and renal carcinoma rates (APC, 5.4%; 95% CI, 2.8 to 8.1) increased significantly, as did the group of unspecified intracranial and intraspinal neoplasms among the CNS tumors (APC, 4.4%; 95% CI, 0.1 to 8.9). Extracranial and extragonadal germ cell tumors (APC, −2.0%; 95% CI, −3.9 to −0.2) and malignant melanomas (APC, −3.8%; 95% CI, −6.7 to −0.9) were decreasing overall. Selected overall significant trends are presented in Fig 2.

Rates of renal carcinomas, thyroid carcinomas, other unspecified epithelial carcinomas, and other unspecified malignant neoplasms increased significantly for boys, and the trend for thyroid carcinomas increased significantly for girls (Table 1). Rates of intracranial and intraspinal embryonal tumors and malignant melanomas decreased significantly among boys. Among girls, the rates of neuroblastoma, Ewing tumor and related sarcomas, and extracranial and extragonadal germ cell tumors were all significantly decreasing.

Age-specific trend analyses (data not shown) revealed that rates for cancers in the malignant gonadal germ cell tumors group increased among children aged 0 to 14 years (APC, 1.9%; 95% CI, 0.2 to 3.6). Among adolescents aged 15 to 19 years, the rates for renal tumors (APC, 6.2%; 95% CI, 1.3 to 11.4), thyroid carcinomas (APC, 5.7%; 95% CI, 3.7 to 7.7), and unspecified epithelial carcinomas (APC, 1.2%; 95% CI, 0.3 to 2.1) increased, whereas the rates for intracranial and intraspinal embryonal tumors (APC, −5.9%; 95% CI, −9.5 to −2.2) and malignant melanoma (APC, −5.1%; 95% CI, −8.1 to −2.0) decreased.

Trends by race and ethnicity are displayed in Table 2 and reveal a significant increase in the overall cancer rates for African American children and adolescents (APC, 1.3%; 95% CI, 0.2 to 2.5). The significant increases in African Americans held for children of the 0- to 14-year age group (APC, 1.3%; 95% CI, 0.1 to 2.5) but not the 15- to 19-year age group (APC, 1.4%; 95% CI, −0.1 to 2.9). Among African American children and adolescents, we found a significant increase in the rates for Hodgkin's lymphoma, renal tumors (specifically the nephroblastoma and other nonepithelial renal tumors group), and thyroid carcinomas. Among white children and adolescents, there was a significant increase in unspecified intracranial and intraspinal neoplasms and in thyroid carcinoma and a significant decrease in malignant melanoma. Among non-Hispanic children and adolescents, we found significantly increasing trends of lymphomas and reticuloendothelial neoplasms, other gliomas, renal carcinomas, and unspecified epithelial carcinomas and decreasing trends of bone tumors and malignant melanomas. In the Hispanic group, there were significantly increasing trends of leukemias and decreasing trends in the fibrosarcomas and the extracranial and extragonadal germ cell tumors groups. Regardless of ethnicity, rates of thyroid carcinoma significantly increased. For rates by race and ethnicity (non-Hispanic white children and non-Hispanic black children compared with the above analysis), findings were similar overall (Supplemental Table 3).

Figure 3 reveals all significant cancer trends stratified by US Census region. Thyroid carcinomas were increasing in all regions except the Midwest region, with APCs ranging from 4.3% to 6.6%. There were decreased rates of acute myeloid leukemia, Ewing tumor, and malignant melanoma in the Northeast. In the Midwest, there was an increase in rates for lymphomas and reticuloendothelial neoplasms, other gliomas, and intracranial and

intraspinal germ cell tumors. In the South, there was an increase in the rates for chronic myeloproliferative diseases, unspecified soft tissue sarcomas, and other malignant epithelial neoplasms and melanomas. In the West, there was a rate decrease in intracranial and intraspinal germ cell tumors and also in malignant melanomas. Regional trends subdivided by race are displayed in Supplemental Table 4, and is significant for increasing rates for overall cancers in African Americans in the South and increasing rates overall in Hispanics in the West.

DISCUSSION

Specific Findings

Our study revealed that overall incidence rates of pediatric cancer have increased among African American children and adolescents, which has been previously documented.[4,15] Previous reports have commented on decreased pediatric cancer survival among minorities, including African American children and adolescents, and suggested this could be caused by differences in drug metabolism, delayed detection, tumor characteristics, or barriers associated with socioeconomic status.[16–18] Given that no increases in race-combined cancer incidence rates were observed for the entire pediatric population, further investigation is needed to better understand the underlying causes for this increase and better guide the development of preventive measures among African Americans.

Increased rates of thyroid cancers were found among the overall pediatric population in most geographic regions, in both genders, in adolescents aged 15 to 19 years, and among white, African American, Hispanic, and non-Hispanic populations. Holmes et al[7] previously reported increased pediatric thyroid cancer incidence rates during 1973–2007 among girls and adolescents aged 15 to 19 years, but that report only included 11% population coverage. Previous studies also have revealed increased rates of thyroid cancers among adults of both genders.[19–21] It is unclear if this increase in pediatric thyroid cancer is caused by the same forces that are driving the increase in adult thyroid cancer. There is evidence that exposure to radiation by computed tomography scans or dental radiographs may be associated with thyroid cancer, although many studies looking at radiographs and cancer were unable to find a significant association.[22–26] Previous studies have suggested obesity as a possible cause for the increase in adult thyroid cancers.[27,28] As both thyroid cancer rates and obesity prevalence increase among the pediatric population, further research is needed to investigate an association between these 2 variables.[29] Other potential causes of an increase in thyroid cancer rates include environmental exposures, such as exposures to perchlorate or polybrominated diphenyl ethers.[30,31] Reproductive or hormonal factors have been inconsistently associated with thyroid cancer in the literature, but this potential cause may explain why girls are more affected than boys.[7,19,32] Alternatively, some studies suggest that increasing incidence could reflect enhanced detection through improved diagnostic tests, although other studies disagree.[21,33]

Our study is consistent with previous reports that girls, people in their 20s, and African Americans have higher incidence rates of renal carcinoma.[34,35] There are few studies about the epidemiology of pediatric renal carcinomas because of their rarity, making our finding of increased renal carcinoma rates among boys and those aged 15 to 19 years a novel

finding.[6,34,36] Renal cancers are known to be increasing among both male and female adults.[6,37] Recent research has suggested that the increase of renal cancers among adults may be related to obesity and a lack of sufficient physical activity.[6,38] Increased rates of obesity among adolescents might explain increases in renal carcinomas observed overall and among those aged 15 to 19 years. Our study revealed that the incidence of nephroblastoma (Wilms tumor) remained stable in the 0- to 14-year age range (APC, −0.1%; 95% CI, −1.1 to 0.8) from 2001 to 2009. However, this finding does not necessarily contradict the observation that Wilms tumor may have decreased after the fortification of grains with folic acid in the United States from 1996 to 1998.[39]

A significant decrease in melanoma was seen overall, in boys, white patients, non-Hispanic patients, persons aged 15 to 19, and in both the Northeast and the West. Although previous studies using SEER have documented an increasing incidence of melanoma, these studies examined a much longer period (19–36 years) and did not include NPCR data.[40–42] It is possible that pediatric melanoma is decreasing after an increase seen at the end of the last century. However, melanoma is often an outpatient disease that adds registry data late into SEER and NPCR. It is important to monitor this trend to distinguish significant decrease from an artifact of late reporting.

The extracranial and extragonadal germ cell tumor group was decreasing overall and in girls and Hispanics. This group contains sacrococcygeal teratomas and germ cell tumors located in the mediastinum, retroperitoneal area, and uterus. Sacrococcygeal teratomas are the most common of this group, are often diagnosed prenatally, and are more common in girls.[43] Unspecified intracranial and intraspinal neoplasms were increasing overall, which is a small group of unspecified CNS neoplasms that is difficult to attribute to any 1 type of CNS tumor. Rates of pediatric acute lymphoblastic leukemia, acute myeloid leukemia, non-Hodgkin's lymphoma, and testicular germ cell tumors have been previously reported as increasing from 1975 to 2010, but our study did not reveal an overall increase in these cancers looking at the last decade of this time period.[10]

Overall Findings

This study summarizes childhood and adolescent cancer incidence and trends by using nationwide NPCR and SEER data. Overall and subgroup cancer incidence rates were similar to previous studies of pediatric cancer incidence using SEER and NPCR (leukemia was the highest, followed by CNS neoplasms).[3,4,10,44] Incidence variance by age, gender, and race were similar to previous reports.[3,4,10]

Our findings indicate that overall cancer rates among children and adolescents are stable. Several studies have revealed significant increases in cancer rates among children and adolescents during the past 2 decades,[5,15,44] but other studies have revealed an increase[4,45] or decrease, neither of which were significant.[46] These different findings may be due to different study years and population coverage. Consistent with the 2013 Annual Report to the Nation on the Status of Cancer (years 2000–2009), our study revealed that overcall cancer incidence rates for children and adolescents were stable from 2001 to 2009.[8]

Strengths and Limitations

The NPCR and SEER databases have quality standards that help to minimize misclassification of gender, age, and race.[3,11] Because the *International Classification of Diseases for Oncology, Third Edition*, coding standard was introduced in 2001, limiting our analysis to 2001–2009 further minimized misclassification artifacts that were potentially caused by the coding standard change.[3] Additionally, restricting our analysis to use no data beyond 2009 allowed us to avoid a change in demographic denominators that would be included with 2010 data using the 2010 census.[15] Using the SEER and NPCR databases allowed us to analyze cancer incidence and trends by US Census region.[3]

Despite using high-quality data, the NPCR and SEER database may have some variation in the coding of individual races and ethnicities, especially when considering the Hispanic and American Indians/Alaska Natives designations.[3,47,48] Changes in diagnostic accuracy or coding changes during this period, such as a change in the coding of astrocytomas, may have had a small effect on the trend result.[4,9,49] Late-diagnosed cancers, such as melanomas, might be underrepresented in the later years contained in this study and may explain differences in findings from other studies that evaluated trends over a longer period of time or that used a delay-adjustment model to estimate late-reported cases.[5,8,40] Because our study did not use delay-adjusted data, the finding of significantly decreasing rates of melanoma must be interpreted critically.

Given the rarity of pediatric cancer, there is a greater possibility of a type I error when analyzing subgroup analyses with small numbers. Some significant findings in the present study demonstrate significance that is very close to the cutoff margin, such as the finding of increasing leukemia among the Hispanic group or increasing Hodgkin's lymphoma among the African American population. Although these trends may be true, these findings must be further validated to distinguish rate changes secondary to coding or diagnostic artifact versus a change that could be caused from behavioral, environmental, genetic, or population-based factors. The cause of changing incidence rates is often unknown. Findings such as the increase of thyroid carcinoma that hold true across several age, geographic, and racial subgroups may need to be the subject of future investigations that would help us better understand the forces driving this change.

CONCLUSIONS

This study illustrates recent childhood and adolescent cancer incidence rates and trends in the United States and demonstrates, previously unreported, that renal carcinoma rates are increasing. In addition, this study supplements previous research of increasing overall cancer incidence rates in African Americans and provides data with more comprehensive population coverage demonstrating increasing rates of thyroid carcinoma among children and adolescents. These findings highlight an opportunity to improve our knowledge of the driving factors of these cancer incidence rate trends, and this understanding may help develop new preventive measures.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

FUNDING: No external funding.

ABBREVIATIONS

APC	annual percent change
CI	confidence interval
CNS	central nervous system
ICCC	International Classification of Childhood Cancer
NPCR	National Program of Cancer Registries
SEER	Surveillance, Epidemiology, and End Results

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WHAT'S KNOWN ON THIS SUBJECT

Cancer continues to be the leading disease-related cause of death among children and adolescents in the United States. More information is needed about recent trends.

WHAT THIS STUDY ADDS

This study provides recent, robust data supporting the increasing incidence of pediatric thyroid cancer and rising overall cancer rates among African American children and adolescents and is the first study to describe increasing rates of pediatric renal carcinoma.

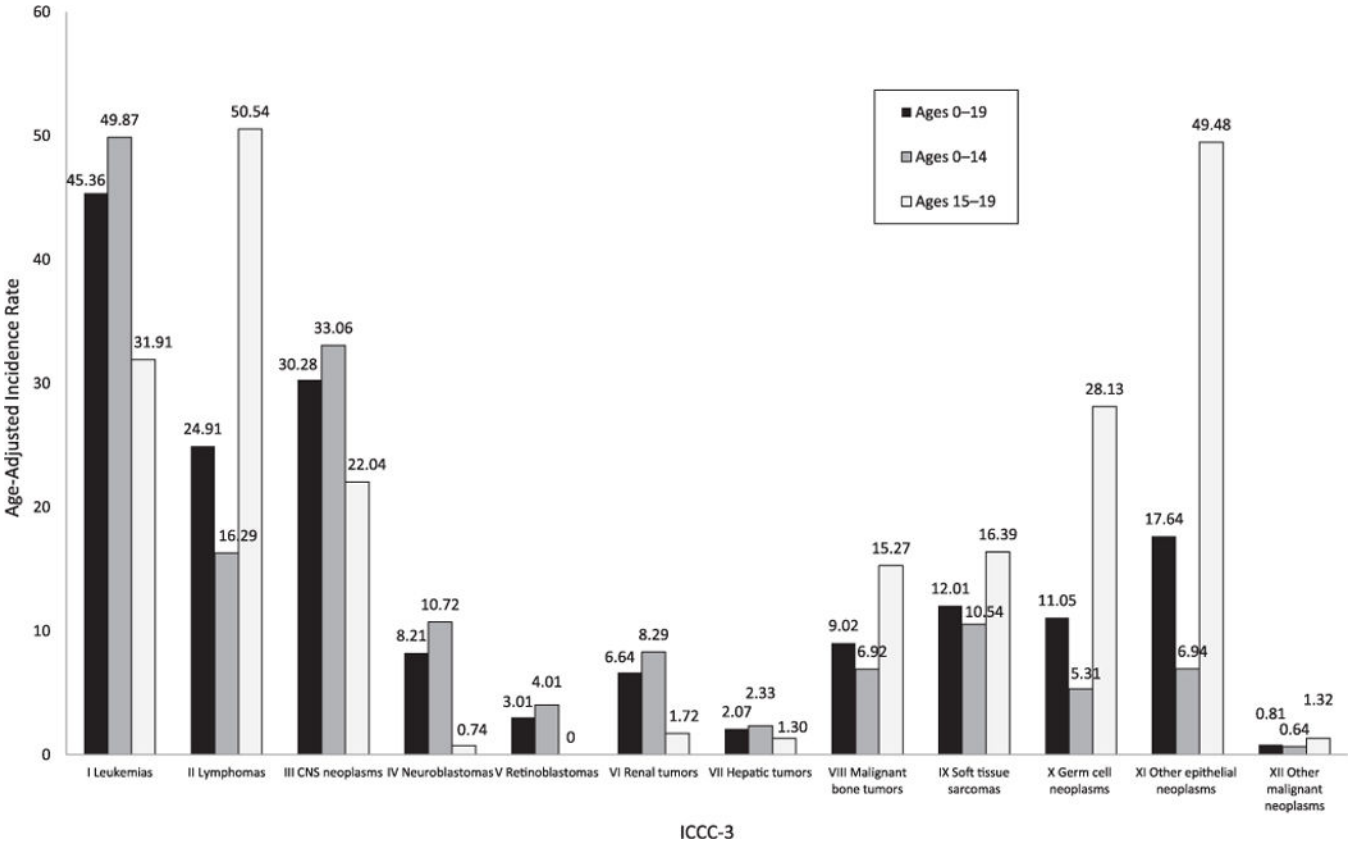


FIGURE 1.

Cancer incidence rates per million in the United States, 2001–2009. Age-adjusted incidence of pediatric cancers stratified by age group. Rates are per million and were age-adjusted to the 2000 US standard population (19 age groups, Census P25–1130) standard. Data are from population-based cancer registries that participate in the NPCR or the SEER program. Data include malignant tumors only and cover 94.2% of the US population. The ICCC-3 is displayed by abbreviated title.

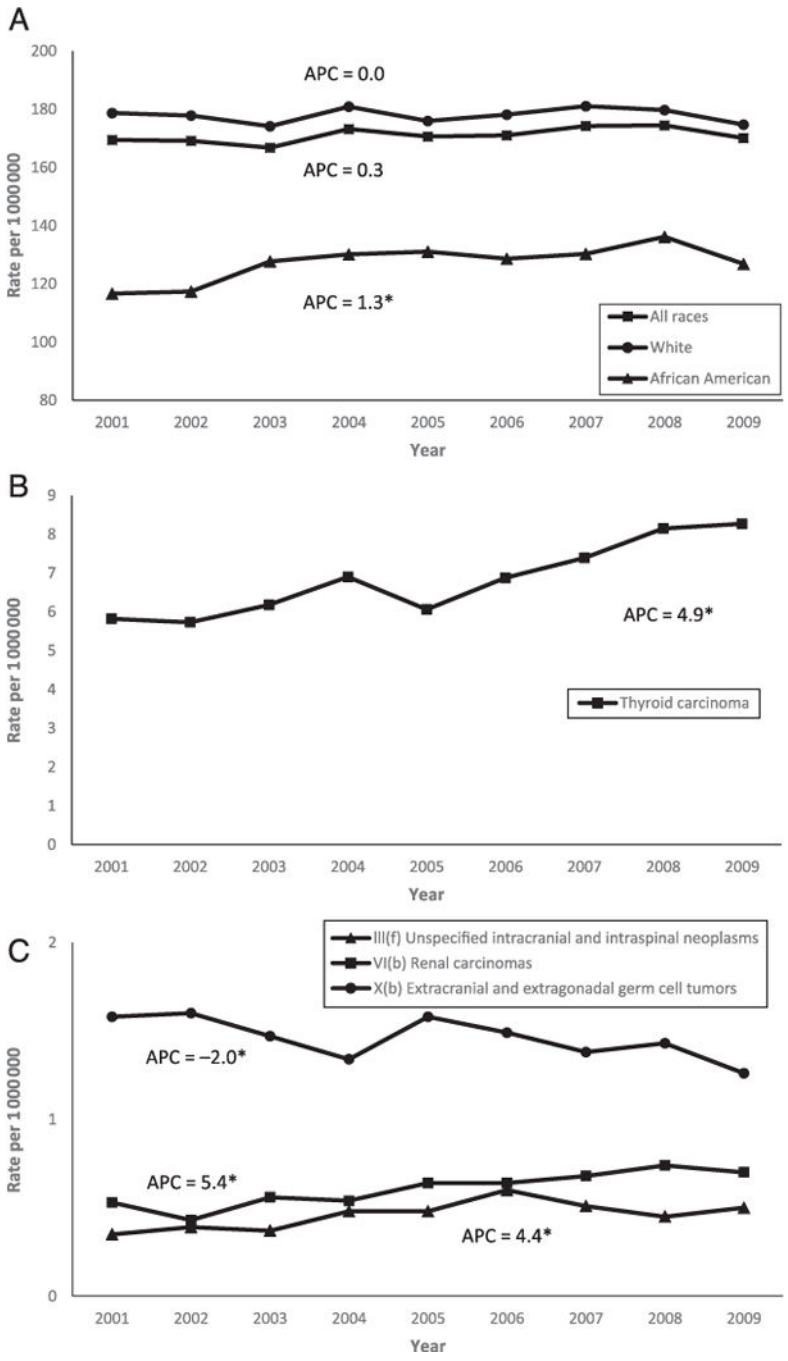
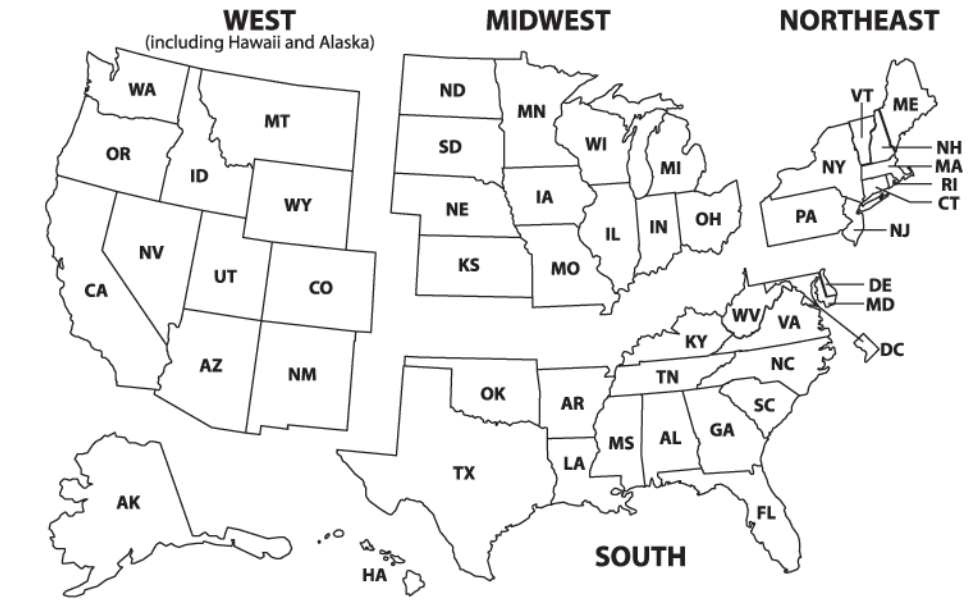


FIGURE 2.

Cancer rates and APC in children and adolescents (ages 0–19 years) in the United States, 2001–2009. A, Overall rates and APC by race. B, Overall thyroid carcinoma rates and APC. C, Overall rates and APC of unspecified intracranial and intraspinal neoplasms, renal carcinomas, and extracranial and extragonadal germ cell tumors. Rates are per million and were age-adjusted to the 2000 US standard population (19 age groups, Census P25–1130) standard. Data are from population-based cancer registries that participate in the NPCR or the SEER program. Data include malignant tumors only and cover 94.2% of the US

population. *Denotes significant APC. APCs were calculated by using weighted least squares method. Statistical significance was determined if the 95% CI of APC did not include zero ($P < .05$).



Northeast

Increasing

XI(b) Thyroid carcinomas, APC, 5.8% (1.9 to 9.8)

Decreasing

I(b) Acute myeloid leukemias, APC, –2.8% (–4.8 to –0.7)

VIII(c) Ewing tumor, related sarcomas of bone, APC, –3.9% (–7.2 to –0.6)

XI(d) Malignant melanomas, APC, –6.3% (–11.9 to –0.4)

Midwest

Increasing

II Lymphomas, reticuloendothelial neoplasms, APC, 1.3% (0.6 to 1.9)

III(d) Other gliomas, APC, 2.9% (0.0 to 5.8)

X(a) Intracranial and intraspinal germ cell tumors, APC, 6.0% (3.1 to 8.9)

South

Increasing

I(c) Chronic myeloproliferative diseases, APC, 4.3% (0.5 to 8.4)

IX(e) Unspecified soft tissue sarcomas, APC, 4.5% (1.5 to 7.7)

XI Other malignant epithelial neoplasms, melanomas, APC, 1.9% (0.6 to 3.3)

XI(b) Thyroid carcinomas, APC, 4.3% (1.7 to 7.0)

West

Increasing

XI(b) Thyroid carcinomas, APC, 6.6% (2.8 to 10.5)

Decreasing

X(a) Intracranial and intraspinal germ cell tumors, APC, –4.6% (–8.3 to –0.6)

XI(d) Malignant melanomas, APC, –7.3% (–12.1 to –2.2)

FIGURE 3.

Significant APC of cancer rates in children and adolescents (ages 0–19 years) by ICCC-3 code displayed by US Census region, 2001–2009. Data are from population-based cancer registries that participate in the NPCR or the SEER program. Data include malignant tumors only and cover 94.2% of the US population. APCs were calculated by using weighted least squares method. Statistical significance was determined if the 95% CI of APC did not include zero ($P < .05$). APCs are expressed with 95% CIs. Some significant values appear to include zero because APC was rounded to the nearest 10th.

TABLE 1

Cancer Incidence Rates and APC of Rates in Children and Adolescents (Ages 0–19 Years) by Gender, United States, 2001–2009

ICCC Group	Boys and Girls			Boys			Girls		
	Count	Rate[a]	APC[b] (95% CI)	Count	Rate[a]	APC[b] (95% CI)	Count	Rate[a]	APC[b] (95% CI)
All ICCC groups combined	120 137	171.01	0.3 (−0.1 to 0.7)	64 651	179.63	0.2 (−0.4 to 0.8)	55 486	161.96	0.4 (−0.1 to 0.9)
I Leukemias, myeloproliferative, myelodysplastic diseases	31 824	45.36	0.5 (20.3 to 1.3)	17 871	49.74	0.4 (−0.5 to 1.3)	13 953	40.75	0.6 (−0.6 to 1.9)
I(a) Lymphoid leukemias	22 834	32.59	0.7 (−0.2 to 1.5)	13 052	36.37	0.7 (−0.2 to 1.5)	9782	28.60	0.7 (−0.6 to 1.9)
I(b) Acute myeloid leukemias	5542	7.88	0.2 (−1.4 to 0.9)	2939	8.16	−1.2 (−3.5 to 1.1)	2603	7.58	0.9 (−0.3 to 2.1)
I(c) Chronic myeloproliferative diseases	1549	2.20	1.7 (−0.9 to 4.3)	813	2.25	2.8 (−0.5 to 6.2)	736	2.14	0.4 (−3.3 to 4.2)
I(d) Myelodysplastic syndrome, other myeloproliferative	1049	1.49	0.2 (−3.0 to 2.6)	584	1.61	−0.4 (−4.4 to 3.9)	465	1.35	0.0 (−4.3 to 4.5)
I(e) Unspecified and other specified leukemias	850	1.21	0.1 (−3.8 to 4.1)	483	1.34	0.6 (−4.2 to 5.6)	367	1.07	−0.7 (−5.1 to 4.0)
II Lymphomas and reticuloendothelial neoplasms	17 445	24.91	0.5 (−0.2 to 1.3)	10 387	28.97	0.8 (−0.3 to 1.9)	7058	20.64	0.1 (−0.9 to 1.2)
II(a) Hodgkin’s lymphomas	8780	12.50	0.5 (−0.3 to 1.3)	4678	13.01	0.5 (−0.7 to 1.7)	4102	11.98	0.5 (−1.1 to 2.0)
II(b) Non-Hodgkin’s lymphomas (except Burkitt lymphoma)	6047	8.66	0.7 (−0.5 to 1.8)	3821	10.67	1.3 (0.0 to 2.5)	2226	6.53	−0.4 (−1.3 to 0.6)
II(c) Burkitt lymphoma	1712	2.47	−0.1 (−2.7 to 2.7)	1359	3.83	0.0 (−2.9 to 2.9)	353	1.04	0.1 (−4.7 to 5.1)
II(d) Miscellaneous lymphoreticular neoplasms	663	0.93	1.2 (−4.0 to 6.6)	392	1.08	2.4 (−4.0 to 9.2)	271	0.78	−0.3 (−6.3 to 6.1)
II(e) Unspecified lymphomas	243	0.35	0.4 (−5.7 to 6.8)	137	0.38	—	106	0.31	—
III CNS and miscellaneous intracranial and intraspinal neoplasms	21 135	30.28	−0.1 (−1.0 to 0.8)	11 377	31.84	−0.3 (−1.4 to 0.9)	9758	28.65	0.1 (−1.1 to 1.4)
III(a) Ependymomas and choroid plexus tumor	1800	2.56	−1.5 (−4.5 to 1.7)	986	2.74	0.0 (−3.4 to 3.5)	814	2.37	−3.2 (−7.1 to 0.8)
III(b) Astrocytomas	10 533	15.10	−0.1 (−1.2 to 0.9)	5529	15.48	−0.4 (−1.6 to 0.9)	5004	14.71	0.1 (−1.6 to 1.8)
III(c) Intracranial and intraspinal embryonal tumors	4364	6.24	−0.6 (−1.9 to 0.8)	2591	7.25	−1.1 (−2.0 to −0.1)[c]	1773	5.18	0.2 (−2.1 to 2.5)
III(d) Other gliomas	3653	5.26	0.9 (−0.6 to 2.4)	1856	5.22	0.3 (−1.4 to 1.9)	1797	5.30	1.6 (−0.6 to 3.8)
III(e) Other specified intracranial/intraspinal neoplasms	462	0.66	−1.2 (−4.9 to 2.7)	246	0.69	−1.0 (−5.4 to 3.6)	216	0.63	−1.4 (−6.5 to 4.0)
III(f) Unspecified intracranial and intraspinal neoplasms	323	0.46	4.4 (0.1 to 8.9)[c]	169	0.47	—	154	0.45	—
IV Neuroblastoma, other peripheral nervous cell tumors	5870	8.21	−1.2 (−3.0 to 0.8)	3121	8.53	−0.5 (−2.9 to 2.0)	2749	7.87	−2.0 (−4.0 to 0.1)
IV(a) Neuroblastoma and ganglioneuroblastoma	5726	8.00	−1.2 (−3.1 to 0.6)	3043	8.31	−0.5 (−3.0 to 1.9)	2683	7.68	−2.1 (−4.1 to 0.0)[c]
IV(b) Other peripheral nervous cell tumors	144	0.20	—	78	0.22	—	66	0.19	—
V Retinoblastoma	2169	3.01	−0.2 (−1.8 to 1.5)	1100	2.99	−1.6 (−3.6 to 0.3)	1069	3.03	1.4 (−1.1 to 3.9)
VI Renal tumors	4697	6.64	0.5 (−0.3 to 1.3)	2228	6.15	0.0 (−1.5 to 1.5)	2469	7.15	1.1 (−1.3 to 3.2)
VI(a) Nephroblastoma, other nonepithelial renal tumors	4248	6.00	0.0 (−0.7 to 0.8)	2006	5.53	−0.4 (−1.9 to 1.1)	2242	6.49	0.4 (−1.7 to 2.5)
VI(b) Renal carcinomas	426	0.61	5.4 (2.8 to 8.1)[c]	210	0.59	4.2 (1.4 to 7.0)[c]	216	0.63	—

ICCC Group	Boys and Girls			Boys			Girls		
	Count	Rate[a]	APC[b] (95% CI)	Count	Rate[a]	APC[b] (95% CI)	Count	Rate[a]	APC[b] (95% CI)
VI(c) Unspecified malignant renal tumors	23	0.03	—	—	—	—	—	—	—
VII Hepatic tumors	1477	2.07	1.7 (−1.7 to 5.3)	874	2.40	2.8 (−1.4 to 7.2)	603	1.73	0.1 (−4.1 to 4.4)
VII(a) Hepatoblastoma	1050	1.46	1.6 (−2.2 to 5.6)	634	1.73	2.4 (−1.9 to 6.8)	416	1.18	0.3 (−4.8 to 5.7)
VII(b) Hepatic carcinomas	411	0.59	2.1 (−0.7 to 4.9)	229	0.64	3.8 (−0.7 to 8.5)	182	0.53	0.2 (−3.8 to 4.4)
VII(c) Unspecified malignant hepatic tumors	16	0.02	—	—	—	—	—	—	—
VIII Malignant bone tumors	6285	9.02	−0.6 (−1.3 to 0.2)	3582	10.00	−0.5 (−2.1 to 1.1)	2703	7.98	−0.7 (−1.8 to 0.5)
VIII(a) Osteosarcomas	3546	5.09	−0.4 (−1.7 to 1.0)	2016	5.63	−0.9 (−2.7 to 0.9)	1530	4.52	0.3 (−2.3 to 3.1)
VIII(b) Chondrosarcomas	248	0.35	−3.1 (−11.1 to 5.6)	158	0.44	—	90	0.26	—
VIII(c) Ewing tumor and related sarcomas of bone	2054	2.95	−1.0 (−3.2 to 1.4)	1185	3.31	−0.3 (−4.0 to 3.7)	869	2.56	−1.9 (−3.8 to 0.0)[c]
VIII(d) Other specified malignant bone tumors	300	0.43	−1.3 (−6.8 to 4.5)	146	0.41	—	154	0.45	—
VIII(e) Unspecified malignant bone tumors	137	0.20	—	77	0.21	—	60	0.18	—
IX Soft tissue and other extraosseous sarcomas	8419	12.01	0.3 (−0.4 to 1.0)	4620	12.86	0.0 (−1.0 to 1.1)	3799	11.12	0.6 (−1.1 to 2.4)
IX(a) Rhabdomyosarcomas	3299	4.71	−0.7 (−3.0 to 1.7)	1942	5.42	−1.1 (−3.0 to 1.0)	1357	3.97	−0.1 (−4.2 to 4.2)
IX(b) Fibrosarcomas, peripheral nerve, other fibrous	940	1.33	−0.7 (−3.8 to 2.6)	495	1.37	−2.3 (−5.6 to 1.0)	445	1.30	1.2 (−3.5 to 6.2)
IX(c) Kaposi sarcoma	26	0.04	—	20	0.06	—	—	—	—
IX(d) Other specified soft tissue sarcomas	3304	4.71	0.9 (−1.0 to 2.9)	1725	4.80	1.5 (−1.4 to 4.5)	1579	4.63	0.3 (−2.3 to 3.0)
IX(e) Unspecified soft tissue sarcomas	850	1.21	2.8 (−0.4 to 6.2)	438	1.22	1.0 (−4.4 to 6.7)	412	1.21	5.1 (−0.6 to 11.0)
X Germ cell, trophoblastic tumors, neoplasms of gonads	7814	11.05	0.7 (−0.5 to 2.0)	4968	13.65	1.1 (−0.7 to 2.6)	2846	8.30	0.5 (−1.3 to 2.2)
X(a) Intracranial and intraspinal germ cell tumors	1133	1.62	0.8 (−1.6 to 3.2)	831	2.32	−1.7 (−1.3 to 4.8)	302	0.89	−1.3 (−7.3 to 5.0)
X(b) Extracranial and extragonadal germ cell tumors	1046	1.46	−2.0 (−3.9 to −0.2)[c]	457	1.25	1.7 (−3.8 to 0.4)	589	1.68	−2.3 (−4.5 to −0.1)[c]
X(c) Malignant gonadal germ cell tumors	5142	7.27	1.1 (−0.6 to 2.9)	3618	9.91	1.0 (−1.1 to 3.2)	1524	4.48	1.5 (−0.5 to 3.5)
X(d) Gonadal carcinomas	281	0.40	5.3 (−0.5 to 11.4)	24	0.07	—	257	0.75	5.9 (−0.3 to 12.4)
X(e) Other and unspecified malignant gonadal tumors	212	0.30	—	38	0.11	—	174	0.51	—
XI Other malignant epithelial neoplasms and melanomas	12 428	17.64	0.8 (0.1 to 1.5)[c]	4277	11.85	−0.1 (−1.6 to 1.4)	8151	23.77	1.3 (0.4 to 2.2)[c]
XI(a) Adrenocortical carcinomas	151	0.21	—	55	0.15	—	96	0.28	—
XI(b) Thyroid carcinomas	4812	6.83	4.9 (3.2 to 6.6)[c]	934	2.59	4.7 (0.9 to 8.7)[c]	3878	11.31	4.9 (3.2 to 6.5)[c]
XI(c) Nasopharyngeal carcinomas	412	0.59	0.0 (−4.8 to 5.1)	275	0.76	2.7 (−3.0 to 8.7)	137	0.40	—
XI(d) Malignant melanomas	4047	5.74	−3.8 (−6.7 to −0.9)[c]	1699	4.70	−5.3 (−8.4 to −2.1)[c]	2348	6.84	−2.8 (−6.4 to 1.1)
XI(e) Skin carcinomas	58	0.08	—	28	0.08	—	30	0.09	—

ICCC Group	Boys and Girls			Boys			Girls		
	Count	Rate[a]	APC[b] (95% CI)	Count	Rate[a]	APC[b] (95% CI)	Count	Rate[a]	APC[b] (95% CI)
XI(f) Other and unspecified carcinomas	2948	4.19	1.1 (−0.1 to 2.3)	1286	3.56	2.4 (0.2 to 4.6)[c]	1662	4.86	0.1 (−2.2 to 2.4)
XII Other and unspecified malignant neoplasms	574	0.81	0.6 (−2.9 to 4.3)	246	0.68	3.8 (0.4 to 7.3)[c]	328	0.95	−1.6 (−6.7 to 3.9)

[a] Rates are per million and were age-adjusted to the 2000 US standard population (19 age groups, Census P25–1130) standard. Rate statistics were not displayed if case count was <16 cases.

[b] APCs were calculated by using weighted least squares method. Statistical significance was determined if the 95% CI of APC did not include zero ($P < .05$). APC was not calculated if case count was <16 cases in any 1 year. Some significant values appear to include zero because APC was rounded to the nearest 10th.

[c] Denotes significant APC.

TABLE 2

Cancer Incidence Rates and APC of Rates in Children and Adolescents (Ages 0–19 Years) by Race or Ethnicity, United States, 2001–2009

ICCC Group	White			African American			Non-Hispanic			Hispanic		
	Count	Rate[a]	APC[b] (95% CI)	Count	Rate[a]	APC[b] (95% CI)	Count	Rate[a]	APC[b] (95% CI)	Count	Rate[a]	APC[b] (95% CI)
All ICCC groups combined	97 765	177.91	0.0 (−0.5 to 0.5)	13 779	127.29	1.3 (0.2 to 2.5)[c]	95716	171.66	0.3 (−0.2 to 0.7)	24 421	168.94	0.6 (0.0 to 1.3)
I Leukemias, myeloproliferative, myelodysplastic diseases	26 283	47.94	0.3 (−0.6 to 1.2)	3022	27.97	1.2 (−0.3 to 2.7)	23 391	42.49	0.0 (−0.7 to 0.8)	8433	56.62	1.3 (0.1 to 2.6)[c]
I(a) Lymphoid leukemias	19 252	35.16	0.4 (−0.5 to 1.3)	1820	16.89	1.9 (0.0 to 3.9)	16 508	30.15	0.1 (−0.8 to 1.1)	6326	42.25	1.6 (0.1 to 3.1)[c]
I(b) Acute myeloid leukemias	4331	7.87	−0.4 (−1.6 to 0.8)	770	7.10	−0.4 (−5.2 to 4.7)	4270	7.67	−0.5 (−2.0 to 1.1)	1272	8.72	0.2 (−1.7 to 2.1)
I(c) Chronic myeloproliferative diseases	1197	2.17	1.6 (−1.8 to 5.1)	212	1.95	1.5 (−3.8 to 7.1)	1189	2.10	1.4 (−0.3 to 3.0)	360	2.51	1.9 (−4.7 to 9.0)
I(d) Myelodysplastic syndrome, other myeloproliferative	826	1.50	−0.6 (−5.2 to 4.2)	125	1.15	—	821	1.48	0.3 (−3.0 to 3.7)	228	1.49	−2.0 (−6.5 to 2.8)
I(e) Unspecified and other specified leukemias	677	1.23	0.8 (−3.2 to 4.9)	95	0.88	—	603	1.09	−1.4 (−5.5 to 2.9)	247	1.65	3.0 (−2.5 to 8.8)
II Lymphomas and reticuloendothelial neoplasms	14015	25.53	0.1 (−0.6 to 0.8)	2306	21.30	2.0 (−0.5 to 4.5)	14 425	25.45	0.9 (0.6 to 1.7)[c]	3020	22.23	−0.9 (−1.9 to 0.2)
II(a) Hodgkin's lymphomas	7256	13.17	0.1 (−0.7 to 1.0)	1067	9.84	2.9 (0.2 to 5.7)[c]	7360	12.83	0.7 (−0.1 to 1.5)	1420	10.83	−0.2 (−2.5 to 2.1)
II(b) Non-Hodgkin's lymphomas (except Burkitt lymphoma)	4610	8.42	0.2 (−0.7 to 1.0)	974	9.00	0.6 (−2.9 to 4.2)	4958	8.81	0.9 (−0.4 to 2.2)	1089	7.99	−0.2 (−3.0 to 2.6)
II(c) Burkitt lymphoma	1437	2.65	−1.0 (−4.4 to 2.6)	169	1.57	—	1460	2.64	1.2 (−1.4 to 3.7)	252	1.77	−5.6 (−13.1 to 2.6)
II(d) Miscellaneous lymphoreticular neoplasms	532	0.96	2.1 (−3.7 to 8.1)	54	0.49	—	461	0.84	3.6 (−0.7 to 8.1)	202	1.22	—
II(e) Unspecified lymphomas	180	0.33	—	42	0.39	—	186	0.33	—	57	0.41	—
III CNS and miscellaneous intracranial and intraspinal neoplasms	17 322	31.76	−0.5 (−1.6 to 0.7)	2458	22.86	1.2 (−1.0 to 3.4)	17416	31.63	0.3 (−0.7 to 1.2)	3719	25.22	−1.0 (−2.6 to 0.6)
III(a) Ependymomas and choroid plexus tumor	1471	2.68	−1.8 (−4.8 to 1.3)	213	1.97	−1.6 (−9.6 to 7.1)	1393	2.53	−1.2 (−4.3 to 2.0)	407	2.68	−2.3 (−6.5 to 2.2)
III(b) Astrocytomas	8716	15.99	−0.6 (−1.8 to 0.7)	1163	10.81	2.3 (−1.5 to 6.4)	8860	16.06	0.2 (−1.1 to 1.4)	1673	11.53	−0.5 (−2.9 to 1.9)
III(c) Intracranial and intraspinal embryonal tumors	3636	6.66	−0.8 (−2.5 to 1.0)	446	4.14	−0.6 (−3.0 to 1.9)	3489	6.38	−0.1 (−1.7 to 1.5)	875	5.76	−2.1 (−5.2 to 1.1)
III(d) Other gliomas	2940	5.41	0.6 (−1.4 to 2.6)	462	4.32	1.7 (−2.1 to 5.6)	3025	5.49	1.5 (0.1 to 2.9)[c]	628	4.32	−1.4 (−6.5 to 4.0)

ICCC Group	White			African American			Non-Hispanic			Hispanic		
	Count	Rate[a]	APC[b] (95% CI)	Count	Rate[a]	APC[b] (95% CI)	Count	Rate[a]	APC[b] (95% CI)	Count	Rate[a]	APC[b] (95% CI)
III(e) Other specified intracranial/ intraspinal neoplasms	316	0.58	−2.4 (−7.0 to 2.5)	120	1.12	—	389	0.70	−1.8 (−6.1 to 2.8)	73	0.50	—
III(f) Unspecified intracranial and intraspinal neoplasms	243	0.44	5.9 (0.2 to 12.0)[c]	54	0.50	—	260	0.47	3.7 (−2.2 to 10.0)	63	0.43	—
IV Neuroblastoma, other peripheral nervous cell tumors	4739	8.50	−1.5 (−3.4 to 0.5)	756	6.93	0.7 (−3.4 to 5.0)	4950	9.08	−0.6 (−2.4 to 1.4)	920	5.40	−2.3 (−5.9 to 1.4)
IV(a) Neuroblastoma and ganglioneuroblastoma	4627	8.30	−1.6 (−3.5 to 0.3)	734	6.73	0.7 (−3.3 to 4.9)	4833	8.88	−0.6 (−2.4 to 1.3)	893	5.21	−2.9 (−6.5 to 0.9)
IV(b) Other peripheral nervous cell tumors	112	0.20	—	22	0.20	—	117	0.21	—	27	0.19	—
V Retinoblastoma	1587	2.83	−0.2 (−2.5 to 2.2)	379	3.43	−0.3 (−2.9 to 2.3)	1569	2.88	−0.1 (−1.2 to 1.1)	600	3.43	−0.7 (−5.1 to 3.9)
VI Renal tumors	3537	6.41	−0.4 (−1.2 to 0.4)	855	7.92	2.5 (1.6 to 3.5)[c]	3872	7.11	0.8 (−0.4 to 2.0)	825	5.05	0.5 (−3.0 to 4.0)
VI(a) Nephroblastoma, other nonepithelial renal tumors	3252	5.89	−0.7 (−1.5 to 0.0)	726	6.73	2.3 (0.6 to 3.6)[c]	3485	6.42	0.3 (−0.8 to 1.5)	763	4.58	−1.0 (−3.6 to 3.6)
VI(b) Renal carcinomas	267	0.49	3.8 (−2.2 to 10.2)	125	1.15	—	367	0.65	5.8 (3.3 to 8.4)[c]	59	0.45	—
VI(c) Unspecified malignant renal tumors	18	0.03	—	—	—	—	20	0.04	—	—	—	—
VII Hepatic tumors	1162	2.09	1.5 (−2.5 to 5.6)	156	1.43	—	1114	2.02	1.3 (−1.2 to 3.9)	363	2.25	3.5 (−5.6 to 13.4)
VII(a) Hepatoblastoma	842	1.51	1.2 (−3.0 to 5.5)	100	0.91	—	776	1.42	1.3 (−1.9 to 4.5)	274	1.59	3.1 (−6.5 to 13.7)
VII(b) Hepatic carcinomas	308	0.56	2.6 (−2.4 to 8.0)	55	0.51	—	324	0.57	1.3 (−2.6 to 5.2)	87	0.65	—
VII(c) Unspecified malignant hepatic tumors	—	—	—	—	—	—	—	—	—	—	—	—
VIII Malignant bone tumors	5085	9.32	−0.7 (−1.8 to 0.3)	781	7.22	−0.8 (−4.9 to 3.5)	5030	8.91	−0.9 (−1.7 to 0.0)[c]	1255	9.49	0.5 (−1.7 to 2.7)
VIII(a) Osteosarcomas	2670	4.89	−0.4 (−1.8 to 1.1)	622	5.75	−0.7 (−5.6 to 4.4)	2776	4.91	−0.8 (−2.2 to 0.6)	770	5.87	0.8 (−1.7 to 3.3)
VIII(b) Chondrosarcomas	206	0.37	—	25	0.23	—	210	0.37	—	38	0.29	—
VIII(c) Ewing tumor and related sarcomas of bone	1874	3.44	−1.1 (−3.1 to 0.9)	70	0.65	—	1705	3.03	−1.2 (−3.8 to 1.5)	349	2.60	0.7 (−3.2 to 4.7)
VIII(d) Other specified malignant bone tumors	233	0.43	−2.8 (−8.8 to 3.7)	40	0.37	—	240	0.42	−0.2 (−5.7 to 5.8)	60	0.45	—

ICCC Group	White			African American			Non-Hispanic			Hispanic		
	Count	Rate[a]	APC[b] (95% CI)	Count	Rate[a]	APC[b] (95% CI)	Count	Rate[a]	APC[b] (95% CI)	Count	Rate[a]	APC[b] (95% CI)
VIII(e) Unspecified malignant bone tumors	102	0.19	—	24	0.22	—	99	0.18	—	38	0.28	—
IX Soft tissue and other extraosseous sarcomas	6543	11.93	−0.1 (−0.8 to 0.7)	1359	12.55	1.4 (−0.4 to 3.1)	6791	12.15	0.5 (−0.4 to 1.5)	1628	11.49	−0.2 (−2.2 to 1.8)
IX(a) Rhabdomyosarcomas	2599	4.75	−1.7 (−3.7 to 0.3)	526	4.88	2.8 (−1.7 to 7.6)	2645	4.79	−0.8 (−3.5 to 1.9)	654	4.42	0.2 (−4.7 to 5.4)
IX(b) Fibrosarcomas, peripheral nerve, other fibrous	736	1.34	0.1 (−3.0 to 3.3)	159	1.46	—	742	1.32	1.0 (−2.6 to 4.7)	198	1.40	−6.7 (−10.9 to −2.3)[c]
IX(c) Kaposi sarcoma	—	—	—	—	—	—	22	0.04	—	—	—	—
IX(d) Other specified soft tissue sarcomas	2553	4.65	0.8 (−1.4 to 3.0)	520	4.79	1.1 (−2.2 to 4.6)	2688	4.76	1.1 (−0.9 to 3.0)	616	4.53	0.6 (−2.3 to 3.7)
IX(e) Unspecified soft tissue sarcomas	644	1.17	3.2 (−0.5 to 7.0)	142	1.31	—	694	1.23	3.1 (−0.5 to 6.7)	156	1.11	—
X Germ cell, trophoblastic tumors, neoplasms of gonads	6546	11.81	0.6 (−1.0 to 2.2)	662	6.07	1.4 (−0.2 to 3.1)	5914	10.35	0.3 (−1.0 to 1.6)	1900	14.26	1.6 (−0.6 to 3.8)
X(a) Intracranial and intraspinal germ cell tumors	900	1.65	0.5 (−2.7 to 3.7)	100	0.92	—	890	1.58	1.1 (−1.9 to 4.2)	243	1.81	−0.3 (−4.8 to 4.4)
X(b) Extracranial and extragonadal germ cell tumors	784	1.40	−1.8 (−4.4 to 0.7)	152	1.38	—	800	1.44	−1.3 (−3.9 to 1.4)	246	1.66	−4.5 (−7.8 to −1.2)[c]
X(c) Malignant gonadal germ cell tumors	4468	8.05	1.0 (−0.9 to 2.8)	349	3.21	3.5 (−0.3 to 8.0)	3838	6.66	0.4 (−1.3 to 2.2)	1304	9.96	2.5 (−0.7 to 5.8)
X(d) Gonadal carcinomas	235	0.42	4.0 (−1.8 to 10.1)	18	0.17	—	216	0.37	3.6 (−1.8 to 9.2)	65	0.51	—
X(e) Other and unspecified malignant gonadal tumors	159	0.29	—	43	0.39	—	170	0.30	—	42	0.32	—
XI Other malignant epithelial neoplasms and melanomas	10511	19.02	0.7 (−0.3 to 1.7)	960	8.83	1.4 (−2.8 to 5.9)	10 789	18.77	0.4 (−0.5 to 1.3)	1639	12.67	4.9 (2.7 to 7.1)[c]
XI(a) Adrenocortical carcinomas	130	0.24	—	—	—	—	121	0.22	—	30	0.20	—
XI(b) Thyroid carcinomas	4182	7.57	4.9 (2.9 to 6.9)[c]	255	2.35	6.6 (0.7 to 12.8)[c]	3974	6.89	4.1 (2.3 to 5.9)[c]	838	6.53	9.1 (5.4 to 12.8)[c]
XI(c) Nasopharyngeal carcinomas	194	0.35	2.0 (−1.5 to 5.6)	180	1.65	—	351	0.61	−0.8 (−6.4 to 5.1)	61	0.48	—
XI(d) Malignant melanomas	3694	6.68	−3.9 (−6.8 to −0.9)[c]	54	0.50	—	3829	6.66	−3.5 (−6.3 to −0.6)[c]	218	1.64	−2.0 (−5.7 to 1.0)
XI(e) Skin carcinomas	44	0.08	—	—	—	—	51	0.09	—	—	—	—
XI(f) Other and unspecified carcinomas	2267	4.11	1.0 (−0.6 to 2.6)	455	4.18	−0.5 (−4.3 to 3.5)	2463	4.29	1.2 (0.0 to 2.4)[c]	485	3.78	1.1 (−1.9 to 4.1)

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	Count	Rate[a]	APC[b] (95% CI)	Count	Rate[a]	APC[b] (95% CI)	Count	Rate[a]	APC[b] (95% CI)	Count	Rate[a]	APC[b] (95% CI)
XII Other and unspecified malignant neoplasms	435	0.79	−1.0 (−3.7 to 1.8)	85	0.78	—	455	0.81	0.4 (−4.3 to 5.2)	119	0.83	—

[a] Rates are per million and were age-adjusted to the 2000 US standard population (19 age groups, Census P25–1130) standard. Rate statistics were not displayed if case count was <16 cases.

[b] APCs were calculated by using weighted least squares method. Statistical significance was determined if the 95% CI of APC did not include zero ($P < .05$). APC was not calculated if case count was <16 cases in any 1 year. Some significant values appear to include zero because APC was rounded to the nearest 10th.

[c] Denotes significant APC.