

CBTRUS

CENTRAL BRAIN TUMOR REGISTRY OF THE UNITED STATES



CBTRUS STATISTICAL REPORT
PRIMARY BRAIN AND CENTRAL NERVOUS SYSTEM
TUMORS DIAGNOSED IN THE UNITED STATES IN
2004-2006

FEBRUARY 2010

CBTRUS MISSION



The Central Brain Tumor Registry of the United States (CBTRUS) is a not-for-profit corporation committed to providing a resource for gathering and disseminating current epidemiologic data on all primary brain and central nervous system tumors, malignant and non-malignant, for the purposes of accurately describing their incidence and survival patterns, evaluating diagnosis and treatment, facilitating etiologic studies, establishing awareness of the disease, and ultimately, for the prevention of all brain tumors.

This report was prepared by the CBTRUS executive team and the research staff at the University of Illinois at Chicago, School of Public Health. The CBTRUS data presented in this report were provided through an agreement with the Centers for Disease Control and Prevention (CDC), National Program of Cancer Registries (NPCR). In addition, CBTRUS used data from the limited use data sets of the National Cancer Institute, Surveillance, Epidemiology, and End Results (SEER) Program. CBTRUS acknowledges and appreciates these contributions to this report and to cancer surveillance in general.

Sources of geographic population–based cancer registry data included in this report:

Alabama	Nebraska
Alaska	Nevada
Arkansas	New Hampshire
California	New Jersey
Colorado	New Mexico ^{SEER}
Connecticut ^{SEER}	New York
Delaware	North Carolina
District of Columbia	North Dakota
Florida	Ohio
Georgia	Oklahoma
Hawaii ^{SEER}	Oregon
Idaho	Pennsylvania
Illinois	Rhode Island
Indiana	South Carolina
Iowa ^{SEER}	South Dakota
Kentucky	Tennessee
Louisiana	Texas
Maine	Utah ^{SEER}
Massachusetts	Vermont
Michigan	Virginia
Minnesota	Washington
Mississippi	West Virginia
Missouri	Wyoming
Montana	

^{SEER} Data obtained from the SEER limited use data files for these population–based cancer registries. All other population–based cancer registry data provided by the NPCR.

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The CBTRUS would appreciate your help in order to support its database. Contributions are tax deductible and can be mailed to:

*CBTRUS
244 East Ogden Avenue
Suite 116
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I am so proud of the progress we have made with the collection and reporting of primary brain tumors. In 1992 we started out with four state cancer registries, Connecticut, Massachusetts, Missouri, and Utah who believed in our mission to report data on primary brain tumors that include the “benign” brain tumors along with the malignant ones. Over the course of seventeen years we grew to the data included in this current report; we also began to change the term “benign” to non-malignant to describe those tumors that were not reported in standard brain tumor statistics. We also grew in our understanding and appreciation of the tasks involved with collecting and reporting cancer data.



We admire all those from the hospital tumor registrars to the central cancer staff to the larger surveillance organizations. We admire the dynamic, collaborative relationship between the premier reporting organizations, The National Cancer Data Base (NCDB) of the Commission on Cancer of the American College of Surgeons, the National Program of Cancer Registries (NPCR) of the Centers for Disease Control and Prevention, the North American Association of Central Cancer Registries (NAACCR) and the Surveillance Epidemiology, End Results (SEER) program of the National Cancer Institute.

We are proud of being on the team who crafted the uniform rules and standards that now guide the collection of all primary brain tumors in the United States. The accuracy and completeness of these data will be insured as these rules are fully implemented by all state cancer registries.

We are proud that CBTRUS incidence and prevalence data has influenced the formulation of more clinical trials for non-malignant brain and central nervous system tumors. Meningioma is now recognized as having the highest incidence of all brain tumor histologies. Hopefully, this recognition will result in optimum health care for those patients afflicted with the affects of these “benign” tumors.

We are proud to be a model for the partnership that the National Institutes of Health have set forth for the funding of scientific research in our country. CBTRUS is funded by three nonprofits and a government contract with the National Cancer Institute. With this partnership, a small incidence, often called orphan, disease, such as brain tumors, has statistical data available in a similar way and timeframe as major cancers in the United States.

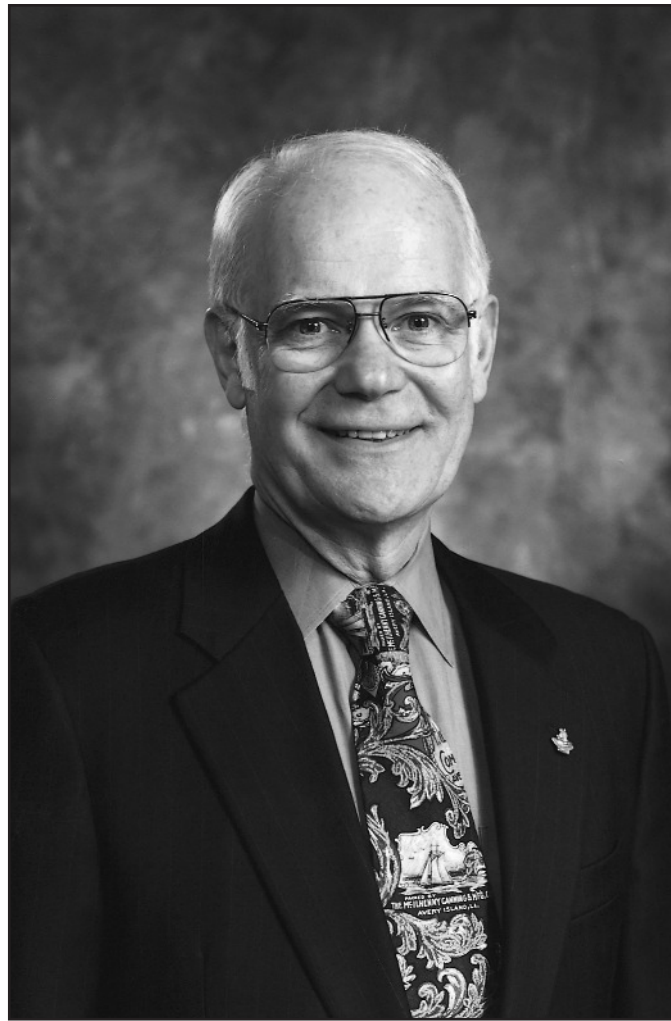
On behalf of the Board of Directors and Advisors, I would like to thank the NPCR and SEER for providing data for the analyses in the CBTRUS 2009-2010 Statistical Report. I would like to thank our partners for providing our funding and our friends and families for supporting our dedication to our mission.

Sincerely,

A handwritten signature in black ink that reads "Carol Kruchko". The signature is written in a cursive, flowing style.

Carol Kruchko

President & Administrator, CBTRUS



MICHAEL E. TRAYNOR
March 2, 1939 - September 12, 2009

With gratitude for his dedication to the mission of the Central Brain Tumor Registry of the United States (CBTRUS), we dedicate this report to the memory of Michael E. Traynor.

Mr. Traynor, affectionately called Mike by all who knew him, began his fundraising efforts to support pediatric brain tumor research along with his wife, Dianne, in 1984. Motorcycle rides became the hallmark of these efforts. Known as the *Ride for Kids*, these events now include Rides held in cities across the United States. Originally the Rides directly supported CBTRUS with twenty-five percent of the funds raised in each city going to the Registry and the remainder going to pediatric brain tumor research. As Mike's organization grew into the Pediatric Brain Tumor Foundation of the United States, its funding to CBTRUS changed, and CBTRUS received a 5 year grant of over \$600,000. It was Mike's belief in the importance of our mission that persuaded his Board to make this generous grant and enabled CBTRUS to develop free from fundraising concerns. CBTRUS became like one of the children for whom he intensely cared. These funds to CBTRUS have topped over a million dollars. Mike was always proud of the CBTRUS "red" books and carried them to many meetings during those years.

Mike was a member of the CBTRUS Board of Directors since its establishment in 1992. His guidance and wise words, peppered with storytelling and his sense of humor, will be missed. He was a cheerleader and an ambassador for CBTRUS. We thank Mike for all he has done for pediatric brain tumor research and for CBTRUS.

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- *CBTRUS (Central Brain Tumor Registry of the United States) incidence rates and estimated new cases include all primary malignant and non-malignant tumors of the brain, central nervous system, pituitary and pineal glands, and olfactory tumors of the nasal cavity (including brain lymphoma and leukemia).*
 - *SEER (Surveillance, Epidemiology, and End Results) program incidence and survival rates extracted from the SEER Cancer Statistics Review, 1975-2006 include primary malignant tumors of the brain and central nervous system (excluding brain lymphoma and leukemia, tumors of the pituitary and pineal gland, and olfactory tumors of the nasal cavity).*
 - *SEER (Surveillance, Epidemiology, and End Results) program survival rates estimated using the SEER Cancer Incidence Limited-Use Database, 1973-2006 include all primary malignant tumors of the brain, central nervous system, pituitary and pineal glands, and olfactory tumors of the nasal cavity (including brain lymphoma and leukemia).*
 - *ACS (American Cancer Society) estimated deaths include primary malignant tumors of the brain and central nervous system (excluding brain lymphoma and leukemia, tumors of the pituitary and pineal glands, and olfactory tumors of the nasal cavity).*
 - *IARC (International Agency for Research on Cancer) worldwide incidence rates include primary malignant tumors of the brain and central nervous system (excluding brain lymphoma and leukemia, tumors of the pituitary and pineal glands, and olfactory tumors of the nasal cavity). Global rates are age-adjusted using the world standard population. These rates may be compared to other rates adjusted to the world standard population, but they cannot be compared to rates adjusted to other population standards, such as the 2000 United States standard population.*
 - *Incidence rates are age-adjusted using the 2000 United States standard population unless otherwise noted.*
-

Incidence

- **CBTRUS:** The incidence rate of all primary non-malignant and malignant brain and central nervous system tumors is 18.71 cases per 100,000 person-years (11.52 per 100,000 person-years for non-malignant tumors and 7.19 per 100,000 person-years for malignant tumors). The rate is higher in females (19.88 per 100,000 person-years) than males (17.44 per 100,000 person-years).^{1a}
- **CBTRUS:** An estimated 62,930 new cases of primary non-malignant and malignant brain and central nervous system tumors are expected to be diagnosed in the United States in 2010.^{1b}
- **SEER:** The incidence rate of primary malignant brain and central nervous system tumors (excluding lymphomas, leukemias, tumors of pituitary and pineal glands, and olfactory tumors of the nasal cavity) is 6.4 cases per 100,000 person-years. This rate is higher in males (7.6 per 100,000 person-years) than females (5.4 per 100,000 person-years).^{2a}
- **ACS:** An estimated 22,070 new cases of primary malignant brain and central nervous system tumors are expected to be diagnosed in the United States in 2009 (12,010 in males and 10,060 in females). This represents 1.49% of all primary malignant cancers expected to be diagnosed in the United States in 2009.³
- **IARC:** The worldwide incidence rate of primary malignant brain and central nervous system tumors in 2002, age-adjusted using the world standard population, is 3.7 per 100,000 person-years in males and 2.6 per 100,000 person-years in females. This represents an estimated 108,277 males and 81,305 females who were diagnosed with a primary malignant brain tumor in 2002, an overall total of 189,582 individuals. The incidence rates are higher in more developed countries (males: 5.8 per 100,000 person-years; females: 4.1 per 100,000 person-years) than in less developed countries (males: 3.0 per 100,000 person-years; females: 2.1 per 100,000 person-years).⁴
- **CBTRUS:** CBTRUS has calculated a worldwide estimate of 186,678 newly diagnosed primary non-malignant brain and central nervous system tumors per annum for 2002 (males: n=80,759; females: n=105,918).⁵

Pediatric Incidence (Ages 0-19)

- **CBTRUS:** The incidence rate of childhood primary non-malignant and malignant brain and central nervous system tumors is 4.71 cases per 100,000 person-years. The rate is higher in males (4.75 per 100,000 person-years) than females (4.66 per 100,000 person-years).^{1a}
- **CBTRUS:** An estimated 4,030 new cases of childhood primary non-malignant and malignant brain and central nervous system tumors are expected to be diagnosed in the United States in 2010.^{1b} Of these 4,030 new cases, an estimated 2,880 will be in children less than 15 years of age.^{1b}

Mortality

- **ACS:** An estimated 12,920 deaths will be attributed to primary malignant brain and central nervous system tumors in the United States in 2009.

Lifetime Risk

- SEER: From birth, males have a 0.67% lifetime risk of being diagnosed with a primary malignant brain/central nervous system tumor and 0.48% chance of dying from a brain/central nervous system tumor (excluding lymphomas, leukemias, tumors of pituitary and pineal glands, and olfactory tumors of the nasal cavity).^{2b}
- SEER: From birth, females have a 0.54% lifetime risk of being diagnosed with a primary malignant brain/central nervous system tumor and a 0.38% chance of dying from a brain/central nervous system tumor (excluding lymphomas, leukemias, tumors of pituitary and pineal glands, and olfactory tumors of the nasal cavity).^{2b}

Survival

- SEER: The five-year relative survival rate following diagnosis of a primary malignant brain and central nervous system tumor (including lymphomas and leukemias, tumors of the pituitary and pineal glands, and olfactory tumors of the nasal cavity) is 33.6% for males and 37.0% for females (1995-2006 data).⁶
- SEER: Five-year relative survival rates following diagnosis of a primary malignant brain and central nervous system tumor (including lymphomas and leukemias, tumors of the pituitary and pineal glands, and olfactory tumors of the nasal cavity) by age of diagnosis (1995-2006 data):⁶

Age 0-19 years: 72.1%	Age 55-64 years: 16.7%
Age 20-44 years: 55.9%	Age 65-74 years: 9.6%
Age 45-54 years: 30.7%	Age 75 or older: 5.2%

Prevalence

- CBTRUS: The prevalence rate for all primary brain and central nervous system tumors was estimated to be 209.0 per 100,000 in 2004. It was estimated that more than 612,000 persons were living with a diagnosis of primary brain and central nervous system tumor in the United States in 2004 (malignant tumor: more than 124,000 persons; non-malignant tumor: more than 488,000 persons).⁷
- CBTRUS: The prevalence rate for all pediatric (ages 0-19) primary brain and central nervous system tumors was estimated at 35.4 per 100,000 with more than 28,000 children estimated to be living with this diagnosis in the United States in 2004.⁷

^{1a}Central Brain Tumor Registry of the United States analyses of the NPCR and SEER data, 2004-2006.

^{1b}The age-specific rate method (www.idph.state.il.us/cancer/pdf/projections/Final_methodsV2_no_examples_updated_for_2007-2010.pdf) was utilized to project 2010 estimates of all primary brain tumors using the NPCR/SEER 2004-2006 age-sex-race-specific brain tumor incidence rates for a group by the age-sex-race-specific projections for that group. Projected population estimates for 2010 were derived for the 50 states and District of Columbia using the US Census Bureau 1990-2006 population data (seer.cancer.gov/popdata/index.html).

² Horner MJ, Ries LAG, Krapcho M, Neyman N, Aminou R, Howlander N, Altekruse SF, Feuer EJ, Huang L, Mariotto A, Miller BA, Lewis DR, Eisner MP, Stinchcomb DG, Edwards BK (eds). SEER Cancer Statistics Review, 1975-2006, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2006/, based on November 2008 SEER data submission, posted to the SEER web site, 2009.

^{2a}Table 3.6 (2002-2006 data).

^{2b}Table 3.11 (2004-2006 data).

³ American Cancer Society. Cancer Facts & Figures 2009. Atlanta: American Cancer Society; 2009.

⁴ Ferlay J, Bray F, Pisani P and Parkin DM. GLOBOCAN 2002: Cancer Incidence, Mortality and Prevalence Worldwide, Version 2.0. IARC CancerBase No. 5. Lyon, IARC Press, 2004. Limited version available from: URL: [http://www_depdb.iarc.fr/globocan2002.htm](http://www.depdb.iarc.fr/globocan2002.htm)

⁵ McCarthy BJ, Schellinger KA, Propp JM, Kruchko C, Malmer B. A Case for the Worldwide Collection of Primary Benign Brain Tumors. *Neuroepidemiology* 33(3):268-275, 2009.

⁶ Estimated by CBTRUS using Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence—SEER 17 Regs Limited-Use, Nov 2008 Sub (1973-2006), National Cancer Institute, DCCPS, Surveillance Research Program, Cancer Statistics Branch, released April 2009, based on the November 2008 submission.

⁷ Porter KR, McCarthy BJ, Freels S, Kim Y, Davis FG. Prevalence estimates for primary brain tumors in the US by age, gender, behavior, and histology. *Neuro-Oncology*, In Press.

BACKGROUND

CBTRUS was incorporated with a founding and sustaining grant from the Pediatric Brain Tumor Foundation in 1992 following a two-year study conducted by the American Brain Tumor Association to determine the feasibility of a central registry for all primary brain and central nervous system (CNS) tumor cases in the United States. Until that time, standard data reporting in the United States had been limited to malignant cases only. Non-malignant brain tumors, however, may, and often do, impose the same costs to society in terms of medical care, case fatality and lost productivity as malignant brain tumors. A histologically non-malignant brain tumor may produce devastating effects based on its location, while a malignant tumor may not produce visible symptoms. In addition, as molecular markers have been discovered, it has become clear that certain non-malignant brain tumors may become malignant over time. Passed in 2002, Public Law 107-206 required the expansion of primary brain and CNS tumor data collection by the National Program of Cancer Registries (NPCR) to include tumors of benign and uncertain behavior beginning with the 2004 diagnosis year. All state cancer registries now include data on primary non-malignant brain and CNS tumors in their collection practices. Starting in 2004, Uniform Data Standards (UDS) guide the collection of non-malignant brain & CNS tumors; in 2005, the UDS for the collection of malignant brain & CNS tumors were revised.

The CBTRUS database contains the largest aggregation of population-based data on the incidence of all primary brain and CNS tumors in the United States. These data have been developed by compiling data from cancer registries that include information on both malignant and non-malignant primary brain and CNS tumors. Non-malignant brain and CNS tumors include those tumors with a benign behavior code of “0” or uncertain behavior code of “1” as specified in the International Classification of Diseases for Oncology, Third Edition (ICD-O-3).¹ This CBTRUS Report contains data collected from the National Program of Cancer Registries (NPCR) and states belonging to the National Cancer Institutes Surveillance, Epidemiology and End Results (SEER) program. Data from forty-seven population-based cancer registries were included.

This Statistical Report continues the past efforts CBTRUS has made to provide accurate, population-based incidence rates for all primary brain and CNS tumors by histology, age, gender, race and Hispanic origin. As in previous reports, these data have been listed in histologic groupings with improved clinical relevance. They are useful for surveillance and may serve as a baseline for comparison with regional rates. They are also important for allocation and planning of specialty health-care services, for planning programs for disease prevention and control, and in the development of research proposals. These data may lead to clues that will stimulate research into the causes of this terrible disease.

DISCLAIMER

The Central Brain Tumor Registry of the United States (CBTRUS) is a not-for-profit corporation that gathers and disseminates epidemiologic data on primary brain and CNS tumors in order to facilitate research and establish awareness of the disease. CBTRUS makes no representations or warranties, and gives no other assurances or guarantees, expressed or implied, with respect to the accuracy or completeness of the data presented. The information provided in this publication is not intended to assist in the evaluation, diagnosis or treatment of disease in any individual person. Persons with questions regarding their own disease should contact their own physician to obtain medical assistance.

The objective of this Statistical Report is to provide a current overview of the descriptive epidemiology of primary brain and central nervous system (CNS) tumors in the United States. CBTRUS has obtained data on all primary brain and CNS tumors from the National Program of Cancer Registries (NPCR) and the Surveillance, Epidemiology, and End Results (SEER) program. Incidence rates of primary malignant and non-malignant brain and CNS tumors for 2004-2006 were calculated by gender, age, race and Hispanic origin. This Report uses the term non-malignant to replace the terms benign and uncertain used in previous CBTRUS Reports.

METHODS

Data Collection

CBTRUS obtained incidence data from forty-seven population-based cancer registries that include cases of non-malignant (benign and uncertain) and malignant primary brain and central nervous system tumors. Data were requested for all primary malignant and non-malignant (benign or uncertain) brain and central nervous system (CNS) tumors newly diagnosed in years 2004-2006 at any of the following sites (ICD-O-3 topography codes in parentheses): brain (C71.0-C71.9), meninges (C70.0-C70.9), spinal cord, cranial nerves, and other parts of the central nervous system (C72.0-C72.9), pituitary and pineal glands (C75.1-C75.3), and olfactory tumors of the nasal cavity [C30.0 (9522-9523)].¹ Data were received without direct personal identifiers. Population data for each state/region were obtained from the SEER program website, which receives yearly population estimates from the U.S. Census Bureau.²

The National Program of Cancer Registries (NPCR) provided data on 152,966 primary brain and CNS tumors diagnosed in 2004-2006. NPCR cancer registries had to both agree to participate in the CBTRUS Statistical Report and to pass certain data quality standards required by NPCR in order for CBTRUS to receive the data.³ From the Surveillance, Epidemiology, and End Results (SEER) program limited-use dataset, data from cancer registries not included in the NPCR data were obtained and included 6,684 primary brain and CNS tumor case records diagnosed in 2004-2006. These data were combined into a single data set for analyses. A total of 1,203 records (0.75%) were deleted from the final data analyses because of invalid site/histology combinations based on a review by the CBTRUS consulting neuropathologist. In addition, 359 records (0.22%) were duplicate records and were deleted from the final data analyses. A total of 158,088 records from 47 population-based cancer registries were included in the final dataset.

Definition of Rates

Rates measure the occurrence of disease in a population. They are calculated by counting the observed numbers of cases of an event occurring in a defined population within a specified time period and dividing by the total

population at risk within the same time period. As an example, in this report the incidence of brain tumors in a state is calculated by adding the total number of newly diagnosed cases of brain tumors within that state for the years of interest and dividing by the state populations for the same years.

Incidence Rates measure the occurrence of newly diagnosed cases of disease. *Prevalence Rates* measure the number of people with a disease at a particular point in time or during a particular period of time. *Mortality Rates* quantify the number of people who have died from the disease. *Survival Rates* (percents) are the probability of surviving for a specified time period. *Relative Survival Rates* are defined as the observed probability of survival adjusted for the expected survival rate of the United States population for that age, gender, and calendar year. Rates in this report are expressed in units of *Person-Time* with each person-year reflecting one individual over one year. For cancer, rates are usually expressed per 100,000 person-years. The rate of disease in an entire population is the *Crude Rate*. Crude rates are frequently adjusted by age. *Age-Adjusted Rates* to a common standard population allows for comparisons of rates across regions with different age structures. Cancer rates in this report are adjusted to the *Year 2000 U.S. Standard Population*. Rates for a subset of a population are specific rates. *Age-Specific Rates* that describe the rate of disease in a defined age group are presented in this report. Specific rates by race, Hispanic origin, and gender are also reported. The variability around the estimates of rates is reflected in the standard error, which is incorporated into the formula for computing the confidence interval associated with a certain rate. A *Confidence Interval* is the computed interval with a given probability, e.g., 95 percent, that the true value of a variable such as a mean, proportion, or rate is contained within the interval. For example, the age-adjusted primary brain tumor incidence rate is 18.71 cases per 100,000 person-years. We can be 95 percent certain that the actual incidence rate is between 18.62 and 18.80 cases per 100,000 person-years.

In order to be able to compare incidence rates among statistical reports, agencies, or registries, one must determine whether the case definition, data collection, and rate calculation are similar by asking some of the following questions: How is an incident case defined? Are all primary malignant and non-malignant tumors included

in the analysis? Are only malignant tumors included in the analysis? What tumor locations (primary sites) are included in the analysis? Are lymphomas and hematopoietic neoplasms included in the incidence rates? Are the populations comparable? Are the incidence rates age-adjusted? And if so, to which standard population are they age-adjusted? Differences in case definition, data collection, methodology, analysis, and rate computation may prevent the direct comparison of published rates between sources.

Classification by Histology

The histology groupings used in this report were developed in collaboration with the CBTRUS consulting neuropathologist, Dr. Janet Bruner, of the University of Texas M.D. Anderson Cancer Center. These clinically relevant groupings are broadly based on the World Health Organization (WHO) categories for brain tumors.^{4,5} The list of ICDO-morphology codes included in each group is presented in Table 1. The classification scheme utilizes ICD-O-3 codes¹ and may include morphology codes that were not previously reported to CBTRUS.⁶ In Tables 1a and 1b, we present a list of malignant only and non-malignant only histologies, respectively. In this report, incidence rates are provided by histology and by major histology grouping.

Definition of Tumor Locations (Sites)

Various terms are used to describe the regions of the brain and central nervous system. The sites referred to in this report are broadly based on the categories and site codes defined in the SEER Site/Histology Validation List.⁷ Tumors include olfactory tumors of the nasal cavity in addition to brain tumors located in sites included in the standard definition from the Consensus Conference on Brain Tumor Definition for Registration.⁶ According to the standard definition from the Consensus Conference, reportable primary brain-related tumors (intracranial and central nervous system tumors) are all primary tumors, irrespective of histology and behavior, occurring in the following sites: meninges; brain; spinal cord, cranial nerves, other parts of the central nervous system, pituitary gland, craniopharyngeal duct, and pineal gland. As per the site definition outlined by the Consensus Conference on Brain Tumor Definition for Registration⁶, brain lymphomas coded to any of the brain or CNS site codes listed above are included in the CBTRUS report.

In this report, statistics by ICD-O-3 topography site are grouped in the following manner: The frontal lobe (ICDO site code C71.1), temporal lobe (C71.2), parietal lobe (C71.3), and occipital lobe (C71.4) are grouped together. Cerebrum (C71.0), ventricle (C71.5), cerebellum (C71.6), and brain stem (C71.7) are each grouped inde-

pendently. Overlapping lesion of the brain, as well as brain sites not otherwise specified (NOS), are defined by ICDO site codes C71.8-C71.9. The cranial nerve category (C72.2-72.5) includes the olfactory nerve, optic nerve, acoustic nerve, and other cranial nerves. The spinal cord (C72.0) and cauda equina (C72.1) are grouped together. Overlapping lesion of the brain and central nervous system, as well as nervous system sites not otherwise specified (NOS), are defined by ICDO site codes C72.8-C72.9. The meninges (C70.0-C70.9) include the cerebral meninges and spinal meninges. Pituitary tumors (C75.1-C75.2) include tumors located in the pituitary gland and craniopharyngeal duct. Pineal tumors (C75.3) include tumors located in the pineal gland. In this report, tumors located in the nasal cavity (C30.0) are olfactory tumors (defined by ICDO-3 morphology codes 9522-9523). For pediatric distributions, because of the small number of cases, olfactory tumors were grouped with other CNS tumors.

Estimation of Incidence and Mortality Rates

Incidence rates, means, and frequencies were calculated using SPSS and SEER*Stat statistical software.^{8,9} Statistics were not presented when fewer than 16 brain tumors were reported for the specific histology category. The suppressed cells were included in the counts and rates for the totals. Age-adjusted incidence rates and 95% confidence intervals for non-malignant and malignant tumors and age-adjusted incidence rates and 95% confidence intervals for selected histology groupings by gender, race, Hispanic origin (using the North American Association of Central Cancer Registries (NAACCR) Hispanic Identification Algorithm) and pediatric, young adult and adult age groups were estimated. CBTRUS includes statistics on pediatric age groups 0-14 years and 0-19 years. The 0-19 year age group includes tumors diagnosed in the adolescent 15-19 year age group, while the 0-14 year age group is more consistent with other tumor incidence publications.

Age-adjustment using the direct method was based on five-year age groupings and standardized to the Year 2000 U.S. standard population. Age-specific incidence rates by five-year age groups were also calculated. The age distribution of the 2000 U.S. standard population is shown in Table 2. Populations for the regions included in this report are shown in Tables 3 and 4. The number of incident tumors by gender, race, Hispanic origin, and histology are presented in Tables 5-8 for all ages and for children.

State incidence and mortality rates for malignant tumors from 2002-2006 were obtained from the most current Cancer Incidence in North America (CINA) Publication on the NAACCR website.¹⁰ These rates were adjusted using the 2000 U.S. standard population.

Differences in Brain Tumor Definition

NAACCR, NPCR, and SEER categorize brain tumors differently than CBTRUS. The definition of brain tumors used by NAACCR, NPCR, and SEER (in their published incidence and mortality statistics) includes tumors located in the brain, meninges, and other central nervous system tumors (C70.0-9, C71.0-9, and C72.0-9), but excludes lymphoma and leukemia morphologies (9590-9989) from all brain and central nervous system sites. NPCR and SEER include separate tables for malignant and non-malignant brain and CNS tumors reflecting the Consensus Conference definition in their respective publications: *United States Cancer Statistics Incidence and Mortality and Cancer Statistics Review*.¹¹ With the inclusion of non-malignant brain tumors, an increase in incidence rates for the following histology groups and subgroups may result: (groups) tumors of the cranial and spinal nerves; tumors of the sellar region; and (subgroups) unique astrocytoma variants; neuronal/glial, neuronal; meningioma; hemangioma.

The CBTRUS reports data on all tumor morphologies located within the Consensus Conference site definition including the leukemia and lymphoma morphologies (9590-9989) as well as including olfactory tumors of the nasal cavity [C30.0 (9522-9523)]. NAACCR, NPCR, and SEER include pilocytic astrocytomas, a tumor listed in the *WHO Classification of Tumours of the Central Nervous System*⁵ as having uncertain behavior, in their malignant brain tumor data and statistics. The CBTRUS has categorized pilocytic astrocytomas in the malignant tumor category to enhance comparability of rates, especially for comparison of childhood brain and CNS tumor rates. It is important to understand these differences in definition as they prevent the direct comparison of published rates. Please keep in mind that statistics for lymphomas and hematopoietic neoplasms contained in this report refer only to lymphomas and hematopoietic neoplasms of the brain and central nervous system.

The Benign Brain Tumor Cancer Registries Amendment Act (Public Law 107-260), requiring all cancer registries supported by the National Program of Cancer Registries to include the collection of tumors of benign and uncertain behavior (ICD-O-3 topography codes: 0 and 1), went into effect January 1, 2004. Standardization of brain tumor reporting occurred with the adoption of Uniform Data Standards (UDS) for non-malignant brain tumors in July 2003 for tumors diagnosed beginning in 2004. These issues were recognized by CBTRUS and by the National Coordinating Council for Cancer Surveillance and were actively addressed by the Brain Tumor Working Group. This Report utilizes data collected by state cancer registries utilizing the UDS for brain tumor collection as mandated in January 2004 and is the reason

why the years reported in the 2009-2010 CBTRUS Statistical Report are limited to those primary brain and central nervous system tumors diagnosed in the United States in 2004, 2005 and 2006. Future CBTRUS Reports will add new years of data and will eventually result in publications with 5 year increments, a standard surveillance reporting interval. CBTRUS will continue to share its expertise and to work cooperatively with the larger surveillance organizations and brain tumor clinicians and researchers to insure that primary brain tumors are collected and reported accurately and completely.

Estimation of Number of Cases and Number of Deaths

Estimated numbers of cases of malignant and non-malignant tumors were calculated using age-specific rates (CBTRUS 2004-2006 data). Population data for each state for 2010 were obtained from the U.S. Census Bureau website. The age-specific rate method was utilized to project malignant and non-malignant brain tumor incidence for 2010. The method involved the multiplication of the most recent age-sex-race-specific incidence rates for a group by the age-, sex-, race-specific population projections for that group. The age-, sex-, race-specific population projection for 2010 was obtained by modeling population growth as an exponential function of time. The population projection for new years was then made by extrapolation of the model using the census population estimates for 1990-2006.²

Estimated number of deaths for malignant tumors were obtained from the American Cancer Society publication, *Cancer Facts & Figures 2009*.¹² The source for its data was the U.S. Mortality Public Use Data Tapes, 1969-2006, from the National Center for Health Statistics.

Estimation of Survival Rates

SEER*Stat 6.5.2 statistical software was used to estimate one-through ten-year relative survival rates for primary malignant brain tumor cases diagnosed between 1995-2006 in seventeen SEER areas.⁸ This software utilizes life-table (actuarial) methods to compute survival estimates and accounts for current follow-up. The traditional cohort analysis of survival rates was utilized for the survival estimates presented in this report. Long-term cohort-based survival estimates reflect the survival experience of individuals diagnosed over the time period, often many years ago. Survival estimates were determined for brain (C71.0-C71.9), meninges (C70.0-C70.9), spinal cord, cranial nerves, and other parts of the central nervous system (C72.0-C72.9), pituitary and pineal glands (C75.1-C75.3), and olfactory tumors of the nasal cavity [C30.0 (9522-9523)]. Lymphomas and leukemias (morphology codes 9590-9989) and meningiomas (9530-

BRAIN TUMOR STATISTICS REPORT AND FIGURES

9539) are included from all brain and central nervous system sites. Second or later primary tumors, cases diagnosed at autopsy, cases in which race or sex is coded as other or unknown, and cases known to be alive but for whom follow-up time could not be calculated were excluded from the SEER data analyses.

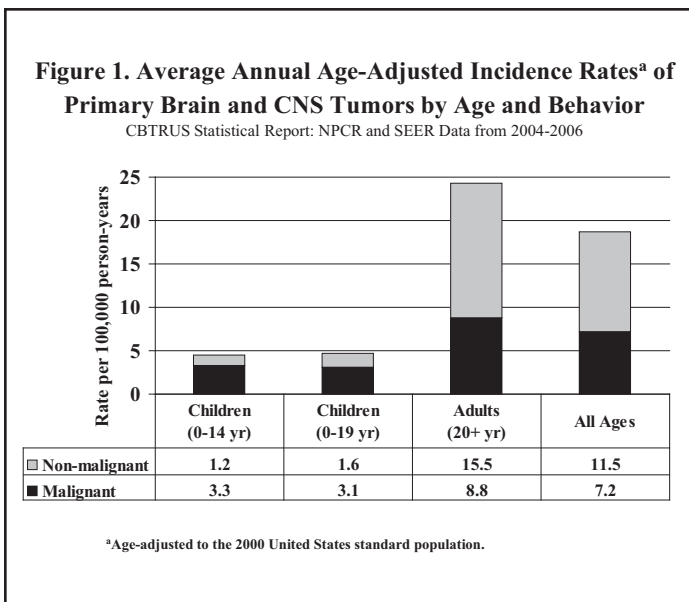
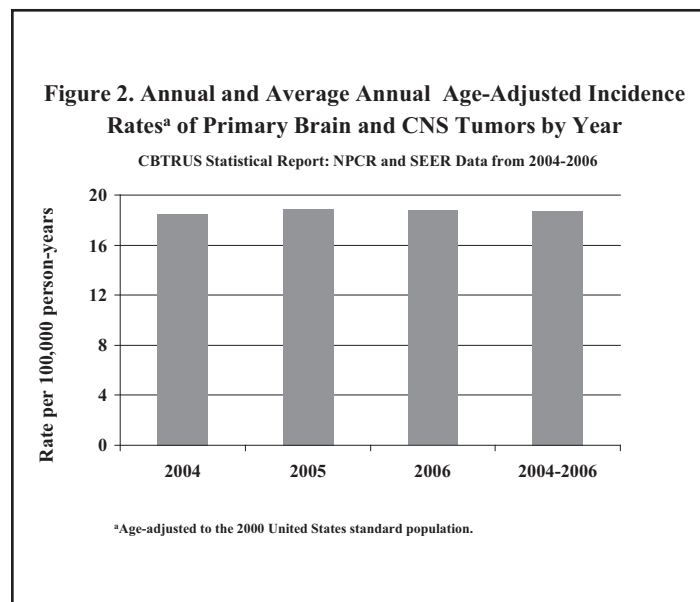
RESULTS

Primary Brain and CNS Tumors: Incidence by Cancer Registry, Behavior, and Age Distribution

The number of reported brain tumors is listed by cancer registry in Table 9. More than 158,000 tumors were reported to CBTRUS from a combined average annual population of 276.1 million that represents approximately 93% of the U.S. population. The overall percent of non-malignant tumors varied considerably by cancer registry (range: 49-71%). About sixty-eight percent of all tumors had a histologically confirmed diagnosis, with substantial regional variation (cancer registry range: 57-97%). Of the non-malignant brain tumors, 57% were histologically confirmed, while 39% were confirmed radiologically. Note: SEER includes pilocytic astrocytoma, a tumor of uncertain, not malignant, behavior in their malignant brain tumor data and statistics. CBTRUS has categorized pilocytic astrocytoma in the malignant tumor category to enhance comparability of incidence rates.

Overall Incidence

The overall incidence rate for 2004-2006 for primary



brain and CNS tumors was 18.71 per 100,000 person-years age-adjusted with the year 2000 US standard population. Seven percent of the cases were in individuals less than 20 years of age at the time of diagnosis and 93% were in individuals 20 years of age or older at the time of the diagnosis. The overall incidence rate was 4.71 per 100,000 person-years for children 0-19 years of age (4.57 per 100,000 person-years for children less than 15 years) and 24.35 per 100,000 person-years for adults (20+ years). The overall incidence rates of tumors by behavior and age group (0-19 years and 20+ years) are shown in Figure 1. Incidence rates by cancer registry, age group and behavior are presented in Table 10.

Overall Incidence Rates by Year

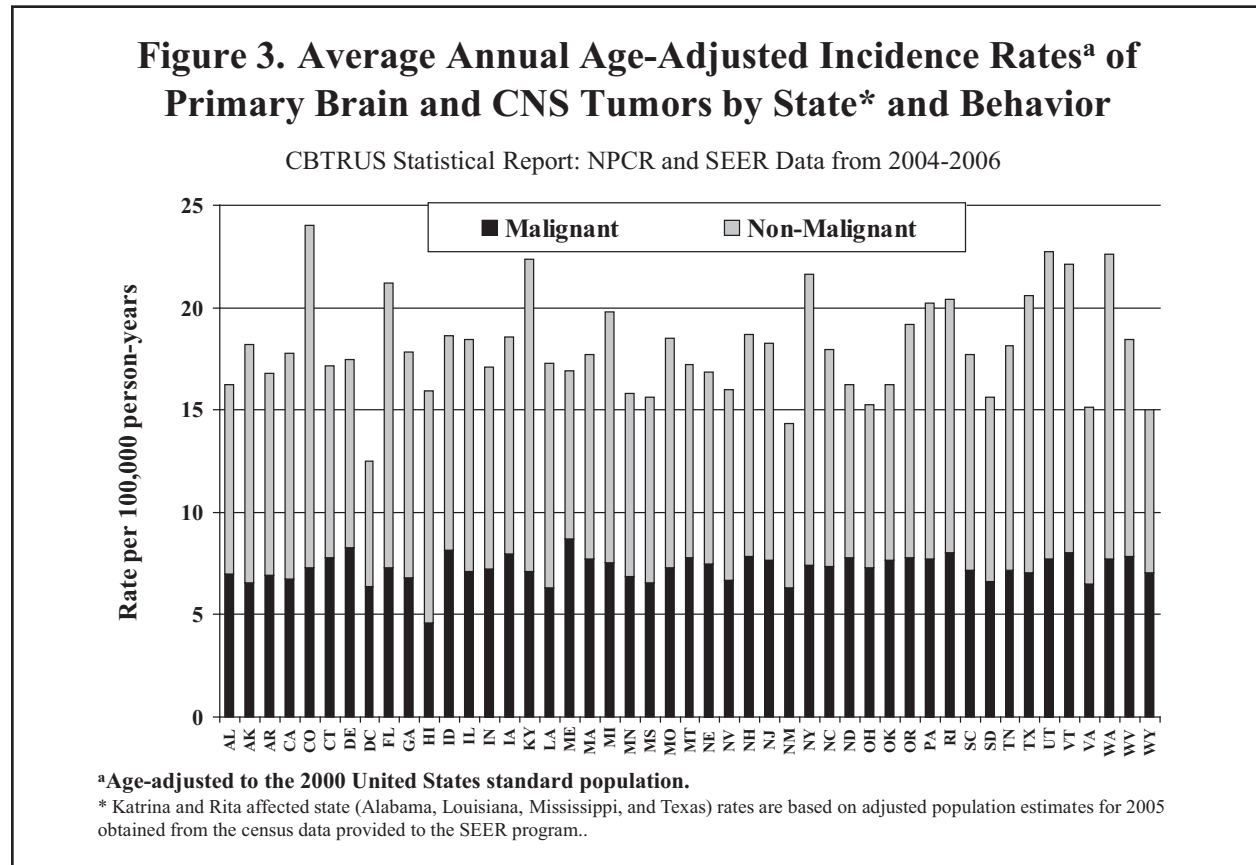
The overall incidence rates by calendar year did not differ overall or by behavior from 2004 though 2006 (Figure 2). In fact, there were no statistically significant trends in either malignant or non-malignant brain tumor incidence rates.

Incidence Rates by Cancer Registry, Age, and Behavior

The overall average annual incidence rate by cancer registry, age, and behavior are displayed in Table 10. The overall incidence rates of all primary brain and CNS tumors (malignant and non-malignant) for each individual cancer registry ranged from 12.48 to 24.02 per 100,000 person-years. In addition, the incidence rates of all primary non-malignant brain tumors ranged from 6.13 to 16.74 per 100,000 person-years and incidence rates of all primary malignant brain tumors ranged from 4.62 to 8.69 per 100,000 per-

son-years. Among adults 20 years of age and older, the cancer registry-specific incidence rates ranged from 8.60 to 22.79 per 100,000 person-years for non-malignant tumors and from 7.77 to 10.83 per 100,000 person-years for malignant tumors. For several cancer registries, the numbers of cases in those less than 20 years of age were too small to report; the highest reported incidence was 2.75 per 100,000 person-years for non-malignant tumors and 4.22 per 100,000 person-years for malignant tumors. There is less variation by cancer registry in malignant tumor incidence rates as compared to incidence rates for tumors of non-malignant behavior suggesting greater consistency in reporting of the malignant tumors and may be due, in part, to non-malignant brain tumor collection

cer registry variation shown in these figures and tables, especially in reported incidence rates for the non-malignant tumors, likely reflects differences in registry reporting practices including case ascertainment. An example of this is Colorado, which has the highest estimated incidence for brain tumors overall. Colorado also has one of the highest percentage of reported non-malignant brain tumors, as well as the lowest percentage of histologically confirmed tumors. Even before 2004, Colorado law required active collection of all primary brain and CNS tumors. The active collection of all brain tumors in Colorado results in a higher incidence rate compared to other registries, some of which did not follow these same reporting practices (Table 9). Standard-

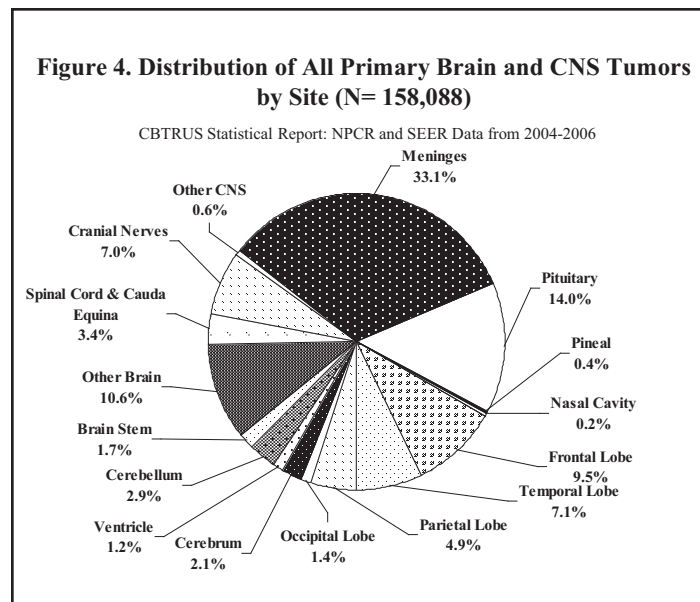


being a recent addition (2004) to some state registry’s workload.

The incidence rates by tumor behavior and cancer registry are also illustrated in Figure 3. The cancer registry incidence rates for the malignant tumors (cancer registry range: 4.62 to 8.69 per 100,000 person-years) are again seen as being much less variable than the reported incidence rates for the non-malignant tumors (cancer registry range: 6.13 to 16.74 per 100,000 person-years). The can-

ization of brain tumor collection and reporting will allow observation of the true variation in the incidence of brain tumors between states (see prior section, Differences in Brain Tumor Definition, for further details). Many non-malignant brain tumors are not histologically confirmed resulting in a lower percent of diagnostically confirmed tumors. A statistically significant negative correlation exists between the proportion of tumors with non-malignant behavior and the proportion of tumors diagnostically confirmed by cancer registry for the data

BRAIN TUMOR STATISTICS REPORT AND FIGURES



presented in Table 9. In general, cancer registries that have a higher proportion of non-malignant brain tumors also have fewer brain tumors that are histologically confirmed by surgery or biopsy.

Primary Brain and CNS Tumors: Incidence by Site, Histology, Gender, Race, Hispanic Origin, and Age

Distribution of Tumors by Site and Histology

The distribution of brain and CNS tumors by site is shown in Figure 4. The majority of tumors (33%) are located in the meninges. Twenty-three percent of tumors are located within the frontal, temporal, parietal, and occipital lobes of the brain. Cerebrum, ventricle, cerebellum, and brain stem tumors account for 2%, 1%, 3%, and 2% of all tumors, respectively. The cranial nerves and the spinal cord/cauda equina account for 7% and 3% of all tumors, respectively. Together, the pituitary and pineal glands account for about 14% of tumors. Olfactory tumors of the nasal cavity account for less than 1% of tumors.

The distribution by brain and CNS histology is shown in Figure 5. The most frequently reported histology is the predominately non-malignant meningioma, which accounts for almost 34% of all tumors, followed by glioblastoma (17%). The predominately non-malignant pituitary and nerve sheath tumors account for 13% and 9% of all tumors, respectively. Acoustic neuromas (defined by ICD-O-3 site code C72.4 and histology code 9560) account for 62% of all nerve sheath tumors.

Gliomas are tumors that arise from glial cells, and include astrocytoma, glioblastoma, oligoden-

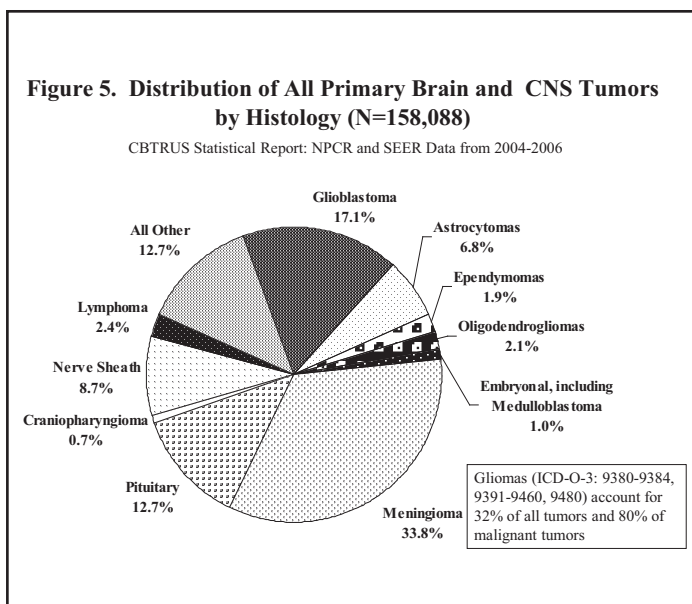
droglioma, ependymoma, mixed glioma, malignant glioma NOS, and a few more rare histologies. In this report, glioma is defined by the ICD-O-3 histology codes 9380-9384, 9391-9460, and 9480. The broad category glioma represents 32% of all tumors (Figure 5). The distribution of tumors by site for glioma is shown in Figure 6. Sixty-one percent of gliomas occur in the four lobes of the brain.

The distribution by specific histology for glioma is illustrated in Figure 7. Glioblastoma accounts for the majority of gliomas, while astrocytoma and glioblastoma combined account for about three-quarters of gliomas.

Although spinal cord and cauda equina tumors account for a small percentage of all brain and CNS tumors (3%), these tumors result in significant morbidity. The most prevalent histologies found in the spinal cord/cauda equina are presented in Figure 8 for both children (0-19 years) and adults (20+ years).

Distribution of Tumors by Site and Histology in Young Adults (Aged 20-34 Years)

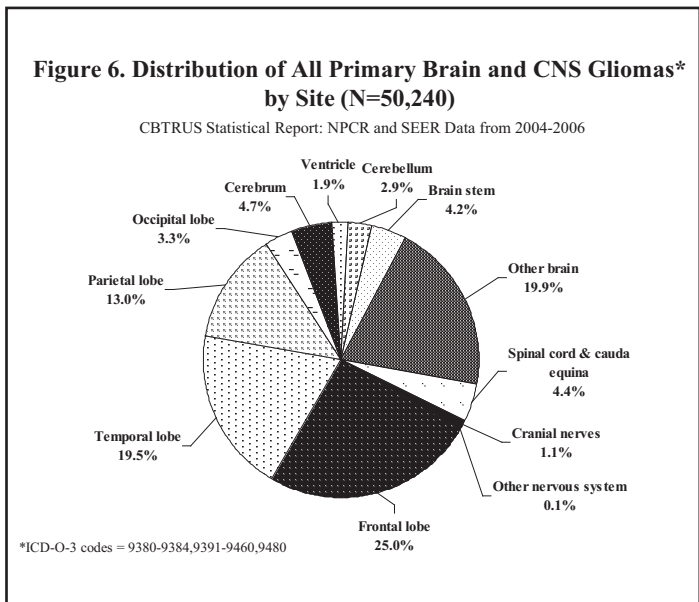
Eight percent of brain and CNS tumors occurred in persons between the ages of 20-34 years. The distribution of all brain tumors by site for young adults is shown in Figure 9. The majority of tumors (28%) in young adults (ages 20-34 years) are located within the frontal, temporal, parietal, and occipital lobes of the brain. Cerebrum, ventricle, cerebellum, and brain stem tumors account for 2%, 3%, 5%, and 3% of all young adult tumors, respectively. Tumors of the meninges represent 14% of all young adult



tumors, while the cranial nerves and the spinal cord/cauda equina each account for 7% and 6% of all young adult tumors, respectively. The pituitary and pineal glands account for about 29% of young adult tumors. The distribution by histology for young adults (ages 20-34 years) is shown in Figure 9. The most frequently reported histologies are the predominately non-malignant tumors pituitary (25%) and meningioma (14%). Astrocytic tumors (including glioblastoma and astrocytoma), as a group, account for 18% of all young adult tumors. The predominately non-malignant nerve sheath tumors account for 10% of all young adult tumors. The broad category glioma accounts for 34% of tumors in young adults.

Incidence Rates by Site and Gender

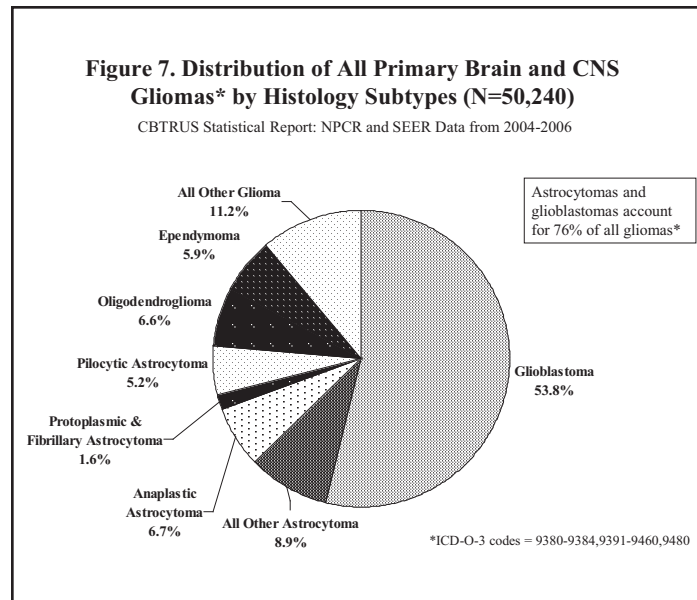
Incidence rates for brain and CNS tumors by site are provided in Table 11. Males accounted for 43% of the cases and females for 57% of the cases. Incidence rates were highest for tumors located in the meninges (6.15 per 100,000 person-years), followed by tumors located in the four lobes of the brain, pituitary, other areas of the brain, cranial nerves, spinal cord/cauda equina, cerebellum, cerebrum, brain stem, ventricle, other nervous system, and pineal gland. Incidence rates were lowest for olfactory tumors of the nasal cavity (0.04 per 100,000 person-years). By gender, incidence rates were statistically significantly higher in females than in males for tumors located in the meninges and in the pituitary. Males had higher or similar incidence rates compared to females for all other sites.



Incidence Rates by Major Histology Groupings and Specific Histologies

Incidence rates by major histology groupings are provided (Tables 12-19). Among major histology groupings, incidence rates were highest for tumors of the meninges (6.52 per 100,000 person-years), followed by tumors of the neuroepithelial tissue (6.46 per 100,000 person-years), tumors of the sellar region (2.54 per 100,000 person-years) and tumors of the cranial and spinal nerves (1.61 per 100,000 person-years) (Table 12).

Incidence rates also varied by specific brain and CNS histology (Table 12). Incidence rates were highest for meningiomas (6.29 per 100,000 person-years), glioblastomas (3.17 per 100,000 person-years), pituitary tumors (2.40 per 100,000 person-years), and nerve sheath tumors (1.61 per 100,000 person-years). The incidence rate of the overall category glioma was 5.97 per 100,000 person-years, a major contributor to the magnitude of the neuroepithelial tissue rate. Acoustic neuromas (0.99 per 100,000 person-years) comprise the majority (62%) of nerve sheath tumors (1.61 per 100,000 person-years). These tumors are included under tumors of cranial and spinal nerves according to the CBTRUS grouping scheme. Acoustic neuromas account for 5% of all primary brain and CNS tumors.

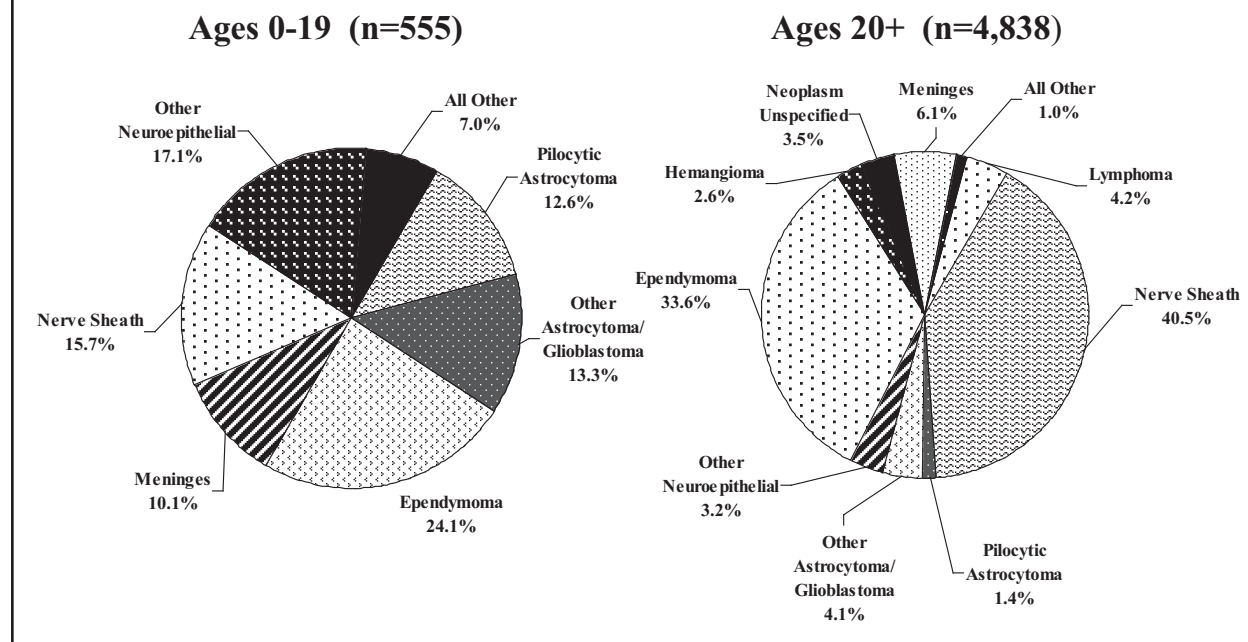


Incidence Rates by Behavior and Histology

Brain and CNS tumor incidence rates by behavior (malignant and non-malignant) are presented in Table 12a. For those with malignant behavior, the incidence rate was highest for glioblastoma (3.17 per 100,000 person-years) followed by lymphoma (0.46 per 100,000 person-years). Menin-

Figure 8. Distribution of Primary Spinal Cord and Cauda Equina Tumors by Histology

CBTRUS Statistical Report: NPCR and SEER Data from 2004-2006



glioma (6.14 per 100,000 person-years), pituitary (2.39 per 100,000 person-years), and nerve sheath (1.60 per 100,000 person-years) tumors were the non-malignant histologies with the highest incidence rates.

Incidence Rates by Gender and Histology

Incidence rates by histology and gender are presented in Table 13. Incidence rates for all primary brain and CNS tumors combined are higher among females (19.88 per 100,000 person-years) than males (17.44 per 100,000 person-years). The difference between these incidence rates is statistically significant. Incidence rates for tumors of the neuroepithelial tissue are 1.4 times greater in males as compared to females, while tumors of the meninges are 2.2 times greater in females as compared to males. The incidence rate of gliomas is higher in males (7.10 per 100,000 person-years) than in females (5.01 per 100,000 person-years). Similar patterns were found for individual histologies, with incidence rates higher in males, especially for germ cell tumors, most glial tumors, lymphomas, and embryonal/ primitive/medulloblastomas, or comparable between males and females, with the notable exception of meningiomas and pituitary tumors, which are more common in women. Incidence rate ratios (male:female) for selected histologies are shown in Figure 10.

Incidence Rates by Race and Histology

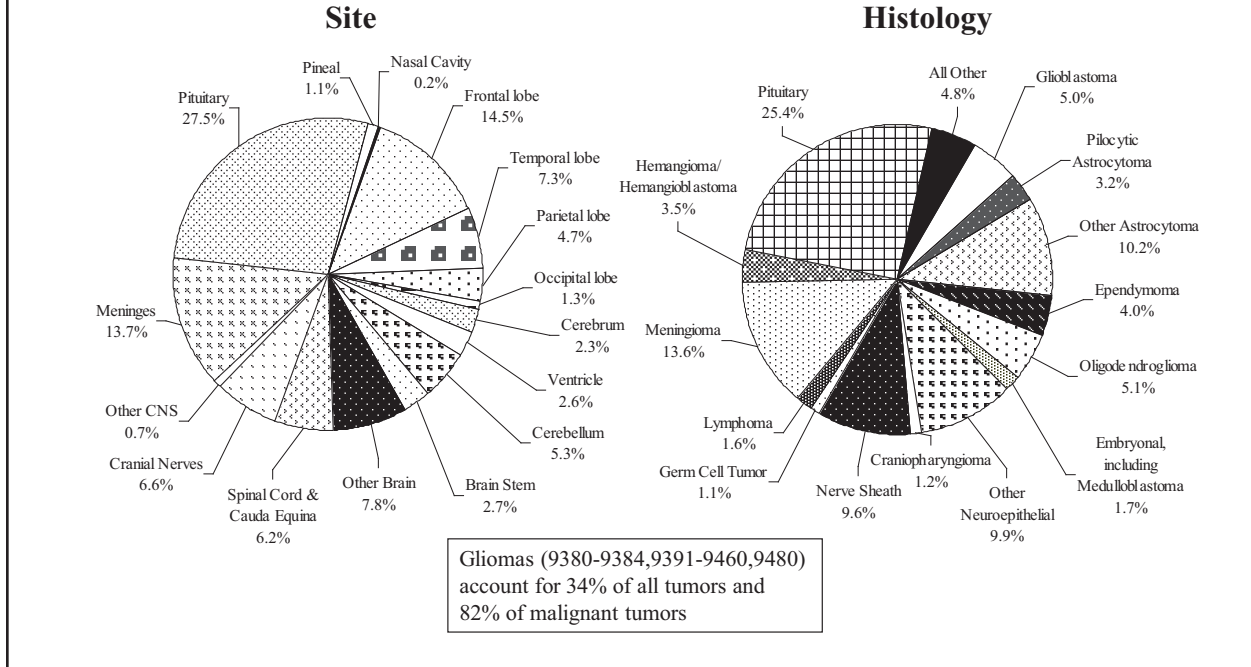
Incidence rates by race and histology are shown in Table 14. Whites accounted for 85% and blacks for 10% of cases. Incidence rates for all primary brain and CNS tumors combined are higher among whites (18.89 per 100,000 person-years) than blacks (17.14 per 100,000 person-years). The difference between these incidence rates is statistically significant. Incidence rates for mixed gliomas, nerve sheath tumors, oligodendrogliomas, protoplasmic and fibrillary astrocytomas, anaplastic astrocytomas, and glioblastomas are two or more times greater in whites than in blacks. In contrast, incidence rates for meningiomas, pituitary tumors, craniopharyngiomas, and neoplasm, unspecified are significantly higher among blacks than whites. Incidence rate ratios (white:black) for selected histologies are shown in Figure 11.

Incidence Rates by Hispanic Origin, Race, and Histology

Incidence rates by Hispanic origin, race, and histology are shown in Table 15. Nine percent of tumors were in persons of Hispanic origin using the North American Association of Central Cancer Registries Hispanic Identification Algorithm, version 2, data element to indicate Hispanic ethnicity. This variable utilizes a combination of cancer registry data fields (such as birthplace, race, and

Figure 9. Distribution of Primary Brain and CNS Tumors by Site and Histology Among Young Adults (Ages 20-34) (N=13,414)

CBTRUS Statistical Report: NPCR and SEER Data from 2004-2006



surnames) to directly and indirectly classify cases as Hispanic or non-Hispanic for analytical purposes.

The overall incidence rate for primary brain and CNS tumors among Hispanics is 17.73 per 100,000 person-years and among non-Hispanics is 18.88 per 100,000 person-years (Table 15). The difference between these two incidence rates is statistically significant. White non-Hispanics (19.13 per 100,000 person-years) have statistically significantly higher incidence rates than white-Hispanics (17.65 per 100,000 person-years), and black non-Hispanics (17.36 per 100,000 person-years).

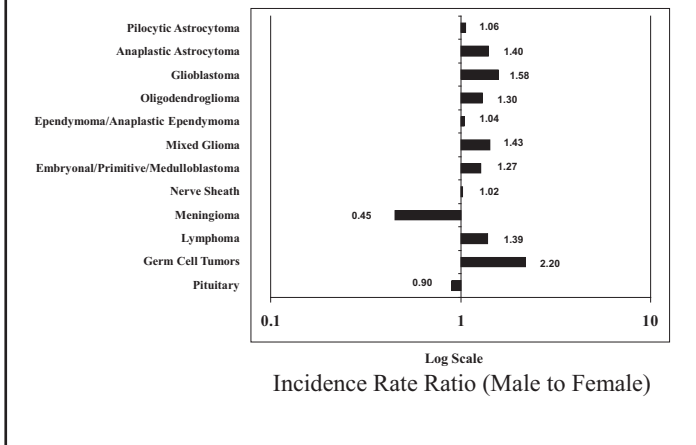
Incidence Rates by Age and Histology

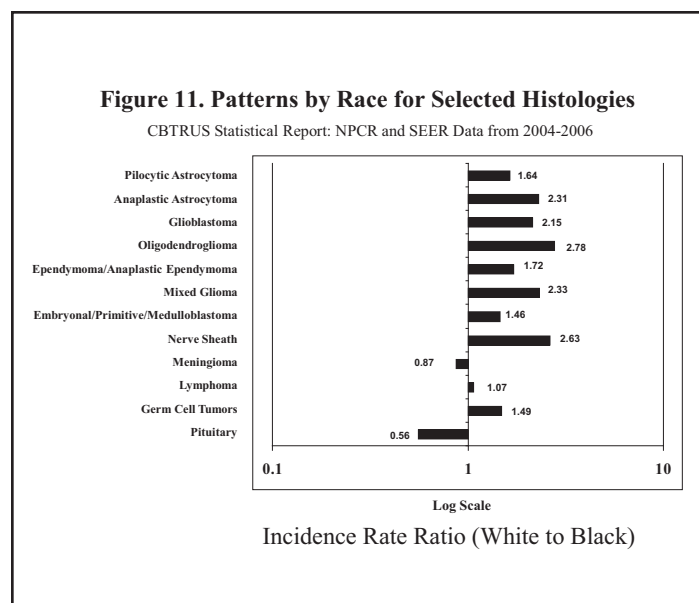
The age-specific incidence rates by histology are presented in Table 16. The incidence for all brain and CNS tumors is highest among the 75-84 year olds (65.50 per 100,000 person-years) and lowest among children less than 20 years (4.71 per 100,000 person-years). However, the age distributions differ by histology as shown in Table 16. Note: The 0-14 year age category found in Tables 16 and 19, and in Figures 1, 12, and 14 is a standard age category for childhood cancer used by some cancer surveillance organizations and has been included in this report for consistency. The

incidence of pilocytic astrocytoma, germ cell tumors, and medulloblastoma are higher in the younger age groups and decrease with age. This is in contrast to the incidence rate of meningioma, which increases progressively with age. Most other tumors, such as glioblastoma and pituitary tumors, increase with age until the incidence begins

Figure 10. Patterns by Gender for Selected Histologies

CBTRUS Statistical Report: NPCR and SEER Data from 2004-2006





to decline again at the oldest ages. Age-specific incidence rates for selected histologies are shown in Figure 12.

The most common brain and CNS tumor by age at occurrence are shown in Figure 13. The histologic-specific differences in brain and central nervous system tumor distribution by age, gender, race, and Hispanic origin suggest that these tumors have different causes.

Childhood Primary Brain and CNS Tumors: Incidence by Site, Histology, Gender, and Age

Childhood Brain Tumors

Brain tumors are the second most common malignancy among children, leukemias as a group being the most common.¹³⁻¹⁴ Brain tumors are the most common form of solid tumors in children.¹³ About 7% of all reported primary brain tumors occurred in persons under the age of 20 years.

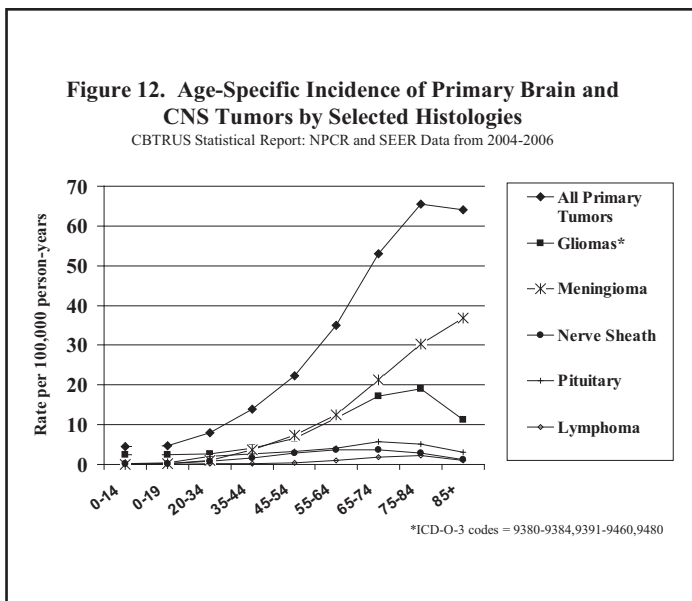
Distribution of Tumors by Site and Histology

The distribution of brain and CNS tumors by site is shown in Figure 14. The largest percentage of childhood tumors (17%) are located within the frontal, temporal, parietal, and occipital lobes of the brain. Cerebrum, ventricle, cerebellum, and brain stem tumors account for 6%, 6%, 16%, and 11% of all childhood tumors, respectively. Other tumors of the brain account for 14% of all childhood tumors. Tumors of the meninges represent 3% of all childhood tumors. The cranial nerves and the spinal cord/cauda equina account for 7% and 5% of all childhood tumors, respectively. The pituitary and pineal glands, together, account for about 15% of all childhood tumors.

The most common brain and CNS histologies in the younger age group (ages 0-14 years) include pilocytic astrocytomas, malignant glioma, NOS, and embryonal tumors (medulloblastomas), which account for 19%, 14%, and 13%, respectively, of all brain tumors in children in this age group (Figure 15). The broad category glioma accounts for 55% of tumors in children less than 15 years of age. The most common histologies in adolescents ages 15-19 years include pituitary tumors and pilocytic astrocytomas, which account for 21% and 12%, respectively, of all brain tumors in that age group (Figure 15). The broad category glioma accounts for 40% of tumors in adolescents aged 15-19 years.

Childhood Incidence Rates by Histology and Gender

The incidence of the most common childhood tumors is shown in Table 17. The overall incidence rate for childhood brain and CNS tumors (ages 0-19 years) is 4.71 per 100,000 person-years. Among major histology groupings, incidence rates were highest for tumors of the neuroepithelial tissue (3.32 per 100,000 person-years). Pilocytic astrocytoma (0.80 per 100,000 person-years), malignant glioma, not otherwise specified (0.53 per 100,000 person-years), and medulloblastoma (0.49 per 100,000 person-years) are the most common individual histologies. Among the younger population, all brain tumors are slightly more common in boys; however, embryonal tumors are more common and germ cell tumors more than twice as common in boys compared to girls (Table 17). Alternatively, the incidence of pituitary tumors is almost three times as large in females compared to males. The differences in incidence



rates between boys and girls for embryonal, germ cell, and pituitary tumors are statistically significant. The small numbers for some tumors require caution when interpreting and comparing incidence rates.

Childhood Incidence Rates by Race and Gender

Among the younger population (ages 0-19 years), brain and CNS tumors are more common in whites (4.89 per 100,000 person-years) than in blacks (3.57 per 100,000 person-years) (Table 18). This difference in incidence rates between the two races is statistically significant. Among both whites and blacks, incidence rates are not statistically different between boys and girls.

Childhood Incidence Rates by Age and Histology

The age-specific incidence rates by histology for children are displayed in Table 19. The incidence for all brain and CNS tumors is highest among 0-4 year olds (5.13 per 100,000 person-years) and lowest among 10-14 year olds (4.22 per 100,000 person-years). However, the different histologies have different age distributions. The incidences of pilocytic astrocytoma, malignant glioma NOS, and medulloblastoma in children decrease with age. The incidence of germ cell tumors among children peaks in the 10-14 year age group. Age-specific incidence rates for selected histologies are shown in Figure 16. The most common childhood brain and CNS tumor by age at occurrence are shown in Figure 13. The histology-specific differences in brain and central nervous system tumor distribution by age, gender, and race suggest that these childhood tumors have different causes.

Figure 13. Most Common Brain and CNS Tumors by Age

CBTRUS Statistical Report: NPCR and SEER Data from 2004-2006

Age (yr)	Most Common Histology	Second Most Common Histology
0-4	Embryonal/medulloblastoma	Pilocytic astrocytoma
5-9	Pilocytic astrocytoma	Malignant glioma, NOS
10-14	Pilocytic astrocytoma	Neuronal/glial
15-19	Pituitary	Pilocytic astrocytoma
20-34	Pituitary	Meningioma
35-44	Meningioma	Pituitary
45-54	Meningioma	Glioblastoma
55-64	Meningioma	Glioblastoma
65-74	Meningioma	Glioblastoma
75-84	Meningioma	Glioblastoma
85+	Meningioma	Neoplasm, unspecified

Primary Malignant Brain Tumor Rates: Incidence, Mortality, Estimated Cases and Deaths, and Survival

Incidence and Mortality Rates for Malignant Brain Tumors by State and Gender

Incidence and mortality rates for primary malignant brain tumors by state were obtained from the most recent NAACCR Cancer Incidence in North America publication¹⁰ and are shown in Table 20. These rates are adjusted using the 2000 U.S. standard population. The 2002-2006 mortality rates by gender are available for all 50 states and the District of Columbia. Incidence rates for malignant brain tumors were available for most states from the same time period with a few exceptions. Incidence statistics for the United States as a whole include data from 52 central cancer registries (46 states, 5 metropolitan areas, and the District of Columbia) covering 91% of the United States population.

Estimated Numbers of Cases of All Primary Brain Tumors by State

The estimated numbers of cases of all primary brain and CNS tumors and of all malignant brain and CNS tumors by state for 2010 are shown in Table 21. The estimated numbers of cases of malignant and non-malignant tumors by state were calculated using NPCR and SEER CBTRUS-modified age-specific incidence rates (2004-2006) and population projections for each state. The total number of new cases of primary brain tumors for all 50 states and the District of Columbia in 2010 is estimated to be 62,930 with 23,720 being malignant and 39,210 being non-malignant.

Figure 14. Distribution of All Childhood (Ages 0-19 years) Primary Brain and CNS Tumors by Site (N=10,776)

CBTRUS Statistical Report: NPCR and SEER Data from 2004-2006

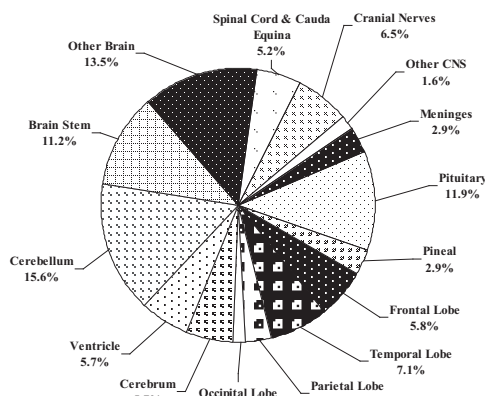
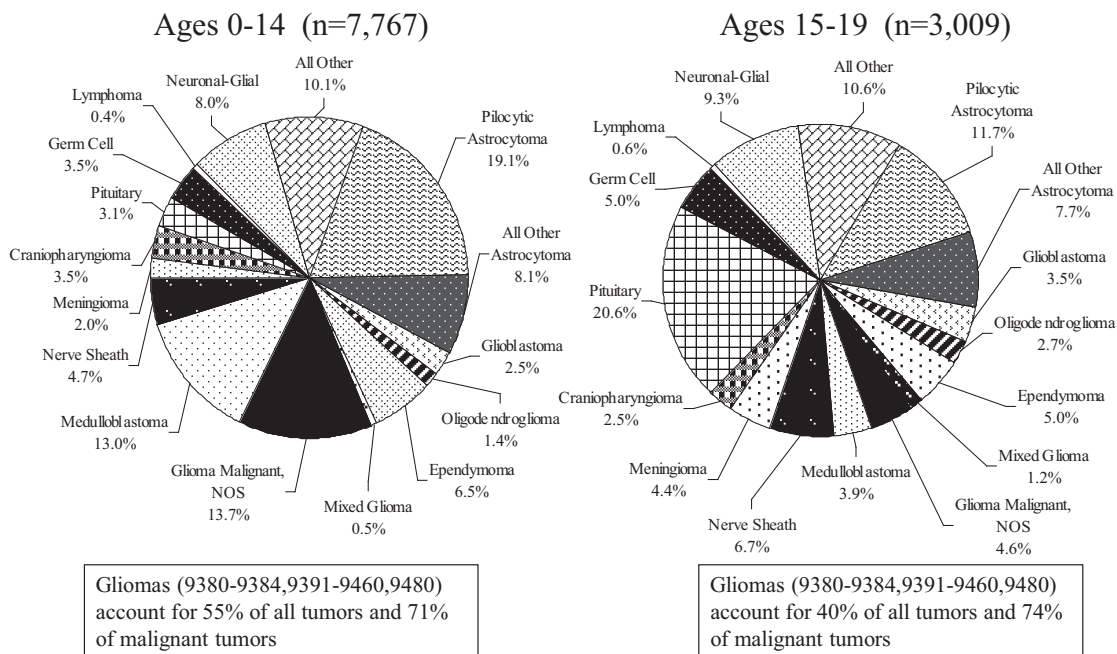


Figure 15. Distribution of Childhood Primary Brain and CNS Tumors by Histology

CBTRUS Statistical Report: NPCR and SEER Data from 2004-2006



Estimated Numbers of Deaths for Malignant Brain Tumors by State

The estimated numbers of deaths for primary malignant brain tumors by state for 2009 are shown in Table 21. The estimated numbers of deaths for malignant tumors were obtained from the American Cancer Society publication, Cancer Facts & Figures 2009.¹² The total number of primary malignant brain tumor deaths for all 50 states and the District of Columbia in 2009 is estimated to be 12,920.

Survival Rates for Malignant Brain Tumors by Tumor Location (Site) and Gender

Survival estimates by brain and CNS tumor location (site) and gender are presented in Table 22. Patients diagnosed between 1995 and 2006 with tumors in the cerebrum, the frontal, temporal, parietal, and occipital lobes of the brain, and other brain have five-year survival rates less than 30%. Patients with tumors in the cranial nerves, spinal cord/cauda equina, pituitary and pineal glands, nasal cavity, and cerebellum have five-year survival rates equal to or greater than 70%. For most tumor locations, females have slightly better survival, although survival is much higher in females with tumors of the meninges than males. Males

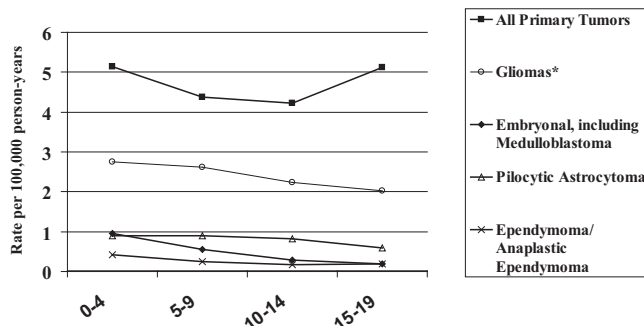
have slightly better five-year survival than females for tumors of the brain stem, and pineal glands.

Survival Rates for Malignant Brain Tumors by Histology and Age

Survival estimates for malignant brain tumors by his-

Figure 16. Age-Specific Incidence of Childhood Primary Brain and CNS Tumors by Selected Histologies

CBTRUS Statistical Report: NPCR and SEER Data from 2004-2006



*ICD-O-3 codes = 9380-9384,9391-9460,9480

tology and age at diagnosis are presented in Tables 23 and 24. The one-through ten-year relative survival rates by histology are shown in Table 23. The estimated five- and ten-year relative survival rates for malignant brain tumors are 35.1% and 31.5%, respectively. However, there is a large variation in survival estimates among tumor histologies (Table 23). Five-year survival rates are 94% for pilocytic astrocytomas but are less than 5% for glioblastomas. Survival generally decreases with older age at diagnosis (Table 24). Children and young adults have better survival for most histologies.

Histology-Specific Summary Information

The information presented in these tables can be synthesized to describe specific histologies. As an example we have chosen the two most common histologies, meningiomas and glioblastomas. Meningiomas are the most frequently reported tumor and account for more than 33% of tumors reported to CBTRUS (Table 12). Ninety-eight percent of meningiomas reported to CBTRUS had a non-malignant behavior code. Of the non-malignant meningiomas, 53% were histologically confirmed, while 45% were radiologically confirmed. Meningiomas are more common in older adults (Table 12) and are uncommon in children. The incidence of meningiomas increases with increasing age. The rates for meningiomas increase dramatically after age 65 and continue to be high even among the population aged 85 and older (Table 16). Meningiomas are more than twice as common in females as compared to males (Table 13). The incidence in meningiomas is significantly higher in blacks than whites (Table 14). Only malignant meningiomas are reported in the SEER database and survival estimates were not generated. Information about meningioma survival estimates was obtained from a manuscript that used the National Cancer Data Base and showed the overall five-year survival rate for meningioma to be 69% (70% for benign and 55% for malignant).¹⁵

Glioblastomas (GBMs) are the second most frequently reported histology and the most common malignancy. They account for 17% of all primary brain tumors (Table 12). Glioblastomas are more common in older adults (Table 12) and are uncommon in children. Glioblastomas comprise approximately 3% of all tumors reported among 0-19 year olds (Table 17). The incidence of glioblastomas increases with increasing age. The rates for glioblastomas are highest in 75 to 84 years olds (Table 16). Glioblastomas are 1.6 times more common in males than females (Table 13). Glioblastomas are over two times higher among whites as compared to blacks (Table 14). The relative survival estimates for glioblastoma are quite low; less than 5% of patients diagnosed between 1995 and 2006 survived five-years post diagnosis (Table 23).

Glioblastoma survival estimates are somewhat higher for the small number of patients who are diagnosed under age 20 (Table 24).

SUMMARY

These data present an updated summary (2004-2006) of the incidence of all primary malignant and non-malignant brain and central nervous system tumors collected and reported by 47 population-based cancer registries in the United States. The overall incidence rate was 18.71 per 100,000. The incidence rates were higher in females, and Caucasians, and increased with age. These data serve as a useful resource to clinicians, researchers, and patient families.

GLOSSARY

- ACS—American Cancer Society
- CBTRUS—Central Brain Tumor Registry of the United States
- CNS—central nervous system
- IARC—International Agency for Research on Cancer
- ICD-O-3—International Classification of Diseases for Oncology, Third Edition
- NAACCR—North American Association of Central Cancer Registries
- NCDB—National Cancer Data Base
- NOS—not otherwise specified
- NPCR—National Program of Cancer Registries
- SEER—Surveillance, Epidemiology and End Results
- UDS—Uniform Data Standards
- WHO—World Health Organization

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TABLE 1: CBTRUS BRAIN AND CENTRAL NERVOUS SYSTEM TUMOR HISTOLOGY GROUPINGS, 2009 REVISION^a

Histology	ICDO-3^b Histology Code
<u>Tumors of Neuroepithelial Tissue</u>	
Pilocytic astrocytoma	9421
Protoplasmic & fibrillary astrocytoma	9410, 9420
Anaplastic astrocytoma	9401, 9411
Unique astrocytoma variants	9383, 9384, 9424
Astrocytoma, NOS	9400
Glioblastoma	9440, 9441, 9442/3 ^d
Oligodendroglioma	9450
Anaplastic oligodendroglioma	9451, 9460
Ependymoma/anaplastic ependymoma	9391, 9392, 9393
Ependymoma variants	9394
Mixed glioma	9382
Glioma malignant, NOS	9380
Choroid plexus	9390
Neuroepithelial	9381, 9423, 9430, 9444
Non-malignant and malignant neuronal/glial, neuronal and mixed	8680,8681, 8682, 8690, 8693, 9412, 9413, 9442/1 ^e , 9490, 9491, 9492, 9493, 9500, 9505, 9506, 9522, 9523
Pineal parenchymal	9360, 9361, 9362
Embryonal/primitive/medulloblastoma	8901 ^c , 8921 ^c , 8963, 9363, 9364, 9470, 9471, 9472,9473, 9474, 9501, 9502, 9503, 9508
<u>Tumors of Cranial and Spinal Nerves</u>	
Nerve sheath, non-malignant and malignant	9540, 9541, 9550, 9560, 9561, 9570, 9571
Other tumors of cranial and spinal nerves	9562
<u>Tumors of Meninges</u>	
Meningioma	9530, 9531, 9532, 9533, 9534, 9537, 9538, 9539
Other mesenchymal, non-malignant and malignant	8324, 8728, 8800, 8801, 8802, 8803, 8804, 8805, 8806, 8810, 8815, 8824, 8830, 8831, 8850, 8851, 8852 ^c , 8854 ^c , 8857, 8861, 8870 ^c , 8890, 8897, 8900, 8910, 8920, 8990, 9040, 9150, 9170 ^c , 9180, 9210, 9241, 9260, 9480, 9536 ^c
Hemangioblastoma	9161, 9535
<u>Lymphomas and Hemopoietic Neoplasms</u>	
Lymphoma	9590, 9591, 9596, 9650, 9651, 9652, 9653, 9654, 9655, 9659, 9661, 9662, 9663, 9664, 9665, 9667, 9670, 9671, 9673, 9675, 9680, 9684, 9687, 9690, 9691, 9695, 9698, 9699, 9701, 9702, 9705, 9714, 9719, 9727, 9728, 9729, 9731, 9733, 9734, 9740, 9741, 9750, 9755, 9756, 9757, 9758, 9766, 9826 ^c , 9827, 9860 ^c , 9861, 9930, 9970
<u>Germ Cell Tumors and Cysts</u>	
Germ cell tumors, cysts and heterotopias	8020, 8440 ^c , 9060, 9061, 9064, 9065, 9070, 9071, 9072, 9080, 9081, 9082, 9083, 9084, 9085, 9100
<u>Tumors of Sellar Region</u>	
Pituitary	8022, 8040, 8140, 8146, 8190, 8202 ^c , 8240 ^c , 8246, 8260, 8270, 8271, 8272, 8280, 8281, 8290, 8300, 8310, 8320, 8323, 8333, 8334, 8341, 9582
Craniopharyngioma	9350, 9351, 9352
<u>Local Extensions from Regional Tumors</u>	
Chordoma/chondrosarcoma	8711 ^c , 9220, 9231, 9240, 9370, 9371, 9372, 9373
<u>Unclassified Tumors</u>	
Hemangioma	9120, 9121, 9122, 9123, 9125, 9130, 9131, 9133, 9140
Neoplasm, unspecified	8000, 8001, 8002, 8003, 8004, 8005, 8010, 8013, 8021
All other	8452 ^c , 8683, 8720, 8811, 8840, 8860, 8896, 8980, 9173, 9580, 9751, 9752, 9753, 9754, 9823, 9837, 9866

^aIncludes all the histologies listed in the standard definition of reportable brain tumors from the Consensus Conference on Brain Tumor Definitions.

^bInternational Classification of Diseases for Oncology, 3rd Edition, 2000. World Health Organization, Geneva, Switzerland.

^cHistologies added in the 2009 revision of the CBTRUS histology grouping scheme as compared to the previous versions.

^dMorphology 9442/3 only.

^eMorphology 9442/1 only.

TABLES

TABLE 1A: CBTRUS BRAIN AND CENTRAL NERVOUS SYSTEM TUMOR MALIGNANT HISTOLOGIES^a

Histology	ICDO-3^b Histology Code
<u>Tumors of Neuroepithelial Tissue</u>	
Pilocytic astrocytoma	9421/1 [Included with malignant tumors]
Protoplasmic & fibrillary astrocytoma	9410/3, 9420/3
Anaplastic astrocytoma	9401/3, 9411/3
Unique astrocytoma variants	9424/3
Astrocytoma, NOS	9400/3
Glioblastoma	9440/3, 9441/3, 9442/3
Oligodendroglioma	9450/3
Anaplastic oligodendroglioma	9451/3, 9460/3
Ependymoma/anaplastic ependymoma	9391/3, 9392/3, 9393/3
Mixed glioma	9382/3
Glioma malignant, NOS	9380/3
Choroid plexus	9390/3
Neuroepithelial	9381/3, 9423/3, 9430/3
Non-malignant and malignant neuronal/glial, neuronal and mixed	8680/3, 8693/3, 9490/3, 9500/3, 9505/3, 9522/3, 9523/3
Pineal parenchymal	9362/3
Embryonal/primitive/medulloblastoma	8901/3, 8921/3, 8963/3, 9364/3, 9470/3, 9471/3, 9472/3, 9473/3, 9474/3, 9501/3, 9502/3, 9503/3, 9508/3
<u>Tumors of Cranial and Spinal Nerves</u>	
Nerve sheath, non-malignant and malignant	9540/3, 9560/3, 9561/3, 9571/3
<u>Tumors of Meninges</u>	
Meningioma	9530/3, 9538/3, 9539/3
Other mesenchymal, non-malignant and malignant	8728/3, 8800/3, 8801/3, 8802/3, 8803/3, 8804/3, 8805/3, 8806/3, 8810/3, 8815/3, 8830/3, 8850/3, 8851/3, 8852/3, 8854/3, 8857/3, 8890/3, 8900/3, 8910/3, 8920/3, 8990/3, 9040/3, 9150/3, 9170/3, 9180/3, 9260/3, 9480/3
<u>Lymphomas and Hemopoietic Neoplasms</u>	
Lymphoma	9590/3, 9591/3, 9596/3, 9650/3, 9651/3, 9652/3, 9653/3, 9654/3, 9655/3, 9659/3, 9661/3, 9662/3, 9663/3, 9664/3, 9665/3, 9667/3, 9670/3, 9671/3, 9673/3, 9675/3, 9680/3, 9684/3, 9687/3, 9690/3, 9691/3, 9695/3, 9698/3, 9699/3, 9701/3, 9702/3, 9705/3, 9714/3, 9719/3, 9727/3, 9728/3, 9729/3, 9731/3, 9733/3, 9734/3, 9740/3, 9741/3, 9750/3, 9755/3, 9756/3, 9757/3, 9758/3, 9826/3, 9827/3, 9860/3, 9861/3, 9930/3
<u>Germ Cell Tumors and Cysts</u>	
Germ cell tumors, cysts and heterotopias	8020/3, 8440/3, 9060/3, 9061/3, 9064/3, 9065/3, 9070/3, 9071/3, 9072/3, 9080/3, 9081/3, 9082/3, 9083/3, 9084/3, 9085/3, 9100/3
<u>Tumors of Sellar Region</u>	
Pituitary	8022/3, 8140/3, 8190/3, 8240/3, 8246/3, 8260/3, 8270/3, 8272/3, 8280/3, 8281/3, 8290/3, 8300/3, 8310/3, 8320/3, 8323/3, 8333/3, 8341/3
<u>Local Extensions from Regional Tumors</u>	
Chordoma/chondrosarcoma	8711/3, 9220/3, 9231/3, 9240/3, 9370/3, 9371/3, 9372/3
<u>Unclassified Tumors</u>	
Hemangioma	9120/3, 9130/3, 9133/3, 9140/3
Neoplasm, unspecified	8000/3, 8001/3, 8002/3, 8003/3, 8004/3, 8005/3, 8010/3, 8013/3, 8021/3
All other	8720/3, 8811/3, 8840/3, 8896/3, 8980/3, 9580/3, 9754/3, 9823/3, 9837/3, 9866/3

^aIncludes all the histologies listed in the standard definition of reportable brain tumors from the Consensus Conference on Brain Tumor Definitions.

^bInternational Classification of Diseases for Oncology, 3rd Edition, 2000. World Health Organization, Geneva, Switzerland.
Abbreviations: CBTRUS, Central Brain Tumor Registry of the United States; NOS, not otherwise specified.

TABLE 1B: CBTRUS BRAIN AND CENTRAL NERVOUS SYSTEM TUMOR NON-MALIGNANT HISTOLOGIES^a

Histology	ICDO-3^b Histology Code
<u>Tumors of Neuroepithelial Tissue</u>	
Pilocytic astrocytoma	9421/1 [Included with malignant tumors]
Unique astrocytoma variants	9383/1; 9384/1
Ependymoma variants	9394/1
Choroid plexus	9390/0,1
Neuroepithelial	9444/1
Non-malignant and malignant neuronal/glial, neuronal and mixed	8680/0,1; 8681/1; 8682/1; 8690/1; 8693/1; 9412/1; 9413/0; 9442/1; 9490/0; 9491/0; 9492/0; 9493/0; 9505/1; 9506/1
Pineal parenchymal	9360/1; 9361/1
Embryonal/primitive/medulloblastoma	9363/0
<u>Tumors of Cranial and Spinal Nerves</u>	
Nerve sheath, non-malignant and malignant	9540/0,1; 9541/0, 9550/0; 9560/0,1; 9570/0; 9571/0
Other tumors of cranial and spinal nerves	9562/0
<u>Tumors of Meninges</u>	
Meningioma	9530/0,1; 9531/0; 9532/0; 9533/0; 9534/0; 9537/0; 9538/1; 9539/1
Other mesenchymal, non-malignant and malignant	8324/0; 8728/0,1; 8800/0; 8810/0; 8815/0; 8824/0,1; 8830/0,1; 8831/0; 8850/0,1; 8851/0; 8852/0, 8854/0; 8857/0; 8861/0; 8870/0; 8890/0,1; 8897/1; 8900/0; 8920/1; 8990/0,1; 9040/0; 9150/0,1; 9170/0; 9180/0; 9210/0; 9241/0; 9536/0
Hemangioblastoma	9161/1; 9535/0
<u>Lymphomas and Hemopoietic Neoplasms</u>	
Lymphoma	9740/1; 9766/1; 9970/1
<u>Germ Cell Tumors and Cysts</u>	
Germ cell tumors, cysts and heterotopias	8440/0; 9080/0,1; 9084/0
<u>Tumors of Sellar Region</u>	
Pituitary	8040/0,1; 8140/0,1; 8146/0; 8190/0; 8202/0; 8240/1; 8260/0; 8270/0; 8271/0; 8272/0; 8280/0; 8281/0; 8290/0; 8300/0; 8310/0; 8323/0; 8333/0, 8334/0; 9582/0
Craniopharyngioma	9350/1; 9351/1; 9352/1
<u>Local Extensions from Regional Tumors</u>	
Chordoma/chondrosarcoma	8711/0; 9220/0,1; 9373/0
<u>Unclassified Tumors</u>	
Hemangioma	9120/0; 9121/0; 9122/0; 9123/0; 9125/0; 9130/0,1; 9131/0; 9133/1
Neoplasm, unspecified	8000/0,1; 8001/0,1; 8005/0; 8010/0
All other	8452/1; 8683/0; 8811/0; 8840/0; 8860/0; 9173/0; 9580/0; 9751/1; 9752/1; 9753/1

^aIncludes all the histologies listed in the standard definition of reportable brain tumors from the Consensus Conference on Brain Tumor Definitions.

^bInternational Classification of Diseases for Oncology, 3rd Edition, 2000. World Health Organization, Geneva, Switzerland.

Abbreviations: CBTRUS, Central Brain Tumor Registry of the United States; NOS, not otherwise specified.

TABLES

TABLE 2: 2000 U.S. STANDARD POPULATION

Age Group	2000 U.S.	Age Group	2000 U.S.	Age Group	2000 U.S.
0-4	18,986,520	45-49	19,805,793	Total	274,633,642
5-9	19,919,840	50-54	17,224,359		
10-14	20,056,779	55-59	13,307,234		
15-19	19,819,518	60-64	10,654,272		
20-24	18,257,225	65-69	9,409,940		
25-29	17,722,067	70-74	8,725,574		
30-34	19,511,370	75-79	7,414,559		
35-39	22,179,956	80-84	4,900,234		
40-44	22,479,229	85+	4,259,173		

TABLE 3: AVERAGE ANNUAL POPULATIONS^a FOR 2004-2006, BY AGE, GENDER AND RACE

Age Group	Males			Females		
	All Races	Whites	Blacks	All Races	Whites	Blacks
0-4	9,661,522	7,506,087	1,572,532	9,227,822	7,152,159	1,521,786
5-9	9,345,831	7,281,439	1,504,958	8,926,984	6,921,716	1,456,510
10-14	9,959,214	7,718,245	1,659,009	9,487,318	7,322,580	1,607,711
15-19	10,041,996	7,842,751	1,612,234	9,543,413	7,416,385	1,570,141
20-24	10,071,191	7,950,191	1,495,081	9,471,847	7,397,901	1,473,799
25-29	9,521,621	7,554,588	1,297,574	9,146,587	7,091,344	1,380,763
30-34	9,449,002	7,506,503	1,207,777	9,254,723	7,161,134	1,339,681
35-39	9,863,637	7,962,516	1,223,314	9,778,196	7,705,047	1,370,295
40-44	10,561,902	8,650,654	1,280,796	10,668,566	8,548,471	1,455,206
45-49	10,336,331	8,572,715	1,203,120	10,603,426	8,604,871	1,382,236
50-54	9,120,710	7,656,633	987,478	9,518,707	7,813,423	1,165,868
55-59	7,852,334	6,704,356	762,197	8,333,870	6,968,152	924,869
60-64	5,773,255	4,989,505	515,689	6,334,476	5,369,081	661,783
65-69	4,408,742	3,811,673	394,362	5,060,916	4,292,180	533,195
70-74	3,552,693	3,108,837	297,910	4,397,367	3,770,406	437,052
75-79	2,897,930	2,583,871	209,912	4,008,276	3,507,868	353,146
80-84	2,002,460	1,799,993	135,059	3,237,141	2,883,275	256,204
85+	1,477,472	1,327,886	100,959	3,241,059	2,907,776	251,068
Total	135,897,841	110,528,443	17,459,961	140,240,693	112,833,767	19,141,312

^a Population data source for 47 population-based geographic regions: Estimates from the U.S. Census Bureau <http://seer.cancer.gov/popdata/index.html>

TABLE 4: AVERAGE ANNUAL POPULATIONS^a FOR 2004-2006 BY AGE, GENDER, RACE AND HISPANIC ORIGIN

Males						
Age Group	Hispanic	White Hispanic	Black Hispanic	Non-Hispanic	White Non-Hispanic	Black Non-Hispanic
0-4	2,183,571	2,058,623	85,028	7,477,951	5,447,464	1,487,503
5-9	1,895,008	1,747,966	88,079	7,450,823	5,533,474	1,416,879
10-14	1,846,735	1,700,041	87,524	8,112,479	6,018,203	1,571,485
15-19	1,674,402	1,543,778	76,142	8,367,593	6,298,974	1,536,093
20-24	1,900,501	1,768,451	74,367	8,170,690	6,181,740	1,420,714
25-29	2,077,446	1,943,346	75,386	7,444,175	5,611,242	1,222,188
30-34	1,919,584	1,802,398	66,299	7,529,418	5,704,106	1,141,479
35-39	1,698,362	1,591,712	61,511	8,165,275	6,370,804	1,161,803
40-44	1,476,570	1,381,916	54,418	9,085,332	7,268,738	1,226,377
45-49	1,164,727	1,087,829	44,155	9,171,604	7,484,886	1,158,965
50-54	868,347	809,166	34,843	8,252,363	6,847,467	952,635
55-59	642,302	600,004	25,170	7,210,032	6,104,351	737,027
60-64	435,091	408,414	16,322	5,338,164	4,581,092	499,367
65-69	322,610	303,560	12,075	4,086,132	3,508,113	382,287
70-74	240,068	226,922	8,427	3,312,625	2,881,916	289,482
75-79	175,664	166,767	5,666	2,722,266	2,417,104	204,246
80-84	108,851	103,639	3,312	1,893,609	1,696,354	131,747
85+	76,299	72,347	2,426	1,401,173	1,255,539	98,533
Total	20,706,138	19,316,877	821,151	115,191,704	91,211,566	16,638,809
Females						
Age Group	Hispanic	White Hispanic	Black Hispanic	Non-Hispanic	White Non-Hispanic	Black Non-Hispanic
0-4	2,093,100	1,973,845	81,048	7,134,722	5,178,313	1,440,738
5-9	1,809,374	1,667,964	84,704	7,117,610	5,253,752	1,371,806
10-14	1,765,128	1,622,706	84,817	7,722,191	5,699,873	1,522,894
15-19	1,576,222	1,450,108	73,378	7,967,190	5,966,276	1,496,763
20-24	1,587,828	1,468,183	69,133	7,884,018	5,929,718	1,404,666
25-29	1,667,229	1,544,774	74,412	7,479,358	5,546,569	1,306,350
30-34	1,635,754	1,520,498	71,600	7,618,969	5,640,636	1,268,082
35-39	1,492,263	1,385,079	66,297	8,285,933	6,319,967	1,303,998
40-44	1,354,759	1,257,448	58,969	9,313,808	7,291,023	1,396,237
45-49	1,121,115	1,040,405	48,929	9,482,311	7,564,466	1,333,307
50-54	880,762	817,956	38,475	8,637,944	6,995,467	1,127,393
55-59	685,672	639,090	28,862	7,648,198	6,329,061	896,007
60-64	494,182	463,236	19,478	5,840,295	4,905,845	642,305
65-69	387,173	363,553	15,405	4,673,743	3,928,627	517,789
70-74	309,666	291,823	11,708	4,087,701	3,478,583	425,343
75-79	245,522	232,042	8,907	3,762,754	3,275,827	344,238
80-84	164,380	155,647	5,933	3,072,761	2,727,628	250,270
85+	146,428	138,834	5,261	3,094,631	2,768,942	245,806
Total	19,416,556	18,033,192	847,318	120,824,137	94,800,576	18,293,994

^a Population data source for 47 population-based geographic regions: Estimates from the U.S. Census Bureau
<http://seer.cancer.gov/popdata/index.html>

TABLES

TABLE 5: NUMBER OF BRAIN AND CNS TUMORS BY MAJOR HISTOLOGY GROUPINGS, HISTOLOGY, GENDER AND RACE; CBTRUS STATISTICAL REPORT: NPCR AND SEER, 2004-2006

Histology	Total	By Gender		By Race	
		Male	Female	White	Black
<u>Tumors of Neuroepithelial Tissue</u>	54,301	30,189	24,112	48,666	3,616
Pilocytic astrocytoma	2,625	1,373	1,252	2,214	266
Protoplasmic & fibrillary astrocytoma	854	504	350	779	44
Anaplastic astrocytoma	3,385	1,893	1,492	3,069	189
Unique astrocytoma variants	753	478	275	633	85
Astrocytoma, NOS	3,695	1,978	1,717	3,241	294
Glioblastoma	27,040	15,392	11,648	24,962	1,407
Oligodendroglioma	2,269	1,268	1,001	2,046	117
Anaplastic oligodendroglioma	1,031	575	456	927	46
Ependymoma/anaplastic ependymoma	2,147	1,081	1,066	1,849	175
Ependymoma variants	798	446	352	723	39
Mixed glioma	1,573	911	662	1,402	92
Glioma malignant, NOS	3,516	1,791	1,725	3,010	327
Choroid plexus	351	182	169	289	36
Neuroepithelial	171	88	83	152	-
Non-malignant and malignant neuronal/glia	2,250	1,219	1,031	1,866	248
Pineal parenchymal	279	123	156	204	61
Embryonal/primitive/medulloblastoma	1,564	887	677	1,300	177
<u>Tumors of Cranial and Spinal Nerves</u>	13,735	6,632	7,103	12,032	628
Nerve sheath, non-malignant and malignant	13,733	6,631	7,102	12,030	628
<u>Tumors of Meninges</u>	55,432	15,171	40,261	46,226	6,152
Meningioma	53,455	14,119	39,336	44,548	5,970
Other mesenchymal, non-malignant and malignant	631	313	318	526	60
Hemangioblastoma	1,346	739	607	1,152	122
<u>Lymphomas and Hematopoietic Neoplasms</u>	3,855	2,079	1,776	3,237	411
Lymphoma	3,855	2,079	1,776	3,237	411
<u>Germ Cell Tumors and Cysts</u>	642	447	195	521	68
Germ cell tumors, cysts and heterotopias	642	447	195	521	68
<u>Tumors of Sellar Region</u>	21,287	9,703	11,584	15,937	3,816
Pituitary	20,131	9,120	11,011	15,083	3,613
Craniopharyngioma	1,156	583	573	854	203
<u>Local Extensions from Regional Tumors</u>	156	89	67	130	-
Chordoma/chondrosarcoma	156	89	67	130	-
<u>Unclassified Tumors</u>	8,680	3,846	4,834	7,322	969
Hemangioma	1,161	487	674	992	99
Neoplasm, unspecified	7,443	3,316	4,127	6,269	864
All other	76	43	33	61	-
TOTAL	158,088	68,156	89,932	134,071	15,670

-Counts are not presented when fewer than 16 cases were reported for the specific histology category. The suppressed cases are included in the counts for totals.

Abbreviation: CBTRUS, Central Brain Tumor Registry of the United States; NPCR, CDC's National Program of Cancer Registries; SEER, NCI's Surveillance, Epidemiology and End Results program

TABLE 6: NUMBER OF BRAIN AND CNS TUMORS BY MAJOR HISTOLOGY GROUPINGS, HISTOLOGY, RACE AND HISPANIC ETHNICITY; CBTRUS STATISTICAL REPORT: NPCR AND SEER, 2004-2006

Histology	Hispanics		Non-Hispanics		
	Of Any Race	White	Of Any Race	White	Black
<u>Tumors of Neuroepithelial Tissue</u>	4,763	4,499	49,538	44,167	3,510
Pilocytic astrocytoma	354	326	2,271	1,888	257
Protoplasmic & fibrillary astrocytoma	60	58	794	721	43
Anaplastic astrocytoma	290	278	3,095	2,791	183
Unique astrocytoma variants	89	84	664	549	83
Astrocytoma, NOS	363	341	3,332	2,900	287
Glioblastoma	1,680	1,600	25,360	23,362	1,372
Oligodendroglioma	228	219	2,041	1,827	117
Anaplastic oligodendroglioma	93	89	938	838	44
Ependymoma/anaplastic ependymoma	284	269	1,863	1,580	169
Ependymoma variants	75	71	723	652	39
Mixed glioma	172	164	1,401	1,238	87
Glioma malignant, NOS	389	363	3,127	2,647	313
Choroid plexus	69	65	282	224	35
Neuroepithelial	-	-	153	136	-
Non-malignant and malignant neuronal/glia	258	237	1,992	1,629	239
Pineal parenchymal	32	30	247	174	60
Embryonal/primitive/medulloblastoma	309	289	1,255	1,011	171
<u>Tumors of Cranial and Spinal Nerves</u>	1,088	998	12,647	11,034	605
Nerve sheath, non-malignant and malignant	1,088	998	12,645	11,032	605
<u>Tumors of Meninges</u>	4,652	4,301	50,780	41,925	6,019
Meningioma	4,412	4,074	49,043	40,474	5,843
Other mesenchymal, non-malignant and malignant	78	75	553	451	58
Hemangioblastoma	162	152	1,184	1,000	118
<u>Lymphomas and Hematopoietic Neoplasms</u>	410	384	3,445	2,853	399
Lymphoma	410	384	3,445	2,853	399
<u>Germ Cell Tumors and Cysts</u>	131	125	511	396	66
Germ cell tumors, cysts and heterotopias	131	125	511	396	66
<u>Tumors of Sellar Region</u>	2,872	2,646	18,415	13,291	3,747
Pituitary	2,704	2,495	17,427	12,588	3,553
Craniopharyngioma	168	151	988	703	194
<u>Local Extensions from Regional Tumors</u>	29	28	127	102	-
Chordoma/chondrosarcoma	29	28	127	102	-
<u>Unclassified Tumors</u>	855	802	7,825	6,520	949
Hemangioma	124	117	1,037	875	97
Neoplasm, unspecified	725	679	6,718	5,590	846
All other	-	-	70	55	-
TOTAL	14,800	13,783	143,288	120,288	15,305

-Counts are not presented when fewer than 16 cases were reported for the specific histology category. The suppressed cases are included in the counts for totals.

Abbreviation: CBTRUS, Central Brain Tumor Registry of the United States; NPCR, CDC's National Program of Cancer Registries; SEER, NCI's Surveillance, Epidemiology and End Results program

TABLES

TABLE 7: NUMBER OF CHILDHOOD (AGES 0-19) BRAIN AND CNS TUMORS BY MAJOR HISTOLOGY GROUPINGS, HISTOLOGY, GENDER AND RACE; CBTRUS STATISTICAL REPORT: NPCR AND SEER, 2004-2006

Histology	Total	By Gender		By Race	
		Male	Female	White	Black
<u>Tumors of Neuroepithelial Tissue</u>	7,589	4,065	3,524	6,163	957
Pilocytic astrocytoma	1,834	965	869	1,524	201
Protoplasmic & fibrillary astrocytoma	101	57	44	85	-
Anaplastic astrocytoma	165	81	84	133	21
Unique astrocytoma variants	217	113	104	164	41
Astrocytoma, NOS	497	267	230	397	65
Glioblastoma	297	179	118	222	50
Oligodendroglioma	146	80	66	111	29
Anaplastic oligodendroglioma	39	17	22	-	-
Ependymoma/anaplastic ependymoma	574	296	278	458	74
Ependymoma variants	79	53	26	-	-
Mixed glioma	78	36	42	-	-
Glioma malignant, NOS	1,201	597	604	977	135
Choroid plexus	202	117	85	165	21
Neuroepithelial	30	-	-	-	-
Non-malignant and malignant neuronal/glia	907	506	401	749	119
Pineal parenchymal	92	46	46	56	32
Embryonal/primitive/medulloblastoma	1,130	642	488	935	133
<u>Tumors of Cranial and Spinal Nerves</u>	565	282	283	458	59
Nerve sheath, non-malignant and malignant	565	282	283	458	59
<u>Tumors of Meninges</u>	457	231	226	370	55
Meningioma	285	144	141	222	43
Other mesenchymal, non-malignant and malignant	108	51	57	-	-
Hemangioblastoma	64	36	28	-	-
<u>Lymphomas and Hematopoietic Neoplasms</u>	48	25	23	-	-
<u>Germ Cell Tumors and Cysts</u>	422	297	125	346	39
<u>Tumors of Sellar Region</u>	1,208	410	798	931	161
Pituitary	866	241	625	667	112
Craniopharyngioma	342	169	173	264	49
<u>Local Extensions from Regional Tumors</u>	-	-	-	-	-
<u>Unclassified Tumors</u>	473	247	226	386	55
Hemangioma	105	60	45	90	-
Neoplasm, unspecified	359	184	175	290	49
All other	-	-	-	-	-
TOTAL	10,776	5,564	5,212	8,702	1,336

-Counts are not presented when fewer than 16 cases were reported for the specific histology category. The suppressed cases are included in the counts for totals.

Abbreviation: CBTRUS, Central Brain Tumor Registry of the United States; NPCR, CDC's National Program of Cancer Registries; SEER, NCI's Surveillance, Epidemiology and End Results program

TABLE 8: NUMBER OF CHILDHOOD (AGES 0-19) BRAIN AND CNS TUMORS BY MAJOR HISTOLOGY GROUPINGS, HISTOLOGY AND AGE AT DIAGNOSIS; CBTRUS STATISTICAL REPORT: NPCR AND SEER, 2004-2006

Histology	Age at Diagnosis					
	0-4	5-9	10-14	15-19	0-19	0-14
<u>Tumors of Neuroepithelial Tissue</u>	2,419	1,905	1,693	1,572	7,589	6,017
Pilocytic astrocytoma	511	489	482	352	1,834	1,482
Protoplasmic & fibrillary astrocytoma	18	25	35	23	101	78
Anaplastic astrocytoma	32	36	51	46	165	119
Unique astrocytoma variants	23	55	73	66	217	151
Astrocytoma, NOS	145	98	134	120	497	377
Glioblastoma	49	74	68	106	297	191
Oligodendroglioma	21	23	39	63	146	83
Anaplastic oligodendroglioma	-	-	-	-	39	22
Ependymoma/anaplastic ependymoma	238	131	95	110	574	464
Ependymoma variants	-	-	-	-	79	38
Mixed glioma	-	-	-	-	78	41
Glioma malignant, NOS	452	404	206	139	1,201	1,062
Choroid plexus	133	26	23	20	202	182
Neuroepithelial	-	-	-	-	30	20
Non-malignant and malignant neuronal/glioma	219	168	240	280	907	627
Pineal parenchymal	-	-	-	-	92	67
Embryonal/primitive/medulloblastoma	536	305	172	117	1,130	1,013
<u>Tumors of Cranial and Spinal Nerves</u>	130	115	118	202	565	363
Nerve sheath, non-malignant and malignant	130	115	118	202	565	363
<u>Tumors of Meninges</u>	96	54	102	205	457	252
Meningioma	48	36	69	132	285	153
Other mesenchymal, non-malignant and malignant	46	17	18	27	108	81
Hemangioblastoma	-	-	-	-	64	18
<u>Lymphomas and Hematopoietic Neoplasms</u>	-	-	-	-	48	31
<u>Germ Cell Tumors and Cysts</u>	62	58	153	149	422	273
<u>Tumors of Sellar Region</u>	79	168	265	696	1,208	512
Pituitary	16	55	173	622	866	244
Craniopharyngioma	63	113	92	74	342	268
<u>Local Extensions from Regional Tumors</u>	-	-	-	-	-	-
<u>Unclassified Tumors</u>	109	87	116	161	473	312
Hemangioma	-	-	-	-	105	64
Neoplasm, unspecified	82	76	83	118	359	241
TOTAL	2,909	2,396	2,462	3,009	10,776	7,767

-Counts are not presented when fewer than 16 cases were reported for the specific histology category. The suppressed cases are included in the counts for totals.

Abbreviation: CBTRUS, Central Brain Tumor Registry of the United States; NPCR, CDC's National Program of Cancer Registries; SEER, NCI's Surveillance, Epidemiology and End Results program

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TABLE 9: CHARACTERISTICS OF PRIMARY (MALIGNANT AND NON-MALIGNANT) BRAIN AND CENTRAL NERVOUS SYSTEM TUMORS BY POPULATION-BASED CANCER REGISTRY; CBTRUS STATISTICAL REPORT: NPCR AND SEER, 2004-2006

State	No. Of Newly Diagnosed Brain & CNS Tumors	Percent Non-Malignant Tumors	Percent Histologically Confirmed	Average Annual 2004-2006 Population ^a
Alabama	2,317	57.4	72.2	4,544,922
Alaska	303	64.4	62.7	669,507
Arkansas	1,472	58.6	66.2	2,774,720
California	18,267	62.2	73.2	35,987,392
Colorado	3,175	69.4	56.5	4,683,079
Connecticut	1,921	55.1	78.0	3,488,044
Delaware	463	52.9	81.0	840,325
District of Columbia	220	49.5	75.5	582,376
Florida	13,064	66.4	59.4	17,712,053
Georgia	4,520	61.6	67.2	9,123,723
Hawaii	646	71.2	71.1	1,266,796
Idaho	782	55.9	70.6	1,427,174
Illinois	7,015	61.5	63.2	12,725,548
Indiana	3,271	57.9	64.4	6,259,543
Iowa	1,792	57.8	64.5	2,958,054
Kentucky	2,897	68.2	56.5	4,171,773
Louisiana	2,255	63.4	67.2	4,362,761
Maine	745	48.9	80.7	1,312,008
Massachusetts	3,625	57.0	76.1	6,432,401
Michigan	6,175	62.0	64.3	10,104,327
Minnesota	2,460	57.2	96.5	5,118,012
Mississippi	1,355	58.1	69.5	2,886,510
Missouri	3,384	60.9	64.5	5,790,092
Montana	523	54.5	76.1	936,433
Nebraska	911	55.8	75.4	1,753,920
Nevada	1,141	58.0	75.8	2,410,445
New Hampshire	769	58.8	71.0	1,303,073
New Jersey	4,965	58.2	71.0	8,654,918
New Mexico	835	55.9	70.5	1,916,938
New York	13,073	66.0	64.8	19,267,671
North Carolina	4,768	59.1	75.4	8,695,636
North Dakota	329	52.9	61.7	636,737
Ohio	5,526	52.5	76.1	11,458,699
Oklahoma	1,783	52.9	68.4	3,543,338
Oregon	2,213	59.8	75.4	3,634,690
Pennsylvania	8,416	62.6	65.8	12,372,904
Rhode Island	705	60.9	68.2	1,067,074
South Carolina	2,343	59.4	65.3	4,262,178
South Dakota	387	57.9	72.4	780,881
Tennessee	3,398	60.9	67.8	5,992,095
Texas	12,853	65.1	59.7	22,900,974
Utah	1,433	64.8	76.8	2,505,130
Vermont	448	63.8	62.3	619,769
Virginia	3,467	57.5	77.0	7,553,957
Washington	4,302	66.2	62.0	6,278,539
West Virginia	1,141	57.8	63.3	1,806,314
Wyoming	235	53.6	79.1	507,519

^aPopulation estimates were obtained from the census data provided to the SEER program.

Abbreviation: CBTRUS, Central Brain Tumor Registry of the United States; NPCR, CDC's National Program of Cancer Registries; SEER, NCI's Surveillance, Epidemiology and End Results program

TABLE 10: PRIMARY (MALIGNANT AND NON-MALIGNANT) BRAIN AND CENTRAL NERVOUS SYSTEM TUMOR INCIDENCE RATES^a AND 95% CONFIDENCE INTERVALS BY AGE, CANCER REGISTRY, AND BEHAVIOR, AGE-ADJUSTED TO THE 2000 U.S. STANDARD POPULATION; CBTRUS STATISTICAL REPORT: NPCR AND SEER, 2004-2006*

State	0-19 Years		20+ Years		All Ages		
	Malignant	Non-Malignant	Malignant	Non-Malignant	Malignant	Non-Malignant	All Tumors
Alabama	3.41 (2.84-4.06)	0.94 (0.65-1.31)	8.39 (7.84-8.98)	12.66 (11.97-13.37)	6.96 (6.53-7.42)	9.30 (8.80-9.81)	16.26 (15.60-16.94)
Alaska	2.81 (1.64-4.50)	2.75 (1.60-4.41)	8.03 (6.32-10.04)	15.22 (12.88-17.85)	6.53 (5.25-8.01)	11.64 (9.93-13.55)	18.17 (16.01-20.54)
Arkansas	2.87 (2.21-3.65)	2.54 (1.93-3.28)	8.55 (7.84-9.30)	12.81 (11.93-13.73)	6.92 (6.38-7.49)	9.86 (9.21-10.55)	16.78 (15.93-17.67)
California	2.86 (2.67-3.05)	1.51 (1.38-1.66)	8.26 (8.05-8.48)	14.92 (14.64-15.21)	6.71 (6.55-6.87)	11.08 (10.87-11.28)	17.79 (17.53-18.05)
Colorado	2.77 (2.27-3.35)	1.72 (1.33-2.19)	9.09 (8.48-9.72)	22.79 (21.81-23.79)	7.28 (6.82-7.75)	16.74 (16.04-17.47)	24.02 (23.18-24.88)
Connecticut	3.03 (2.42-3.75)	1.61 (1.18-2.16)	9.70 (9.03-10.41)	12.50 (11.74-13.30)	7.79 (7.27-8.33)	9.38 (8.82-9.97)	17.17 (16.40-17.96)
Delaware	3.44 (2.18-5.16)	-	10.26 (8.86-11.81)	12.23 (10.71-13.91)	8.30 (7.23-9.49)	9.14 (8.03-10.37)	17.44 (15.88-19.12)
District of Columbia	-	-	8.71 (7.14-10.52)	8.60 (7.04-10.39)	6.35 (5.21-7.66)	6.13 (5.02-7.41)	12.48 (10.87-14.26)
Florida	3.40 (3.09-3.73)	1.54 (1.34-1.77)	8.82 (8.54-9.11)	18.88 (18.47-19.29)	7.27 (7.05-7.49)	13.91 (13.61-14.21)	21.17 (20.80-21.54)
Georgia	2.52 (2.19-2.89)	1.53 (1.27-1.83)	8.51 (8.08-8.95)	14.86 (14.29-15.44)	6.79 (6.47-7.12)	11.03 (10.62-11.46)	17.82 (17.30-18.36)
Hawaii	2.75 (1.80-4.03)	1.99 (1.20-3.11)	5.37 (4.56-6.27)	15.09 (13.71-16.58)	4.62 (3.97-5.34)	11.34 (10.32-12.43)	15.95 (14.74-17.24)
Idaho	3.56 (2.62-4.74)	-	10.01 (8.89-11.22)	14.38 (13.04-15.82)	8.16 (7.31-9.07)	10.48 (9.51-11.51)	18.63 (17.34-20.00)
Illinois	3.05 (2.73-3.40)	1.37 (1.15-1.61)	8.75 (8.40-9.11)	15.29 (14.83-15.76)	7.12 (6.85-7.39)	11.30 (10.96-11.64)	18.41 (17.98-18.85)
Indiana	2.70 (2.27-3.18)	1.46 (1.15-1.83)	9.01 (8.51-9.53)	13.28 (12.67-13.91)	7.20 (6.82-7.59)	9.89 (9.45-10.35)	17.09 (16.50-17.69)
Iowa	3.03 (2.37-3.82)	1.37 (0.94-1.92)	9.91 (9.17-10.69)	14.38 (13.49-15.31)	7.94 (7.38-8.53)	10.64 (10.00-11.32)	18.58 (17.72-19.47)
Kentucky	3.30 (2.71-3.98)	1.97 (1.52-2.51)	8.65 (8.06-9.27)	20.55 (19.64-21.50)	7.12 (6.66-7.59)	15.22 (14.55-15.91)	22.34 (21.53-23.17)
Louisiana	2.65 (2.16-3.22)	1.32 (0.98-1.74)	7.77 (7.21-8.36)	14.88 (14.10-15.69)	6.30 (5.88-6.75)	10.99 (10.42-11.58)	17.29 (16.58-18.03)
Maine	3.38 (2.31-4.77)	1.74 (1.01-2.80)	10.83 (9.71-12.05)	10.79 (9.67-12.01)	8.69 (7.83-9.63)	8.20 (7.36-9.10)	16.89 (15.68-18.17)
Massachusetts	3.69 (3.17-4.27)	1.62 (1.28-2.01)	9.32 (8.83-9.83)	13.38 (12.79-13.98)	7.70 (7.32-8.10)	10.00 (9.58-10.45)	17.71 (17.13-18.30)
Michigan	2.96 (2.60-3.35)	1.64 (1.37-1.93)	9.41 (9.01-9.83)	16.49 (15.96-17.03)	7.56 (7.26-7.88)	12.23 (11.84-12.62)	19.79 (19.30-20.29)
Minnesota	2.59 (2.13-3.12)	1.23 (0.92-1.61)	8.57 (8.02-9.13)	12.05 (11.41-12.71)	6.85 (6.44-7.28)	8.94 (8.48-9.43)	15.79 (15.17-16.44)
Mississippi	2.72 (2.11-3.44)	1.26 (0.86-1.77)	8.08 (7.38-8.82)	12.26 (11.39-13.17)	6.54 (6.01-7.10)	9.10 (8.47-9.76)	15.64 (14.81-16.50)
Missouri	3.14 (2.66-3.69)	1.42 (1.11-1.81)	8.93 (8.42-9.46)	15.20 (14.54-15.89)	7.27 (6.88-7.67)	11.25 (10.77-11.75)	18.52 (17.89-19.16)
Montana	2.86 (1.77-4.37)	-	9.80 (8.53-11.22)	12.63 (11.16-14.25)	7.81 (6.84-8.89)	9.42 (8.34-10.60)	17.23 (15.76-18.80)
Nebraska	3.76 (2.84-4.88)	2.52 (1.78-3.46)	8.98 (8.06-9.99)	12.12 (11.05-13.28)	7.48 (6.77-8.26)	9.37 (8.57-10.23)	16.85 (15.77-17.99)
Nevada	2.58 (1.92-3.38)	0.94 (0.56-1.49)	8.30 (7.53-9.14)	12.73 (11.75-13.77)	6.66 (6.07-7.29)	9.35 (8.64-10.10)	16.01 (15.08-16.98)
New Hampshire	3.48 (2.42-4.84)	2.04 (1.28-3.10)	9.62 (8.52-10.83)	14.40 (13.06-15.84)	7.86 (7.01-8.79)	10.85 (9.87-11.91)	18.71 (17.40-20.10)
New Jersey	3.42 (2.99-3.88)	1.83 (1.52-2.17)	9.36 (8.94-9.80)	14.08 (13.56-14.62)	7.66 (7.33-8.00)	10.57 (10.18-10.96)	18.22 (17.72-18.74)
New Mexico	2.17 (1.52-3.01)	1.27 (0.79-1.94)	7.98 (7.14-8.89)	10.75 (9.77-11.81)	6.31 (5.68-7.00)	8.03 (7.32-8.80)	14.35 (13.38-15.36)
New York	3.53 (3.24-3.85)	2.11 (1.89-2.35)	9.00 (8.72-9.29)	19.02 (18.62-19.44)	7.43 (7.22-7.66)	14.17 (13.87-14.48)	21.61 (21.24-21.98)
North Carolina	3.43 (3.01-3.89)	1.58 (1.30-1.90)	8.93 (8.51-9.37)	14.22 (13.69-14.77)	7.35 (7.03-7.69)	10.60 (10.21-11.00)	17.95 (17.44-18.47)
North Dakota	-	-	9.70 (8.14-11.47)	11.22 (9.56-13.10)	7.77 (6.58-9.12)	8.46 (7.23-9.83)	16.23 (14.50-18.11)
Ohio	3.31 (2.95-3.71)	1.62 (1.38-1.90)	8.87 (8.51-9.24)	10.54 (10.15-10.94)	7.28 (7.00-7.56)	7.98 (7.69-8.28)	15.26 (14.86-15.67)
Oklahoma	3.34 (2.71-4.07)	1.37 (0.98-1.86)	9.36 (8.70-10.07)	11.53 (10.79-12.32)	7.64 (7.12-8.17)	8.62 (8.07-9.19)	16.25 (15.50-17.03)
Oregon	3.12 (2.50-3.84)	2.25 (1.73-2.88)	9.68 (9.02-10.38)	15.04 (14.22-15.91)	7.80 (7.29-8.33)	11.37 (10.76-12.01)	19.17 (18.37-20.00)
Pennsylvania	3.61 (3.24-4.02)	1.51 (1.28-1.78)	9.32 (8.98-9.68)	16.99 (16.52-17.47)	7.69 (7.42-7.96)	12.55 (12.21-12.90)	20.24 (19.80-20.68)
Rhode Island	4.22 (2.92-5.90)	-	9.59 (8.41-10.89)	16.90 (15.31-18.62)	8.05 (7.12-9.07)	12.36 (11.21-13.60)	20.41 (18.91-21.99)
South Carolina	3.04 (2.48-3.68)	1.34 (0.99-1.78)	8.86 (8.27-9.48)	14.24 (13.48-15.02)	7.19 (6.74-7.67)	10.54 (9.99-11.11)	17.73 (17.01-18.46)
South Dakota	2.73 (1.62-4.32)	-	8.16 (6.87-9.62)	12.34 (10.74-14.12)	6.60 (5.62-7.71)	9.02 (7.87-10.30)	15.62 (14.09-17.28)
Tennessee	2.73 (2.28-3.24)	1.65 (1.31-2.06)	8.91 (8.41-9.44)	14.74 (14.09-15.41)	7.14 (6.76-7.54)	10.98 (10.51-11.47)	18.12 (17.52-18.75)
Texas	3.20 (2.97-3.45)	1.84 (1.66-2.04)	8.61 (8.33-8.89)	18.18 (17.78-18.59)	7.06 (6.85-7.27)	13.50 (13.20-13.79)	20.55 (20.19-20.91)
Utah	3.36 (2.69-4.14)	1.83 (1.34-2.44)	9.52 (8.61-10.50)	20.26 (18.92-21.67)	7.75 (7.07-8.48)	14.97 (14.01-15.99)	22.72 (21.54-23.96)
Vermont	-	-	10.55 (8.93-12.39)	19.24 (17.02-21.66)	8.05 (6.84-9.42)	14.05 (12.45-15.81)	22.11 (20.08-24.29)
Virginia	2.55 (2.16-2.98)	0.91 (0.69-1.18)	8.04 (7.61-8.49)	11.78 (11.26-12.33)	6.47 (6.14-6.81)	8.67 (8.29-9.06)	15.13 (14.63-15.65)
Washington	3.37 (2.88-3.92)	2.16 (1.77-2.60)	9.43 (8.92-9.97)	20.04 (19.29-20.81)	7.69 (7.30-8.10)	14.91 (14.36-15.47)	22.60 (21.93-23.30)
West Virginia	3.16 (2.27-4.29)	1.59 (0.98-2.43)	9.75 (8.85-10.72)	14.20 (13.10-15.36)	7.86 (7.16-8.61)	10.58 (9.78-11.43)	18.44 (17.37-19.56)
Wyoming	-	-	8.92 (7.23-10.89)	10.89 (9.03-13.03)	7.07 (5.79-8.55)	7.97 (6.63-9.52)	15.04 (13.16-17.12)

^aRates are per 100,000 person years

* Katrina and Rita affected state (Alabama, Louisiana, Mississippi, and Texas) rates are based on adjusted population estimates for 2005 obtained from the census data provided to the SEER program.

Abbreviations: CBTRUS, Central Brain Tumor Registry of the United States; NPCR, CDC's National Program of Cancer Registries; SEER, NCI's Surveillance, Epidemiology and End Results program; CI, confidence interval; NOS, not otherwise specified.

TABLES

TABLE 11: PRIMARY (MALIGNANT AND NON-MALIGNANT) BRAIN AND CENTRAL NERVOUS SYSTEM TUMOR INCIDENCE RATES^a BY SITE^b AND GENDER, AGE-ADJUSTED TO THE 2000 U.S. STANDARD POPULATION; CBTRUS STATISTICAL REPORT: NPCR AND SEER, 2004-2006

ICDO Code	Site	Males			Females			Total		
		N	Adjusted Rate	95% C.I.	N	Adjusted Rate	95% C.I.	N	Adjusted Rate	95% C.I.
C71.1-C71.4	Frontal, temporal, parietal, & occipital lobes of the brain	19,781	5.05	(4.98-5.12)	16,393	3.63	(3.57-3.69)	36,174	4.28	(4.24-4.33)
C71.0	Cerebrum	1,740	0.44	(0.42-0.46)	1,503	0.34	(0.32-0.36)	3,243	0.39	(0.37-0.40)
C71.5	Ventricle	1,068	0.26	(0.25-0.28)	819	0.20	(0.18-0.21)	1,887	0.23	(0.22-0.24)
C71.6	Cerebellum	2,470	0.61	(0.59-0.64)	2,127	0.50	(0.48-0.53)	4,597	0.56	(0.54-0.57)
C71.7	Brain stem	1,415	0.35	(0.33-0.37)	1,276	0.31	(0.29-0.33)	2,691	0.33	(0.32-0.34)
C71.8-C71.9	Other brain	8,642	2.25	(2.20-2.30)	8,117	1.76	(1.72-1.80)	16,759	1.98	(1.95-2.01)
C72.0-C72.1	Spinal cord and cauda equina	2,763	0.68	(0.65-0.71)	2,630	0.61	(0.58-0.63)	5,393	0.64	(0.62-0.66)
C72.2-C72.5	Cranial nerves	5,237	1.29	(1.25-1.32)	5,769	1.31	(1.27-1.34)	11,006	1.29	(1.27-1.32)
C72.8-C72.9	Other nervous system	515	0.13	(0.12-0.14)	437	0.10	(0.09-0.11)	952	0.11	(0.11-0.12)
C70.0-C70.9	Meninges (cerebral & spinal)	13,871	3.69	(3.63-3.76)	38,438	8.25	(8.16-8.33)	52,309	6.15	(6.10-6.20)
C75.1-C75.2	Pituitary	10,053	2.54	(2.49-2.59)	12,030	2.80	(2.75-2.85)	22,083	2.63	(2.60-2.67)
C75.3	Pineal	423	0.10	(0.09-0.11)	259	0.06	(0.06-0.07)	682	0.08	(0.08-0.09)
C30.0 (9522-9523)	Olfactory tumors of the nasal cavity	178	0.04	(0.04-0.05)	134	0.03	(0.03-0.04)	312	0.04	(0.03-0.04)
TOTAL		68,156	17.44	(17.31-17.58)	89,932	19.88	(19.75-20.01)	158,088	18.71	(18.62-18.80)

^aRates are per 100,000 person years

^bThe sites referred to in this table are loosely based on the categories and site codes defined in the SEER site/histology validation list.

Abbreviations: CBTRUS, Central Brain Tumor Registry of the United States; NPCR, CDC's National Program of Cancer Registries; SEER, NCI's Surveillance, Epidemiology and End Results program; CI, confidence interval.

TABLE 12: DISTRIBUTION AND INCIDENCE RATES^a OF PRIMARY (MALIGNANT AND NON-MALIGNANT) BRAIN AND CENTRAL NERVOUS SYSTEM TUMORS BY MAJOR HISTOLOGY GROUPINGS AND HISTOLOGY, AGE-ADJUSTED TO THE 2000 U.S. STANDARD POPULATION; CBTRUS STATISTICAL REPORT: NPCR AND SEER, 2004-2006

Histology	TOTAL N	% of All Reported Brain Tumors	Adjusted Rate	95% C.I.
<u>Tumors of Neuroepithelial Tissue</u>	54,301	34.3	6.46	(6.41-6.52)
Pilocytic astrocytoma	2,625	1.7	0.33	(0.31-0.34)
Protoplasmic & fibrillary astrocytoma	854	0.5	0.10	(0.10-0.11)
Anaplastic astrocytoma	3,385	2.1	0.40	(0.39-0.42)
Unique astrocytoma variants	753	0.5	0.09	(0.08-0.10)
Astrocytoma, NOS	3,695	2.3	0.44	(0.43-0.46)
Glioblastoma	27,040	17.1	3.17	(3.13-3.21)
Oligodendroglioma	2,269	1.4	0.27	(0.26-0.29)
Anaplastic oligodendroglioma	1,031	0.7	0.12	(0.12-0.13)
Ependymoma/anaplastic ependymoma	2,147	1.4	0.26	(0.25-0.27)
Ependymoma variants	798	0.5	0.10	(0.09-0.10)
Mixed glioma	1,573	1.0	0.19	(0.18-0.20)
Glioma malignant, NOS	3,516	2.2	0.43	(0.41-0.44)
Choroid plexus	351	0.2	0.04	(0.04-0.05)
Neuroepithelial	171	0.1	0.02	(0.02-0.02)
Non-malignant and malignant neuronal/glial	2,250	1.4	0.27	(0.26-0.29)
Pineal parenchymal	279	0.2	0.03	(0.03-0.04)
Embryonal/primitive/medulloblastoma	1,564	1.0	0.19	(0.18-0.20)
<u>Tumors of Cranial and Spinal Nerves</u>	13,735	8.7	1.61	(1.59-1.64)
Nerve sheath, non-malignant and malignant	13,733	8.7	1.61	(1.59-1.64)
<u>Tumors of Meninges</u>	55,432	35.1	6.52	(6.47-6.57)
Meningioma	53,455	33.8	6.29	(6.23-6.34)
Other mesenchymal, non-malignant and malignant	631	0.4	0.08	(0.07-0.08)
Hemangioblastoma	1,346	0.9	0.16	(0.15-0.17)
<u>Lymphomas and Hematopoietic Neoplasms</u>	3,855	2.4	0.46	(0.44-0.47)
Lymphoma	3,855	2.4	0.46	(0.44-0.47)
<u>Germ Cell Tumors and Cysts</u>	642	0.4	0.08	(0.07-0.09)
Germ cell tumors, cysts and heterotopias	642	0.4	0.08	(0.07-0.09)
<u>Tumors of Sellar Region</u>	21,287	13.5	2.54	(2.50-2.57)
Pituitary	20,131	12.7	2.40	(2.36-2.43)
Craniopharyngioma	1,156	0.7	0.14	(0.13-0.15)
<u>Local Extensions from Regional Tumors</u>	156	0.1	0.02	(0.02-0.02)
Chordoma/chondrosarcoma	156	0.1	0.02	(0.02-0.02)
<u>Unclassified Tumors</u>	8,680	5.5	1.02	(1.00-1.05)
Hemangioma	1,161	0.7	0.14	(0.13-0.15)
Neoplasm, unspecified	7,443	4.7	0.88	(0.86-0.90)
All other	76	0.0	0.01	(0.01-0.01)
TOTAL^b	158,088	100.0	18.71	(18.62-18.80)

^aRates are per 100,000 person years

^bRefers to all brain tumors including histologies not presented in this table.

Abbreviations: CBTRUS, Central Brain Tumor Registry of the United States; NPCR, CDC's National Program of Cancer Registries; SEER, NCI's Surveillance, Epidemiology and End Results program; CI, confidence interval; NOS, not otherwise specified.

TABLES

TABLE 12A: DISTRIBUTION AND INCIDENCE RATES^{a,b} OF PRIMARY (MALIGNANT AND NON-MALIGNANT) BRAIN AND CNS TUMORS BY MAJOR HISTOLOGY GROUPINGS AND HISTOLOGY, AGE-ADJUSTED TO THE 2000 U.S. STANDARD POPULATION; CBTRUS STATISTICAL REPORT: NPCR AND SEER, 2004 - 2006

Histology	Malignant		Non-malignant	
	N	Adjusted Rate (95% C.I.)	N	Adjusted Rate (95% C.I.)
<u>Tumors of Neuroepithelial Tissue</u>	50,877	6.05 (6.00-6.10)	3,424	0.42 (0.40-0.43)
Pilocytic astrocytoma	2,625	0.33 (0.31-0.34)	-	-
Protoplasmic & fibrillary astrocytoma	854	0.10 (0.10-0.11)	-	-
Anaplastic astrocytoma	3,385	0.40 (0.39-0.42)	-	-
Unique astrocytoma variants	216	0.03 (0.02-0.03)	537	0.06 (0.06-0.07)
Astrocytoma, NOS	3,695	0.44 (0.43-0.46)	-	-
Glioblastoma	27,040	3.17 (3.13-3.21)	-	-
Oligodendroglioma	2,269	0.27 (0.26-0.29)	-	-
Anaplastic oligodendroglioma	1,030	0.12 (0.12-0.13)	-	-
Ependymoma/anaplastic ependymoma	2,147	0.26 (0.25-0.27)	-	-
Ependymoma variants	-	-	789	0.10 (0.09-0.10)
Mixed glioma	1,573	0.19 (0.18-0.20)	-	-
Glioma malignant, NOS	3,516	0.43 (0.41-0.44)	-	-
Choroid plexus	83	0.01 (0.01-0.01)	268	0.03 (0.03-0.04)
Neuroepithelial	143	0.02 (0.02-0.02)	28	0.00 (0.00-0.01)
Non-malignant and malignant neuronal/glial	572	0.07 (0.06-0.07)	1,678	0.21 (0.20-0.22)
Pineal parenchymal	157	0.02 (0.02-0.02)	122	0.02 (0.01-0.02)
Embryonal/primitive/medulloblastoma	1,563	0.19 (0.18-0.20)	-	-
<u>Tumors of Cranial and Spinal Nerves</u>	141	0.02 (0.01-0.02)	13,594	1.60 (1.57-1.62)
Nerve sheath, non-malignant and malignant	141	0.02 (0.01-0.02)	13,592	1.60 (1.57-1.62)
<u>Tumors of Meninges</u>	1,379	0.16 (0.15-0.17)	54,053	6.36 (6.30-6.41)
Meningioma	1,208	0.14 (0.13-0.15)	52,247	6.14 (6.09-6.20)
Other mesenchymal, non-malignant and malignant	171	0.02 (0.02-0.02)	460	0.06 (0.05-0.06)
Hemangioblastoma	-	-	1,346	0.16 (0.15-0.17)
<u>Lymphomas and Hematopoietic Neoplasms</u>	3,851	0.46 (0.44-0.47)	-	-
Lymphoma	3,851	0.46 (0.44-0.47)	-	-
<u>Germ Cell Tumors and Cysts</u>	515	0.06 (0.06-0.07)	127	0.02 (0.01-0.02)
Germ cell tumors, cysts and heterotopias	515	0.06 (0.06-0.07)	127	0.02 (0.01-0.02)
<u>Tumors of Sellar Region</u>	96	0.01 (0.01-0.01)	21,191	2.53 (2.49-2.56)
Pituitary	96	0.01 (0.01-0.01)	20,035	2.39 (2.35-2.42)
Craniopharyngioma	-	-	1,156	0.14 (0.13-0.15)
<u>Local Extensions from Regional Tumors</u>	148	0.02 (0.02-0.02)	-	-
Chordoma/chondrosarcoma	148	0.02 (0.02-0.02)	-	-
<u>Unclassified Tumors</u>	3,547	0.42 (0.40-0.43)	5,133	0.61 (0.59-0.63)
Hemangioma	-	-	1,152	0.14 (0.13-0.15)
Neoplasm, unspecified	3,509	0.41 (0.40-0.43)	3,934	0.47 (0.45-0.48)
All other	29	0.00 (0.00-0.01)	47	0.01 (0.00-0.01)
TOTAL^c	60,554	7.19 (7.14-7.25)	97,534	11.52 (11.45-11.59)

^aRates are per 100,000 person years.

^bPopulation data source: Estimates from the U.S. Bureau of the Census, <http://seer.cancer.gov/popdata/index.html>

^cRefers to all brain tumors including histologies not presented in this table.

Abbreviations: CBTRUS, Central Brain Tumor Registry of the United States; SEER, Surveillance, Epidemiology and End Results Program; CI, confidence interval; NOS, not otherwise specified; CNS, central nervous system.

TABLE 13: PRIMARY (MALIGNANT AND NON-MALIGNANT) BRAIN AND CENTRAL NERVOUS SYSTEM TUMOR INCIDENCE RATES^a BY MAJOR HISTOLOGY GROUPINGS, HISTOLOGY AND GENDER, AGE-ADJUSTED TO THE 2000 U.S. STANDARD POPULATION; CBTRUS STATISTICAL REPORT: NPCR AND SEER, 2004-2006

Histology	Males		Females	
	Adjusted Rate	95% C.I.	Adjusted Rate	95% C.I.
<u>Tumors of Neuroepithelial Tissue</u>	7.64	(7.55-7.72)	5.46	(5.39-5.53)
Pilocytic astrocytoma	0.34	(0.32-0.35)	0.32	(0.30-0.33)
Protoplasmic & fibrillary astrocytoma	0.13	(0.12-0.14)	0.08	(0.07-0.09)
Anaplastic astrocytoma	0.48	(0.46-0.50)	0.34	(0.32-0.36)
Unique astrocytoma variants	0.12	(0.11-0.13)	0.07	(0.06-0.08)
Astrocytoma, NOS	0.50	(0.48-0.52)	0.40	(0.38-0.42)
Glioblastoma	3.97	(3.91-4.03)	2.51	(2.46-2.55)
Oligodendroglioma	0.31	(0.29-0.33)	0.24	(0.22-0.25)
Anaplastic oligodendroglioma	0.14	(0.13-0.15)	0.11	(0.10-0.12)
Ependymoma/anaplastic ependymoma	0.26	(0.25-0.28)	0.25	(0.24-0.27)
Ependymoma variants	0.11	(0.10-0.12)	0.08	(0.07-0.09)
Mixed glioma	0.22	(0.21-0.24)	0.16	(0.14-0.17)
Glioma malignant, NOS	0.46	(0.44-0.48)	0.40	(0.38-0.42)
Choroid plexus	0.05	(0.04-0.05)	0.04	(0.04-0.05)
Neuroepithelial	0.02	(0.02-0.03)	0.02	(0.02-0.02)
Non-malignant and malignant neuronal/glia	0.30	(0.28-0.32)	0.25	(0.24-0.27)
Pineal parenchymal	0.03	(0.03-0.04)	0.04	(0.03-0.04)
Embryonal/primitive/medulloblastoma	0.22	(0.20-0.23)	0.17	(0.16-0.18)
<u>Tumors of Cranial and Spinal Nerves</u>	1.63	(1.59-1.67)	1.60	(1.57-1.64)
Nerve sheath, non-malignant and malignant	1.63	(1.59-1.67)	1.60	(1.57-1.64)
<u>Tumors of Meninges</u>	4.02	(3.96-4.09)	8.65	(8.57-8.74)
Meningioma	3.76	(3.70-3.83)	8.44	(8.35-8.52)
Other mesenchymal, non-malignant and malignant	0.08	(0.07-0.09)	0.07	(0.07-0.08)
Hemangioblastoma	0.18	(0.17-0.19)	0.14	(0.13-0.15)
<u>Lymphomas and Hematopoietic Neoplasms</u>	0.54	(0.52-0.56)	0.39	(0.37-0.41)
Lymphoma	0.54	(0.52-0.56)	0.39	(0.37-0.41)
<u>Germ Cell Tumors and Cysts</u>	0.11	(0.10-0.12)	0.05	(0.04-0.06)
Germ cell tumors, cysts and heterotopias	0.11	(0.10-0.12)	0.05	(0.04-0.06)
<u>Tumors of Sellar Region</u>	2.45	(2.40-2.50)	2.69	(2.65-2.74)
Pituitary	2.31	(2.26-2.35)	2.56	(2.51-2.61)
Craniopharyngioma	0.14	(0.13-0.16)	0.14	(0.13-0.15)
<u>Local Extensions from Regional Tumors</u>	0.02	(0.02-0.03)	0.02	(0.01-0.02)
Chordoma/chondrosarcoma	0.02	(0.02-0.03)	0.02	(0.01-0.02)
<u>Unclassified Tumors</u>	1.04	(1.01-1.07)	1.02	(0.99-1.05)
Hemangioma	0.12	(0.11-0.13)	0.16	(0.14-0.17)
Neoplasm, unspecified	0.91	(0.88-0.94)	0.86	(0.83-0.88)
All other	0.01	(0.01-0.02)	0.01	(0.01-0.01)
TOTAL^b	17.44	(17.31-17.58)	19.88	(19.75-20.01)

^aRates are per 100,000 person years

^bRefers to all brain tumors including histologies not presented in this table.

Abbreviations: CBTRUS, Central Brain Tumor Registry of the United States; NPCR, CDC's National Program of Cancer Registries; SEER, NCI's Surveillance, Epidemiology and End Results program; CI, confidence interval; NOS, not otherwise specified.

TABLES

TABLE 14: PRIMARY (MALIGNANT AND NON-MALIGNANT) BRAIN AND CENTRAL NERVOUS SYSTEM TUMOR INCIDENCE RATES^a BY MAJOR HISTOLOGY GROUPINGS, HISTOLOGY AND RACE, AGE-ADJUSTED TO THE 2000 U.S. STANDARD POPULATION; CBTRUS STATISTICAL REPORT: NPCR AND SEER, 2004-2006

Histology	Whites		Blacks	
	Adjusted Rate	95% C.I.	Adjusted Rate	95% C.I.
<u>Tumors of Neuroepithelial Tissue</u>	6.95	(6.89-7.01)	3.61	(3.49-3.74)
Pilocytic astrocytoma	0.35	(0.34-0.36)	0.21	(0.19-0.24)
Protoplasmic & fibrillary astrocytoma	0.11	(0.11-0.12)	0.04	(0.03-0.06)
Anaplastic astrocytoma	0.44	(0.42-0.46)	0.19	(0.16-0.22)
Unique astrocytoma variants	0.09	(0.09-0.10)	0.07	(0.06-0.09)
Astrocytoma, NOS	0.47	(0.46-0.49)	0.29	(0.26-0.33)
Glioblastoma	3.43	(3.39-3.47)	1.60	(1.51-1.69)
Oligodendroglioma	0.30	(0.29-0.32)	0.11	(0.09-0.13)
Anaplastic oligodendroglioma	0.13	(0.13-0.14)	0.05	(0.03-0.06)
Ependymoma/anaplastic ependymoma	0.27	(0.26-0.29)	0.16	(0.14-0.18)
Ependymoma variants	0.11	(0.10-0.12)	0.04	(0.03-0.05)
Mixed glioma	0.21	(0.20-0.22)	0.09	(0.07-0.11)
Glioma malignant, NOS	0.44	(0.43-0.46)	0.31	(0.28-0.35)
Choroid plexus	0.04	(0.04-0.05)	0.03	(0.02-0.04)
Neuroepithelial	0.02	(0.02-0.03)	-	-
Non-malignant and malignant neuronal/glia	0.28	(0.27-0.30)	0.22	(0.19-0.25)
Pineal parenchymal	0.03	(0.03-0.04)	0.05	(0.04-0.07)
Embryonal/primitive/medulloblastoma	0.21	(0.19-0.22)	0.14	(0.12-0.16)
<u>Tumors of Cranial and Spinal Nerves</u>	1.70	(1.67-1.73)	0.65	(0.59-0.70)
Nerve sheath, non-malignant and malignant	1.70	(1.67-1.73)	0.65	(0.59-0.70)
<u>Tumors of Meninges</u>	6.38	(6.32-6.43)	7.21	(7.03-7.40)
Meningioma	6.13	(6.08-6.19)	7.03	(6.85-7.21)
Other mesenchymal, non-malignant and malignant	0.08	(0.07-0.08)	0.06	(0.05-0.08)
Hemangioblastoma	0.17	(0.16-0.18)	0.12	(0.10-0.14)
<u>Lymphomas and Hematopoietic Neoplasms</u>	0.45	(0.44-0.47)	0.42	(0.38-0.47)
Lymphoma	0.45	(0.44-0.47)	0.42	(0.38-0.47)
<u>Germ Cell Tumors and Cysts</u>	0.08	(0.08-0.09)	0.06	(0.04-0.07)
Germ cell tumors, cysts and heterotopias	0.08	(0.08-0.09)	0.06	(0.04-0.07)
<u>Tumors of Sellar Region</u>	2.30	(2.26-2.33)	4.08	(3.95-4.21)
Pituitary	2.17	(2.13-2.20)	3.88	(3.75-4.01)
Craniopharyngioma	0.13	(0.12-0.14)	0.20	(0.17-0.23)
<u>Local Extensions from Regional Tumors</u>	0.02	(0.02-0.02)	-	-
Chordoma/chondrosarcoma	0.02	(0.02-0.02)	-	-
<u>Unclassified Tumors</u>	1.01	(0.99-1.04)	1.10	(1.03-1.18)
Hemangioma	0.14	(0.14-0.15)	0.10	(0.08-0.12)
Neoplasm, unspecified	0.86	(0.84-0.88)	1.00	(0.93-1.07)
All other	0.01	(0.01-0.01)	-	-
TOTAL^b	18.89	(18.79-18.99)	17.14	(16.87-17.42)

^aRates are per 100,000 person years

^bRefers to all brain tumors including histologies not presented in this table.

-Counts are not presented when fewer than 16 cases were reported for the specific histology category. The suppressed cases are included in the counts for totals.

Abbreviations: CBTRUS, Central Brain Tumor Registry of the United States; NPCR, CDC's National Program of Cancer Registries; SEER, NCI's Surveillance, Epidemiology and End Results program; CI, confidence interval; NOS, not otherwise specified.

TABLE 15: PRIMARY (MALIGNANT AND NON-MALIGNANT) BRAIN AND CENTRAL NERVOUS SYSTEM TUMOR INCIDENCE RATES^a BY MAJOR HISTOLOGY GROUPINGS, HISTOLOGY, RACE AND HISPANIC ETHNICITY^b, AGE-ADJUSTED TO THE 2000 U.S. STANDARD POPULATION; CBTRUS STATISTICAL REPORT: NPCR AND SEER, 2004-2006

Histology	Hispanics (Of Any Race)		White Hispanics		Non-Hispanics (Of Any Race)		White Non-Hispanics		Black Non-Hispanics	
	Adjusted Rate	95% C.I.	Adjusted Rate	95% C.I.	Adjusted Rate	95% C.I.	Adjusted Rate	95% C.I.	Adjusted Rate	95% C.I.
Tumors of Neuroepithelial Tissue	5.07	(4.91-5.23)	5.15	(4.98-5.31)	6.65	(6.59-6.70)	7.23	(7.16-7.30)	3.65	(3.53-3.78)
Pilocytic astrocytoma	0.24	(0.21-0.27)	0.24	(0.21-0.27)	0.35	(0.33-0.36)	0.38	(0.36-0.40)	0.22	(0.19-0.25)
Protoplasmic & fibrillary astrocytoma	0.06	(0.04-0.07)	0.06	(0.04-0.08)	0.11	(0.10-0.12)	0.12	(0.11-0.13)	0.04	(0.03-0.06)
Anaplastic astrocytoma	0.32	(0.28-0.36)	0.32	(0.28-0.37)	0.42	(0.40-0.43)	0.46	(0.44-0.48)	0.19	(0.17-0.22)
Unique astrocytoma variants	0.08	(0.06-0.10)	0.08	(0.06-0.10)	0.09	(0.09-0.10)	0.10	(0.09-0.11)	0.08	(0.06-0.09)
Astrocytoma, NOS	0.36	(0.32-0.40)	0.36	(0.32-0.41)	0.46	(0.44-0.47)	0.49	(0.47-0.51)	0.30	(0.26-0.34)
Glioblastoma	2.42	(2.30-2.54)	2.46	(2.34-2.59)	3.24	(3.20-3.28)	3.54	(3.49-3.58)	1.61	(1.52-1.70)
Oligodendroglioma	0.21	(0.19-0.25)	0.22	(0.19-0.25)	0.29	(0.27-0.30)	0.32	(0.31-0.34)	0.11	(0.09-0.14)
Anaplastic oligodendroglioma	0.10	(0.08-0.12)	0.10	(0.08-0.13)	0.13	(0.12-0.14)	0.14	(0.13-0.15)	0.05	(0.03-0.06)
Ependymoma/anaplastic ependymoma	0.23	(0.20-0.26)	0.24	(0.21-0.27)	0.26	(0.25-0.27)	0.28	(0.27-0.29)	0.16	(0.14-0.19)
Ependymoma variants	0.07	(0.05-0.09)	0.07	(0.06-0.09)	0.10	(0.09-0.11)	0.12	(0.11-0.12)	0.04	(0.03-0.05)
Mixed glioma	0.16	(0.13-0.18)	0.16	(0.14-0.19)	0.20	(0.19-0.21)	0.22	(0.21-0.23)	0.09	(0.07-0.11)
Glioma malignant, NOS	0.35	(0.31-0.39)	0.35	(0.31-0.40)	0.44	(0.42-0.45)	0.46	(0.45-0.48)	0.31	(0.28-0.35)
Choroid plexus	0.05	(0.04-0.07)	0.05	(0.04-0.07)	0.04	(0.04-0.05)	0.04	(0.04-0.05)	0.03	(0.02-0.04)
Neuroepithelial	-	-	-	-	0.02	(0.02-0.03)	0.02	(0.02-0.03)	-	-
Non-malignant and malignant neuronal/glial	0.20	(0.17-0.23)	0.20	(0.17-0.22)	0.29	(0.28-0.30)	0.31	(0.29-0.32)	0.22	(0.19-0.25)
Pineal parenchymal	0.03	(0.02-0.04)	0.03	(0.02-0.04)	0.04	(0.03-0.04)	0.03	(0.03-0.04)	0.05	(0.04-0.07)
Embryonal/primitive/medulloblastoma	0.20	(0.18-0.22)	0.20	(0.18-0.22)	0.19	(0.18-0.20)	0.21	(0.20-0.22)	0.14	(0.12-0.17)
Tumors of Cranial and Spinal Nerves	1.23	(1.15-1.31)	1.20	(1.12-1.28)	1.67	(1.64-1.69)	1.78	(1.74-1.81)	0.65	(0.60-0.70)
Nerve sheath, non-malignant and malignant	1.23	(1.15-1.31)	1.20	(1.12-1.28)	1.67	(1.64-1.69)	1.78	(1.74-1.81)	0.65	(0.60-0.70)
Tumors of Meninges	6.63	(6.43-6.83)	6.53	(6.33-6.74)	6.53	(6.47-6.59)	6.38	(6.32-6.45)	7.29	(7.10-7.48)
Meningioma	6.39	(6.19-6.60)	6.30	(6.09-6.50)	6.30	(6.24-6.35)	6.14	(6.08-6.20)	7.11	(6.92-7.30)
Other mesenchymal, non-malignant and malignant	0.08	(0.06-0.10)	0.08	(0.06-0.10)	0.08	(0.07-0.08)	0.08	(0.07-0.09)	0.06	(0.05-0.08)
Hemangioblastoma	0.16	(0.13-0.19)	0.16	(0.13-0.19)	0.16	(0.15-0.17)	0.17	(0.16-0.18)	0.12	(0.10-0.14)
Lymphomas and Hematopoietic Neoplasms	0.52	(0.46-0.57)	0.52	(0.46-0.57)	0.45	(0.43-0.46)	0.44	(0.42-0.45)	0.43	(0.39-0.47)
Lymphoma	0.52	(0.46-0.57)	0.52	(0.46-0.57)	0.45	(0.43-0.46)	0.44	(0.42-0.45)	0.43	(0.39-0.47)
Germ Cell Tumors and Cysts	0.09	(0.07-0.11)	0.09	(0.08-0.11)	0.08	(0.07-0.08)	0.08	(0.07-0.09)	0.06	(0.04-0.07)
Germ cell tumors, cysts and heterotopias	0.09	(0.07-0.11)	0.09	(0.08-0.11)	0.08	(0.07-0.08)	0.08	(0.07-0.09)	0.06	(0.04-0.07)
Tumors of Sellar Region	3.05	(2.93-3.18)	3.02	(2.89-3.15)	2.48	(2.44-2.52)	2.21	(2.17-2.25)	4.16	(4.02-4.30)
Pituitary	2.91	(2.80-3.04)	2.88	(2.76-3.01)	2.34	(2.31-2.38)	2.08	(2.04-2.12)	3.96	(3.83-4.10)
Craniopharyngioma	0.14	(0.12-0.17)	0.14	(0.11-0.16)	0.14	(0.13-0.15)	0.13	(0.12-0.14)	0.20	(0.17-0.23)
Local Extensions from Regional Tumors	0.03	(0.02-0.04)	0.03	(0.02-0.05)	0.02	(0.01-0.02)	0.02	(0.01-0.02)	-	-
Chordoma/chondrosarcoma	0.03	(0.02-0.04)	0.03	(0.02-0.05)	0.02	(0.01-0.02)	0.02	(0.01-0.02)	-	-
Unclassified Tumors	1.12	(1.04-1.20)	1.12	(1.04-1.21)	1.02	(0.99-1.04)	1.00	(0.98-1.03)	1.12	(1.05-1.19)
Hemangioma	0.12	(0.10-0.15)	0.13	(0.10-0.15)	0.14	(0.13-0.15)	0.15	(0.14-0.16)	0.10	(0.08-0.13)
Neoplasm, unspecified	0.99	(0.91-1.07)	0.99	(0.91-1.07)	0.87	(0.85-0.89)	0.85	(0.82-0.87)	1.01	(0.94-1.08)
All other	-	-	-	-	0.01	(0.01-0.01)	0.01	(0.01-0.01)	-	-
TOTAL^c	17.73	(17.42-18.04)	17.65	(17.33-17.98)	18.88	(18.78-18.98)	19.13	(19.02-19.24)	17.36	(17.08-17.64)

^aRates are per 100,000 person years

^bHispanic ethnicity is not mutually exclusive of race; Classified using the North American Association of Central Cancer Registries Hispanic Identification Algorithm, version 2 (NHIA v2) .

^cRefers to all brain tumors including histologies not presented in this table.

-Counts are not presented when fewer than 16 cases were reported for the specific histology category. The suppressed cases are included in the counts for totals.

Abbreviations: CBTRUS, Central Brain Tumor Registry of the United States; NPCR, CDC's National Program of Cancer Registries; SEER, NCI's Surveillance, Epidemiology and End Results program; CI, confidence interval; NOS, not otherwise specified.

TABLES

TABLE 16: PRIMARY (MALIGNANT AND NON-MALIGNANT) BRAIN AND CENTRAL NERVOUS SYSTEM TUMOR AGE-SPECIFIC INCIDENCE RATES^a BY MAJOR HISTOLOGY GROUPINGS, HISTOLOGY AND AGE AT DIAGNOSIS; CBTRUS STATISTICAL REPORT: NPCR AND SEER, 2004-2006

Histology	Age at Diagnosis								Age at Diagnosis									
	0-14		0-19		20-34		35-44		45-54		55-64		65-74		75-84		85+	
	Rate	95% C.I.	Rate	95% C.I.	Rate	95% C.I.	Rate	95% C.I.	Rate	95% C.I.	Rate	95% C.I.	Rate	95% C.I.	Rate	95% C.I.	Rate	95% C.I.
Tumors of Neuroepithelial Tissue	3.54	(3.45 -3.63)	3.32	(3.25 -3.40)	3.10	(3.02 -3.18)	4.40	(4.28 -4.52)	6.91	(6.76 -7.06)	11.87	(11.64-12.11)	17.51	(17.15-17.88)	19.37	(18.92-19.83)	11.44	(10.89-12.02)
Pilocytic astrocytoma	0.87	(0.83 -0.92)	0.80	(0.77 -0.84)	0.25	(0.22 -0.27)	0.12	(0.10 -0.14)	0.09	(0.07 -0.10)	0.07	(0.06 -0.10)	0.06	(0.04 -0.09)	0.05	(0.03 -0.08)	-	-
Protoplasmic & fibrillary astrocytoma	0.05	(0.04 -0.06)	0.04	(0.04 -0.05)	0.09	(0.08 -0.11)	0.11	(0.10 -0.14)	0.11	(0.09 -0.13)	0.15	(0.12 -0.18)	0.23	(0.19 -0.28)	0.19	(0.15 -0.25)	-	-
Anaplastic astrocytoma	0.07	(0.06 -0.08)	0.07	(0.06 -0.08)	0.29	(0.26 -0.31)	0.43	(0.39 -0.46)	0.51	(0.47 -0.55)	0.75	(0.69 -0.81)	1.05	(0.96 -1.14)	1.03	(0.93 -1.14)	0.39	(0.29 -0.51)
Unique astrocytoma variants	0.09	(0.08 -0.11)	0.10	(0.08 -0.11)	0.08	(0.07 -0.10)	0.08	(0.06 -0.09)	0.10	(0.08 -0.12)	0.13	(0.10 -0.15)	0.10	(0.07 -0.13)	0.06	(0.04 -0.09)	-	-
Astrocytoma, NOS	0.22	(0.20 -0.24)	0.22	(0.20 -0.24)	0.35	(0.32 -0.38)	0.45	(0.42 -0.49)	0.47	(0.43 -0.51)	0.61	(0.56 -0.67)	0.94	(0.86 -1.02)	1.12	(1.01 -1.23)	0.62	(0.50 -0.77)
Glioblastoma	0.11	(0.10 -0.13)	0.13	(0.12 -0.15)	0.40	(0.37 -0.43)	1.18	(1.12 -1.25)	3.73	(3.62 -3.84)	8.16	(7.97 -8.36)	13.10	(12.79-13.41)	14.49	(14.10-14.88)	8.40	(7.93 -8.89)
Oligodendroglioma	0.05	(0.04 -0.06)	0.06	(0.05 -0.08)	0.32	(0.29 -0.34)	0.51	(0.47 -0.55)	0.41	(0.37 -0.45)	0.33	(0.29 -0.37)	0.26	(0.22 -0.30)	0.18	(0.14 -0.23)	-	-
Anaplastic oligodendroglioma	0.01	(0.01 -0.02)	0.02	(0.01 -0.02)	0.09	(0.08 -0.11)	0.19	(0.16 -0.21)	0.19	(0.17 -0.22)	0.23	(0.20 -0.27)	0.22	(0.18 -0.27)	0.18	(0.14 -0.23)	-	-
Ependymoma/anaplastic ependymoma	0.27	(0.25 -0.30)	0.25	(0.23 -0.27)	0.19	(0.17 -0.22)	0.26	(0.24 -0.29)	0.31	(0.28 -0.34)	0.36	(0.32 -0.40)	0.31	(0.27 -0.36)	0.20	(0.15 -0.25)	-	-
Ependymoma variants	0.02	(0.02 -0.03)	0.03	(0.03 -0.04)	0.12	(0.11 -0.14)	0.14	(0.12 -0.16)	0.14	(0.12 -0.16)	0.12	(0.10 -0.15)	0.10	(0.07 -0.13)	0.07	(0.05 -0.10)	-	-
Mixed glioma	0.02	(0.02 -0.03)	0.03	(0.03 -0.04)	0.24	(0.22 -0.27)	0.33	(0.30 -0.36)	0.25	(0.22 -0.28)	0.26	(0.23 -0.30)	0.20	(0.17 -0.25)	0.14	(0.10 -0.18)	-	-
Glioma malignant, NOS	0.63	(0.59 -0.67)	0.53	(0.50 -0.56)	0.21	(0.19 -0.23)	0.22	(0.20 -0.25)	0.28	(0.25 -0.31)	0.38	(0.34 -0.43)	0.65	(0.58 -0.72)	1.31	(1.19 -1.43)	1.49	(1.30 -1.71)
Choroid plexus	0.10	(0.09 -0.12)	0.09	(0.08 -0.10)	0.03	(0.02 -0.04)	0.03	(0.02 -0.04)	0.02	(0.02 -0.03)	0.02	(0.01 -0.03)	-	-	-	-	-	-
Neuroepithelial	0.01	(0.01 -0.02)	0.01	(0.01 -0.02)	-	-	0.02	(0.01 -0.03)	0.03	(0.02 -0.04)	0.03	(0.02 -0.04)	0.05	(0.03 -0.07)	0.07	(0.04 -0.10)	-	-
Non-malignant and malignant neuronal/glia	0.37	(0.34 -0.40)	0.40	(0.37 -0.42)	0.26	(0.24 -0.29)	0.25	(0.22 -0.28)	0.21	(0.18 -0.23)	0.20	(0.17 -0.24)	0.18	(0.14 -0.22)	0.21	(0.16 -0.26)	-	-
Pineal parenchymal	0.04	(0.03 -0.05)	0.04	(0.03 -0.05)	0.03	(0.03 -0.04)	0.03	(0.02 -0.04)	0.03	(0.02 -0.05)	0.03	(0.02 -0.05)	0.03	(0.02 -0.05)	-	-	-	-
Embryonal/primitive/medulloblastoma	0.59	(0.56 -0.63)	0.49	(0.47 -0.52)	0.14	(0.12 -0.16)	0.07	(0.06 -0.09)	0.05	(0.04 -0.06)	0.04	(0.02 -0.05)	0.03	(0.02 -0.05)	-	-	-	-
Tumors of Cranial and Spinal Nerves	0.21	(0.19 -0.24)	0.25	(0.23 -0.27)	0.77	(0.73 -0.81)	1.68	(1.61 -1.76)	2.91	(2.81 -3.01)	3.76	(3.63 -3.89)	3.74	(3.57 -3.91)	2.81	(2.64 -2.99)	1.30	(1.12 -1.50)
Nerve sheath, non-malignant and malignant	0.21	(0.19 -0.24)	0.25	(0.23 -0.27)	0.77	(0.73 -0.81)	1.68	(1.61 -1.76)	2.91	(2.81 -3.01)	3.76	(3.63 -3.89)	3.74	(3.57 -3.91)	2.81	(2.64 -2.99)	1.30	(1.12 -1.50)
Tumors of Meninges	0.15	(0.13 -0.17)	0.20	(0.18 -0.22)	1.31	(1.25 -1.37)	4.03	(3.92 -4.14)	7.73	(7.57 -7.89)	12.88	(12.64- 3.12)	21.68	(21.29-22.09)	30.58	(30.02-31.15)	37.09	(36.09-38.11)
Meningioma	0.09	(0.08 -0.11)	0.12	(0.11 -0.14)	1.10	(1.05 -1.15)	3.74	(3.64 -3.85)	7.39	(7.24 -7.55)	12.48	(12.24-12.72)	21.27	(20.88-21.67)	30.25	(29.69-30.82)	36.90	(35.90-37.91)
Other mesenchymal, non-malignant and malignant	0.05	(0.04 -0.06)	0.05	(0.04 -0.06)	0.05	(0.04 -0.07)	0.09	(0.07 -0.11)	0.09	(0.08 -0.11)	0.12	(0.09 -0.14)	0.14	(0.11 -0.17)	0.10	(0.07 -0.13)	-	-
Hemangioblastoma	0.01	(0.01 -0.02)	0.03	(0.02 -0.04)	0.16	(0.14 -0.18)	0.20	(0.17 -0.22)	0.24	(0.22 -0.27)	0.28	(0.25 -0.32)	0.28	(0.23 -0.33)	0.24	(0.19 -0.29)	-	-
Lymphomas and Hemopoietic Neoplasms	0.02	(0.01 -0.03)	0.02	(0.02 -0.03)	0.13	(0.11 -0.14)	0.28	(0.25 -0.31)	0.49	(0.46 -0.54)	0.96	(0.89 -1.03)	1.81	(1.69 -1.93)	2.17	(2.02 -2.33)	0.95	(0.79 -1.12)
Lymphoma	0.02	(0.01 -0.03)	0.02	(0.02 -0.03)	0.13	(0.11 -0.14)	0.28	(0.25 -0.31)	0.49	(0.46 -0.54)	0.96	(0.89 -1.03)	1.81	(1.69 -1.93)	2.17	(2.02 -2.33)	0.95	(0.79 -1.12)
Germ Cell Tumors and Cysts	0.16	(0.14 -0.18)	0.18	(0.17 -0.20)	0.09	(0.07 -0.10)	0.02	(0.02 -0.03)	0.02	(0.01 -0.03)	-	-	-	-	-	-	-	-
Germ cell tumors, cysts and heterotopias	0.16	(0.14 -0.18)	0.18	(0.17 -0.20)	0.09	(0.07 -0.10)	0.02	(0.02 -0.03)	0.02	(0.01 -0.03)	-	-	-	-	-	-	-	-
Tumors of Sellar Region	0.30	(0.28 -0.33)	0.53	(0.50 -0.56)	2.11	(2.04 -2.18)	2.84	(2.74 -2.93)	3.42	(3.32 -3.53)	4.20	(4.06 -4.34)	5.82	(5.62 -6.04)	5.33	(5.10 -5.58)	3.07	(2.78 -3.37)
Pituitary	0.14	(0.13 -0.16)	0.37	(0.35 -0.40)	2.01	(1.95 -2.08)	2.69	(2.60 -2.78)	3.27	(3.17 -3.37)	4.03	(3.89 -4.16)	5.65	(5.45 -5.86)	5.19	(4.96 -5.44)	3.02	(2.74 -3.32)
Craniopharyngioma	0.16	(0.14 -0.18)	0.15	(0.14 -0.17)	0.09	(0.08 -0.11)	0.15	(0.13 -0.17)	0.15	(0.13 -0.17)	0.17	(0.15 -0.20)	0.17	(0.14 -0.21)	0.14	(0.10 -0.18)	-	-
Local Extensions from Regional Tumors	-	-	-	-	0.02	(0.01 -0.02)	0.01	(0.01 -0.02)	0.02	(0.02 -0.04)	0.03	(0.02 -0.04)	0.05	(0.03 -0.07)	0.05	(0.03 -0.08)	-	-
Chordoma/chondrosarcoma	-	-	-	-	0.02	(0.01 -0.02)	0.01	(0.01 -0.02)	0.02	(0.02 -0.04)	0.03	(0.02 -0.04)	0.05	(0.03 -0.07)	0.05	(0.03 -0.08)	-	-
Unclassified Tumors	0.18	(0.16 -0.21)	0.21	(0.19 -0.23)	0.43	(0.40 -0.46)	0.63	(0.59 -0.68)	0.85	(0.80 -0.91)	1.28	(1.20 -1.36)	2.37	(2.24 -2.51)	5.19	(4.96 -5.43)	10.29	(9.76 -10.83)
Hemangioma	0.04	(0.03 -0.05)	0.05	(0.04 -0.06)	0.12	(0.11 -0.14)	0.17	(0.15 -0.20)	0.18	(0.16 -0.21)	0.21	(0.18 -0.24)	0.25	(0.21 -0.30)	0.24	(0.19 -0.29)	0.17	(0.11 -0.25)
Neoplasm, unspecified	0.14	(0.12 -0.16)	0.16	(0.14 -0.17)	0.30	(0.28 -0.33)	0.46	(0.42 -0.50)	0.66	(0.61 -0.71)	1.05	(0.98 -1.12)	2.11	(1.99 -2.24)	4.91	(4.69 -5.14)	10.07	(9.56 -10.61)
All other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL^b	4.57	(4.46- 4.67)	4.71	(4.62 -4.79)	7.94	(7.81 -8.08)	13.90	(13.69 -4.11)	22.35	(22.09-22.62)	34.97	(34.58-35.38)	53.00	(52.38-53.63)	65.50	(64.67-66.34)	64.17	(62.85-65.50)

^aRates are per 100,000 person years and age-adjusted to the 2000 U.S. standard population.

^bRefers to all brain tumors including histologies not presented in this table.

-Counts are not presented when fewer than 16 cases were reported for the specific histology category. The suppressed cases are included in the counts for totals.

Abbreviations: CBTRUS, Central Brain Tumor Registry of the United States; NPCR, CDC's National Program of Cancer Registries; SEER, NCI's Surveillance, Epidemiology and End Results program; CI, confidence interval; NOS, not otherwise specified

TABLE 17: SELECTED CHILDHOOD (AGES 0-19) PRIMARY (MALIGNANT AND NON-MALIGNANT) BRAIN AND CENTRAL NERVOUS SYSTEM TUMOR INCIDENCE RATES^a BY MAJOR HISTOLOGY GROUPINGS, HISTOLOGY AND GENDER, AGE-ADJUSTED TO THE 2000 U.S. STANDARD POPULATION; CBTRUS STATISTICAL REPORT: NPCR AND SEER, 2004-2006

Histology	Male		Female		TOTAL	
	Adjusted Rate	95% C.I.	Adjusted Rate	95% C.I.	Adjusted Rate	95% C.I.
<u>Tumors of Neuroepithelial Tissue</u>	3.48	(3.37-3.58)	3.16	(3.05-3.26)	3.32	(3.25-3.40)
Pilocytic astrocytoma	0.83	(0.78-0.88)	0.78	(0.73-0.84)	0.80	(0.77-0.84)
Protoplasmic & fibrillary astrocytoma	0.05	(0.04-0.06)	0.04	(0.03-0.05)	0.04	(0.04-0.05)
Anaplastic astrocytoma	0.07	(0.06-0.09)	0.08	(0.06-0.09)	0.07	(0.06-0.08)
Unique astrocytoma variants	0.10	(0.08-0.12)	0.09	(0.08-0.11)	0.10	(0.08-0.11)
Astrocytoma, NOS	0.23	(0.20-0.26)	0.21	(0.18-0.23)	0.22	(0.20-0.24)
Glioblastoma	0.15	(0.13-0.18)	0.11	(0.09-0.13)	0.13	(0.12-0.15)
Oligodendroglioma	0.07	(0.05-0.09)	0.06	(0.05-0.08)	0.06	(0.05-0.08)
Anaplastic oligodendroglioma	0.01	(0.01-0.02)	0.02	(0.01-0.03)	0.02	(0.01-0.02)
Ependymoma/anaplastic ependymoma	0.25	(0.22-0.28)	0.25	(0.22-0.28)	0.25	(0.23-0.27)
Ependymoma variants	0.05	(0.03-0.06)	0.02	(0.02-0.03)	0.03	(0.03-0.04)
Mixed glioma	0.03	(0.02-0.04)	0.04	(0.03-0.05)	0.03	(0.03-0.04)
Glioma malignant, NOS	0.51	(0.47-0.56)	0.54	(0.50-0.59)	0.53	(0.50-0.56)
Choroid plexus	0.10	(0.08-0.12)	0.08	(0.06-0.09)	0.09	(0.08-0.10)
Neuroepithelial	-	-	-	-	0.01	(0.01-0.02)
Non-malignant and malignant neuronal/glial	0.43	(0.39-0.47)	0.36	(0.32-0.40)	0.40	(0.37-0.42)
Pineal parenchymal	0.04	(0.03-0.05)	0.04	(0.03-0.06)	0.04	(0.03-0.05)
Embryonal/primitive/medulloblastoma	0.55	(0.51-0.59)	0.44	(0.40-0.48)	0.49	(0.47-0.52)
<u>Tumors of Cranial and Spinal Nerves</u>	0.24	(0.21-0.27)	0.25	(0.22-0.28)	0.25	(0.23-0.27)
Nerve sheath, non-malignant and malignant	0.24	(0.21-0.27)	0.25	(0.22-0.28)	0.25	(0.23-0.27)
<u>Tumors of Meninges</u>	0.20	(0.17-0.22)	0.20	(0.18-0.23)	0.20	(0.18-0.22)
Meningioma	0.12	(0.10-0.14)	0.13	(0.11-0.15)	0.12	(0.11-0.14)
Other mesenchymal, non-malignant and malignant	0.04	(0.03-0.06)	0.05	(0.04-0.07)	0.05	(0.04-0.06)
Hemangioblastoma	0.03	(0.02-0.04)	0.03	(0.02-0.04)	0.03	(0.02-0.04)
<u>Lymphomas and Hemopoietic Neoplasms</u>	0.02	(0.01-0.03)	0.02	(0.01-0.03)	0.02	(0.02-0.03)
<u>Germ Cell Tumors and Cysts</u>	0.25	(0.22-0.28)	0.11	(0.09-0.13)	0.18	(0.17-0.20)
<u>Tumors of Sellar Region</u>	0.35	(0.32-0.39)	0.71	(0.66-0.76)	0.53	(0.50-0.56)
Pituitary	0.20	(0.18-0.23)	0.55	(0.51-0.60)	0.37	(0.35-0.40)
Craniopharyngioma	0.15	(0.12-0.17)	0.16	(0.13-0.18)	0.15	(0.14-0.17)
<u>Local Extensions from Regional Tumors</u>	-	-	-	-	-	-
<u>Unclassified Tumors</u>	0.21	(0.19-0.24)	0.20	(0.18-0.23)	0.21	(0.19-0.23)
Hemangioma	0.05	(0.04-0.07)	0.04	(0.03-0.05)	0.05	(0.04-0.06)
Neoplasm, unspecified	0.16	(0.14-0.18)	0.16	(0.13-0.18)	0.16	(0.14-0.17)
All other	-	-	-	-	-	-
TOTAL^b	4.75	(4.62-4.87)	4.66	(4.53-4.79)	4.71	(4.62-4.79)

^aRates are per 100,000 person years

^bRefers to all brain tumors including histologies not presented in this table.

-Counts are not presented when fewer than 16 cases were reported for the specific histology category. Suppressed cases are included in the total count.
Abbreviations: CBTRUS, Central Brain Tumor Registry of the United States; NPCR, CDC's National Program of Cancer Registries; SEER, NCI's Surveillance, Epidemiology and End Results program; CI, confidence interval; NOS, not otherwise specified.

TABLES

TABLE 18: CHILDHOOD (AGES 0-19) PRIMARY (MALIGNANT AND NON-MALIGNANT) BRAIN AND CENTRAL NERVOUS SYSTEM TUMOR INCIDENCE RATES^a BY MAJOR HISTOLOGY GROUPINGS AND RACE, AGE-ADJUSTED TO THE 2000 U.S. STANDARD POPULATION; CBTRUS STATISTICAL REPORT: NPCR AND SEER, 2004-2006

Histology Grouping	Whites		Blacks	
	Adjusted Rate	95% C.I.	Adjusted Rate	95% C.I.
<u>Tumors of Neuroepithelial Tissue</u>	3.47	(3.39-3.56)	2.56	(2.40-2.72)
Pilocytic astrocytoma	0.86	(0.82-0.91)	0.54	(0.46-0.62)
Protoplasmic & fibrillary astrocytoma	0.05	(0.04-0.06)	-	-
Anaplastic astrocytoma	0.08	(0.06-0.09)	0.06	(0.04-0.09)
Unique astrocytoma variants	0.09	(0.08-0.11)	0.11	(0.08-0.15)
Astrocytoma, NOS	0.22	(0.20-0.25)	0.17	(0.13-0.22)
Glioblastoma	0.13	(0.11-0.14)	0.13	(0.10-0.18)
Oligodendroglioma	0.06	(0.05-0.08)	0.08	(0.05-0.11)
Anaplastic oligodendroglioma	-	-	-	-
Ependymoma/anaplastic ependymoma	0.26	(0.23-0.28)	0.20	(0.16-0.25)
Ependymoma variants	-	-	-	-
Mixed glioma	-	-	-	-
Glioma malignant, NOS	0.55	(0.52-0.59)	0.37	(0.31-0.43)
Choroid plexus	0.09	(0.08-0.11)	0.06	(0.03-0.08)
Neuroepithelial	-	-	-	-
Non-malignant and malignant neuronal/glia	0.42	(0.39-0.45)	0.32	(0.26-0.38)
Pineal parenchymal	0.03	(0.02-0.04)	0.09	(0.06-0.12)
Embryonal/primitive/medulloblastoma	0.53	(0.49-0.56)	0.35	(0.30-0.42)
<u>Tumors of Cranial and Spinal Nerves</u>	0.26	(0.23-0.28)	0.16	(0.12-0.21)
Nerve sheath, non-malignant and malignant	0.26	(0.23-0.28)	0.16	(0.12-0.21)
<u>Tumors of Meninges</u>	0.21	(0.19-0.23)	0.15	(0.11-0.19)
Meningioma	0.12	(0.11-0.14)	0.11	(0.08-0.15)
Other mesenchymal, non-malignant and malignant	-	-	-	-
Hemangioblastoma	-	-	-	-
<u>Lymphomas and Hemopoietic Neoplasms</u>	-	-	-	-
<u>Germ Cell Tumors and Cysts</u>	0.19	(0.17-0.22)	0.10	(0.07-0.14)
<u>Tumors of Sellar Region</u>	0.52	(0.49-0.56)	0.43	(0.37-0.50)
Pituitary	0.37	(0.34-0.40)	0.30	(0.24-0.36)
Craniopharyngioma	0.15	(0.13-0.17)	0.13	(0.10-0.18)
<u>Local Extensions from Regional Tumors</u>	-	-	-	-
<u>Unclassified Tumors</u>	0.22	(0.20-0.24)	0.15	(0.11-0.19)
Hemangioma	0.05	(0.04-0.06)	-	-
Neoplasm, unspecified	0.16	(0.15-0.18)	0.13	(0.10-0.17)
All other	-	-	-	-
TOTAL^b	4.89	(4.79-5.00)	3.57	(3.38-3.76)
Male	5.01	(4.86-5.15)	3.40	(3.15-3.68)
Female	4.77	(4.63-4.92)	3.73	(3.46-4.02)

^aRates are per 100,000 person years

^bRefers to all brain tumors including histologies not presented in this table.

-Counts are not presented when fewer than 16 cases were reported for the specific histology category. Suppressed cases are included in the total count.

Abbreviations: CBTRUS, Central Brain Tumor Registry of the United States; NPCR, CDC's National Program of Cancer Registries; SEER, NCI's Surveillance, Epidemiology and End Results program; CI, confidence interval; NOS, not otherwise specified.

TABLE 19: SELECTED CHILDHOOD PRIMARY (MALIGNANT AND NON-MALIGNANT) BRAIN AND CENTRAL NERVOUS SYSTEM TUMOR, AGE-SPECIFIC AND AGE-ADJUSTED INCIDENCE RATES^a BY MAJOR HISTOLOGY GROUPINGS, HISTOLOGY AND AGE AT DIAGNOSIS; CBTRUS STATISTICAL REPORT: NPCR AND SEER, 2004-2006

	Age At Diagnosis								Age at Diagnosis			
	0-4		5-9		10-14		15-19		0-19 ^b		0-14 ^b	
	Rate	95% C.I.	Rate	95% C.I.	Rate	95% C.I.	Rate	95% C.I.	Adjusted Rate	95% C.I.	Adjusted Rate	95% C.I.
Tumors of Neuroepithelial Tissue	4.27	(4.10-4.44)	3.48	(3.32-3.64)	2.90	(2.77-3.04)	2.68	(2.55-2.81)	3.32	(3.25-3.40)	3.54	(3.45-3.63)
Pilocytic astrocytoma	0.90	(0.83-0.99)	0.89	(0.82-0.98)	0.83	(0.75-0.90)	0.60	(0.54-0.67)	0.80	(0.77-0.84)	0.87	(0.83-0.92)
Protoplasmic & fibrillary astrocytoma	0.03	(0.02-0.05)	0.05	(0.03-0.07)	0.06	(0.04-0.08)	0.04	(0.03-0.06)	0.04	(0.04-0.05)	0.05	(0.04-0.06)
Anaplastic astrocytoma	0.06	(0.04-0.08)	0.07	(0.05-0.09)	0.09	(0.07-0.12)	0.08	(0.06-0.10)	0.07	(0.06-0.08)	0.07	(0.06-0.08)
Unique astrocytoma variants	0.04	(0.03-0.06)	0.10	(0.08-0.13)	0.13	(0.10-0.16)	0.11	(0.09-0.14)	0.10	(0.08-0.11)	0.09	(0.08-0.11)
Astrocytoma, NOS	0.26	(0.22-0.30)	0.18	(0.15-0.22)	0.23	(0.19-0.27)	0.20	(0.17-0.24)	0.22	(0.20-0.24)	0.22	(0.20-0.24)
Glioblastoma	0.09	(0.06-0.11)	0.14	(0.11-0.17)	0.12	(0.09-0.15)	0.18	(0.15-0.22)	0.13	(0.12-0.15)	0.11	(0.10-0.13)
Oligodendroglioma	0.04	(0.02-0.06)	0.04	(0.03-0.06)	0.07	(0.05-0.09)	0.11	(0.08-0.14)	0.06	(0.05-0.08)	0.05	(0.04-0.06)
Anaplastic oligodendroglioma	-	-	-	-	-	-	-	-	0.02	(0.01-0.02)	0.01	(0.01-0.02)
Ependymoma/anaplastic ependymoma	0.42	(0.37-0.48)	0.24	(0.20-0.28)	0.16	(0.13-0.20)	0.19	(0.15-0.23)	0.25	(0.23-0.27)	0.27	(0.25-0.30)
Ependymoma variants	-	-	-	-	-	-	-	-	0.03	(0.03-0.04)	0.02	(0.02-0.03)
Mixed glioma	-	-	-	-	-	-	-	-	0.03	(0.03-0.04)	0.02	(0.02-0.03)
Glioma malignant, NOS	0.80	(0.73-0.88)	0.74	(0.67-0.81)	0.35	(0.31-0.41)	0.24	(0.20-0.28)	0.53	(0.50-0.56)	0.63	(0.59-0.67)
Choroid plexus	0.23	(0.20-0.28)	0.05	(0.03-0.07)	0.04	(0.03-0.06)	0.03	(0.02-0.05)	0.09	(0.08-0.10)	0.10	(0.09-0.12)
Neuroepithelial	-	-	-	-	-	-	-	-	0.01	(0.01-0.02)	0.01	(0.01-0.02)
Non-malignant and malignant neuronal/glia	0.39	(0.34-0.44)	0.31	(0.26-0.36)	0.41	(0.36-0.47)	0.48	(0.42-0.54)	0.40	(0.37-0.42)	0.37	(0.34-0.40)
Pineal parenchymal	-	-	-	-	-	-	-	-	0.04	(0.03-0.05)	0.04	(0.03-0.05)
Embryonal/primitive/medulloblastoma	0.95	(0.87-1.03)	0.56	(0.50-0.62)	0.30	(0.25-0.34)	0.20	(0.17-0.24)	0.49	(0.47-0.52)	0.59	(0.56-0.63)
Tumors of Cranial and Spinal Nerves	0.23	(0.19-0.27)	0.21	(0.17-0.25)	0.20	(0.17-0.24)	0.34	(0.30-0.40)	0.25	(0.23-0.27)	0.21	(0.19-0.24)
Nerve sheath, non-malignant and malignant	0.23	(0.19-0.27)	0.21	(0.17-0.25)	0.20	(0.17-0.24)	0.34	(0.30-0.40)	0.25	(0.23-0.27)	0.21	(0.19-0.24)
Tumors of Meninges	0.17	(0.14-0.21)	0.10	(0.07-0.13)	0.18	(0.14-0.21)	0.35	(0.30-0.40)	0.20	(0.18-0.22)	0.15	(0.13-0.17)
Meningioma	0.08	(0.06-0.11)	0.07	(0.05-0.09)	0.12	(0.09-0.15)	0.23	(0.19-0.27)	0.12	(0.11-0.14)	0.09	(0.08-0.11)
Other mesenchymal, non-malignant and malignant	0.08	(0.06-0.11)	0.03	(0.02-0.05)	0.03	(0.02-0.05)	0.05	(0.03-0.07)	0.05	(0.04-0.06)	0.05	(0.04-0.06)
Hemangioblastoma	-	-	-	-	-	-	-	-	0.03	(0.02-0.04)	0.01	(0.01-0.02)
Lymphomas and Hemopoietic Neoplasms	-	-	-	-	-	-	-	-	0.02	(0.02-0.03)	0.02	(0.01-0.03)
Germ Cell Tumors and Cysts	0.11	(0.08-0.14)	0.11	(0.08-0.14)	0.26	(0.22-0.31)	0.25	(0.22-0.30)	0.18	(0.17-0.20)	0.16	(0.14-0.18)
Tumors of Sellar Region	0.14	(0.11-0.17)	0.31	(0.26-0.36)	0.45	(0.40-0.51)	1.19	(1.10-1.28)	0.53	(0.50-0.56)	0.30	(0.28-0.33)
Pituitary	0.03	(0.02-0.05)	0.10	(0.08-0.13)	0.30	(0.25-0.34)	1.06	(0.98-1.15)	0.37	(0.35-0.40)	0.14	(0.13-0.16)
Craniopharyngioma	0.11	(0.09-0.14)	0.21	(0.17-0.25)	0.16	(0.13-0.19)	0.13	(0.10-0.16)	0.15	(0.14-0.17)	0.16	(0.14-0.18)
Local Extensions from Regional Tumors	-	-	-	-	-	-	-	-	-	-	-	-
Unclassified Tumors	0.19	(0.16-0.23)	0.16	(0.13-0.20)	0.20	(0.16-0.24)	0.27	(0.23-0.32)	0.21	(0.19-0.23)	0.18	(0.16-0.21)
Hemangioma	-	-	-	-	-	-	-	-	0.05	(0.04-0.06)	0.04	(0.03-0.05)
Neoplasm, unspecified	0.14	(0.12-0.18)	0.14	(0.11-0.17)	0.14	(0.11-0.18)	0.20	(0.17-0.24)	0.16	(0.14-0.17)	0.14	(0.12-0.16)
TOTAL^c	5.13	(4.95-5.32)	4.37	(4.20-4.55)	4.22	(4.06-4.39)	5.12	(4.94-5.31)	4.71	(4.62-4.79)	4.57	(4.46-4.67)

^aRates are per 100,000 person years

^bAge adjusted to the 2000 U.S. standard population

^cRefers to all brain tumors including histologies not presented in this table.

-Counts are not presented when fewer than 16 cases were reported for the specific histology category. The suppressed cases are included in the counts for totals.

Abbreviations: CBTRUS, Central Brain Tumor Registry of the United States; NPCR, CDC's National Program of Cancer Registries; SEER, NCI's Surveillance, Epidemiology and End Results program; CI, confidence interval; NOS, not otherwise specified.

TABLES

TABLE 20: PRIMARY MALIGNANT BRAIN AND CNS TUMOR INCIDENCE AND MORTALITY RATES^a BY STATE, AGE-ADJUSTED TO THE 2000 U.S. STANDARD POPULATION, CINA 2002-2006^b

STATE	INCIDENCE				MORTALITY			
	MALES		FEMALES		MALES		FEMALES	
	N	RATE	N	RATE	N	RATE	N	RATE
Alabama	730	7.5	623	5.5	565	5.3	464	3.5
Alaska	95	6.8	72	5.3	64	5.0	39	3.5
Arizona	1,036	7.4	856	5.7	668	4.9	527	3.4
Arkansas	501	7.5	392	5.1	386	5.8	343	4.2
California	5,866	7.4	4,651	5.2	4,004	5.3	3,101	3.5
Colorado	782	7.5	667	5.9	530	5.2	411	3.6
Connecticut	698	8.3	591	6.0	409	4.8	365	3.5
Delaware	171	8.5	121	5.4	110	5.5	82	3.5
District of Columbia	74	5.6	77	4.9	48	3.8	41	2.6
Florida	3,636	7.9	2,933	5.6	2,361	4.9	1,904	3.3
Georgia	1,378	7.1	1,228	5.5	842	4.6	691	3.2
Hawaii	138	4.4	127	3.7	107	3.4	81	2.3
Idaho	286	8.5	242	6.8	207	6.2	163	4.6
Illinois	2,152	7.4	1,883	5.6	1,308	4.7	1,126	3.3
Indiana	1,150	7.9	1,005	6.0	796	5.6	669	3.9
Iowa	638	8.7	522	6.3	465	6.3	393	4.5
Kansas	548	8.5	417	5.6	423	6.6	333	4.3
Kentucky	784	7.9	645	5.7	503	5.2	427	3.6
Louisiana	666	7.4	493	4.7	569	5.9	434	3.6
Maine	340	10.2	240	6.2	222	6.5	159	3.9
Maryland	-	-	-	-	604	4.9	475	3.2
Massachusetts	1,286	8.4	1,119	6.2	802	5.2	634	3.3
Michigan	1,930	8.1	1,674	6.1	1,374	5.8	1,066	3.8
Minnesota	953	7.8	707	5.4	630	5.3	485	3.6
Mississippi	385	6.5	386	5.5	379	5.9	340	4.2
Missouri	1,077	7.7	960	6.0	761	5.5	612	3.7
Montana	227	9.5	153	5.9	141	5.7	110	4.2
Nebraska	344	8.2	269	5.7	234	5.6	203	4.0
Nevada	420	7.3	328	5.6	267	4.9	213	3.7
New Hampshire	272	8.7	200	5.8	193	6.1	140	3.9
New Jersey	1,749	8.5	1,403	5.8	921	4.6	745	2.9
New Mexico	316	7.0	221	4.4	206	4.6	152	3.0
New York	3,713	8.3	3,058	5.7	2,113	4.7	1,642	2.9
North Carolina	1,602	8.0	1,360	5.8	1,013	5.3	841	3.5
North Dakota	122	7.8	100	5.6	88	5.6	83	4.4
Ohio	-	-	-	-	1,496	5.5	1,225	3.7
Oklahoma	704	8.2	620	6.4	504	6.0	387	3.8
Oregon	765	8.5	628	6.5	591	6.6	450	4.4
Pennsylvania	2,601	8.4	2,201	6.0	1,568	5.0	1,353	3.4
Rhode Island	248	9.7	191	6.0	160	6.2	131	4.0
South Carolina	750	7.6	670	5.8	524	5.4	460	3.8
South Dakota	168	8.8	104	4.8	139	7.3	77	3.4
Tennessee	1,071	7.6	931	5.7	891	6.4	812	4.8
Texas	3,414	7.8	2,827	5.8	2,464	5.4	1,926	3.6
Utah	417	8.1	343	6.2	260	5.6	188	3.8
Vermont	-	-	-	-	90	5.5	63	3.5
Virginia	1,253	7.3	965	4.9	812	4.9	603	3.0
Washington	1,284	8.8	1,000	6.3	949	6.7	731	4.5
West Virginia	416	8.8	334	6.2	274	5.7	208	3.6
Wisconsin	-	-	-	-	738	5.6	597	3.8
Wyoming	108	8.7	71	5.4	63	5.1	55	4.1
United States^c	46,698	7.9	38,358	5.7	35,836	5.3	28,762	3.5

^aRates are per 100,000 population.

^bSource: Cancer Incidence in North America, 2002-2006. Volumes One, Two, and Three. North American Association of Central Cancer Registries, Inc., June 2009.

^cIncludes data from 52 central registries (46 states, 5 metropolitan areas, and the District of Columbia) covering approximately 91% of the total United States population.

- Not available.

TABLE 21: PRIMARY BRAIN AND OTHER NERVOUS SYSTEM TUMORS, ESTIMATED NUMBER OF CASES^{a,b} OVERALL AND BY BEHAVIOR BY STATE, 2010; PRIMARY MALIGNANT BRAIN AND OTHER NERVOUS SYSTEM TUMORS, ESTIMATED NUMBER OF DEATHS^{b,c} BY STATE, 2009

STATE	2010 Estimated New Cases			2009 Estimated Deaths
	All	Malignant	Non-Malignant	Malignant
Alabama	970	350	610	200
Alaska	130	50	80	-
Arizona	1,400	550	850	280
Arkansas	610	230	380	130
California	7,100	2,670	4,430	1,460
Colorado	1,010	390	620	200
Connecticut	760	290	470	150
Delaware	190	70	120	50
District of Columbia	110	-	70	-
Florida	4,430	1,670	2,770	810
Georgia	1,830	670	1,160	320
Hawaii	250	80	170	-
Idaho	310	120	190	90
Illinois	2,560	960	1,600	470
Indiana	1,310	500	800	290
Iowa	650	250	400	160
Kansas	580	220	350	150
Kentucky	890	350	550	150
Louisiana	870	310	560	210
Maine	310	120	190	80
Maryland	1,160	410	750	200
Massachusetts	1,410	530	870	270
Michigan	2,120	800	1,320	490
Minnesota	1,100	420	670	230
Mississippi	580	210	370	160
Missouri	1,240	470	770	270
Montana	220	80	130	50
Nebraska	370	140	230	80
Nevada	600	230	370	120
New Hampshire	300	120	180	70
New Jersey	1,860	690	1,170	320
New Mexico	420	160	260	80
New York	4,000	1,460	2,530	790
North Carolina	1,880	700	1,190	330
North Dakota	140	50	90	-
Ohio	2,440	920	1,520	550
Oklahoma	740	280	460	170
Oregon	830	320	510	210
Pennsylvania	2,790	1,050	1,740	550
Rhode Island	230	90	150	50
South Carolina	930	340	590	190
South Dakota	170	70	100	-
Tennessee	1,310	490	810	350
Texas	4,550	1,750	2,800	850
Utah	470	190	280	100
Vermont	150	60	90	-
Virginia	1,600	590	1,010	290
Washington	1,370	530	850	380
West Virginia	410	160	250	90
Wisconsin	1,200	460	740	260
Wyoming	110	-	70	-
United States	62,930	23,720	39,210	12,920

^aSource: CBTRUS NPCR and SEER 2004-2006 data.

^bRounded to the nearest 10.

^cSource: Cancer Facts & Figures 2009. American Cancer Society, 2009.

- Estimated number is less than 50.

TABLES

TABLE 22: FIVE-YEAR RELATIVE SURVIVAL RATES^a FOR MALIGNANT BRAIN AND CENTRAL NERVOUS SYSTEM TUMORS BY SITE^b AND GENDER, SEER 17 REGISTRIES, 1995-2006

ICD-O-3 CODE	SITE ^b	Male		Female		Total	
		N	5-YR	N	5-YR	N	5-Yr
C71.1-C71.4	Frontal, temporal, parietal, and occipital lobes of the brain	12,427	26.82%	9,495	29.79%	21,922	28.11%
C71.0	Cerebrum	1,185	23.91%	947	26.51%	2,132	25.19%
C71.5	Ventricle	439	58.97%	330	65.87%	769	62.26%
C71.6	Cerebellum	1,362	69.52%	1,040	72.34%	2,402	70.80%
C71.7	Brain stem	961	45.99%	886	43.36%	1,847	44.75%
C71.8-C71.9	Other brain	5,474	21.38%	4,329	24.36%	9,803	22.71%
C72.0-C72.1	Spinal cord and cauda equina	782	77.64%	627	82.51%	1,409	79.88%
C72.2-C72.5	Cranial nerves	208	91.30%	199	91.76%	407	91.77%
C72.8-C72.9	Other nervous system	259	35.02%	184	46.46%	443	39.75%
C70.0-C70.9	Meninges (cerebral and spinal)	339	54.99%	487	70.44%	826	63.95%
C75.1-C75.2	Pituitary and craniopharyngeal duct	79	67.29%	85	84.46%	164	76.15%
C75.3	Pineal	313	75.46%	97	63.66%	410	72.79%
C30.0 (9522-9523)	Olfactory tumors of the nasal cavity	181	68.58%	151	80.05%	332	74.24%

^aThe cohort analysis of survival rates was utilized for calculating the survival estimates presented in this table. Long-term cohort-based survival estimates reflect the survival experience of individuals diagnosed over the time period, and they may not necessarily reflect the long-term survival outlook of newly diagnosed cases.

^bThe sites referred to in this table are loosely based on the categories and site codes defined in the SEER Site/Histology Validation List. Abbreviation: SEER, Survival, Epidemiology and End Results.

TABLE 23: ONE-, TWO-, THREE-, FOUR-, FIVE-, AND 10-YEAR RELATIVE SURVIVAL RATES^{a,b} FOR SELECTED MALIGNANT BRAIN AND CENTRAL NERVOUS SYSTEM TUMORS, SEER 17 REGISTRIES, 1995-2006

Histology	# Cases	1-Yr	2-Yr	3-Yr	4-Yr	5-Yr	10-Yr
Pilocytic astrocytoma	2,064	97.76%	96.69%	95.64%	94.69%	94.04%	91.43%
Protoplasmic & fibrillary astrocytoma	554	74.60%	60.51%	54.99%	50.93%	47.43%	35.49%
Anaplastic astrocytoma	2,599	59.78%	42.28%	34.50%	30.34%	27.42%	21.31%
Astrocytoma, NOS	3,011	69.29%	59.12%	53.65%	50.05%	47.54%	38.67%
Glioblastoma	17,672	33.67%	11.89%	6.82%	5.08%	4.46%	2.70%
Oligodendroglioma	2,236	94.11%	89.82%	86.36%	82.58%	79.05%	64.22%
Anaplastic oligodendroglioma	906	79.31%	65.22%	58.96%	52.60%	47.42%	34.83%
Ependymoma/anaplastic ependymoma	1,569	93.92%	88.81%	85.28%	82.70%	81.86%	76.74%
Mixed glioma	1,135	87.00%	74.61%	67.09%	61.39%	56.97%	45.80%
Glioma malignant, NOS	2,492	59.03%	47.66%	44.68%	42.66%	41.47%	38.29%
Neuroepithelial	97	55.54%	43.46%	42.47%	37.65%	33.63%	27.53%
Malignant neuronal/glial, Neuronal and mixed	480	88.60%	79.43%	76.15%	70.71%	69.48%	57.59%
Embryonal/primitive/medulloblastoma	1,671	82.39%	71.81%	66.67%	63.44%	61.36%	54.28%
Lymphoma	3,116	47.38%	37.94%	33.27%	30.02%	27.46%	20.45%
Total: All Brain and CNS^c	42,866	56.70%	42.86%	38.62%	36.39%	35.10%	31.50%

^aThe cohort analysis of survival rates was utilized for calculating the survival estimates presented in this table. Long-term cohort-based survival estimates reflect the survival experience of individuals diagnosed over the time period, and they may not necessarily reflect the long-term survival outlook of newly diagnosed cases.

^bRates are an estimate of the percentage of patients alive at one, two, three, four, five, and ten year, respectively.

^cIncludes histologies not listed in this table.

Abbreviations: SEER, Survival, Epidemiology and End Results; NOS, not otherwise specified.

TABLES

TABLE 24: ONE-, TWO-, THREE-, FOUR-, FIVE-, AND TEN-YEAR RELATIVE SURVIVAL RATES^{a,b} FOR SELECTED MALIGNANT BRAIN AND CENTRAL NERVOUS SYSTEM TUMORS BY AGE GROUPS, SEER 17 REGISTRIES, 1995-2006

Histology	Age Group	# Cases	1-Yr	2-Yr	3-Yr	4-Yr	5-Yr	10-Yr
Pilocytic astrocytoma	0-14	1,243	98.6	98.5	98.0	97.5	97.2	95.7
	0-19	1,488	98.3	98.2	97.5	97.1	96.6	95.5
	20-44	440	96.8	95.3	93.9	91.9	90.8	87.4
	45-54	78	93.5	86.5	86.5	82.1	80.2	67.1
	55-64	33	97.6	84.7	81.4	81.4	81.4	c
	65-74	18	c	c	c	c	c	c
	75+	c	c	c	c	c	c	c
Protoplasmic & fibrillary astrocytoma	0-14	83	92.6	82.3	82.3	82.3	82.3	79.7
	0-19	100	93.8	83.3	83.3	83.3	83.3	81.2
	20-44	221	91.2	81.1	73.0	65.4	58.3	39.2
	45-54	68	72.1	53.3	49.6	43.1	40.5	c
	55-64	83	55.2	26.7	c	c	c	c
	65-74	50	c	c	c	c	c	c
	75+	32	c	c	c	c	c	c
Anaplastic astrocytoma	0-14	139	58.0	41.4	32.1	31.1	31.1	26.5
	0-19	183	61.8	41.7	32.6	31.8	31.8	28.0
	20-44	861	87.2	72.1	62.1	54.8	47.6	36.1
	45-54	482	68.8	46.5	36.4	29.7	28.2	13.7
	55-64	433	46.3	23.1	14.7	11.1	9.0	5.8
	65-74	375	29.4	10.0	5.6	4.5	4.5	c
	75+	265	12.4	c	c	c	c	c
Astrocytoma, NOS	0-14	391	90.9	86.8	84.1	82.4	82.0	78.4
	0-19	493	91.6	86.9	83.7	82.2	81.8	77.9
	20-44	1,032	91.5	82.5	76.1	70.3	64.1	44.3
	45-54	459	70.3	56.3	47.9	40.4	38.8	28.8
	55-64	377	51.8	32.0	21.5	18.9	18.5	10.2
	65-74	324	29.7	19.3	14.9	12.3	11.1	8.4
	75+	326	18.8	9.0	7.5	6.9	c	c
Glioblastoma	0-14	132	46.8	28.0	23.7	22.4	22.4	11.9
	0-19	206	54.4	30.1	21.1	18.6	18.6	10.3
	20-44	1,862	66.0	34.4	23.3	18.5	15.9	10.0
	45-54	3,183	50.5	17.7	9.0	6.2	5.2	2.3
	55-64	4,329	38.4	11.0	5.3	3.2	2.7	0.5
	65-74	4,325	21.4	4.8	2.3	1.7	1.3	0.6
	75+	3,767	9.4	2.2	1.0	0.7	0.6	c
Oligodendroglioma	0-14	107	97.1	96.1	96.1	96.1	96.1	89.6
	0-19	177	98.3	95.8	94.5	94.5	93.6	88.5
	20-44	1,200	97.9	95.5	92.4	88.2	84.1	67.5
	45-54	472	93.6	88.9	85.1	80.4	76.4	56.0
	55-64	227	87.6	77.7	71.3	67.3	63.1	48.5
	65-74	95	77.1	66.1	58.6	54.4	51.3	22.2
	75+	65	60.0	40.6	35.3	31.0	27.2	27.2
Anaplastic oligodendroglioma	0-14	c	c	c	c	c	c	c
	0-19	26	86.4	62.1	c	c	c	c
	20-44	367	93.7	81.6	77.6	70.9	64.0	51.3
	45-54	217	82.6	68.9	62.0	55.6	50.3	36.5
	55-64	159	70.6	54.4	44.2	34.6	31.0	14.4
	65-74	98	50.5	34.4	26.4	19.9	c	c
	75+	39	c	c	c	c	c	c
Ependymoma/anaplastic ependymoma	0-14	398	93.3	84.8	78.1	71.6	68.9	59.5
	0-19	476	94.0	86.3	79.9	74.4	72.1	63.2
	20-44	506	95.8	94.0	92.5	91.1	90.8	87.0
	45-54	267	93.8	89.3	87.2	84.5	83.2	81.4
	55-64	186	94.1	90.2	88.0	85.5	84.9	84.9
	65-74	91	87.5	73.5	68.4	68.4	68.4	58.9
	75+	43	81.1	74.1	61.9	61.9	61.9	33.9

TABLE 24: ONE-, TWO-, THREE-, FOUR-, FIVE-, AND TEN-YEAR RELATIVE SURVIVAL RATES^{a,b} FOR SELECTED MALIGNANT BRAIN AND CENTRAL NERVOUS SYSTEM TUMORS BY AGE GROUPS, SEER 17 REGISTRIES, 1995-2006

Histology	Age Group	# Cases	1-Yr	2-Yr	3-Yr	4-Yr	5-Yr	10-Yr
Glioma malignant, NOS	0-19	83	90.1	83.1	83.1	79.5	79.5	79.5
	20-44	615	96.0	88.0	80.0	74.2	67.4	54.9
	45-54	213	86.5	71.0	59.8	52.5	51.4	25.7
	55-64	118	70.2	45.2	36.6	32.4	26.8	c
	65-74	72	67.0	38.0	30.3	c	c	c
	75+	34	c	c	c	c	c	c
	0-14	767	72.6	56.8	53.3	51.8	51.8	50.9
Malignant neuronal/glioma, neuronal and mixed	0-19	849	74.0	59.0	55.4	53.2	53.2	52.5
	20-44	464	88.2	77.9	72.8	68.1	63.6	45.9
	45-54	258	66.7	53.8	47.1	43.0	39.6	29.5
	55-64	225	46.1	29.3	26.6	24.6	22.0	21.0
	65-74	257	30.7	19.7	17.5	14.7	14.7	14.3
	75+	439	13.9	8.6	7.3	6.8	5.2	c
	0-14	79	87.0	75.3	72.0	67.6	67.6	67.6
Embryonal/primitive/medulloblastoma	0-19	99	87.6	74.4	70.3	64.6	64.6	64.6
	20-44	123	95.1	88.8	85.4	80.1	77.2	64.3
	45-54	105	91.5	90.8	87.3	80.7	76.5	62.0
	55-64	80	88.9	72.6	71.3	61.0	61.0	54.3
	65-74	39	70.2	59.7	57.5	57.5	57.5	c
	75+	34	76.2	61.8	51.8	51.8	51.8	c
	0-14	1,099	81.0	70.2	66.2	63.8	61.9	57.2
Lymphoma	0-19	1,212	81.8	70.8	66.4	63.9	61.8	57.4
	20-44	368	86.6	78.5	71.4	65.9	64.0	49.8
	45-54	46	78.2	62.7	57.0	57.0	53.7	42.5
	55-64	25	67.2	c	c	c	c	c
	65-74	c	c	c	c	c	c	c
	75+	c	c	c	c	c	c	c
	0-14	34	84.6	80.2	80.2	74.9	74.9	74.9
Total: All Brain and CNS^d	0-19	55	81.1	76.1	76.1	73.0	73.0	62.8
	20-44	835	35.7	29.5	26.9	25.5	24.0	18.1
	45-54	510	57.8	48.4	45.0	41.0	39.2	29.6
	55-64	555	61.9	50.8	45.0	41.1	36.3	25.4
	65-74	623	48.7	36.9	28.8	22.4	19.8	8.6
	75+	538	35.2	23.6	18.3	16.3	11.8	8.1
	0-14	5,030	85.4	77.6	74.6	72.5	71.5	67.1
	0-19	6,148	86.4	78.6	75.2	73.1	72.1	68.1
	20-44	9,510	82.1	70.2	64.1	59.7	55.9	44.6
	45-54	6,694	64.1	42.9	36.1	32.4	30.7	22.6
	55-64	7,188	48.8	26.5	20.6	17.9	16.7	11.9
	65-74	6,818	30.5	15.7	12.2	10.5	9.6	6.7
	75+	6,508	16.4	8.5	6.7	6.1	5.2	4.2

^aThe cohort analysis of survival rates was utilized for calculating the survival estimates presented in this table. Long-term cohort-based survival estimates reflect the survival experience of individuals diagnosed over the time period, and they may not necessarily reflect the long-term survival outlook of newly diagnosed cases.

^bRates are an estimate of the percentage of patients alive at one, two, three, four, five, and ten year, respectively.

^cToo few cases to report/estimate.

^dIncludes histologies not listed in this table.

Abbreviations: SEER, Survival, Epidemiology and End Results; NOS, not otherwise specified.

PROCEDURE FOR REQUESTING ADDITIONAL DATA ANALYSES

The Central Brain Tumor Registry of the United States (CBTRUS) serves as a resource for gathering and disseminating current data on the epidemiology of all primary brain tumors. Analyses of its CBTRUS data are available to assist in research projects that intend to describe incidence and survival patterns of brain tumor cases, to evaluate diagnosis and treatment, and to conduct etiologic studies.

The CBTRUS maintains an analytic database containing incidence of epidemiologic data on all brain tumors, malignant and non-malignant, consolidated from seventeen of the population-based state cancer registries contributing data to its Statistical Reports. This database includes cases newly diagnosed between 2002-2006 with ICDO codes: C70.0-C70.9, C71.0-C71.9, C72.0-C72.9, C75.1-C75.3, and C30.0 (9522-9523). In addition, the CBTRUS can assist in assessing mortality, survival and treatment information using other databases.

To obtain more information regarding CBTRUS and related databases, please contact the Central Brain Tumor Registry of the United States. To obtain additional data, please complete the application form and send to CBTRUS, 244 East Ogden Ave., Suite 116, Hinsdale, IL 60521 or access online at www.cbtrus.org.

CENTRAL BRAIN TUMOR REGISTRY OF THE UNITED STATES

APPLICATION FOR ADDITIONAL DATA ANALYSES

1. TITLE OF PROJECT:

2. PRINCIPAL INVESTIGATOR/PROGRAM DIRECTOR: (Attach Current Resume)
NAME DEGREE(S) SSN

3. POSITION TITLE:

4. DEPARTMENT, SERVICE, LABORATORY OR EQUIVALENT:

5. TELEPHONE: FAX:

6. E-MAIL ADDRESS:

7. NAME AND ADDRESS OF APPLICANT ORGANIZATION:

8. TYPE OF ORGANIZATION (circle one):

PUBLIC PRIVATE NOT-FOR-PROFIT FOR PROFIT

9. SOURCE OF FUNDING (if different from #7 above):

10. PROJECT DESCRIPTION: State the applicant's broad, long-term objectives and specific aims. Describe concisely the research design and methods for achieving these goals. (Attach additional pages if necessary.)

11. SIGNATURE OF PRINCIPAL INVESTIGATOR:

PUBLISHED

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THE CENTRAL BRAIN TUMOR REGISTRY OF THE US (CBTRUS)



- CBTRUS is a not-for-profit 501(c)3 corporation committed to collecting and disseminating high quality incidence and survival data on all primary brain tumors.
- CBTRUS analyzes the largest aggregation of databases on primary brain tumors from population-based registries in the United States participating in the *Surveillance, Epidemiology, and End Results* (SEER) program of the *National Cancer Institute* and the *National Program of Cancer Registries* (NPCR) of the *Centers for Disease Control*.
- CBTRUS serves as consultant on brain tumor data classification, coding and collection to national and international organizations including the *International Agency for Research on Cancer* of the *World Health Organization* and the *National Coordinating Council for Cancer Surveillance* in the United States.
- CBTRUS analyzes and disseminates brain tumor information from the *National Cancer Data Base* (NCDB) of the *American College of Surgeons Commission on Cancer* with their permission.
- CBTRUS provides a resource for the neuroscience community that does not exist elsewhere and is recognized by the Joint Section on Tumors of the *Congress of Neurological Surgeons / American Association of Neurological Surgeons*.
- CBTRUS is guided by experts in the field of brain tumor research.
- CBTRUS presents data in histologic groupings with improved clinical relevance that were previously unavailable.
- CBTRUS conducts specialized data analysis in response to specific questions.
- CBTRUS investigates patterns of brain tumor incidence including trends over time and patterns by geographical area.
- CBTRUS can assist in planning studies of brain tumors by providing:
 - sources of collaboration to obtain cases for case control studies
 - sources of collaboration for rare tumor studies
 - estimates of expected cases
- CBTRUS provides an incidence standard against which other data can be compared, including
 - hospital case series
 - physician/physician group case series
 - cluster investigations
- CBTRUS encourages all cancer registries to collect data on all primary brain tumors.
- CBTRUS promotes awareness of the disease of brain tumors through presentation of descriptive statistics.