National Cancer Institute

A Snapshot of

Brain and Central Nervous System Cancers

Incidence and Mortality Rate Trends

It is estimated that 22,340 new cases of primary malignant brain and central nervous system (CNS) tumors will be diagnosed in the United States in 2011; of those, approximately 3,000 will be new cases of childhood primary brain and CNS tumors.[1] The incidence and mortality rates for cancers that originate in the brain and CNS have decreased slightly in the past decade. Both incidence and mortality rates are substantially higher for whites than for people of other racial/ethnic groups. In all racial/ethnic groups, men have higher incidence and mortality rates than women.

Brain tumors are the leading cause of death from solid tumor cancers in children; brain and CNS cancers make up approximately 27 percent of all childhood cancers. The incidence rate of brain and CNS cancers in children has risen slightly over the past three decades, but the death rate has dropped slightly over this period.

It is estimated that approximately $3.7 billion[2] is spent in the United States each year on brain cancer treatment.

Source for incidence and mortality data: Surveillance, Epidemiology, and End Results (SEER) Program and the National Center for Health Statistics. Additional statistics and charts are available at http://seer.cancer.gov/.

1 Central Brain Tumor Registry of the United States (http://www.cbtrus.org/factsheet/factsheet.html).

2 Cancer Trends Progress Report (http://progressreport.cancer.gov), in 2006 dollars.

Trends in NCI Funding for Brain and Central Nervous System Cancers Research

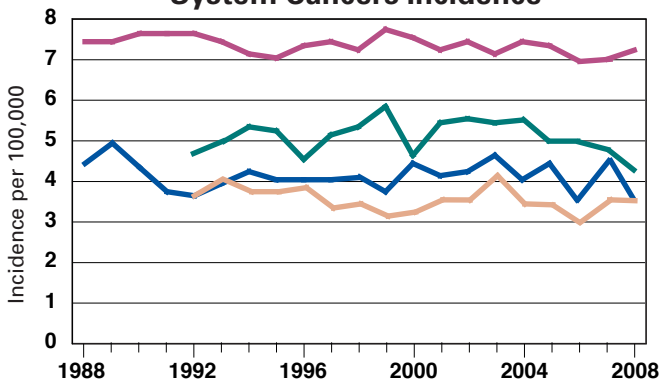
The National Cancer Institute's (NCI) investment[3] in brain and CNS cancers research increased from $130.3 million in fiscal year (FY) 2006 to $156.8 million in FY 2010. In addition, NCI supported $53.8 million in brain and CNS cancers research in FY 2009 and 2010 using funding from the American Recovery and Reinvestment Act (ARRA).[4]

Source: NCI Office of Budget and Finance (http://obf.cancer.gov).

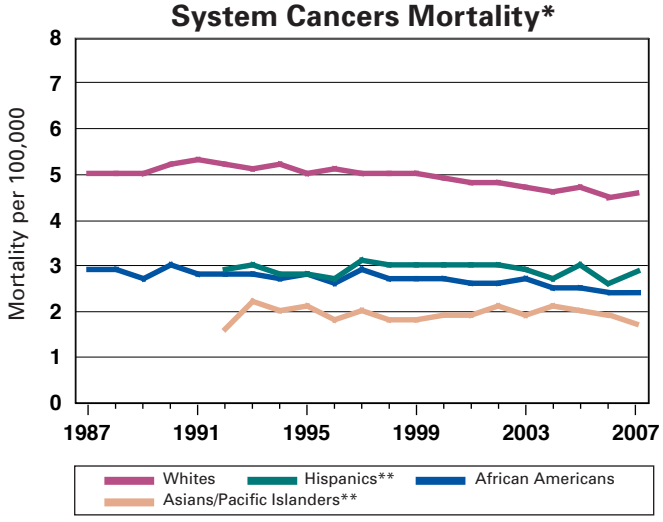
3 The estimated NCI investment is based on funding associated with a broad range of peer-reviewed scientific activities. For additional information on research planning and budgeting at the National Institutes of Health (NIH), see http://www.nih.gov/about/.

4 For more information regarding ARRA funding at NCI, see http://www.cancer.gov/aboutnci/recovery/recoveryfunding.

U.S. Brain and Other Central Nervous System Cancers Incidence*

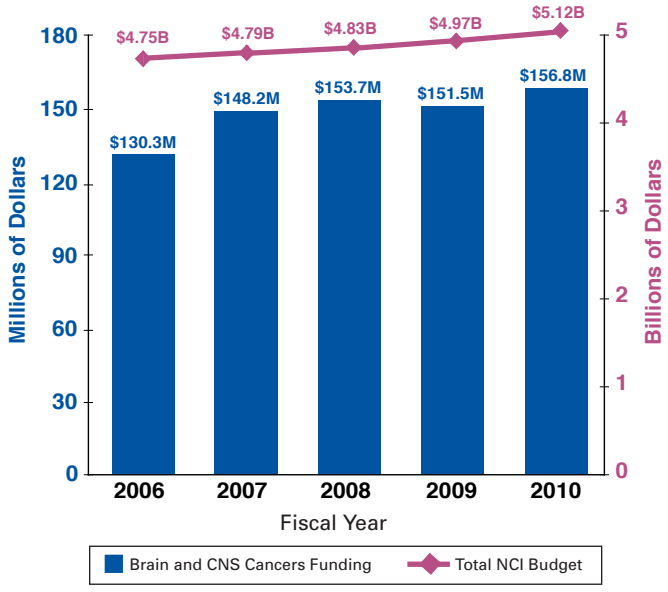


U.S. Brain and Other Central Nervous System Cancers Mortality*



* Insufficient data available for time trend analysis for American Indians/Alaska Natives.
** Incidence and mortality data not available before 1992.

NCI Brain and Central Nervous System Cancers Research Investment



Snapshots can be found online at:
http://www.cancer.gov/aboutnci/servingpeople/cancer-statistics/snapshots

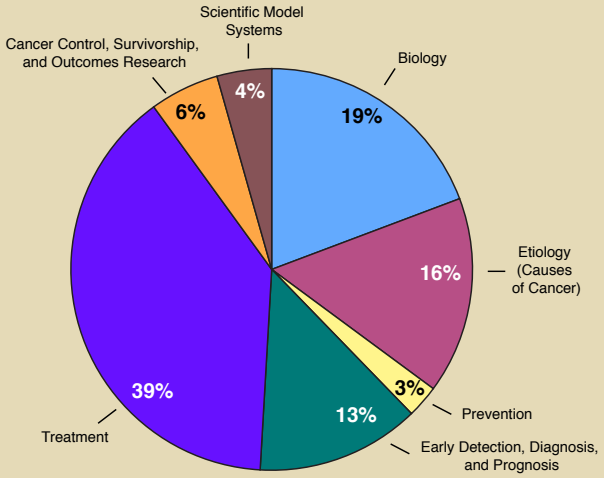
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

National Institutes of Health

Examples of NCI Activities Relevant to Brain and Central Nervous System Cancers

- The **Tumor Microenvironment Network (TMEN)** is exploring the role of the microenvironment—the cells and blood vessels that feed a tumor cell—in tumor initiation and progression. Network investigators are studying the interaction between brain tumors and the brain microenvironment. http://tmen.nci.nih.gov/
- The **Cancer Genome Atlas (TCGA)** is assessing the feasibility of systematically identifying the major genomic changes involved in 20 cancers using state-of-the-art genomic analysis technologies. TCGA has discovered novel molecular subtypes of brain cancer, which was one of the first cancer types to be studied in the pilot phase. http://cancergenome.nih.gov/
- The **Neuro-Oncology Branch** is a joint program of NCI and the National Institute of Neurological Disorders and Stroke. The Branch supports the development of novel experimental therapeutics for adults and children with central nervous system tumors. http://home.ccr.cancer.gov/nob/
- The **Integrative Cancer Biology Program** combines experimental and clinical research with mathematical modeling to gain new insight into cancer biology, prevention, diagnostics, and treatments. One center is using brain cancer as a model site. http://icbp.nci.nih.gov/
- The **Brain Tumor Epidemiology Consortium** fosters the development of international and interdisciplinary collaborations to increase the understanding of brain cancer etiology, prevention, and outcomes. http://epi.grants.cancer.gov/btec/index.html
- Three brain-tumor-specific **Specialized Programs of Research Excellence (SPOREs)** are focused primarily on the epidemiology and treatment of adult brain tumors. http://trp.cancer.gov/spores/brain.htm

NCI Brain and CNS Cancers Research Portfolio



Percentage of Total Dollars by Scientific Area
Fiscal Year 2010

Data source: The NCI Funded Research Portfolio. Only projects with assigned scientific area codes are included. A description of relevant research projects can be found on the NCI Funded Research Portfolio Web site at http://fundedresearch.cancer.gov

- The **What You Need to Know About™ Brain Tumors** booklet provides information about diagnosis, treatment, and supportive care for primary brain tumors. Information specialists can also answer questions about cancer at 1-800-4-CANCER. http://www.cancer.gov/cancertopics/wyntk/brain
- The **NCI Brain Tumor Home Page** provides up-to-date information on brain cancer treatment, prevention, genetics, causes, and other related topics. http://www.cancer.gov/cancertopics/types/brain/

Selected Advances in Brain and Central Nervous System Cancers Research

- A new test that uses information on clinical factors may **help surgeons decide whether to operate** on patients when glioblastoma multiforme, the most common brain tumor in adults, returns. http://www.cancer.gov/ncicancerbulletin/072710/page5 and http://www.ncbi.nlm.nih.gov/pubmed/20644085
- A groundbreaking technology has allowed scientists to **visualize changes in tumor blood vessels** in deep brain regions in a mouse model of glioma over a period of weeks. http://www.ncbi.nlm.nih.gov/pubmed/21240263
- Researchers have discovered that **tissue surrounding brain tumors**, **called the tumor microenvironment**, may help make brain tumors resistant to radiation therapy. http://home.ccr.cancer.gov/inthejournals/camphausen2011.asp and http://www.ncbi.nlm.nih.gov/pubmed/21037023
- Experiments in cell lines and biopsy samples suggest that changes in **mitochondrial metabolism may be the basis of resistance to the chemotherapy** drug temozolomide in patients with glioma. http://www.ncbi.nlm.nih.gov/pubmed/20870728