

BRAIN AND CENTRAL NERVOUS SYSTEM CANCERS

Includes malignant neoplasms of the meninges, brain, spinal cord, and cranial nerves.

Includes primary tumors only. Does not include metastatic tumors or carcinoma in situ.

Background

This case definition was developed by the Armed Forces Health Surveillance Division (AFHSD) for the purpose of descriptive epidemiological reports on invasive cancers among active duty Service members.¹ The case definition uses the “standard” AFHSD oncology case definition.

Clinical Description

Malignant brain and central nervous (CNS) tumors are cancerous growths originating in the brain, spinal cord and cranial nerves. In 2025, the American Cancer Society estimated 1.3% of new cancer cases and 3.1% of all cancer deaths in the United States were due to brain and CNS cancers.² Common malignant CNS tumors include glioblastomas, medulloblastomas and CNS lymphomas. Symptoms vary widely depending on the size and location of the tumor. Symptoms associated with brain tumors include persistent or worsening headaches; seizures; changes in speech, hearing or vision; memory loss and personality changes. Symptoms of spinal cord tumors include pain, weakness, or numbness radiating to the arms or legs and changes in bowel or urinary habits. Symptoms of cranial nerve tumors depend on the specific nerve affected. Approximately one-third of all brain tumors are malignant and 78% of those are gliomas. Compared to benign tumors, malignant tumors grow quickly and are more likely to invade normal tissue or spread to other parts of the CNS. Treatment depends upon tumor type, location, size and grade and typically involves surgical resection, radiation and chemotherapy. While environmental factors such as exposure to ionizing radiation have been associated with the development of brain and CNS tumors, there are very few known risk factors.

Case Definition and Incidence Rules (*April 2026 - present*)

For surveillance purposes, a case of a malignant brain or CNS tumor is defined as:

- *One hospitalization* with a case defining diagnosis of a malignant brain or CNS tumor (see ICD9 and ICD10 code lists below) in the *first* diagnostic position; or
- *One hospitalization with a procedure code* indicating radiotherapy, chemotherapy, or immunotherapy treatment (see ICD9 and ICD10 code lists below) in the *first* diagnostic position; AND a case defining diagnosis of a malignant brain or CNS tumor (see ICD9 and ICD10 code lists below) in the *second* diagnostic position; or
- *Three or more outpatient medical encounters, occurring within a 90-day period*, with a case defining diagnosis of a malignant brain or CNS tumor (see ICD9 and ICD10 code lists below) in the *first or second* diagnostic position.

(continued on next page)

¹ Armed Forces Health Surveillance Center. Incident diagnoses of cancers and cancer-related deaths, active component, U.S. Armed Forces, 2005-2014. *MSMR*. 2016; 23(7): 23-31.

² American Cancer Society. Cancer Facts & Figures 2024. <https://www.cancer.org/research/cancer-facts-statistics.html>. Accessed April 2026.



Case Definition and Incidence Rules *(continued)*

Incidence rules:

For individuals who meet the case definition:

- The incidence date is considered the date of the first hospitalization or outpatient medical encounter that includes a case defining diagnosis of a malignant brain or CNS tumor.
- An individual is considered an incident case *once per lifetime*.

Exclusions:

- None

Codes

The following ICD9 and ICD10 codes are included in the case definition:

Condition	ICD-10-CM Codes	ICD-9-CM Codes
Malignant neoplasms of meninges	<i>C70 (malignant neoplasm of meninges)</i>	<i>192 (malignant neoplasm of other and unspecified part of nervous system)</i>
	C70.0 (malignant neoplasm of cerebral meninges) <i>ignant neoplasm of other and unspecified part of nervous system</i>	192.1 (malignant neoplasm of cerebral meninges)
	C70.1 (malignant neoplasm of spinal meninges)	192.3 (malignant neoplasm of spinal meninges)
	C70.9 (malignant neoplasm of meninges, unspecified)	192.1 (above)
Malignant neoplasms of brain	<i>C71 (malignant neoplasm of brain, of...)</i>	<i>191(malignant neoplasm of brain, of...)</i>
	C71.0 (cerebrum, except lobes and ventricles)	191.0 (cerebrum, except lobes and ventricles)
	C71.1 (frontal lobe)	191.1 (frontal lobe)
	C71.2 (temporal lobe)	191.2 (temporal lobe)
	C71.3 (parietal lobe)	191.3 (parietal lobe)
	C71.4 (occipital lobe)	191.4 (occipital lobe)
	C71.5 (cerebral ventricle)	191.5 (cerebral ventricles)
	C71.6 (cerebellum)	191.6 (cerebellum, not otherwise specified)
	C71.7 (brain stem)	191.7 (brain stem)
		<i>(continued on next page)</i>



	C71.8 (overlapping sites of brain)	191.8 (other parts of brain)
	C71.9 (brain, unspecified)	191.9 (brain unspecified)
Malignant neoplasms of spinal cord, cranial nerves and other parts of central nervous system	<i>C72 (malignant neoplasm of spinal cord, cranial nerves and other parts of central nervous system)</i>	<i>192 (above)</i>
	C72.0 (malignant neoplasm of spinal cord)	192.2 (malignant neoplasm of spinal cord)
	C72.1 (malignant neoplasm of cauda equina)	
	C72.2 (malignant neoplasm of olfactory nerve...)	192.0 (malignant neoplasm of cranial nerves)
	- C72.20 (unspecified olfactory nerve)	
	- C72.21 (right olfactory nerve)	
	- C72.22 (left olfactory nerve)	
	C72.3 (malignant neoplasm of optic nerve...)	
	- C72.30 (unspecified optic nerve)	
	- C72.31 (right optic nerve)	
	- C72.32 (left optic nerve)	
	C72.4 (malignant neoplasm of acoustic nerve...)	
	- C72.40 (unspecified acoustic nerve)	
	- C72.41 (right acoustic nerve)	
	- C72.42 (left acoustic nerve)	
	C72.5 (malignant neoplasm of other and unspecified cranial nerves)	
	- C72.50 (unspecified cranial nerve)	
	- C72.59 (other cranial nerves)	
	C72.9 (malignant neoplasm of central nervous system, unspecified)	192.8 (malignant neoplasm of other specified sites of nervous system)
		192.9 (malignant neoplasm of nervous system, part unspecified)

Procedures	ICD-10-CM Codes	ICD-9-CM Codes
Related treatment procedures	Z51.0 (encounter for antineoplastic radiation therapy)	V58.0 (radiotherapy) <i>(continued on next page)</i>



<i>(Radiotherapy, chemotherapy, immunotherapy)</i>	Z51.1 (encounter for antineoplastic chemotherapy and immunotherapy)	V58.1 (encounter for chemotherapy and immunotherapy for neoplastic conditions)
	- Z51.11 (encounter for antineoplastic chemotherapy)	- V58.11 (encounter for antineoplastic chemotherapy)
	- Z51.12 (encounter for antineoplastic immunotherapy)	- V58.12 (encounter for antineoplastic immunotherapy)

Development and Revisions

- This case definition expands the previously used AFHSD case definition “Malignant Brain Tumor” to include tumors of the spinal cord and the cranial nerves. The original definition was developed in 2013 and was utilized in various AFHSD cancer reports through August 2025. The code set included ICD10 codes C71.x / ICD9 191.x (malignant neoplasm of brain) only.

Oncology Case Definition

- In 2024, the Defense Health Agency (DHA) Health Surveillance & Epidemiology (HSE) cancer surveillance Sub Working Group (SubWG) evaluated and expanded the list of cancers in the AFHSD cancer report to include breast (female), bladder, brain and CNS, cervical, colorectal, kidney (renal), leukemia, liver (hepatic), lung/bronchial, non-Hodgkin lymphoma, ovarian, pancreatic, prostate, stomach (gastric) and testicular cancer.
- In a 2019 *Monthly Surveillance Medical Report (MSMR)* article, analysis of the AFHSD standard oncology case definition revealed the definition had a high positive predictive value (PPV) for capturing cases of common cancers, (e.g., breast, prostate, testicular), and a low-to-moderate PPV for rarer cancers, (e.g., gallbladder, intestinal, laryngeal). Analyses also revealed the case definition was less sensitive for identifying cancers of the brain and nervous system, lung and bronchus, bones and joints, and liver ($PPV \leq 50$ percent); these cases often represent metastases rather than true incident cases. While the broad application of a single case definition may affect sensitivity and specificity in varying ways for individual cancers, the PPV for all the cancers included in the report are >70 percent, and most have a $PPV \geq 90$ percent.³
- In September of 2015 the case definition was updated to include ICD10 codes.
- The standard AFHSD oncology case definition was originally developed in 2011 by the Armed Forces Health Surveillance Center (AFHSC) in collaboration with a working group of subject matter experts from the Office of the Assistant Secretary of Defense for Health Affairs (ASDHA), the United States Army Public Health Command (USAPHC) and the United States Military Cancer Institute for a report on 10 different *invasive* cancers. The case definition was developed based on reviews of the ICD9 and ICD10 codes, the scientific literature and previous AFHSC analyses.

Case Definition and Incidence Rule Rationale

- In the 2019 *MSMR* article, cases of “brain and other nervous system” cancers identified using the standard AFHSD oncology case definition had a total PPV of 84.3 percent [CI 76.0-90.6]: female 75.0 percent [CI 47.6-92.7], male 85.9 percent [CI 77.1-92.3], among a subset of active component and retired officers.³

³ Webber, B, Rogers, A, Pathak, S, Robbins, A. Positive Predictive Value of an Algorithm Used for Cancer Surveillance in the U.S. Armed Forces. *MSMR*. 2019; 26(12): 18-23.



- The case finding criteria of *three or more outpatient medical encounters, within a 90-day period*, is used to identify cases that do not meet the other criteria in the definition. Exploratory analysis of Defense Medical Surveillance System (DMSS) data revealed this criterion yielded optimal specificity.⁴
 - A period of 90 days allows for the likelihood that “true” cases of a malignant brain or CNS tumor will have second and third encounters within that timeframe. The timeframe is based on the following standards of care: (1) following a biopsy of a clinically suspicious brain or CNS lesion, the average time to obtain a pathology report and definitive diagnosis is 1-3 weeks; (2) individuals whose biopsy results are positive for a malignant brain or CNS tumor are likely to have a follow-up visit for treatment within 4 weeks of a definitive diagnosis; and (3) individuals are likely to have follow-up visits to monitor clinical indicators of disease within the 90-day timeframe.⁵
 - For outpatient encounters, the incident date is considered the first of the three encounters occurring within the 90-day period, (e.g., if an individual has four malignant brain or CNS tumor codes on 1-Jan-12, 1-Dec-15, 8-Dec-15, and 15-Dec-15, the incident date would be 1-Dec-15; 1-Jan-12 would be considered a screening encounter and dropped).
- To maintain consistency with the standard AFHSD methodology for surveillance of invasive cancers, AFHSD uses a *once per lifetime* incidence rule. The workgroup recognizes individuals, may be considered disease free after treatment or after an extended period of time, (e.g., 5 years), with no clinical evidence of disease. Individuals who develop a second primary tumor after being disease free could, theoretically, be counted as a new incident case. However, for surveillance of cancer using administrative, (i.e., billing), data, it is difficult to identify individuals who are disease free after treatment.

Code Set Determination and Rationale

- Procedure codes (ICD10 and CPT) indicating surgical treatment of individual cancers such as hysterectomy, mastectomy, prostatectomy, and other procedures unique to certain types of cancers are not included in the code set. While procedure codes may increase the specificity of case finding criteria in select circumstances, analyses can be labor intensive and the effort does not necessarily guarantee a better case definition, (i.e., the definition may still identify false positive cases).
- *Screening for disease* codes ICD10 Z12.xx / ICD9 V76.xx (encounter for screening for malignant neoplasms) are not included in the code set. Screening codes are used for “testing for disease or disease precursors in seemingly well individuals so that early detection and treatment can be provided for those who test positive for the disease, (e.g., screening mammogram).”⁶ They would not be used for follow-up medical encounters of a specific disease.
- *Personal history of malignant neoplasms* (ICD10 Z85.xx) codes are not included in the code set. While these codes may be beneficial for identifying individuals with a history of cancer, analysis of administrative data reveal these codes lack the specificity to count incident cancer cases and are

⁴ Detailed information on these analyses is available through AFHSD; reference DMSS Requests #R230308, #R230378 and #R240009.

⁵ Central Nervous System Cancers. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2023. <https://www.nccn.org/guidelines/recently-published-guidelines>; Accessed April 2026.

⁶ ICD-10-CM Official Guidelines for Coding and Reporting. FY 2024—Updated October 1, 2023. (October 1, 2023–September 30, 2024). <https://stacks.cdc.gov/view/cdc/133289>. Accessed April 2026.



inconsistently used by providers.⁷ Given these findings, the AFHSD does not use personal history codes to exclude prevalent cases, (i.e., individuals with a history of cancer), nor to identify individuals who are disease free after treatment.

Personal history codes are intended to be used by providers for individuals who have a history of cancer *and* documented evidence in the medical record that the malignancy has been “excised or eradicated and all treatment is complete.” They are not used for a “self-reported” history of malignancy, and they should be used in conjunction with ICD10 codes for follow-up visits (Z08-encounter for follow-up examination after completed treatment for a malignant neoplasm), aftercare visits (Z51.0 - encounter for antineoplastic radiation therapy; Z51.1- encounter for antineoplastic chemotherapy and immunotherapy), and screening visits (Z12 - encounter for screening for malignant neoplasms).⁸

Reports

The AFHSD reports on malignant brain and CNS tumors in the following reports:

- Periodic *MSMR* articles.

Review

Jan 2026 Case definition developed by the DHA HSE cancer surveillance SubWG; approved by the AFHSD Surveillance Methods and Standards (SMS) working group.

Malignant Brain Tumor

Aug 2019 Case definition reviewed and updated by the AFHSD SMS working group.

Sep 2015 Case definition reviewed and updated by the Armed Forces Health Surveillance Branch (AFHSB) SMS working group.

Jun 2013 Case definition reviewed and adopted by the AFHSC SMS working group.

Jun 2012 Case definition developed by the AFHSC, ASDHA, USAPHC and the United States Military Cancer Institute.

Comments

- The Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute (NCI) program combines the codes for malignant and benign brain tumors into a single "brain-related tumor" category.⁹ Tumors may be in any of the following sites: (1) the brain, meninges, spinal cord, cauda equina, a cranial nerve or nerves, or any other part of the central

⁷ Analysis performed by the Defense Centers of Public Health-Dayton. Encounters with at least one Z85.x code in any diagnostic position (dx1- dx20) were pulled from Comprehensive Ambulatory Professional Encounter Records (CAPER) and Standard Inpatient Data Records (SIDR) for all Tri-Service beneficiaries between October 2016 and March 2024. A total of 546,962 encounters were identified. Of these, 68,395 (13%) had at least one neoplasm diagnosis (ICD10 C00-D49). With administrative data, there is no way to determine if the neoplasm codes refer to a resolved malignancy or a new cancer diagnosis. Records with conjunction codes for follow-up (Z08), aftercare (Z51.[0.1]) and screening (Z12) were queried: 420,236 (77%) had no conjunction codes in any diagnostic position suggesting providers use personal history codes independent of the purpose of the visit and potentially inconsistently.

⁸ Bredehoeft, Emily. Clear Up Confusion as to When Cancer Becomes “History Of.” American Academy of Professional Coders (AAPC). Accessed June 2025.

⁹ Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute. See <http://seer.cancer.gov/>. Accessed April 2026.



nervous system; and (2) the pituitary gland, pineal gland, or craniopharyngeal duct. The associated ICD10 codes are: C71.x (brain), C70.x (meninges), C72.0 (spinal cord), C72.1 (cauda equina), C72.2-C72.5 (cranial nerves), C72.8-C72.9 (other CNS), C75.1 (pituitary gland), C75.2 (craniopharyngeal duct) and C75.3 (pineal gland).¹⁰

- *In situ cancer*: There are no specific codes for carcinoma in situ of the brain. The condition is coded under ICD10 D09.8 (carcinoma in situ of other and unspecified sites). The AFHSD uses the standard oncology case definition for surveillance of in situ cancers and is in the process of developing definitions for select in situ cancers.

¹⁰ SEER Training Modules. <http://training.seer.cancer.gov/brain/non-malignant/reportable.html>. Accessed April 2026.

