

MALIGNANT BRAIN TUMOR

Does Not Include Benign Brain Tumors

Background

This case definition was developed by the Armed Forces Health Surveillance Branch (AFHSB) for the purpose of descriptive epidemiological reports on invasive cancers among active duty Service members.¹

Clinical Description

Brain tumors are masses composed of abnormal brain cells that have grown out of control. Symptoms of brain tumors vary according to the type of tumor and the location. Common initial symptoms include headaches, seizures, changes in speech, hearing, or vision, memory loss and personality changes. Malignant brain tumors, compared to benign brain tumors, tend to grow quickly and are more likely to invade normal tissue or spread to other parts of the central nervous system. There are very few known risk factors for developing brain tumors. According to the American Cancer Society, brain and other nervous system cancers are estimated to have caused about 1% of new cancer cases and 2% of all cancer deaths in the United States in 2012.²

Case Definition and Incidence Rules

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

- *One hospitalization* with a case defining diagnosis of a malignant brain tumor (see ICD9 and ICD10 code lists below) in the *first* diagnostic position; or
- *One hospitalization with a V or Z-code* indicating a radiotherapy, chemotherapy, or immunotherapy treatment procedure (see ICD9 and ICD10 code lists below) in the *first* diagnostic position; AND any case defining diagnosis of a malignant brain 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 any case defining diagnoses of a malignant brain tumor (see ICD9 and ICD10 code lists below) in the *first or second* diagnostic position.

Incidence rules:

For individuals who meet the case definition:

(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. *Medical Surveillance Monthly Report (MSMR)*. 2016 July; 23(7): 23-31.

² American Cancer Society. Cancer Facts & Figures 2019. Atlanta: American Cancer Society; 2019. <https://www.cancer.org/research/cancer-facts-statistics/all-cancer-facts-figures/cancer-facts-figures-2019.html>. Accessed July 2019.



Case Definition and Incidence Rules *(continued)*

- The incidence date is considered the date of the first hospitalization or the first of the three or more outpatient medical encounters occurring within a 90-day period that includes a case defining diagnosis of a malignant brain tumor (see *Case Definition and Incidence Rule Rationale*).
- An individual is considered an incident case only *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 brain tumor	<i>C71 (malignant neoplasm of brain)</i>	<i>191 (malignant neoplasm of brain)</i>
	C71.0 (malignant neoplasm of cerebrum, except lobes and ventricles)	191.0 (malignant neoplasm of cerebrum, except lobes and ventricles)
	C71.1 (malignant neoplasm of frontal lobe)	191.1 (malignant neoplasm of frontal lobe)
	C71.2 (malignant neoplasm of temporal lobe)	191.2 (malignant neoplasm temporal lobe)
	C71.3 (malignant neoplasm of parietal lobe)	191.3 (malignant neoplasm of parietal lobe)
	C71.4 (malignant neoplasm of occipital lobe)	191.4 (malignant neoplasm of occipital lobe)
	C71.5 (malignant neoplasm of cerebral ventricle)	191.5 (malignant neoplasm of ventricles)
	C71.6 (malignant neoplasm of cerebellum)	191.6 (malignant neoplasm of cerebellum, not otherwise specified)
	C71.7 (malignant neoplasm of brain stem)	191.7 (malignant neoplasm of brain stem)
	C71.8 (malignant neoplasm of overlapping sites of brain)	191.8 (malignant neoplasm of other parts of brain)
C71.9 (malignant neoplasm of brain, unspecified)	191.9 (malignant neoplasm of brain unspecified)	
		<i>(continued on next page)</i>



Procedures	ICD-10-CM Codes	ICD-9-CM Codes
Related treatment procedures (Radiotherapy, chemotherapy, immunotherapy)	Z51.0 (encounter for antineoplastic radiation therapy)	V58.0 (radiotherapy)
	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

- In September of 2015 the case definition was updated to include ICD10 codes.
- This case definition was developed in 2010 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. The case definition was developed based on reviews of the ICD9 codes, the scientific literature, and previous AFHSC analyses.
- This case definition was developed for a report on ten different invasive cancers. As such, the same case finding criteria are used for all types of cancer in the report. This broad application of a single case definition may affect the sensitivity and specificity in varying ways for the individual cancers. Furthermore, surgical treatment procedures such as hysterectomy, mastectomy, prostatectomy, and other procedures unique to certain types of cancer are not included in the code sets for individual cancers.

Case Definition and Incidence Rule Rationale

- This case definition is designed to capture cases of malignant brain tumors only. Benign brain tumors are not included in this case definition.
- Case finding criteria for this definition requires one hospitalization record with a case-defining ICD9 or ICD10 code for a malignant brain tumor in the *first* diagnostic position *unless* a code for a related treatment procedure is in the *first* diagnostic position; then the case-defining ICD9 or ICD10 code for a malignant brain tumor is allowed in the *second* diagnostic position.
- The case finding criterion of *three or more outpatient medical encounters, within a 90-day period*, with a case defining diagnosis of a malignant brain tumor is used to identify cases that do not meet the other criteria in the definition. 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 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). Exploratory analysis of the Defense Medical Surveillance System (DMSS) data revealed that this criterion yielded optimal specificity.³ The period of 90 days was established to allow for the likelihood that “true” cases of a malignant brain tumor would have second and third encounters within that interval.

³ Detailed information on this analysis is available through AFHSB *MSMR* staff; reference DMSS Requests #R080127, #R080159, #R090184, #R090302, #R090341, #R100181, and #R100303 (DoD Cancer Incidence), 2008-2009.



- For the purposes of counting new incident cases, AFHSB uses a once per lifetime incidence rule unless a specific timeframe is more appropriate and is specified (e.g., individuals may be counted as an incident case once every 365 days). Historically, a "once per surveillance period" incidence rule was used due to limited data in the Defense Medical Surveillance System (DMSS), but that is no longer necessary.

Code Set Determination and Rationale

- This code set includes codes for malignant tumors of the cerebrum, cerebellum, and brain stem only (ICD10 C71.0-C71.9). Codes for benign brain tumors, tumors of the meninges, cranial nerves, pituitary gland, craniopharyngeal duct, pineal gland, spinal cord and other tumors of the Central Nervous System are not included in this definition.
- The code set used for the June 2012 MSMR article on cancer did not include ICD9 code 191.9 (malignant neoplasm of the brain; unspecified). This code is included in this document and will be included in the code set for future analyses.

Reports

AFHSB reports on malignant brain tumors in the following reports:

- Periodic *MSMR* articles on cancers and cancer-related deaths.

Review

Aug 2019	Case definition reviewed and updated by the AFHSB Surveillance Methods and Standards (SMS) working group.
Sep 2015	Case definition reviewed and updated by the AFHSC Surveillance Methods and Standards (SMS) working group.
Jun 2013	Case definition reviewed and adopted by the AFHSC Surveillance Methods and Standards (SMS) working group.
Jun 2012	Case definition reviewed and adopted by the AFHSC <i>MSMR</i> staff.

Comments

The Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute is a cancer registry that provides information on cancer statistics in an effort to reduce the burden of cancer amount the U.S. population.⁴ In the SEERS program, the definition of a reportable case of a "brain-related tumor" means a listed primary tumor (whether malignant or benign) occurring 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 nervous system, (2) The pituitary gland, pineal gland, or craniopharyngeal duct. The associated ICD10 codes are: C71.0- C71.9 (brain), C70.0-C70.9 (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).⁵

⁴ Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute. See <http://seer.cancer.gov/>. Accessed August 2019.

⁵ SEER Training Modules. <http://training.seer.cancer.gov/brain/non-malignant/reportable.html>. Accessed August 2019.

