BREAST CANCER; FEMALE

Includes invasive cancer only. Does not include carcinoma in situ or metastatic cancer. For "Breast Cancer; Male," "Ductal Carcinoma In Situ," and "High-Risk Lesions of the Breast," see specific case definitions.

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

Breast cancer forms in the tissues of the breast, most commonly in the ducts and lobules. After skin cancer, breast cancer is the most common type of cancer among women in the United States and the second leading cause of cancer deaths (after lung cancer). When the breast cancer tumor is small and is producing no symptoms, the prospects for successful treatment and cure are highest. For this reason, early detection through mammography is strongly recommended. A family history of breast cancer and the presence of certain genetic mutations carry an increased risk, but most women who develop breast cancer have neither of these factors. Other risk factors for breast cancer include advancing age, overweight or obesity, use of menopausal hormone therapy, physical inactivity, and alcohol consumption. Treatment of breast cancer may involve surgery, radiotherapy, chemotherapy, and hormone therapy.[2]

Case Definition and Incidence Rules *(2011-present)*

For surveillance purposes, a case of breast cancer is defined as:

- *One hospitalization* with a case defining diagnosis of breast cancer (see ICD9 and ICD10 code lists below) in the *first* diagnostic position; or

- *One hospitalization with 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 breast cancer (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 breast cancer (see ICD9 and ICD10 code lists below) in the *first or second* diagnostic position.

Incidence rules:

For individuals who meet the case definition:

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[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. Available at: https://www.cancer.org/research/cancer-facts-statistics.html. Accessed February 2025.

Case Definition and Incidence Rules *(continued)*

- The incidence date is considered the date of the first hospitalization or outpatient medical encounter that includes a case defining diagnosis of breast cancer.

- An individual is considered an incident case *once per lifetime.*

Exclusions:

- *Optional*: Individuals with bilateral mastectomy (see *Case Definition and Incidence Rule Rationale*)

Codes

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

Condition	ICD-10-CM Codes	ICD-9-CM Codes
Breast cancer (female)	*C50 (malignant neoplasm of breast)*	*174 (malignant neoplasm of female breast)*
	C50.0 (malignant neoplasm of nipple and areola)	174.0 (malignant neoplasm of nipple and areola, female breast)
	C50.01 (malignant neoplasm of nipple and areola, female…)	
	- C50.011 (*right* female breast)	
	- C50.012 (*left* female breast)	
	- C50.019 (*unspecified* female breast)	
	C50.1 (malignant neoplasm of central portion of breast, female)	174.1 (malignant neoplasm of central portion of female breast)
	C50.11 (malignant neoplasm of central portion of breast, female…)	
	- C50.111 (*right* female breast)	
	- C50.112 (*left* female breast)	
	- C50.119 (*unspecified* female breast)	
	C50.2 (malignant neoplasm of upper-inner quadrant of breast)	174.2 (malignant neoplasm of upper-inner quadrant)
	C50.21 (malignant neoplasm of upper-inner quadrant of breast, female…)	
	- C50.211 (*right* female breast)	
	- C50.212 (*left* female breast)	
	- C50.219 (*unspecified* female breast)	*(continued next page)*

	C50.3 (malignant neoplasm of lower-inner quadrant of breast)	174.3 (malignant neoplasm of lower-inner quadrant)
	C50.31 (malignant neoplasm of lower-inner quadrant of breast, female…)	
	- C50.311 (*right* female breast)	
	- C50.312 (*left* female breast)	
	- C50.319 (*unspecified* female breast)	
	C50.4 (malignant neoplasm of upper-outer quadrant of breast)	174.4 (malignant neoplasm of upper-outer quadrant)
	C50.41 (malignant neoplasm of upper-outer quadrant of breast, female…)	
	- C50.411 (*right* female breast)	
	- C50.412 (*left* female breast)	
	- C50.419 (*unspecified* female breast)	
	C50.5 (malignant neoplasm of lower-outer quadrant breast)	174.5 (malignant neoplasm of lower-outer quadrant)
	C50.51 (malignant neoplasm of lower-outer quadrant breast, female…)	
	- C50.511 (*right* female breast)	
	- C50.512 (*left* female breast)	
	- C50.519 (*unspecified* female breast)	
	C50.6 (malignant neoplasm of axillary tail of breast)	174.6 (malignant neoplasm of axillary tail)
	C50.61 (malignant neoplasm of axillary tail of breast, female…)	
	- C50.611 (*right* female breast)	
	- C50.612 (*left* female breast)	
	- C50.619 (*unspecified* female breast)	
	C50.8 (malignant neoplasm of overlapping sites of breast)	174.8 (malignant neoplasm of other specified sites of female breast)
	C50.81 (malignant neoplasm of overlapping sites of breast, female…)	
	- C50.811 (*right* female breast)	
	- C50.812 (*left* female breast)	
	- C50.819 (*unspecified* female breast)	
	C50.9 (malignant neoplasm of breast of unspecified site)	*(continued next page)*

	C50.91 (malignant neoplasm of breast of *unspecified* site, female…)	174.9 (malignant neoplasm of breast, female, unspecified)
	- C50.911 (*right* female breast)	
	- C50.912 (*left* female breast)	
	- C50.919 (*unspecified* female breast)	

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 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, 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 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 represented metastases rather than true incident cases. While the broad application of a single case definition may affect the sensitivity and specificity in varying ways for the 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 codes, the scientific literature and previous AFHSC analyses.

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[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.

Case Definition and Incidence Rule Rationale

- In the 2019 *MSMR* article, cases of female breast cancer identified using the standard AFHSD oncology case definition had a PPV of 99.6 percent [CI 97.8-100.0] among a subset of active component and retired officers.[3]

- 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 breast cancer 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 breast lesion, the average time to obtain a pathology report and definitive diagnosis is 1-3 weeks; (2) individuals whose biopsy results are positive for invasive breast cancer 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]

  - The methodology used in this case definition does not try to distinguish laterality; therefore, the diagnoses and associated ICD10 codes for the three or more outpatient medical encounters *are not required to reference the same breast.* While ICD-10-CM does allow investigators to distinguish right and left breast lesions, analyses of the data revealed the requirement was complicated by the frequent use of nonspecific codes ICD10 C50.81x (malignant neoplasm of overlapping sites of breast, female) / ICD9 174.8 (malignant neoplasm of other specified sites of female breast) and C50.91x (malignant neoplasm of breast of unspecified site, female) / ICD9 *(No comparable code),* making it difficult to assign a tumor to a particular breast. For long term surveillance, attempting to distinguish laterality also makes it more difficult to link data with ICD-9-CM data as ICD9 codes do not distinguish laterality.

  - 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 breast cancer 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, AFHSC 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.

- Individuals who have, or develop over time, a second primary cancer in the same, or contralateral breast are only counted once using this definition. While both lesions are considered primary tumors, for surveillance of invasive cancer, AFHSD counts cases (unique individuals), not individual tumors. Investigators interested in capturing the incidence of distinct primary tumors may want to modify the case finding criteria and consider utilizing different data sources such as pathology data or cancer registry data.

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

[5] Breast cancer. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2023. https://www.nccn.org/guidelines/recently-published-guidelines; Accessed February 2025.

- The AFHSD does not exclude individuals with bilateral mastectomy; however, there may some benefit to incorporating this exclusion into the methodology. These individuals would contribute to the denominator of the rate, particularly among older age groups. Quantifying the number and percentage of women by age group that have a history of bilateral mastectomy and comparing that group with the population of women with no history could help clarify the accuracy of the rate.

- Individuals with a prior, case-defining, incident diagnosis of ductal carcinoma in situ (DCIS) are *not* excluded from this definition. The AFHSD counts the "first-ever" occurrence of each cancer type separately. This methodology ensures rates and trends over time accurately reflect the condition of interest by eliminating the potentially confounding effect of disease trends of excluded conditions, (i.e., ensures invasive breast cancer rates are not dependent upon DCIS rates and vice versa).

Code Set Determination and Rationale

- This case definition is designed to capture cases of *invasive,* primary, breast cancer only. The code set does not include ICD10 D05.x / ICD9 233.0 (carcinoma in situ of breast), which includes ductal carcinoma in situ (DCIS) and lobular carcinoma in situ (LCIS). See *Ductal Carcinoma In Situ* and *High-Risk Lesions of the Breast* case definitions.

- 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 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),

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[6] ICD-10-CM Official Guidelines for Coding and Reporting. FY 2022–Updated April 1, 2022. (October 1, 2021- September 30, 2022. https://stacks.cdc.gov/view/cdc/126426. Accessed February 2025.

[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.

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 female breast cancer in the following reports:

- Periodic *MSMR* articles.

Review

Feb 2025	Case definition reviewed and updated by the DHA HSE cancer surveillance SubWG; adopted by the AFHSD Surveillance Methods and Standards (SMS) working group.
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.
Dec 2012	Case definition reviewed and adopted by the Armed Forces Health Surveillance Center (AFHSC) SMS working group.
Jun 2011	Case definition developed by the AFHSC, ASDHA, USAPHC and the United States Military Cancer Institute.

Comments

None

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[8] Bredehoeft, Emily. Clear Up Confusion as to When Cancer Becomes "History Of." American Academy of Professional Coders (AAPC). https://www.aapc.com/blog/40016-clear-up-confusion-as-to-when-cancer-becomes-history-of/. Accessed February 2025.