LUNG CANCER

Includes bronchial cancer. Includes invasive cancers only. Does not include carcinoma in situ or metastatic cancer.

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

Lung cancer is a malignancy that forms in the tissues of the lung, usually in the cells that line the airways. The Center for Disease Control and Prevention estimates lung cancer is the leading cause of cancer death and the second leading cause of new cancer cases in both men and women in the United States.[2] The two main types are non-small cell lung cancer and small cell lung cancer. In the early stages, the condition is typically asymptomatic. Later symptoms include persistent cough, chest pain, shortness of breath, and hemoptysis.[3] Cigarette smoking is the most common cause of lung cancer; additional causes include use of other forms of tobacco; exposure to radon, secondhand smoke, and air pollution; occupational exposure to asbestos, diesel exhaust, or other chemicals, and heredity.[4]

Case Definition and Incidence Rules *(2012-present)*

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

- *One hospitalization* with a case defining diagnosis of lung cancer (see ICD9 and ICD10 code lists below) in the *first* diagnostic position; or
- *One hospitalization with a procedure code* indicating a radiotherapy, chemotherapy, or immunotherapy treatment (see ICD9 and ICD10 code lists below) in the *first* diagnostic position; AND a case defining diagnosis of lung 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 lung 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 July; 23(7): 23-31.

[2] Lung Cancer. Centers for Disease Control and Prevention. https://www.cdc.gov/lung-cancer/index.html. Accessed April 2025.

[3] American Cancer Society. Cancer Facts & Figures 2024. https://www.cancer.org/research/cancer-facts-statistics.html. Accessed April 2025.

[4] Alberg AJ, Ford FG, Samet JM. Epidemiology of lung cancer: ACCP evidence-based clinical practice guidelines (2nd edition). *Chest* 2007; 132 (3 Suppl): 29S-55S.

Case Definition and Incidence Rules *(continued)*

- The incidence date is considered the date of the first hospitalization or outpatient medical encounter that includes case defining diagnosis of lung cancer.
- 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
Lung cancer	*C34 (malignant neoplasm of bronchus and lung)*	*162 (malignant neoplasm of lung and bronchus)*
	C34.0 (malignant neoplasm of main bronchus…)	- 162.2 (malignant neoplasm of main bronchus)
	- C34.00 (*unspecified* main bronchus)	
	- C34.01 (*right* main bronchus)	
	- C34.02 (*left* main bronchus)	
	C34.1 (malignant neoplasm of upper lobe, bronchus or lung…)	- 162.3 (malignant neoplasm of upper lobe, bronchus or lung)
	- C34.10 (*unspecified* bronchus or lung)	
	- C34.11 (*right* bronchus or lung)	
	- C34.12 (*left* bronchus or lung)	
	C34.2 (malignant neoplasm of middle lobe, bronchus or lung)	- 162.4 (malignant neoplasm of middle lobe, bronchus or lung)
	C34.3 (malignant neoplasm of lower lobe, bronchus or lung…)	- 162.5 (malignant neoplasm of lower lobe, bronchus or lung)
	- C34.30 (*unspecified* bronchus or lung)	
	- C34.31 (*right* bronchus or lung)	
	- C34.32 *(left* bronchus or lung)	
	C34.8 (malignant neoplasm of overlapping sites of bronchus and lung…)	
	- C34.80 (*unspecified* bronchus and lung)	

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	- C34.81(*right* bronchus and lung)	- 162.8 (malignant neoplasm of other parts of bronchus or lung)
	- C34.82 (*left* bronchus and lung)	
	C34.9 (malignant neoplasm of unspecified part of bronchus or lung…)	- 162.9 (malignant neoplasm of bronchus and lung, unspecified)
	- C34.90 (*unspecified* bronchus or lung)	
	- C34.91 (*right* bronchus or lung)	
	- C34.92 (*left* bronchus or lung)	

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.[5]

- 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

[5] 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.

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.

Case Definition and Incidence Rule Rationale

- In the 2019 *MSMR* article, cases of lung and bronchus cancer identified using the standard AFHSD oncology case definition had a total PPV of 70.0 percent [CI 53.5-83.4]: female 80.0 percent [CI 51.9-95.7], male 64.5 percent [CI 43.5-82.0], among a subset of active component and retired officers.[5]

- 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.[6]

    - A period of 90 days allows for the likelihood that "true" cases of lung 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 lung or bronchial lesion, the average time to obtain a pathology report and definitive diagnosis is 1-3 weeks; (2) individuals whose biopsy results are positive for lung 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.[7]

    - 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 lung 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, 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)."[8] They would not be used for follow-up medical encounters of a specific disease.

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

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

[8] 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 April 2025.

- *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. [9] 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).[10]

Reports

The AFHSD reports on lung cancer in the following reports:

- Periodic *MSMR* articles.

Review

Apr 2025	Case definition reviewed and updated by the DHA HSE cancer surveillance SubWG; approved by the AFHSD Surveillance Methods and Standards (SMS) working group.
Nov 2022	Case definition reviewed and updated by the AFHSD SMS working group
May 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.
Sept 2012	Case definition reviewed and adopted by the AFHSC SMS working group.
June 2012	Case definition developed by the AFHSC, ASDHA, USAPHC and the United States Military Cancer Institute.

Comments

- *In situ cancer:* The complete code set for "carcinoma in situ of the respiratory tract" includes the following codes (D02.x). 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.

[9] 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.

[10] 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 April 2025.

D02 Carcinoma in situ of the respiratory system

- D02.0 Carcinoma in situ of larynx
- D02.1 Carcinoma in situ of trachea
- D02.2 Carcinoma in situ of bronchus and lung
  - D02.20 Carcinoma in situ of unspecified bronchus and lung
  - D02.21 Carcinoma in situ of right bronchus and lung
  - D02.22 Carcinoma in situ of left bronchus and lung
- D02.3 Carcinoma in situ of other parts of respiratory system
- D02.4 Carcinoma in situ of respiratory system, unspecified