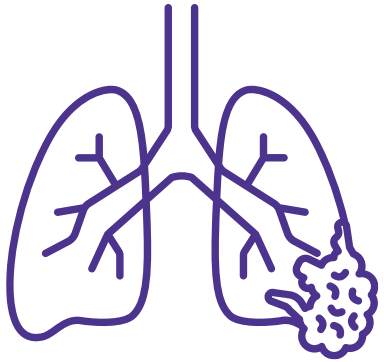


Lung Cancer

MEDICAL INFORMATION FOR PATIENTS AND CAREGIVERS

Anatomical images contained herein are for illustrative purposes only.

Lung Cancer Topics

Presence: Globally and in the US

One of the most common cancers in the world for several decades[1]

Signs and symptoms

Certain observations can raise suspicion and warrant a diagnostic follow-up

Risk factors

Understanding these risks is crucial for prevention and early detection

Cancer stages and survival

Crucial for determining appropriate treatment and predicting outcomes

Screening recommendation

Early detection by proactive screening is recommended for eligible patients

Diagnostic test options

Explore the tests which help detect cancer early.

Treatment options

Personalized treatment plans are developed based on various factors

Spotlight on biomarker testing

Specialized testing carried out to help clinicians make better choices

Spotlight on populations at risk

Certain population groups face a higher risk

1. Schabath MB, Cote ML. *Cancer Epidemiol Biomarkers Prev*. 2019;28(10):1563-1579.

Lung cancer Presence: Globally and in the United States

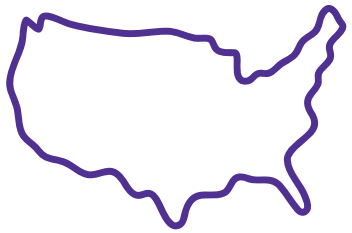
GLOBAL

Ranks **1st** in the number of cases and mortality[1]

2,480,301
New cases in 2022[1]

1,817,172
Deaths in 2022[1]

UNITED STATES



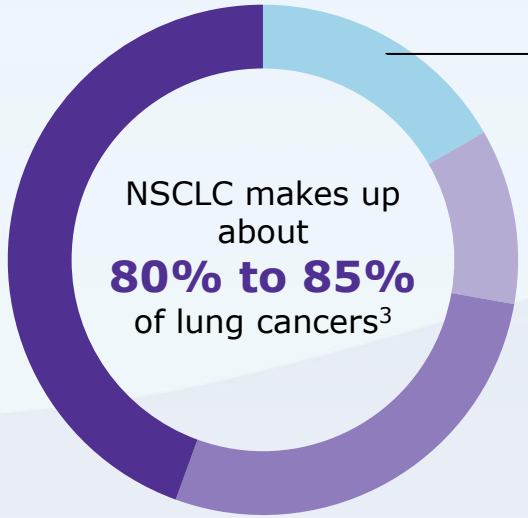
Ranks **3rd** in the number of cases and **1st** in mortality[2]

234,580
New cases in 2024[2]

125,070
Deaths in 2024[2]

2 main types, based on the tumor's presence in different parts:

Non-small cell lung cancer (NSCLC) and Small cell lung cancer (SCLC)[3]



3 subtypes of NSCLC[4]:
- Adenocarcinoma (40%)
- Squamous cell carcinoma (25%)
- Large cell carcinoma (10%)

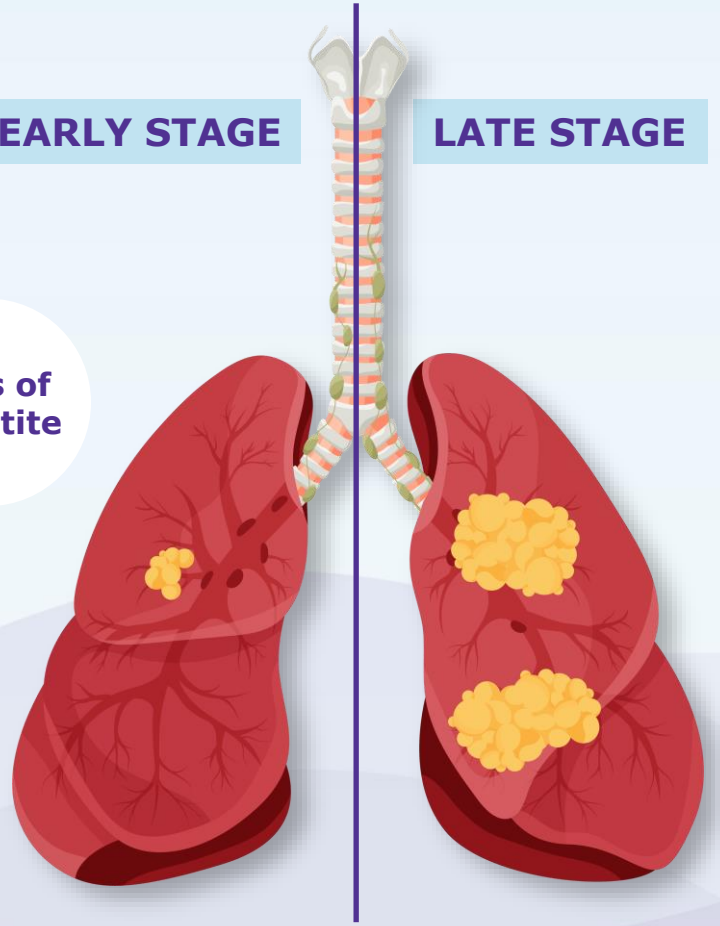
SCLC makes up about **10% to 15%** of lung cancers[3]

1. Bray F, et al. *CA Cancer J Clin.* 2024;74(3):229-263. 2. Siegel RL, et al. *CA Cancer J Clin*. 2024;74(1):12-49. 3. American Cancer Society. What Is Lung Cancer? Revised January 29, 2024. Accessed March 7, 2025. https://www.cancer.org/cancer/types/lung-cancer/about/what-is.html 4. National Cancer Institute. Non-Small Cell Lung Cancer Treatment (PDQ®)–Health Professional Version. Updated February 27, 2025. Accessed March 7, 2025. https://www.cancer.gov/types/lung/hp/non-small-cell-lung-treatment-pdq

Signs and symptoms[1]

EARLY STAGE

LATE STAGE



Chest pain and breathing problems

Persistent cough

Loss of appetite

Persistent bronchitis (swelling in the tubes that carry air to the lungs[2]) **and pneumonia**

Feeling tired or weak

Unexplained weight loss

Swelling of lymph nodes (a small part of the body's immune system[3])

Jaundice (yellowish skin and eyes due to underlying disease)

Bone pain

Nervous system changes (headache, weakness or numbness of limbs, dizziness, balance problems, or seizures)

Symptoms of lung cancer are not specific and can be caused by something that is not cancer.

1. American Cancer Society. Signs and Symptoms of Lung Cancer. Updated January 29, 2024. Accessed October March 7, 2025. https://www.cancer.org/cancer/lung-cancer/detection-diagnosis-staging/signs-symptoms.html 2. NHLBI. Bronchitis. Updated December 2, 2022. Accessed March 12, 2025. https://www.nhlbi.nih.gov/health/bronchitis 3. NCI Dictionary of Cancer Terms. Lymph node. Accessed March 12, 2025. https://www.cancer.gov/publications/dictionaries/cancer-terms/def/lymph-node

Risk factors

Intrinsic risk factors:[1-8]

Age
Average age of 71 years

Inherited and acquired gene changes

History of cancer[6]

Previous radiation therapy to lungs

Race
Highest incidence: African Americans

Prior lung disease,
such as COPD or pulmonary fibrosis

Family history
in first-degree biological relatives

Environmental risk factors:[1-4,8]

Secondhand smoke
>7000
deaths each year in the US

Beta-carotene supplements
in heavy smokers

Exposure to certain chemicals
eg. asbestos, radon, coal, smoke or soot

Heavy metals in drinking water
(arsenic, cadmium, chromium, and nickel)

Air pollution

COPD: chronic obstructive pulmonary disease; US: United States.

1. Reducing Your Risk. Lungevity. Updated February 12, 2024. Accessed March 7, 2025. https://www.lungevity.org/for-patients-caregivers/lung-cancer-101/reducing-your-risk 2. Lung Cancer Risk Factors. American Cancer Society. Updated January 29, 2024. Accessed March 7, 2025. https://www.cancer.org/cancer/lung-cancer/causes-risks-prevention/risk-factors.html 3. What Causes Lung Cancer? American Cancer Society. Updated January 29, 2024. Accessed March 7, 2025. https://www.cancer.org/cancer/lung-cancer/causes-risks-prevention/what-causes.html 4. Non-Small Cell Lung Cancer Treatment (PDQ®)–Health Professional Version. National Cancer Institute. Updated February 27, 2025. Accessed March 7, 2025. https://www.cancer.gov/types/lung/hp/non-small-cell-lung-treatment-pdq 5. NCCN Guidelines for Patients: lung cancer screening. National Comprehensive Cancer Network. Published 2023. Accessed March 7, 2025. https://www.nccn.org/patients/guidelines/content/PDF/lung_screening-patient.pdf 6. Primm KM, et al. *JTO Clin Res Rep*. 2022;3(8):100374. 7. Duncan FC, et al. *Transl Lung Cancer Res.* 2024;13(1):76-94. 8. American Lung Association. Health effects of secondhand smoke. Updated November 20,2024. Accessed March 12, 2025. https://www.lung.org/quit-smoking/smoking-facts/health-effects/secondhand-smoke

Cancer stages and survival

Cancer stages are based on the size and extent of the main tumor, the spread to nearby **lymph nodes** and the **distant sites.**[1]

LOCALIZED

Commonly known as Stage I

Limited to the place where it started, with no sign that it has spread.[1]

It often can be cured, and most people **(~64%)** can expect to live 5 years or longer.[2]

REGIONAL

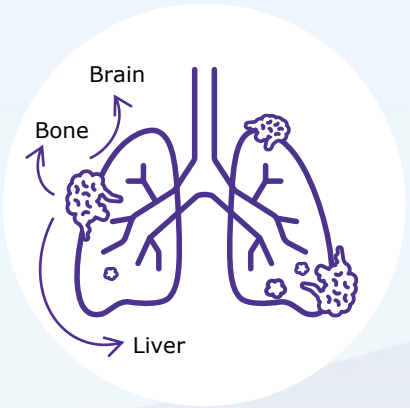
Commonly known as Stage II or Stage III

Spread to nearby lymph nodes, tissues, or organs.[1]

~36% of patients are expected to live 5 years or longer.[2]

More information +

DISTANT



Commonly known as Stage IV

Spread to the other lung or to distant parts of the body (e.g., bone, brain, liver).[1,3]

Cancer is most severe, and only about **9 of 100** patients will survive after 5 years.[2]

1. NCI. Cancer Staging. Updated October 14, 2022. Accessed March 7, 2025. https://www.cancer.gov/about-cancer/diagnosis-staging/staging 2. SEER Explorer: An interactive website for SEER cancer statistics [Internet]. Updated June 27, 2024. Accessed March 7, 2025. https://seer.cancer.gov/statistics-network/explorer/application.html 3. NCI. Metastatic Cancer: When Cancer Spreads. Updated January 17, 2025. Accessed March 7, 2025. https://www.cancer.gov/types/metastatic-cancer

Lung cancer stages and survival

Cancer stages are based on the size and extent of the main tumor, the spread to nearby **lymph nodes** (small bean… …distant sites.[1,2]

Proportion of disease and survival

SEER stages	Percent of cases at diagnosis (%)	5-year relative survival (%)
Localized	24.3	63.7
Regional	20.9	35.9
Distant	47.8	8.9

SEER: Surveillance, Epidemiology, and End Results.
SEER Explorer: An interactive website for SEER cancer statistics [Internet]. Updated November 5, 2024. Accessed March 7, 2025. https://seer.cancer.gov/statistics-network/explorer/application.html

Comm… …own as

Cancer is limit… …the other it started, witl… …s of the body spread.[1] …r).[1,4]

It often can be cured, and most people **(~64%)** can expect to live 5 years or longer.[3]

…live 5 years or longer.[3]

This is when the cancer is most severe, and only about **9 of 100** patients will survive after 5 years.[3]

More information +

1. NCI. Cancer Staging. Updated October 14, 2022. Accessed October 17, 2024. https://www.cancer.gov/about-cancer/diagnosis-staging/staging 2. NCBI Bookshelf. In brief: What are the organs of the immune system? Updated August 14, 2023. Accessed October 17, 2024. https://www.ncbi.nlm.nih.gov/books/NBK279395/ 3. SEER Explorer: An interactive website for SEER cancer statistics [Internet]. Updated June 27, 2024. Accessed October 17, 2024. https://seer.cancer.gov/statistics-network/explorer/application.html 4. NCI. Metastatic Cancer: When Cancer Spreads. Updated November 10, 2020. Accessed October 18, 2024. https://www.cancer.gov/types/metastatic-cancer

Screening recommendation: Lung cancer

If detected early, cancer is often treated successfully. Screening is best for detection at an early, curable stage.[1,2]

Various organizations recommend yearly lung cancer screening in:[1,3,4]

- Adults aged 50 to 80 years
- Who have a 20-pack-year smoking history
- Who currently smoke or have quit within the past 15 years*

Low-dose computed tomography, which is a low radiation CT scan, is the recommended test[1]

Packs per day × years of smoking = Pack-years

Consulting with a healthcare provider will help in optimizing screening, based on individual assessment of symptoms and background.

*Updated ACS guidelines no longer mention ≤ 15 Years Since Quitting.
ACS: American Cancer Society; COPD: chronic obstructive pulmonary disease; CT: computed tomography; USPSTF: United States Preventive Services Task Force.
1. ACS. Lung Cancer Early Detection, Diagnosis, and Staging. Updated January 29, 2024. Accessed March 7, 2025. https://www.cancer.org/cancer/types/lung-cancer/detection-diagnosis-staging/detection.html 2. Zhou Y, et al. *Signal Transduct Target Ther*. 2024;9(1):132. 3.US Preventive Services Task Force. JAMA. 2021;325(10):962-970. 4. ACS. American Cancer Society Updates Lung Cancer Screening Guideline: Nearly Five Million U.S. Adults who Smoke and Formerly Smoked Now Recommended for Testing. Press release. Published November 1,2023. Accessed March 7, 2025. https://pressroom.cancer.org/releases?item=1274

Diagnostic test options

BIOPSIES[1]

Procedures to remove a sample of cells from the body for testing.[2]

FNA biopsy: A technique that involves a thin needle and a syringe to get a cell sample from a suspicious area.[1]

Core biopsy: The removal of a tissue sample with a wide needle for examination under a microscope.[1]

IMAGING TESTS[1]

Invasive and non-invasive imaging test are performed

More information +

OTHERS

Thoracentesis: Removing fluid from lungs, typically involving a needle and a flexible tube (catheter).[1]

Biomarker testing (for NSCLC only): Looking for changes in genes and proteins (called biomarkers or tumor markers) that can provide information about cancer.[3]

FNA: fine needle aspiration; NSCLC: non-small cell lung cancer.

1. ACS. Lung Cancer Early Detection, Diagnosis, and Staging. Updated January 29, 2024. Accessed March 7, 2025. https://www.cancer.org/cancer/types/lung-cancer/detection-diagnosis-staging/how-diagnosed.html 2. NCI. How Cancer Is Diagnosed. Updated January 17, 2023. Accessed March 7, 2025. https://www.cancer.gov/about-cancer/diagnosis-staging/diagnosis 3. NCI. Biomarker Testing for Cancer Treatment. Updated December 14, 2021. Accessed March 7, 2025. https://www.cancer.gov/about-cancer/treatment/types/biomarker-testing-cancer-treatment

Treatment options[1,2]*

Whole body treatments

Drug therapy
Therapy that uses systemic drugs to destroy cancer cells and prevent tumor growth.[1]

Targeted therapies
Cancer treatment that precisely identify and attack certain types of cancer cells.[1,3]

Immunotherapy
Treatment where the medicine activates your own immune system to recognize and kill cancer cells.[4]

Localized treatments

Radiotherapy
Uses beams of intense energy to kill cancer cells.[1]

Surgery
An operation in which doctors cut out the cancer.[1]

*Never use medication from another patient with lung cancer as their cancer is likely different from yours and their medication may cause more harm than benefit. Always consult your doctor.

1. CDC. Treatment of Lung Cancer. Updated October 15, 2024. Accessed March 7, 2025. https://www.cdc.gov/lung-cancer/treatment/index.html 2. American Lung Association. What Are the Types of Lung Cancer Treatment? Updated September 26, 2024. Accessed March 7, 2025. https://www.lung.org/lung-health-diseases/lung-disease-lookup/lung-cancer/treatment/types-of-treatment 3. ACS. How Targeted Therapies Are Used to Treat Cancer. Updated January 29, 2021. Accessed March 7, 2025. https://www.cancer.org/cancer/managing-cancer/treatment-types/targeted-therapy/what-is.html 4. American Lung Association. Lung Cancer Immunotherapy. Updated October 1, 2024. Accessed March 7, 2025. https://www.lung.org/lung-health-diseases/lung-disease-lookup/lung-cancer/treatment/types-of-treatment/immunotherapy

Biomarker testing

What are gene mutations?

A mutation is a change in a gene that tells your body how to function.[1] People with NSCLC often have one or more gene mutations.[2]

What is biomarker testing?

A biomarker is a specific indicator or mutation in your tumor that can be found in blood, tissues, or other bodily fluids. They can help your healthcare team better understand conditions and diseases.[3,4]

To perform a biomarker test, your healthcare team will need to take a sample of your tumor.[4]

Benefits of biomarker testing

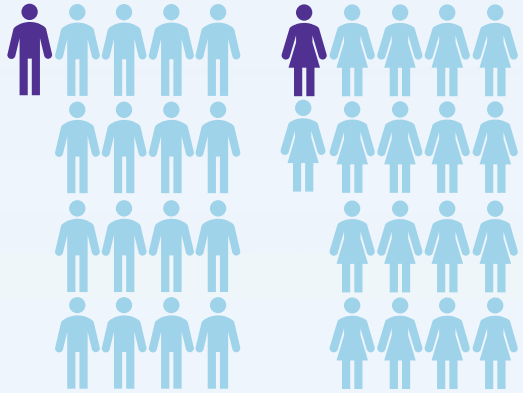
It is important to know if a biomarker is present as this helps determine the best treatment. Different targeted therapies work on different lung cancers with different biomarkers.[4]

Targeted therapy for the appropriate patients showed a higher 5-year survival rate compared to nontargeted therapy.[5]

NSCLC: non-small cell lung cancer.

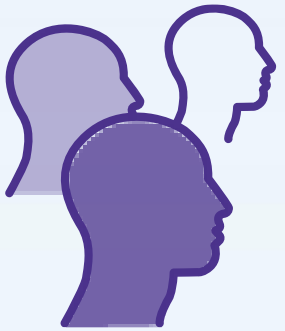
1. ACS. Gene Changes and Cancer. Updated, August 31, 2022. Accessed March 7, 2025. https://www.cancer.org/cancer/understanding-cancer/genes-and-cancer/gene-changes.html
2. Chen X, et al. *Mol Genet Genomic Med*. 2020;8(9):e1398. 3. NCI. Dictionary of cancer terms. Biomarkers. Accessed March 12,2025. https://www.cancer.gov/publications/dictionaries/cancer-terms/def/biomarker 4. Lungevity foundation. Biomarker testing. Updated February 9,2024. Accessed March 12,2025. https://www.lungevity.org/for-patients-caregivers/navigating-your-diagnosis/biomarker-testing 5. Musika W, et al. *Asian Pac J Cancer Prev*. 2021;22(8):2501-2507.

Are you at an increased risk of lung cancer?



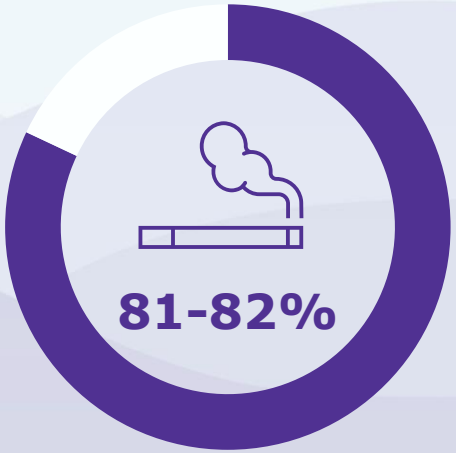
The chance that a man will develop lung cancer in his lifetime is about **1 in 17**; for a woman, the risk is about **1 in 18**[1]

African Americans have the **highest** incidence and deaths rates[3]

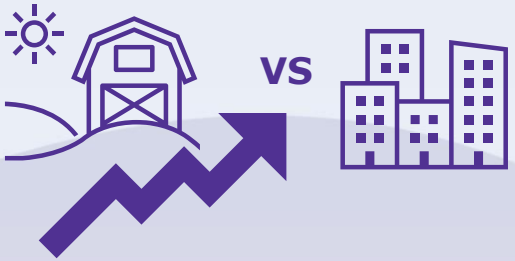


Black men are about **12%** more likely to develop lung cancer than white men[1]

Smoking is the leading cause of lung cancer, contributing to **82%** of cases and **81%** of deaths in the United States[2]



Residents of rural areas are at greater risk for lung cancer incidence and mortality than their urban counterparts[4]



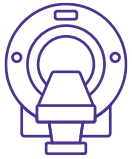
1. ACS. Key Statistics for Lung Cancer. Updated January 16, 2025. Accessed March 7, 2025. https://www.cancer.org/cancer/types/lung-cancer/about/key-statistics.html
2. Kurzrock R, et al. *Cancer Metastasis Rev.* Published online May 16, 2024. doi:10.1007/s10555-024-10187-6 3. NIH. Narrowing Lung Cancer Disparities. Accessed March 7, 2025. https://ccr.cancer.gov/news/milestones-2021/article-narrowing-lung-cancer-disparities 4. Fairfield KM, et al. *JNCI Cancer Spectr*. 2020;4(4):pkaa011.

Imaging test options[1]

Non-invasive: procedures that do not require inserting an instrument through the skin or into a body opening.[2]

Chest X-ray
Low doses of radiation to create pictures of areas inside the body.[1,3]

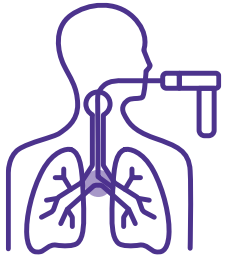
CT scan
Creates 3-dimensional views of organs with X-ray technology.[1,3]



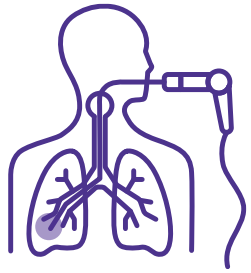
MRI scan
Uses magnetic fields and radio waves to make detailed pictures of areas inside the body.[1,3]

PET scan
Creates detailed 3D pictures of areas inside the body where a radioactive substance has been taken up.[1,3]

Invasive: imaging tests that require entering the body, like cutting or puncturing the skin or inserting instruments.[4]



Bronchoscopy
A test used to look at air passages with a small camera at the end of a flexible tube.[1,3]



Endobronchial ultrasound
A procedure that uses a tube with an attached ultrasound device to look at a specific area of the lungs.[1,5]

CT: computed tomography; MRI: magnetic resonance imaging; PET: positron emission tomography.

1. ACS. Lung Cancer Early Detection, Diagnosis, and Staging. Updated January 29, 2024. Accessed March 7, 2025. https://www.cancer.org/cancer/types/lung-cancer/detection-diagnosis-staging/how-diagnosed.html 2. NCI Dictionary of Cancer Terms. Noninvasive. Accessed March 7, 2025. https://www.cancer.gov/publications/dictionaries/cancer-terms/def/noninvasive 3. NCI. How Cancer Is Diagnosed. Updated January 17, 2023. Accessed March 7, 2025. https://www.cancer.gov/about-cancer/diagnosis-staging/diagnosis 4. NCI Dictionary of Cancer Terms. Invasive procedure. Accessed March 7, 2025. https://www.cancer.gov/publications/dictionaries/cancer-terms/def/invasive-procedure 5. American Lung Association. Endobronchial Ultrasound (EBUS). Updated November 20, 2024. Accessed March 7, 2025. https://www.lung.org/lung-health-diseases/lung-procedures-and-tests/endobronchial-ultrasound-ebus