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## Emphysema

### What is emphysema?

Emphysema is a type of COPD [<https://medlineplus.gov/copd.html>] (chronic obstructive pulmonary disease). COPD is a group of lung diseases that make it hard to breathe and get worse over time. The other main type of COPD is chronic bronchitis [<https://medlineplus.gov/chronicbronchitis.html>] . Most people with COPD have both emphysema and chronic bronchitis, but how severe each type is can be different from person to person.

Emphysema affects the air sacs in your lungs. Normally, these sacs are elastic or stretchy. When you breathe in, each air sac fills up with air, like a small balloon. When you breathe out, the air sacs deflate, and the air goes out.

In emphysema, the walls between many of the air sacs in the lungs are damaged. This causes the air sacs to lose their shape and become floppy. The damage also can destroy the walls of the air sacs, leading to fewer and larger air sacs instead of many tiny ones. This makes it harder for your lungs to move oxygen in and carbon dioxide out of your body.

### What causes emphysema?

The cause of emphysema is usually long-term exposure to irritants that damage your lungs and the airways. In the United States, cigarette smoke [<https://medlineplus.gov/smoking.html>] is the main cause. Pipe, cigar, and other types of tobacco smoke can also cause emphysema, especially if you inhale them.

Exposure to other inhaled irritants can contribute to emphysema. These include secondhand smoke [<https://medlineplus.gov/secondhandsmoke.html>] , air pollution [<https://medlineplus.gov/airpollution.html>] , and chemical fumes or dusts from the environment or workplace.

Rarely, a genetic condition called alpha-1 antitrypsin deficiency [<https://medlineplus.gov/alpha1antitrypsindeficiency.html>] can play a role in causing emphysema.

### Who is at risk for emphysema?

The risk factors for emphysema include:

- **Smoking.** This is the main risk factor. Up to 75% of people who have emphysema smoke or used to smoke.
- **Long-term exposure to other lung irritants**, such as secondhand smoke, air pollution, and chemical fumes and dusts from the environment or workplace.
- **Age.** Most people who have emphysema are at least 40 years old when their symptoms begin.
- **Genetics.** This includes alpha-1 antitrypsin deficiency, which is a genetic condition. Also, smokers who get emphysema are more likely to get it if they have a family history of COPD.

### What are the symptoms of emphysema?

At first, you may have no symptoms or only mild symptoms. As the disease gets worse, your symptoms usually become more severe. They can include:

- Frequent coughing [<https://medlineplus.gov/cough.html>] or wheezing

- A cough that produces a lot mucus
- Shortness of breath, especially with physical activity
- A whistling or squeaky sound when you breathe
- Tightness in your chest

Some people with emphysema get frequent respiratory infections such as colds [<https://medlineplus.gov/commoncold.html>] and the flu [<https://medlineplus.gov/flu.html>] . In severe cases, emphysema can cause weight loss, weakness in your lower muscles, and swelling [<https://medlineplus.gov/edema.html>] in your ankles, feet, or legs.

## How is emphysema diagnosed?

Your health care provider may use many tools to make a diagnosis:

- A medical history, which includes asking about your symptoms
- A family history
- Other tests, such as lung function tests [<https://medlineplus.gov/lab-tests/lung-function-tests/>] , a chest x-ray [<https://medlineplus.gov/xrays.html>] or CT scan [<https://medlineplus.gov/ctscans.html>] , and blood tests

## What are the treatments for emphysema?

There is no cure for emphysema. However, treatments can help with symptoms, slow the progress of the disease, and improve your ability to stay active. There are also treatments to prevent or treat complications of the disease. Treatments include:

- **Lifestyle changes**, such as
  - Quitting smoking [<https://medlineplus.gov/quittingsmoking.html>] if you are a smoker. This is the most important step you can take to treat emphysema.
  - Avoiding secondhand smoke and places where you might breathe in other lung irritants
  - Ask your health care provider for an eating plan that will meet your nutritional needs. Also ask about how much physical activity you can do. Physical activity can strengthen the muscles that help you breathe and improve your overall wellness.
- **Medicines**, such as
  - Bronchodilators, which relax the muscles around your airways. This helps open your airways and makes breathing easier. Most bronchodilators are taken through an inhaler. In more severe cases, the inhaler may also contain steroids [<https://medlineplus.gov/steroids.html>] to reduce inflammation.
  - Vaccines for the flu [<https://medlineplus.gov/flushot.html>] and pneumococcal pneumonia, since people with emphysema are at higher risk for serious problems from these diseases
  - Antibiotics [<https://medlineplus.gov/antibiotics.html>] if you get a bacterial or viral lung infection
- Oxygen therapy [<https://medlineplus.gov/oxygentherapy.html>] , if you have severe emphysema and low levels of oxygen in your blood. Oxygen therapy can help you breathe better. You may need extra oxygen all the time or only at certain times.
- Pulmonary rehabilitation [<https://medlineplus.gov/pulmonaryrehabilitation.html>] , which is a program that helps improve the well-being of people who have chronic breathing problems. It may include
  - An exercise program
  - Disease management training
  - Nutritional counseling
  - Psychological counseling
- **Surgery**, usually as a last resort for people who have severe symptoms that have not gotten better with medicines. There are surgeries to
  - Remove damaged lung tissue
  - Remove large air spaces (bullae) that can form when air sacs are destroyed. The bullae can interfere with breathing.
  - Do a lung transplant [<https://medlineplus.gov/lungtransplantation.html>] . This is might be an option if you have very severe emphysema.

If you have emphysema, it's important to know when and where to get help for your symptoms. You should get emergency care if you have severe symptoms, such as trouble catching your breath or talking. Call your health care provider if your

symptoms are getting worse or if you have signs of an infection, such as a fever [<https://medlineplus.gov/fever.html>].

## Can emphysema be prevented?

Since smoking causes most cases of emphysema, the best way to prevent it is to not smoke. It's also important to try to avoid lung irritants such as secondhand smoke, air pollution, chemical fumes, and dusts.

*NIH: National Heart, Lung, and Blood Institute*

## Diagnosis and Tests

- Alpha-1 Antitrypsin Testing [<https://medlineplus.gov/lab-tests/alpha-1-antitrypsin-testing/>]  (National Library of Medicine)  
Also in Spanish [<https://medlineplus.gov/spanish/pruebas-de-laboratorio/pruebas-de-alfa-1-antitripsina/>]
- Lung Function Tests [<https://medlineplus.gov/lab-tests/lung-function-tests/>]  (National Library of Medicine)  
Also in Spanish [<https://medlineplus.gov/spanish/pruebas-de-laboratorio/pruebas-de-funcion-pulmonar/>]
- Spirometry [<https://www.lung.org/lung-health-diseases/lung-procedures-and-tests/spirometry>]  (American Lung Association)
- Spirometry [<https://www.mayoclinic.org/tests-procedures/spirometry/about/pac-20385201?p=1>]  
(Mayo Foundation for Medical Education and Research)  
Also in Spanish [<https://www.mayoclinic.org/es/tests-procedures/spirometry/about/pac-20385201?p=1>]

## Treatments and Therapies

- COPD Medications [<https://www.nationaljewish.org/conditions/medications/copd?modal=1>] (National Jewish Health)
- Lung Transplant [<https://www.mayoclinic.org/tests-procedures/lung-transplant/about/pac-20384754?p=1>]  
(Mayo Foundation for Medical Education and Research)  
Also in Spanish [<https://www.mayoclinic.org/es/tests-procedures/lung-transplant/about/pac-20384754?p=1>]
- Surgery for COPD [<https://www.lung.org/lung-health-diseases/lung-disease-lookup/copd/treating/surgery>]  
(American Lung Association)

## Living With

- Oxygen Therapy: MedlinePlus Health Topic [<https://medlineplus.gov/oxygentherapy.html>]  (National Library of Medicine)  
Also in Spanish [<https://medlineplus.gov/spanish/oxygentherapy.html>]
- Pulmonary Rehabilitation: MedlinePlus Health Topic [<https://medlineplus.gov/pulmonaryrehabilitation.html>]  (National Library of Medicine)  
Also in Spanish [<https://medlineplus.gov/spanish/pulmonaryrehabilitation.html>]

## Related Issues

- Hyperinflated Lungs: What Does It Mean? [<https://www.mayoclinic.org/diseases-conditions/emphysema/expert-answers/hyperinflated-lungs/FAQ-20058169?p=1>]  
(Mayo Foundation for Medical Education and Research)  
Also in Spanish [<https://www.mayoclinic.org/es/diseases-conditions/emphysema/expert-answers/hyperinflated-lungs/faq-20058169?p=1>]

## Specifics

- Alpha-1 Antitrypsin Deficiency [<https://www.nhlbi.nih.gov/health/alpha-1-antitrypsin-deficiency>]   
(National Heart, Lung, and Blood Institute)  
Also in Spanish [<https://www.nhlbi.nih.gov/es/salud/deficiencia-de-alfa-1-antitripsina>]
- Learn about Alpha-1 Antitrypsin Deficiency [<https://www.lung.org/lung-health-diseases/lung-disease-lookup/alpha-1-antitrypsin-deficiency/learn-about-alpha-1-antitrypsin-deficiency>]  
(American Lung Association)

## Genetics

- Alpha-1 antitrypsin deficiency: MedlinePlus Genetics [<https://medlineplus.gov/genetics/condition/alpha-1-antitrypsin-deficiency>]  (National Library of Medicine)

# Statistics and Research

- FastStats: Chronic Obstructive Pulmonary Disease (COPD) Includes: Chronic Bronchitis and Emphysema [https://www.cdc.gov/nchs/fastats/copd.htm] (National Center for Health Statistics)

## Clinical Trials

- ClinicalTrials.gov: Emphysema [https://clinicaltrials.gov/search?cond=%22Emphysema%22&aggFilters=status:not%20rec] NIH (National Institutes of Health)

## Journal Articles

References and abstracts from MEDLINE/PubMed (National Library of Medicine)

- Article: Identifying emphysema risk using brominated flame retardants exposure: a machine learning... [https://www.ncbi.nlm.nih.gov/pubmed/40636877]
- Article: Hedgehog-interacting protein orchestrates alveogenesis and protects against bronchopulmonary dysplasia and emphysema. [https://www.ncbi.nlm.nih.gov/pubmed/40333979]
- Article: Association of combined pulmonary fibrosis and emphysema in rheumatoid arthritis with... [https://www.ncbi.nlm.nih.gov/pubmed/39975554]
- Emphysema -- see more articles [https://pubmed.ncbi.nlm.nih.gov/?term=%22Emphysema%22%5Bmajr%3Aexp%5D+AND+humans%5Bmh%5D+AND+english%5Bla%5D+AND+%22last+1+Year%22+%5Bdat%5D+NOT+%28letter%5Bpt%5D+OR+case+reports%5Bpt%5D+OR+editorial%5Bpt%5D+OR+comment%5Bpt%5D%29+AND+free+full+text%5Bsb%5D+]

## Reference Desk

- How Lungs Work [https://www.lung.org/lung-health-diseases/how-lungs-work] American Lung Association
- How the Lungs Work [https://www.nhlbi.nih.gov/health/lungs] NIH National Heart, Lung, and Blood Institute  
Also in Spanish [https://www.nhlbi.nih.gov/es/salud/pulmones]

## Find an Expert

- American Lung Association [https://www.lung.org/]
- National Heart, Lung, and Blood Institute [https://www.nhlbi.nih.gov/] NIH

## Patient Handouts

- How to breathe when you are short of breath [https://medlineplus.gov/ency/patientinstructions/000053.htm] (Medical Encyclopedia)  
Also in Spanish [https://medlineplus.gov/spanish/ency/patientinstructions/000053.htm]
- Lung diffusion testing [https://medlineplus.gov/ency/article/003854.htm] (Medical Encyclopedia)  
Also in Spanish [https://medlineplus.gov/spanish/ency/article/003854.htm]
- Lung surgery [https://medlineplus.gov/ency/article/002956.htm] (Medical Encyclopedia)  
Also in Spanish [https://medlineplus.gov/spanish/ency/article/002956.htm]
- Pulmonary function tests [https://medlineplus.gov/ency/article/003853.htm] (Medical Encyclopedia)  
Also in Spanish [https://medlineplus.gov/spanish/ency/article/003853.htm]
- Traveling with breathing problems [https://medlineplus.gov/ency/patientinstructions/000066.htm] (Medical Encyclopedia)  
Also in Spanish [https://medlineplus.gov/spanish/ency/patientinstructions/000066.htm]
- Using oxygen at home [https://medlineplus.gov/ency/patientinstructions/000048.htm] (Medical Encyclopedia)  
Also in Spanish [https://medlineplus.gov/spanish/ency/patientinstructions/000048.htm]



## MEDICAL ENCYCLOPEDIA

Alpha-1 antitrypsin blood test [<https://medlineplus.gov/ency/article/003715.htm>]

Chest CT [<https://medlineplus.gov/ency/article/003788.htm>]

Chest x-ray [<https://medlineplus.gov/ency/article/003804.htm>]

How to breathe when you are short of breath [<https://medlineplus.gov/ency/patientinstructions/000053.htm>]

Lung diffusion testing [<https://medlineplus.gov/ency/article/003854.htm>]

Lung surgery [<https://medlineplus.gov/ency/article/002956.htm>]

Lung surgery - discharge [<https://medlineplus.gov/ency/patientinstructions/000242.htm>]

Oxygen safety [<https://medlineplus.gov/ency/patientinstructions/000049.htm>]

Pulmonary function tests [<https://medlineplus.gov/ency/article/003853.htm>]

Traveling with breathing problems [<https://medlineplus.gov/ency/patientinstructions/000066.htm>]

Using oxygen at home [<https://medlineplus.gov/ency/patientinstructions/000048.htm>]

Using oxygen at home - what to ask your doctor [<https://medlineplus.gov/ency/patientinstructions/000251.htm>]

## Related Health Topics

Alpha-1 Antitrypsin Deficiency [<https://medlineplus.gov/alpha1antitrypsindeficiency.html>]

Chronic Bronchitis [<https://medlineplus.gov/chronicbronchitis.html>]

COPD [<https://medlineplus.gov/copd.html>]

Oxygen Therapy [<https://medlineplus.gov/oxygentherapy.html>]

Pulmonary Rehabilitation [<https://medlineplus.gov/pulmonaryrehabilitation.html>]

## National Institutes of Health

The primary NIH organization for research on *Emphysema* is the National Heart, Lung, and Blood Institute [<http://www.nhlbi.nih.gov/>]

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