

COPD is not a reversible condition, but can be treated with the underlying goal of slowing its progression.

Chronic Obstructive Pulmonary Disease

What Is Chronic Obstructive Pulmonary Disease?

Chronic obstructive pulmonary disease (COPD) describes a state of great and irreversible damage to the lungs that usually results from chronic exposure to airborne irritants. COPD usually includes two conditions: emphysema and chronic bronchitis. Both these terms are more familiar in diagnostic tradition than COPD. However, because emphysema and chronic bronchitis often exist together, doctors now prefer the term COPD to either traditional term.

Healthy lungs inhale air through the mouth, nose, and trachea (windpipe). Air travels further through the larger airways (bronchi), through smaller airways, and finally to the alveoli, which are thin-walled sacs surrounded by capillaries (tiny blood vessels). These air sacs, by virtue of their elasticity, membrane properties, and proximity to the bloodstream, transfer oxygen to the blood and extract carbon dioxide (CO₂) for return to the air passages and exhalation.

Emphysema is a state in which the air sacs (alveoli) in the lungs have been damaged. If these alveoli are repeatedly exposed to airborne irritants such as cigarette smoke, the tissue can be destroyed. The alveoli then lose their gas-exchange properties, their elasticity, and their power to remain open to receive and hold air (collapse). In time, the air sacs are destroyed and the lung tissue develops holes.

In chronic bronchitis, the air passages leading to and from the alveoli become chronically irritated then damaged. With continued irritation, the linings of the airways

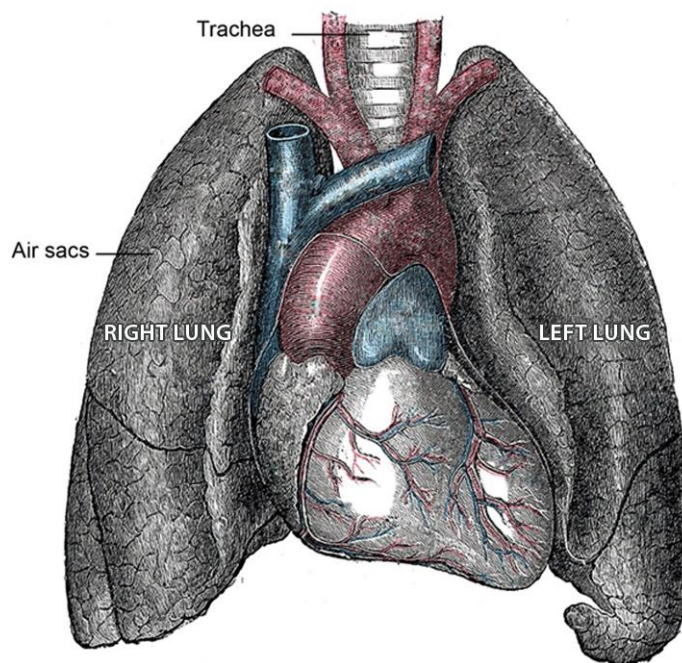
produce and become filled with mucus that induces coughing. The mucus itself restricts airflow. If the coughing continues, the airways become scarred. Coughing also damages the capillaries (small blood vessels) around the air sacs. This state, if it continues, prevents oxygen from reaching the blood stream and carbon dioxide (CO₂) from leaving the body. Scarred airways also contribute to the growth of bacteria, producing infections, and leading to further obstruction, coughing, and scarring.

In chronic bronchitis, blood vessels constrict in an attempt to divert the blood to better-oxygenated areas of the lung. This change increases blood pressure in the arteries that feed the lungs and strains the right side of the heart. Eventually, if blood pressure remains high in the lungs, heart failure develops.

Acute Exacerbation of COPD

An exacerbation of COPD is a significant increase in the shortness of breath (dyspnea) of a patient who has been diagnosed with COPD.

Emphysema and chronic bronchitis may both be present in an individual at the same time. There is no cure: COPD is one of the leading causes of death in developed nations and affects both men and women.



What Causes COPD?

By far the major cause of COPD is cigarette smoking. It represents 85 to 90 percent of all cases. Exposure to any of the following airborne irritants also places you at increased risk:

- ❖ Air pollution and significant air levels of sulfur dioxide. Noxious elements and compounds such as airborne lead, mercury, coal dust, and hydrogen sulfide
- ❖ Second-hand smoke
- ❖ Particulate matter, including smoke from poorly ventilated wood stoves and the burning of biomass
- ❖ Certain industrial pollutants

Who Is at Risk of COPD?

You are at great risk of developing COPD if you smoke. You are also at risk if you are exposed to passive smoking or one or more of the airborne irritants described in the last section. Additional risks of COPD include the following factors of individual experience:

- ❖ History of frequent respiratory illnesses
- ❖ Inherited alpha-1-antitrypsin deficiency
- ❖ Inherited susceptibility to lung tissue damage

What Are the Signs and Symptoms?

Symptoms of chronic bronchitis usually begin in smokers after they reach the age of about 50. These symptoms persist and gradually worsen for the rest of the smoker's life, unless he or she stops smoking and seeks medical advice.

Chronic Bronchitis

If you smoke and have any of the following symptoms, you are very likely to have COPD:

- ❖ A cough that persists for at least three months of the year for two consecutive years

- ❖ A morning cough that brings up mucus and that occurs over increasing spans of time.
- ❖ Heightened vulnerability to respiratory infections

For example, your cough is likely to indicate chronic bronchitis if it began as a cough of winter mornings and now occurs intermittently throughout the day, during all seasons of the year.

Late-stage symptoms of chronic bronchitis can include a continuous cough, breathlessness, rapid breathing, and anoxia (a lack of oxygen that gives a bluish tint to the skin). In addition, you may sustain potentially life-threatening episodes of severe breathing difficulties that require hospitalization (acute exacerbations of COPD). You may become vulnerable to heart failure, a state recognized by chest pain together with swelling (edema) in the ankles, legs, and abdomen.

Emphysema

If you have emphysema, you may first feel short of breath during moderate physical effort, in activities such as walking. Because lung function decreases slowly in emphysema, considerable time may elapse before you notice reductions in lung capacity. The progression of emphysema can bring increased shortness of breath, wheezing, coughing, fatigue, difficulty sleeping, and weight loss. Symptoms of the disease's progression can also include chest distension and a feeling of tightness in the chest.

How Is COPD Diagnosed?

A preliminary physical examination for COPD can include checking for rapid breathing, anoxia, and chest distension. Anoxia is a lack of oxygen that shows itself in a bluish tint in the skin, lips, or fingernails. In addition, any of the following tests may confirm the diagnosis:

Lung Function Tests

In these tests, your doctor uses a spirometer to time and measure cycles and volumes of respiration. A value called forced-air volume in one second (FEV1) indicates the

speed with which your lungs can empty and refill. It is important not to take any medication before taking this test.

Blood Tests

One type of blood test, a CBC, counts the numbers of red blood cells, white blood cells, and platelets. Another type of test measures the levels of oxygen and carbon dioxide, respectively, carried by the blood. A third type of blood test measures alpha-1-antitrypsin levels. Unusually low levels of alpha-1-antitrypsin that appear in a nonsmoker can indicate a rare, hereditary form of COPD. If you are diagnosed with this condition, ensure that family members including children are also tested for this deficiency.

Chest X-rays

Chest X-rays reveal heart size and help to detect pneumonia and lung cancer. In tests for emphysema, chest X-rays can also identify areas where lung tissue has been destroyed.

Electrocardiograms (ECGs)

If your doctor suspects heart problems, he or she may use an ECG to measure the electrical activity of the heart.

Sputum Analysis

In this test a small amount of mucus is collected and tested for respiratory infection.

Exercise Stress Test

In this test you walk on a treadmill while a specialist monitors the intensity of your exercise. Resulting measurements can detect any coronary artery disease that may be causing or exacerbating your symptoms.

What Are Common Treatments?

COPD is not a reversible condition, but the underlying goal of treatment is to slow its progression. Other goals of treatment are to avoid lung infections, be free from COPD symptoms, to sleep through the night, and to eliminate emergency hospitalizations.

Treatments include medications, oxygen therapy, and surgery. The medications used to treat COPD include bronchodilators, antibiotics, and daily inhaled corticosteroids.

Bronchodilators

Many of the medications prescribed for COPD work by opening the airways. These drugs are called bronchodilators and may be taken either as pills or via an inhaled spray.

Antibiotics

Antibiotics also may be necessary to treat acute respiratory infections such as bacterial pneumonia.

Daily Inhaled Corticosteroids

Daily inhaled corticosteroids may be given to reduce airway inflammation. For flare-ups, an oral corticosteroid called prednisone is often prescribed.

If you need help in quitting smoking, you may be prescribed a medication that can aid in your efforts.

In addition to medications, treatments for COPD can include oxygen therapy and surgery.

Oxygen Therapy

Some COPD patients require oxygen therapy at night, during periods of heightened activity, or continually. Oxygen is administered from portable tanks. Oxygen therapy can increase blood oxygenation, in part by making it easier for oxygen to reach the alveoli.

Surgery

Surgery to remove the most severely diseased portions of the lungs can allow the less damaged portions to work more efficiently. Surgery is often combined with medication.

Lung transplants or heart-lung transplants are an option in a small proportion of cases.

Can COPD Be Prevented?

You can greatly reduce your chances of developing COPD if you avoid cigarette smoking and second-hand smoke. In addition, try to avoid breathing significant volumes of air that contains any of the following substances:

- ❖ Sulfur dioxide
- ❖ Noxious elements and compounds such as airborne lead, mercury, coal dust, and hydrogen sulfide
- ❖ Particulate matter including smoke from poorly ventilated wood stoves and the burning of biomass
- ❖ Certain industrial pollutants

Should I Call My Doctor?

Get emergency medical help immediately if you or anyone who is with you stops breathing. Also, call emergency services if you develop any of the following problems:

- ❖ Moderate to severe difficulty breathing
- ❖ Severe or quickly worsening chest pain
- ❖ Coughing up blood in significant volumes (half a cup)
- ❖ Wheezing or shortness of breath that worsens as minutes pass
- ❖ Anew chest pain
- ❖ Coughs intensify in depth or frequency, especially if you notice an increase in mucus (sputum) or a change in its the color or odor
- ❖ Increased swelling in your legs or belly.
- ❖ A high fever (over 101°F)
- ❖ Flu-like symptoms

Also call your doctor for an appointment if:

- ❖ Your medicine is not working as well as it has been
- ❖ Your symptoms are slowly getting worse and you have not seen a doctor recently
- ❖ Your fever lasts longer than two to three days
- ❖ Breathlessness occurs or becomes noticeably worse

- ❖ Your cough gets worse or lasts longer than seven to 10 days
- ❖ You have not been diagnosed with COPD but are having symptoms suggesting the condition. A history of smoking (even in the past) greatly increases the likelihood that symptoms are from COPD.
- ❖ You cough up blood in any amount

For More Information

For more information, refer to the following medical resources:

<http://www.nlm.nih.gov/medlineplus/copdchronicobstructivepulmonarydisease.html>

<http://www.lung.org/lung-disease/copd/resources/facts-figures/COPD-Fact-Sheet.html>

The content in this document is neither intended nor recommended as a substitute for seeking professional medical advice, diagnosis or treatment. It is recommended that you seek the advice of your physician or other qualified healthcare professional regarding any medical questions related to the topics contained within this document, your health or conditions.