

# COPD

It Can Take Your Breath Away



written by Harvard Medical School



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Patient Education Center

[www.patientedu.org](http://www.patientedu.org)

COPD is also a major cause of disability for many of the 11 million Americans diagnosed with the condition. Many more people may have COPD but are not yet diagnosed.

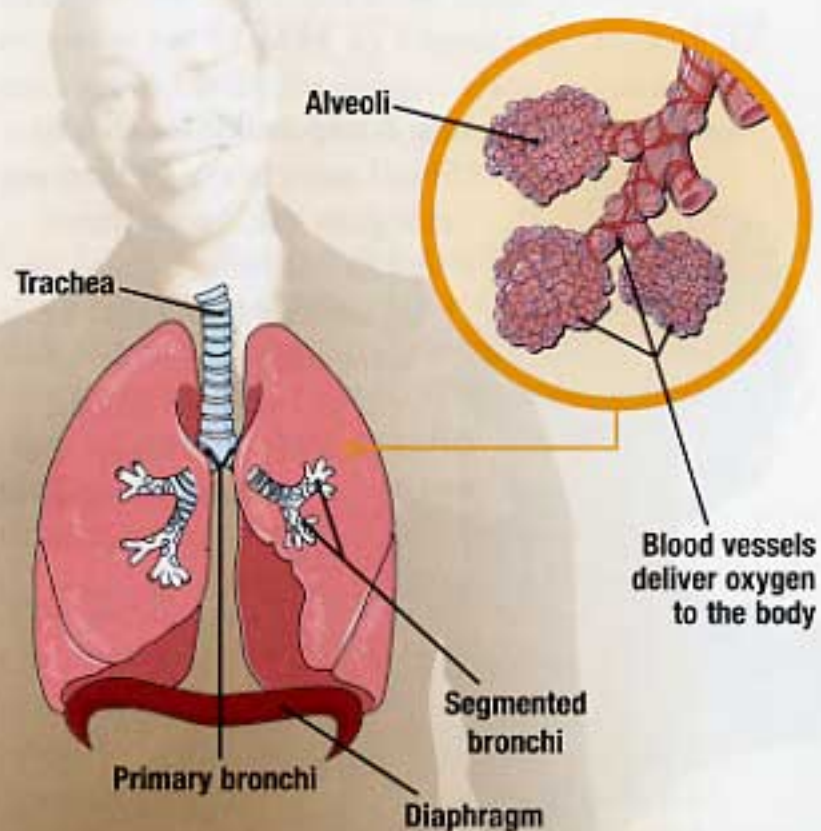
COPD is not curable, but it is treatable. Early treatment can help reduce the long-term effects of COPD. Lifestyle changes and medication can help patients cope with this chronic lung disease.

For more information about COPD from Harvard Health Publications, go to [www.patientedu.org](http://www.patientedu.org)

## Normal Lungs

Every time you breathe, air travels down your windpipe or trachea, then through smaller tubes called *bronchi* (see figure below). The bronchi are studded with mucous glands, and their walls contain muscles that can make the tubes wider or narrower. After passing through the bronchi, the air arrives at its final destination, the lungs' approximately 300 million tiny air sacs or *alveoli*. Here, oxygen enters the blood to nourish the body's tissues, and carbon dioxide makes its way out of the bloodstream.

Breathing is powered by the muscles of the chest wall and the *diaphragm*, the strong muscle that separates the chest from the abdomen. As you inhale, your chest expands and your bronchi widen; when you exhale, the reverse occurs. In COPD, the bronchi are abnormally narrow, so the flow of air is obstructed and breathing is hard.



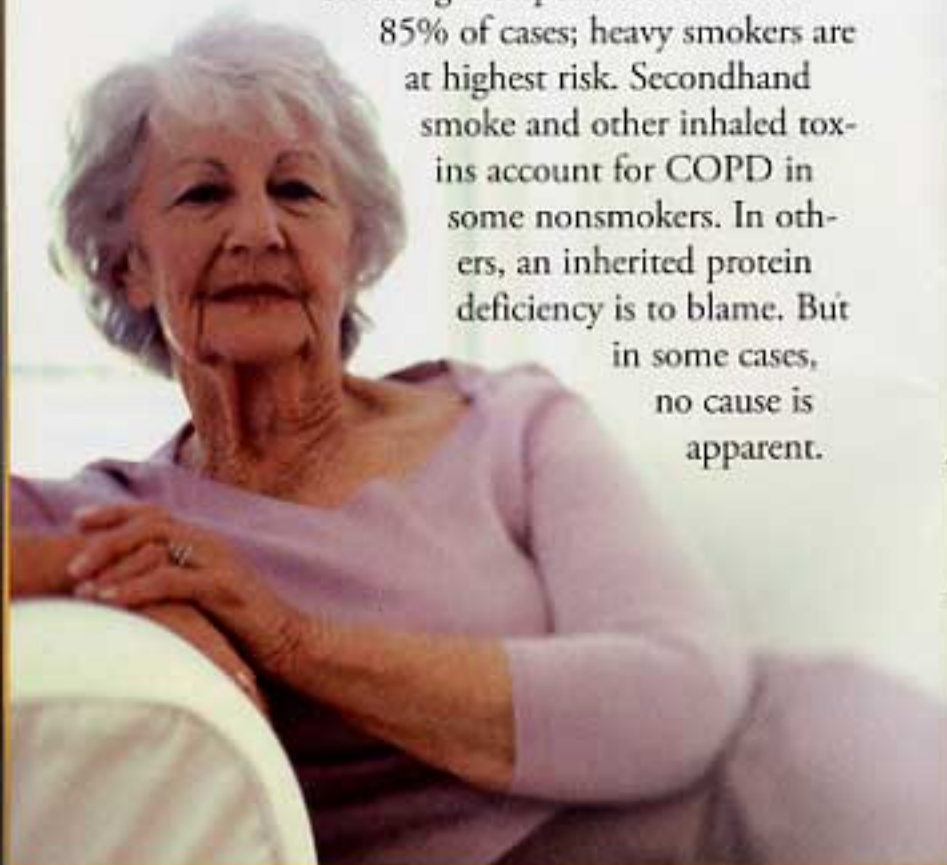
## What Is COPD?

There are two major diseases included in COPD, *chronic bronchitis* and *emphysema*. In both, narrowed *bronchi* (see figure on page 3) make it hard to exhale. Narrowed bronchi also cause asthma—but in asthma, the narrowing is temporary and reversible. In COPD, it's permanent and only partially reversible.

In chronic bronchitis, an enlargement of the mucous glands and excessive mucus production contribute to the narrowing. In emphysema, the narrowing comes from damage to the bronchi themselves and is more severe. *Inflammation* triggered by inhaled irritants also contributes to COPD. White blood cells respond to the irritation, but instead of controlling the problem, they can release chemicals that, if unchecked, damage and eventually destroy lung tissue.

## What Causes COPD?

Smoking is responsible for about 85% of cases; heavy smokers are at highest risk. Secondhand smoke and other inhaled toxins account for COPD in some nonsmokers. In others, an inherited protein deficiency is to blame. But in some cases, no cause is apparent.



## Symptoms

COPD starts gradually and progresses slowly; that's why cases continue to increase years after many Americans quit smoking.

At first, there are no symptoms—but little by little, problems appear, usually in middle age. A morning “smoker's cough” is often the first complaint. The cough gradually gets worse and occurs throughout the day. Next, shortness of breath develops—at first, only during exercise, but as the disease progresses, breathing becomes a chore even at rest. Wheezing is another common symptom. Most patients also become tired and weak.

**Chronic bronchitis.** Patients with chronic bronchitis have a recurrent cough that brings up large amounts of thick, discolored phlegm almost every day for 3 months or longer over a period of at least 2 years. Over time, the lung disease can put a strain on the heart, and some patients develop *congestive heart failure*. As a result, they accumulate fluid and gain weight. Their lips and skin may eventually look bluish due to low blood oxygen levels.

**Emphysema.** Patients with emphysema look and sound different. Their cough is scant and dry, but their shortness of breath is more severe and they breathe faster than normal. They stay pink and don't accumulate fluid, but they lose weight, their muscles tend to waste away, and they develop large, barrel-shaped chests.

Most patients with COPD have mixed features of chronic bronchitis and emphysema. Many patients also have two to three *exacerbations* each year. These are abrupt flares that are often triggered by lung infections. Symptoms get much worse and aggressive treatment may be needed.



## Diagnosis

Your doctor will ask about your smoking history and about possible exposures to secondhand smoke, fumes, and dust particles. You should also report any family history of COPD, particularly if your symptoms began in young adulthood and you haven't been exposed to tobacco. You'll also be asked to report any symptoms of cough, phlegm, shortness of breath, wheezing, fatigue, and changes in your weight.

**Physical exam.** A physical examination can suggest the diagnosis of COPD. Your doctor will check your lips, skin, and nails for bluish discoloration (*cyanosis*) that suggests low oxygen levels. Your nails may be abnormally rounded (*clubbed*); you may have fluid in your legs and feet (*edema*).

Your chest exam is the most important part of the physical exam. With chronic bronchitis, your doctor may hear wheezing and abnormal gurgling sounds (*rales*) through a stethoscope. If emphysema is the main problem, your chest may be enlarged and sound hollow when your doctor taps on it.

**Tests and x-rays.** The most important test of all is a lung function test, the *forced expiratory volume at one second* (FEV<sub>1</sub>). It measures the amount of air you can breathe out with a maximal effort in

one second. The test is simple and safe. You take a deep breath in, then blow out as fast and hard as you can into a *spirometer*, which collects the air and measures the amount you've exhaled in the first second.

Normal FEV<sub>1</sub> values depend on a person's age, sex, and height. Doctors can diagnose COPD and estimate its severity based on how a patient's FEV<sub>1</sub> compares to normal:

Stage 1	Mild COPD	FEV <sub>1</sub> at least 80% of normal
Stage 2	Moderate COPD	FEV <sub>1</sub> between 50% and 80% of normal
Stage 3	Severe COPD	FEV <sub>1</sub> between 30% and 50% of normal
Stage 4	Very Severe COPD	FEV <sub>1</sub> below 30% of normal

By repeating lung function tests, doctors can tell if COPD is getting worse. And they can also tailor therapy to the stage of the disease.

If you have emphysema, your chest x-ray will show enlarged lungs filled with an excessive amount of air. Scarring and large, air-filled cavities (*blebs*) may also be evident. The x-ray abnormalities of chronic bronchitis are less specific. CT scans can show damage at an earlier stage, but no imaging test can accurately gauge the severity of COPD or predict its outcome.

In many cases, your doctor will order additional tests, such as complete blood counts, an EKG to look for heart strain, an analysis of your sputum, and a test to measure the oxygen in your blood.

## Treatment: *Lifestyle*

**Avoid tobacco and secondhand smoke** is the first and most important rule in COPD treatment. No exceptions. The easiest way to avoid COPD is to never smoke, but if you do smoke, your prospects for quitting have never been better. If you go it alone, your odds of quitting are pretty low. But if you use an over-the-counter nicotine patch or other medication and seek behavioral therapy, you can increase your odds of quitting for good. Behavioral therapy includes group counseling and one-on-one contact. Even a series of encouraging phone calls can help, particularly with people who have quit and can motivate you to succeed. The more frequently you get such social support, the better your chances of being smoke-free over the long term.

To learn more about your options to quit smoking, visit or call these resources:

### **American Lung Association**

[www.lungusa.org](http://www.lungusa.org)

800.LUNGUSA (800.586.4872)

### **Centers for Disease Control and Prevention: Office on Smoking and Health**

[www.cdc.gov/tobacco](http://www.cdc.gov/tobacco)

800.CDC.INFO (800.232.4636)

### **Nicotine Anonymous**

[www.nicotine-anonymous.org](http://www.nicotine-anonymous.org)

### **Smokefree.gov**

[www.smokefree.gov](http://www.smokefree.gov)

800.QUITNOW (800.784.8669)



**Good nutrition** is also important—make sure you eat plenty of fruits, vegetables, and fish (see the PEC booklet, 'Good Eating for Good Health'). There is no evidence that vitamin supplements help, and one, beta-carotene, can actually increase a smoker's risk of lung cancer. Patients with

chronic bronchitis and heart strain must avoid sodium (salt). Patients with severe emphysema often don't get enough nutrients and may benefit from high-calorie nutritional supplements. Good hydration is important to keep phlegm loose and easy to cough out.

**Exercise** makes patients huff and puff, but a gradual program of low- to moderate-intensity exercise helps muscles get the most bang out of the oxygen that damaged lungs can deliver. Walking is best, starting with 5 minutes three to four times a day, then building up to as much as 45 minutes a day.

**Talk with your doctor before you begin any new exercise program.** Patients with severe COPD or heart disease may need to work with a training professional. Structured pulmonary rehabilitation programs also offer breathing exercises designed to strengthen chest muscles.

**Preventing infection** is essential. Be sure your flu and pneumonia immunizations are up to date. Keep your distance from folks with respiratory infections. Wash your hands carefully, using an alcohol-based hand rub.





## Treatment: Medications

Early treatment is important; the good news is that many medications are available. Your doctor will decide what is best for you, but be sure to discuss the likely benefits and possible side effects of all of your prescriptions.

Some COPD medications are designed to open your airways quickly to help make it easier to breathe (including *quick relievers* or *rescue inhalers*). Others combat airway swelling, widen the bronchial tubes so more air can get in and out, and decrease mucus and phlegm production (including *maintenance medications*).

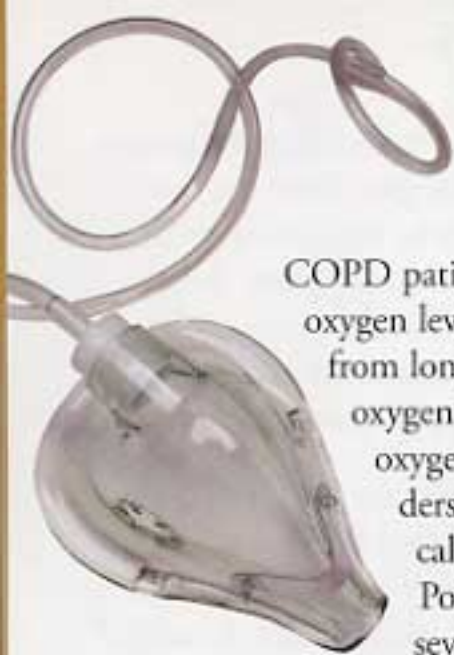
**Quick relievers/rescue inhalers.** Also known as *short-acting beta-agonists*, quick-relief medications relieve symptoms quickly by relaxing the muscles that surround the bronchial tubes, enabling the tubes to open wider. You should carry your quick-relief medication with you at all times. Ask your doctor about when and how often to use a quick reliever.

**Maintenance medications.** Including *beta-agonists*, *corticosteroids*, and *anticholinergics*, these medications are taken daily, usually by inhalation, to help make breathing easier over the long term. Because these medications act on different aspects of the disease, your doctor may recommend that you use different types of therapy in combination.

Since most COPD medicines are inhaled, your doctor may prescribe a handheld device called an inhaler. Be sure to ask your doctor for thorough instructions on how to use your inhaler. In addition to quick-relief and maintenance medications, doctors may prescribe anti-inflammatory drugs and antibiotics, as needed, to treat flare-ups and respiratory infections. Notify your doctor immediately if your breathing becomes worse, if you develop a fever, or if your phlegm becomes thicker, discolored, or more abundant.

While medications will not cure your COPD, they can help you breathe better.





## Treatment: Oxygen

COPD patients who have low blood oxygen levels can benefit greatly from long-term, round-the-clock oxygen therapy. For home use, oxygen can be stored in cylinders or generated by machines called *oxygen concentrators*. Portable tanks can provide several hours of oxygen away

from home. Safe oxygen therapy requires careful physician supervision and responsible cooperation by patients and household members.

## Treatment: Surgery

Some patients with severe emphysema may benefit from special types of lung operations. Expert evaluation by experienced physicians is mandatory. A few COPD patients may be eligible for lung transplantation.

*Work with your doctor to develop a treatment plan that is right for you—and then stick with the program!*

*The earlier, and more aggressively, you treat COPD, the less damage to your lungs and better likelihood that COPD will not be disabling.*

## Living with COPD

During the course of a lifetime, the average person will take millions of breaths. Most people can keep their lungs healthy simply by avoiding tobacco smoke and other noxious fumes. And even when COPD causes lung damage, early diagnosis, treatment, and lifestyle changes can help slow the process, ward off complications, and improve your quality of life. So work closely with your doctor to preserve your breath of life.

