

Breathe Easy

COPD

ROTECH[®]
HEALTHCARE INC.

WHAT IS COPD?

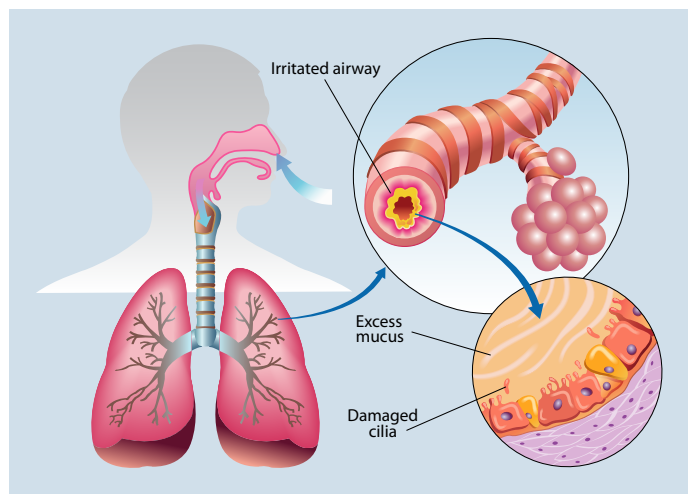
COPD is an acronym for Chronic Obstructive Pulmonary Disease. The term “chronic” refers to a condition which the patient has all the time. Obstruction refers to the fact that these patients have difficulty getting air out of their lungs. Pulmonary tells us the condition is related to the lungs. In a general sense, it could be used to refer to any lung disease that causes chronic problems in getting air out of the lungs. By convention, it typically refers to two conditions: chronic bronchitis and emphysema. It is very common for patients with one condition to also have a component of the other. Because these conditions frequently coexist, it is often easier to group them under the general diagnosis “COPD.”

More than 16 million Americans have been diagnosed with COPD. It's estimated that another 16 million or more are undiagnosed! COPD is the fourth leading cause of death in the United States and the only one of the top four (the others being heart disease, cancer, and stroke) with growing numbers. As medicine continues to advance and we see decreases in cancer, heart disease, and stroke, patients are living longer -- and they're more likely to develop COPD as they age.

CHRONIC BRONCHITIS

Chronic bronchitis is a productive cough lasting for at least three months in two successive years. It is typically the result of changes in the airways that occur from exposure to an irritant such as tobacco smoke.

When tobacco smoke or other irritants are inhaled, the lungs try to protect themselves in several ways. One way is by increasing the protective layer of mucus that lines our airways. Sticky mucus lines our airways to trap inhaled particles such as bacteria, pollen, dust, smoke, and viruses before they travel into the lungs and cause damage. Two specialized structures in our airways produce mucus: the mucus gland and goblet cells. When airways are repeatedly exposed to irritants, the mucus glands get larger and the number of goblet cells increases. This results in more mucus production in the airways.



Small hair-like structures called cilia line the airways. Cilia move rhythmically to sweep old mucus -- and any trapped particles -- up and out of our airways to the throat, where most people swallow it without noticing. Most people produce and swallow about ½ cup of mucus per day. Inhaling tobacco smoke temporarily paralyzes the cilia and mucus sits in the airways instead of being swept out. When the smoker quits smoking overnight, the cilia start working again and push the stagnant mucus out of the airways, resulting in the smoker's familiar “morning cough.”

Another natural response of the body to irritation is inflammation or swelling. Similar to when your skin is exposed to something irritating, the airways become red and swollen due to repeated exposure to an irritant (e.g., tobacco smoke). This causes the lumen (inside diameter) of the airway to become smaller.

Smooth muscle is wrapped around our airways. As the airway is exposed to irritants, this smooth muscle enlarges and constricts the airways. This is called Smooth Muscle Hypertrophy. There is evidence to support that the smooth muscle also becomes more likely to contract, resulting in bronchospasm.

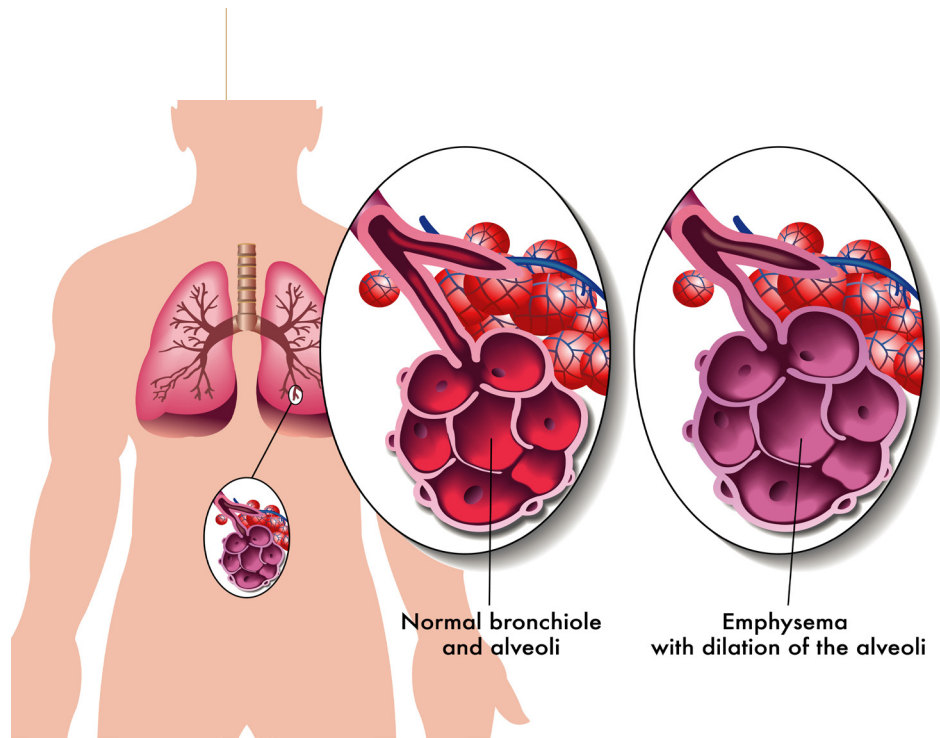
All of these factors have a similar effect on the inside of the airway - they make it smaller. This makes it more difficult to get air out of the airways and obstruction —the “O” in COPD— occurs.

EMPHYSEMA

Emphysema is a disease of the small alveoli (air sacs) in the lungs. The air sacs occur within the lungs in clusters similar to a bunch of grapes. Chemicals within tobacco smoke cause the alveoli to “break down” and change from looking like a cluster of small air sacs to fewer, bigger alveoli. Fewer, bigger air sacs are much less efficient at getting oxygen into the blood stream than several smaller air sacs. It is also more likely to collapse resulting in difficulty getting air out of the lungs.

Another change that occurs in the air sacs with emphysema is in their elasticity (stretchiness). The alveoli are normally very elastic, like a balloon. When you take a breath in, you must inflate the alveoli (or balloons), which takes energy to do. However, you

exhale by simply relaxing and the stretchy alveoli return to their normal size. Emphysema causes the alveoli to lose their elasticity. Instead of balloons, the air sacs become more like paper sacks that require energy not only to breathe in, but also to breathe out.

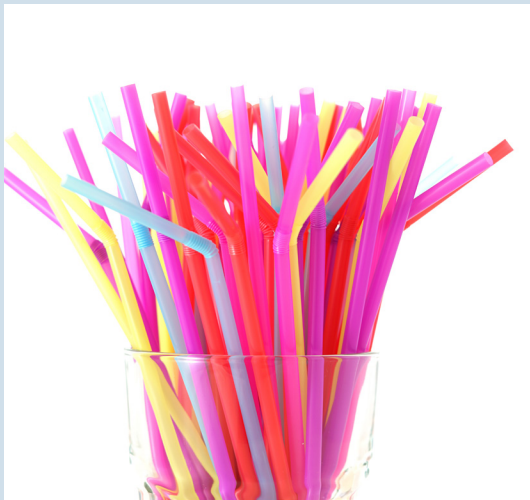


WHAT CAUSES COPD?

If you haven't already figured it out, the most common cause of COPD is smoking. Somewhere between 15 and 30% of smokers will develop significant COPD. Other factors also play a role in which smokers will develop COPD including a family history of COPD, childhood infections, and exposure to other irritants (e.g., pollution).

IN SUMMARY

While COPD cannot be cured, it is certainly very treatable. Treatment is aimed at slowing any further loss of lung function (i.e., smoking cessation), correcting any reversible changes, and treating problems and symptoms of the disease. Early identification is a key as the earlier intervention can be implemented, the greater the likelihood of preventing severely debilitating disease.



Try it yourself!

Take a normal sized straw and a small coffee straw. First, breathe through the normal size straw. Next, try breathing through the smaller diameter coffee straw. Which one is easier? The normal straw represents breathing through normal airways. When the airways become smaller due to mucus plugging, inflammation, and bronchial muscle contraction, the inside of the airway becomes smaller like the coffee straw.

Do you understand why it is so important to use medications to open the airways?