What is COPD?

What is the definition of COPD?

Chronic obstructive pulmonary disease (COPD) is a disease that can be prevented and treated, although it is not curable. It is the umbrella term used for long-term constriction of the airways to the lungs that is:¹,²

- Not fully reversible
- Usually progressive
- Fairly constant over several months
- Associated with an abnormal inflammatory response of the lungs to toxic substances

With evidence that chronic inflammation which is a key factor in COPD¹, it is thought that the same inflammation may be a common link to associated co-morbidities. Although COPD primarily affects the lungs, systemic manifestations are common and include:

- Weight loss
- Skeletal muscle dysfunction
- Osteoporosis
- Cardiovascular disease
- Depression and general fatigue
- Lung cancer.

In the UK, the main cause is cigarette smoking, but there are many other contributory risk factors including genetic ones (such as alpha-1 antitrypsin deficiency) and environmental ones (such as occupational exposure).¹,²

Who gets COPD?

Lung function (measured by FEV₁) declines gradually over a person’s lifetime, with the rate of decline becoming slightly faster with increasing age. People who have never smoked, and those smokers who are not susceptible to the effects, are less likely to develop clinically significant airflow obstruction.⁵

In contrast, smokers who are susceptible to the effects of smoke will have an accelerated decline in their lung function as a direct result of smoking. Depending on the degree of susceptibility (which varies between individuals), this accumulated effect can result in disability and death.⁶ It is not clearly known why some smokers are more susceptible than others but the broad range of clinical presentations in OPD are thought to be related to phenotypes and is an area of ongoing research.³

While lost lung function cannot be recovered, a slowing of the rate of decline to normal (and thus improved life expectancy) can be achieved at any stage but the most severe stages of the disease as long as the patient stops smoking.⁴

The chart shows the different rates of declining lung function (measured by FEV₁) in men who: smoke and are susceptible to developing symptomatic airflow obstruction (COPD); are susceptible to developing COPD but stop smoking (at different ages); smoke but are not susceptible to the effects, or have never smoked.

(Adapted with permission from Fletcher & Peto 1977)⁴

What happens to the lungs in COPD patients?

The umbrella term COPD encompasses several different disease processes:⁵

- Chronic obstructive bronchitis of small airways
- Emphysema, with enlargement of air spaces and destruction of lung parenchyma resulting in loss of lung elasticity and small airway closure
- Excess mucus production and obstruction / plugging.

Most patients with COPD have all three, though the contribution of each element may vary between patients.⁵
**Normal lung**

In normal lungs, the small airways are clear of excess mucus and are kept open by special structures called alveolar attachments. The person can breathe out freely and fully and therefore can fill their lungs to full capacity when they breathe in.4

**Diseased lung**

In the lungs of patients with COPD, there is excess mucus production which blocks the airways, as well as inflammation and thickening of the lining of the airway tubules. Structures holding the tubules open break down, leading to small airway collapse. As a result the lungs do not empty completely when the patient breathes out. All of these factors reduce lung capacity.5

(Adapted with permission from Barnes 2004)5

In patients with COPD, several factors contribute to difficulty breathing and the disability this produces. Aside from excess mucus production, inflammation and damage to lung tissues, patients with COPD have ‘air trapping’, which means:1

- Some air stays in the lungs even when the patient has breathed out as fully as they can – the lungs are described as ‘hyperinflated’.
- Air trapping reduces functional lung capacity and causes breathlessness and exercise limitation.

Since airway obstruction in COPD is not fully irreversible, most patients have symptoms that vary only slightly from day to day.

**GLOSSARY**

FEV₁: forced expiratory volume in 1 second, the volume of air breathed out in that time from full lungs (a measure of lung function); alveolar: belonging to small sac-like structures in the lungs responsible for gas exchange; parenchyma: term that describes the essential (functional) tissue of an organ

**References**


**What you need to know**

COPD is defined as obstruction of airflow to the lungs that is:

- Not fully reversible
- Usually progressive (though decline is gradual and steady over months)
- Linked to an abnormal lung inflammatory reaction to something toxic, most often cigarette smoke.

People who develop COPD are usually smokers or ex-smokers:

- Everyone’s lung function declines over their lifetime, but most will not develop clinical symptoms from this
- In people who smoke or used to smoke and who are predisposed to developing COPD, this decline is faster and clinical symptoms do develop
- Stopping smoking slows the progression of the disease, though lost lung function cannot be recovered.

There are several disease processes that contribute to the signs and symptoms of COPD:

- Chronic bronchitis (inflammation) of the small airways
- Damage to lung tissues and hardening of the lungs, known as emphysema, with associated small airway closure/collapse
- Excess mucus production and obstruction/plugging.

Patients with COPD become tired and short of breath easily, even from the slightest effort:

- COPD causes incomplete emptying of the lungs on breathing out, known as hyperinflation or ‘air trapping’
- This compromises functional lung capacity and contributes to breathlessness and exercise limitation
- Patients become progressively less able to do normal daily activities and their quality of life suffers as a result.

**Think about...**

- Which of your patients might be at risk of developing COPD?
- Do they smoke or did they smoke in the past?
- Do they cough a lot or get breathless easily?
- Do they get frequent chest infections in winter?