

For the Primer, visit [doi:10.1038/nrdp.2015.76](https://doi.org/10.1038/nrdp.2015.76)

→ Chronic obstructive pulmonary disease (COPD) causes a progressive decline in lung function characterized by poorly reversible airway obstruction. The disease can include chronic obstructive bronchitis (narrowing of the small airways) and emphysema (damage to the alveoli), and results in shortness of breath upon exertion.



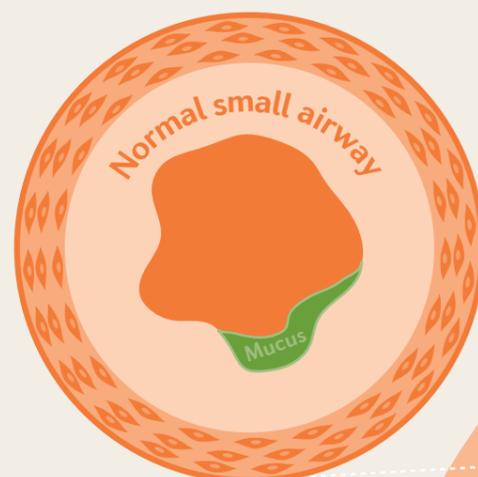
EPIDEMIOLOGY

COPD poses a major public health burden and was estimated to be the third leading cause of death worldwide in 2010. Most deaths due to COPD occur in East and South Asia and, of all the risk factors, poverty is most strongly associated with COPD mortality. The disease involves accelerated ageing of the lungs and, unsurprisingly, becomes more common as people age, with a peak prevalence in those 65 years of age. Exposure to tobacco smoke, through smoking or inhalation of second-hand smoke, is the leading cause of COPD. Additional risk factors include contact with other inhaled irritants, such as smoke from biomass burning, and a history of tuberculosis infection. Although historically men were more likely than women to develop COPD as they were more likely to smoke, recent figures indicate that men and women have a similar risk of developing the disease.

An estimated 20–30% of smokers develop COPD



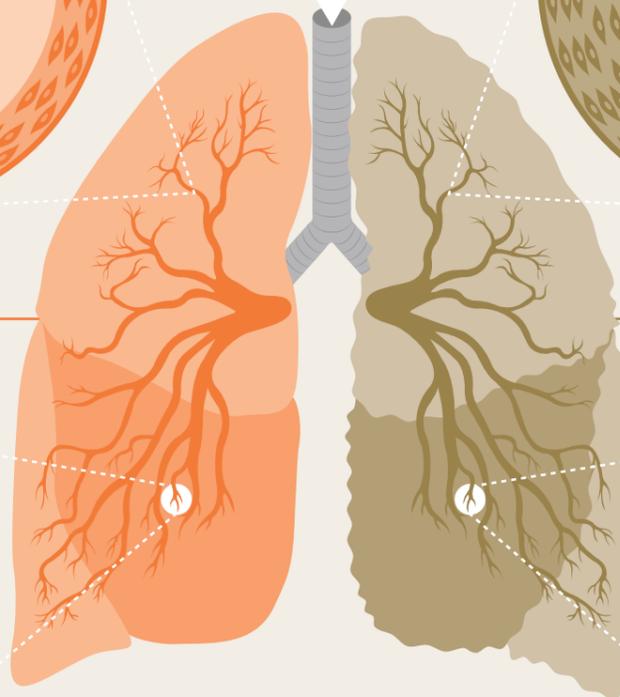
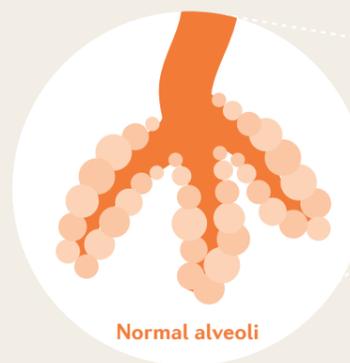
MECHANISMS



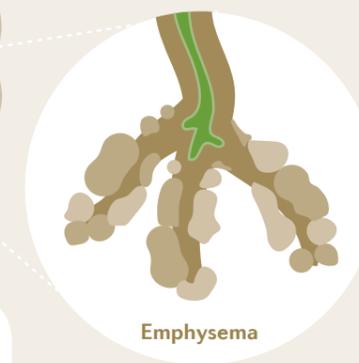
Not all smokers develop COPD and other factors, such as genetics and epigenetics, can contribute to the development and progression of the disease



HEALTHY



COPD



Airway damage and remodelling are caused by inflammation and oxidative stress, both of which can occur in response to inhaled irritants

DIAGNOSIS

Airway narrowing and emphysema cause air trapping in the lungs upon expiration (breathing out). Air trapping can be measured by the ratio of forced expiratory volume in 1 second (FEV_1) to forced vital capacity (FVC). A FEV_1/FVC of <0.7 is indicative of COPD. Diagnosis also involves ruling out other conditions, such as asthma.

QUALITY OF LIFE

Individuals with COPD experience difficulty breathing and shortness of breath. As the disease progresses, COPD causes reduced exercise capacity and muscle weakness that can severely limit the ability of the patient to carry out daily tasks. Exacerbations often require hospitalization, and frequent exacerbations are associated with reduced quality of life.

Rx MANAGEMENT

The airway damage that occurs in COPD cannot be reversed. Treatment aims to relieve symptoms, minimize disease progression and reduce the risk of future exacerbations — transient periods of symptom worsening that are usually triggered by viral or bacterial lung infections. Reduced exposure to inhaled irritants, particularly cigarette smoke, can improve disease outcomes. Bronchodilators are used to manage COPD symptoms, and pulmonary rehabilitation can improve exercise capacity, reduce breathlessness and improve overall health status.

! Smoking cessation, influenza vaccination and the use of long-acting bronchodilators can reduce exacerbation risk, whereas antibiotics and oral corticosteroids are used to treat exacerbations



OUTLOOK

Although bronchodilators can relieve symptoms, they do not target the underlying cause of COPD and, therefore, cannot prevent disease progression. Research to elucidate the cellular and molecular mechanisms of COPD might lead to new treatments that target specific disease processes and halt or even reverse airway damage. Furthermore, the reasons why only a subset of chronic smokers develop the disease are largely unknown, and a greater understanding of the contribution of other risk factors to COPD pathogenesis might lead to improved screening and prevention strategies. Finally, although COPD is a common condition, it remains poorly recognized; a greater awareness of this disease could improve early diagnosis and, in turn, outcomes for patients.