

Factsheet

Chronic obstructive pulmonary disease (COPD)

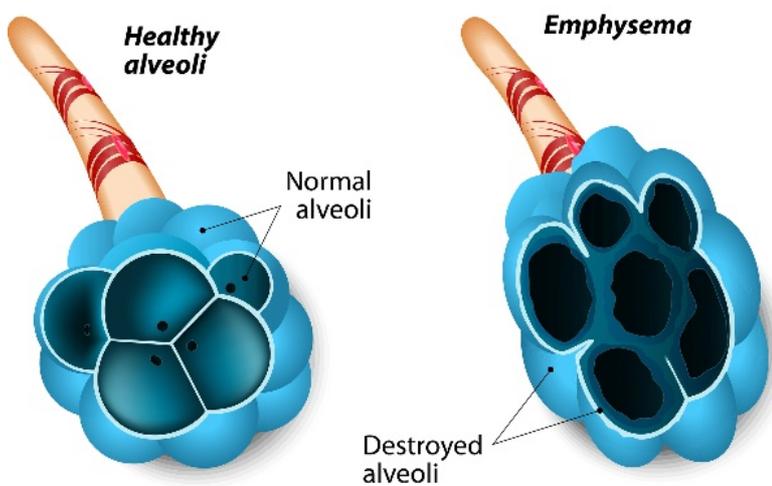
Contents

<u>Definition</u>	2
<u>Prevalence and incidence</u>	3
<u>Signs and symptoms</u>	4
<u>Causes/risk factors</u>	4
<u>Pathophysiology (mechanism of disease)</u>	5
<u>Prognosis and complications</u>	5
<u>Diagnosis/detection</u>	7
<u>Non-pharmacological treatment</u>	7
<u>Pharmacological treatment</u>	8
<u>Carbon footprint of inhalers: an NHS carbon hotspot</u>	9
<u>Other treatment options</u>	10
<u>Further resources</u>	10
<u>External websites</u>	11
<u>References</u>	11

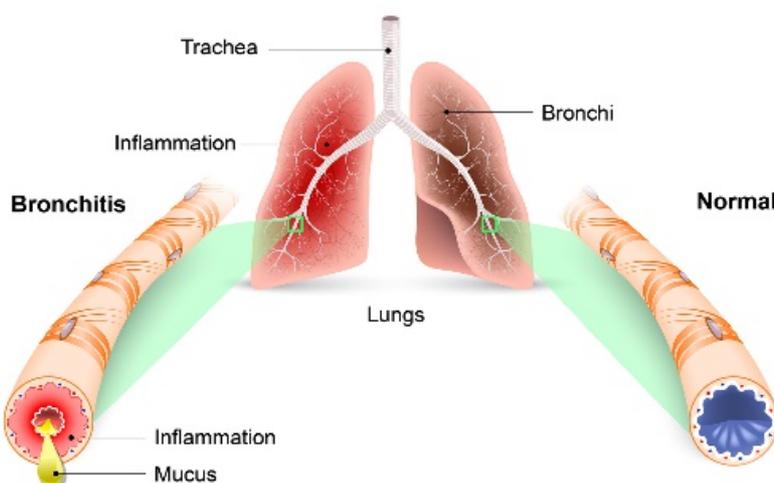
Definition

Chronic obstructive pulmonary disease (COPD) is a treatable, yet incurable, and largely preventable lung disease. It is characterised by obstructed respiratory airflow, which is not fully reversible and is usually progressive. The airway obstruction is due to a combination of emphysema (damage to the alveoli) and chronic bronchitis (long-term inflammation of the airways).⁽¹⁻³⁾

EMPHYSEMA



BRONCHITIS



Factsheet

Chronic obstructive pulmonary disease (COPD)

The National Institute for Health and Care Excellence (NICE) defines COPD in the following way:

- *'Airflow obstruction is defined as a reduced FEV1/FVC ratio (where FEV1 is forced expired volume in 1 second and FVC is forced vital capacity), such that FEV1/FVC is less than 0.7.*
- *If FEV1 is greater than or equal to 80 percent predicted normal a diagnosis of COPD should only be made in the presence of respiratory symptoms, for example breathlessness or cough'.⁽⁴⁾*

People with COPD may occasionally experience an acute exacerbation of COPD symptoms. This is defined by NICE as:

'a sustained worsening of the patient's symptoms from their usual stable state which is beyond normal day-to-day variations, and is acute in onset'.⁽⁴⁾

It is important to understand the differences between COPD and asthma. Access the Pharmaceutical Journal article, [Knowing the differences between COPD and asthma is vital to good practice](#), which discusses this. [Asthma and Lung UK](#) provide an easy-to-understand summary for patients.

[Return to contents](#)

Prevalence and incidence

COPD is the second most prevalent lung disease in the UK after asthma and it affects an estimated **two percent** of the population,⁽⁵⁾ which equates to around **1.2 million people**. It is also estimated that there are an additional 2 million people with COPD who are undiagnosed.⁽³⁾

Asthma and Lung UK research suggests that the prevalence is growing, with the number of people living in the UK who have been diagnosed with COPD rising to over 1 million from 2004; however, the numbers of new diagnoses fell from 226 to 193 per 100,000 people between 2004 and 2012.⁽⁶⁾

The prevalence of COPD increases with age and people are not usually diagnosed until they are 50 years of age or older.⁽³⁾ It is more prevalent in men than women and men are more likely to die from it. Mortality rates are higher in Scotland and the north of England than the south of England, reflecting the fact that the prevalence and incidence is nearly twice as high in the most deprived 20 percent of the population compared to the least.⁽⁵⁾

For more general COPD statistics, visit the [Asthma and Lung UK](#) website.

An inquiry into premature deaths of people with learning disabilities found that the most prevalent immediate cause of death in this population was respiratory disorders.⁽⁷⁾ For more information, access the [Confidential Inquiry into premature deaths of people with learning disabilities \(CIPOLD\)](#).

[Return to contents](#)

Factsheet

Chronic obstructive pulmonary disease (COPD)

Signs and symptoms

The most common symptoms of COPD include cough, increased volume of sputum, persistent wheeze, frequent chest infections and increasing breathlessness.^(8, 9)

At a more advanced stage, symptoms include weight loss, tiredness and swollen ankles (peripheral oedema).

Due to the progressive nature of COPD, these symptoms usually get worse over time and have an increasingly large impact on daily activities.

These symptoms usually develop gradually over time, and significant airflow obstruction may be present before the person is aware of it.^(3, 4)

During an acute exacerbation, patients may report worsening breathlessness, cough, increased sputum production and change in sputum colour.⁽⁴⁾

For more information about how people experience COPD, watch:

[British Lung Foundation - Living with COPD: Jim's story](#)



[Return to contents](#)

Causes/risk factors

Smoking

Tobacco smoke causes the chronic airway inflammation and alveolar damage described above and is the major risk factor for COPD. It is estimated to account for 90 percent of cases and seems to enhance the effects of other risk factors.^(3, 4)

Passive smoking also has a trend towards causing COPD.⁽³⁾ Other types of smoking, such as pipe, cigar, water pipe, and marijuana, increase the risk of COPD compared to non-smokers.

Occupational exposure

Exposure to dust, such as silica dust and grain and flour dust, chemicals, such as isocyanates and noxious gases, and particles has been linked to the development of COPD.⁽³⁾ It has been suggested that 20 percent of diagnosed cases of COPD can be attributed to occupational exposure, and in lifelong non-smokers this increases to 30 percent.^(2, 3)

Factsheet

Chronic obstructive pulmonary disease (COPD)

Other factors

There is some evidence to suggest air pollution can contribute to the development of COPD, although this is not conclusive.

There is also a potential genetic influence. Approximately one percent of those with COPD are deficient in alpha-1 antitrypsin, which is a protease enzyme inhibitor that protects lung tissue. People who have alpha-1 antitrypsin deficiency usually develop COPD at a younger age, particularly if they are a smoker. There seems to be a familial risk in smokers who have close relatives with severe COPD, meaning that there is likely to be a genetic influence in those who develop the disease.

[Return to contents](#)

Pathophysiology (mechanism of disease)

If you would like information on the pathology, pathogenesis and pathophysiology of COPD, then access the following British Medical Journal practice article: [Pathology, pathogenesis, and pathophysiology](#).

The following Proceedings of the American Thoracic Society article focuses specifically on the pathophysiology of exacerbations: [Pathophysiology of exacerbations of chronic obstructive pulmonary disease](#).

[Return to contents](#)

Prognosis and complications

Although the mortality rate for COPD is difficult to quantify, as many people die with the disease, we do know that about five percent of all deaths in the UK are due to COPD; this equates to around 30,000 people per year.

The in-patient mortality rate for people who are admitted to hospital for an exacerbation of COPD is around 3 to 4 percent, or 11 to 24 percent for those requiring intensive care unit treatment.

Complications include reduced quality of life due to breathlessness, [depression and anxiety](#), cor pulmonale (right [heart failure](#) secondary to lung disease), type 2 respiratory failure due to increased airway resistance, and lung [cancer](#).⁽³⁾

Most COPD exacerbations are due to infection. If a chest infection or [pneumonia](#) is diagnosed, NICE recommends initial empirical treatment should be an aminopenicillin (eg, amoxicillin), a macrolide (eg, clarithromycin/erythromycin) or a tetracycline (eg, doxycycline).⁽⁴⁾

For more information about the management of exacerbations of COPD visit the following NICE guidance: [Managing exacerbations of COPD](#).

During an acute exacerbation, a serious complication that can arise is respiratory failure. Should you wish to learn more about respiratory failure in general, the following video offers an introduction to this, the differences between type 1 and 2 respiratory failure, and the associated arterial blood gas changes:

Factsheet

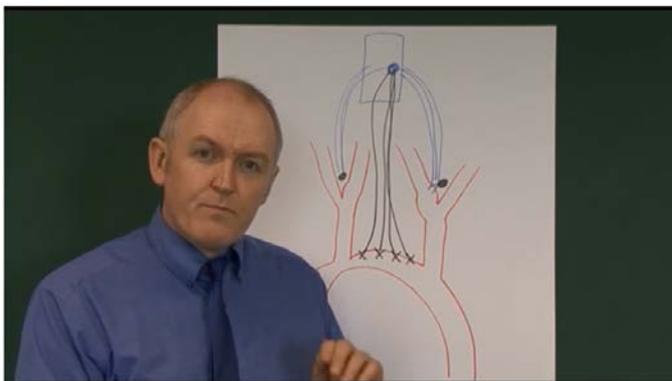
Chronic obstructive pulmonary disease (COPD)

Respiratory Failure



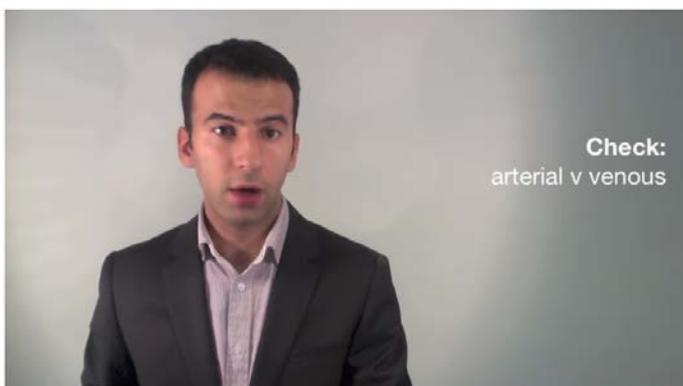
It is important to recognise that in patients with COPD, as mentioned in the above video, their respiratory drive is driven by oxygen levels. Watch the following video to learn more about this mechanism:

Hypoxia 22, Carbon dioxide retainers



For more information about the interpretation of blood gases, watch the following video:

Arterial blood gas interpretation (in 3 easy steps)



Arterial blood gas interpretation (in 3 easy steps)

Factsheet

Chronic obstructive pulmonary disease (COPD)

To learn more about how to manage respiratory failure in COPD, access this International Journal of Chronic Obstruct Pulmonary Disease article: [Treatment of respiratory failure in COPD](#).

[Return to contents](#)

Diagnosis/detection

There is no single diagnostic test for COPD.⁽³⁾ To learn more about the diagnosis and assessment of COPD, access the following NICE clinical knowledge summary (CKS): [Chronic obstructive pulmonary disease. Diagnosis](#).

[Return to contents](#)

Non-pharmacological treatment

Smoking cessation

In current smokers, smoking cessation is the most effective treatment for COPD.⁽¹⁾

Breathing control techniques

Techniques can be used to help reduce breathlessness. Information on these different techniques can be found on the [Asthma and Lung UK's website](#).

Pulmonary rehabilitation

This is a specialised programme focusing on physical exercise training, education, dietary advice, and psychological and emotional support.⁽²⁾

Visit the NHS Choices page on [Pulmonary rehabilitation](#) and watch the embedded video to learn more about pulmonary rehabilitation.

More information about pulmonary rehabilitation can be found on the British Lung Foundation's [Pulmonary rehabilitation \(PR\)](#) page.

Multidisciplinary team support

Physiotherapy can be beneficial for a person with excessive sputum.⁽³⁾ Referral to a dietetic service should be considered for those who have a body mass index (BMI) less than 20 kg/m² or more than 25 kg/m².⁽³⁾ Other services which should be considered include occupational therapy and psychosocial services.

Patient support

Asthma and Lung UK have

a page dedicated to supporting people with COPD: [COPD \(chronic obstructive pulmonary disease\)](#).

NHS Choices also has a dedicated COPD page: [Chronic obstructive pulmonary disease \(COPD\)](#).

To learn more about one project that supports COPD patients, visit the [Eden Project Healthy walking group](#) information page and watch the following video:

Factsheet

Chronic obstructive pulmonary disease (COPD)

[Healthy walking club at the Eden Project](#)



[Return to contents](#)

Pharmacological treatment

NICE updated its COPD guidance in December 2019, which has been widely adopted. There is an easy to follow [flowchart](#) that NICE have produced.

For a patient newly diagnosed with COPD (without asthma features, for instance steroid responsiveness, elevated eosinophil counts, previous diagnosis of asthma or atopy, or variation in airflow), the first-line therapy is a long-acting beta-2 agonist and long-acting muscarinic antagonist (LABA/LAMA) combination.

Note that if a LAMA is introduced, a short-acting muscarinic antagonist (SAMA) should be discontinued, whereas a short-acting beta-2 agonist (SABA) may be continued with all other combinations of inhalers. In practice, LABA/LAMA combination inhalers are now commonly being offered as a first therapy to maximise the symptom control for those with COPD for as long as possible and to reduce exacerbation rates from the outset. This is also a cost-effective option when considering the cost of a LAMA inhaler such as tiotropium and the cost of a LAMA/LABA combination inhaler, which is often cheaper. This approach also reduces the switching of devices and inhalers while stepping up, and although at this point a review is required, there is likely to be less alteration of therapy at this review.

For patients with asthmatic features or evidence of steroid responsiveness, they should be offered an ICS/LABA combination inhaler.

Triple therapy (ICS/LABA/LAMA) should be considered for any patient that continues to experience day-to-day symptoms or if they have one severe (hospitalisation) or two moderate exacerbations in the space of 12 months. Before escalating to triple therapy, a clinical review should be conducted.

Determine if the non-pharmacological management has been optimised, eg, check that the patient is up to date with vaccinations and that the patient has been offered smoking cessation support, where appropriate. Ensure that either acute, or day-to-day symptoms are not caused by another physical or mental health condition prior to escalation of therapy. Adherence and inhaler technique should also be checked.

Factsheet

Chronic obstructive pulmonary disease (COPD)

For patients who continue to have symptoms on a day-to-day basis (as opposed to exacerbations), triple therapy should be trialled for three months, with a view to de-escalation to either LABA/LAMA or ICS/LABA if symptoms have not improved after this time.

Devices for each of these treatments vary and are operated in a variety of ways. Patient preference and ability to use each device should be considered paramount.

Carbon footprint of inhalers: an NHS carbon hotspot

Inhalers constitute approximately three percent of the overall NHS carbon footprint. Reducing the carbon footprint of inhaler prescribing is a key NHS priority in line with the [NHS Long Term Plan](#), the [Greener NHS programme](#) and the [NHS Net Zero](#) targets. The NHS has committed to reducing its carbon footprint by 80 percent by 2028 to 2032, including a shift to lower carbon inhalers. Prescribers are encouraged to prescribe a dry-powder inhaler or soft-mist inhaler instead of a metered-dose inhaler, where clinically appropriate. If this is not possible, they are encouraged to prescribe a lower carbon metered-dose inhaler variant. A person-centred approach to high-quality, low-carbon respiratory care is essential; you will find a wealth of resources on the [Greener Practice](#) website, where you can find a database of the carbon footprint of individual inhalers in the [PrescQIPP](#) low-carbon inhalers resources. NICE provides a [patient decision aid](#) to assist with inhaler choice. The most “sustainable patient”, is somebody who is informed, with well-controlled COPD, and who is given the opportunity to engage in shared decision making and encouraged to take responsibility for their health and wellbeing.⁽¹⁰⁻¹²⁾

Additional devices such as spacers may be useful for patients and nebulisers may be initiated by specialists.⁽³⁾ However, nebulisers should be discouraged as they limit people’s activities, as well as introduce issues surrounding the logistics of maintaining nebuliser equipment. With the advent of the newer bronchodilators, there should be limited need for nebulisers to be recommended.

Other pharmacological treatment options for COPD include the following (although the evidence for these therapies is of variable quality):

- short-term antibiotics for acute exacerbations
- short-term oral corticosteroids (to reduce airway inflammation) for acute exacerbations
- theophylline to encourage bronchodilation to improve lung function, or to act as a steroid-sparing agent⁽⁵⁾ (although its use is not favoured due to the limited evidence of benefit and the toxicity risks)
- mucolytics to reduce the viscosity of the respiratory mucus and reduce exacerbation frequency
- anxiolytics and antidepressants for the management of depression and anxiety associated with COPD⁽³⁾
- PDE4 inhibitors (roflumilast) may be considered in ex-smokers – for further information refer to the NICE guidance entitled [Roflumilast for treating Chronic Obstructive Pulmonary Disease \(2017\)](#)
- Long-term prophylactic antibiotics such as azithromycin 250 mg three times a week are occasionally used in select patient groups – further information can be found in [this NICE scenario \(revised June 2023\)](#)

Long-term oral corticosteroids may be initiated by respiratory specialists, although they are not usually recommended.⁽³⁾ Long-term prophylactic macrolide use, eg, azithromycin, is occasionally used in select high-risk patients, and studies have shown that this may reduce exacerbation rates.⁽¹³⁾ It should be noted

Factsheet

Chronic obstructive pulmonary disease (COPD)

that oral corticosteroids in COPD have been linked with increased risk of sepsis,⁽¹⁴⁾ and NICE lists long-term steroid use as a risk factor for the development of sepsis.⁽¹⁵⁾

A respiratory specialist would be able to assess the need for oxygen and, potentially, long-term oxygen therapy (LTOT), which may also be prescribed.⁽³⁾ Note that it is recommended that oxygen should be regarded as a drug.⁽¹⁶⁾ For more information about LTOT, access the [British Thoracic Society \(BTS\) guideline for home oxygen use](#).

For further information about the recommended pharmacological therapies and appropriate monitoring, access the following guidance documents:

- GOLD's [Pocket guide to COPD diagnosis, management, and prevention: A guide for healthcare professionals](#).
- NICE CKS, [Chronic obstructive pulmonary disease](#).
- NICE guideline [Chronic obstructive pulmonary disease in over 16s: diagnosis and management \[NG115\]](#).

Vaccination against pneumococcal disease (causing pneumococcal pneumonia), influenza or COVID-19 is recommended for those with COPD.^(17, 18) For more information on pneumococcal vaccinations, visit the NICE CKS [Immunizations - pneumococcal](#) and for more information on influenza vaccinations, visit the NICE CKS [Immunizations - seasonal influenza](#). Visit the NICE CKS on the management of [Coronavirus – COVID-19](#) for more information on vaccinations against COVID-19.

[Return to contents](#)

Other treatment options

Non-invasive ventilation

This is often only offered during acute type 2 respiratory failure, although, on occasion, pressurised air administered by a mask or nasal cannula can help to support breathing, especially at night. This can help to improve oxygen saturations.⁽¹⁾ More information can be found in the [Non-invasive ventilation in acute respiratory failure](#) BTS guideline.

Lung surgery

Surgery would only usually be considered for a small number of people. Surgeries include bullectomy (removal of an air pocket), lung volume reduction surgery (removal of a damaged section of lung) and lung transplant.⁽²⁾

[Return to contents](#)

Further resources

NICE quality standard [Chronic obstructive pulmonary disease in adults \(QS10\)](#) covers the assessment, diagnosis and management of COPD.

The BMJ have produced a useful [best practice guide](#) for the management of COPD.

Factsheet

Chronic obstructive pulmonary disease (COPD)

If you would like to look at the evidence relating to the use of LABA/LAMA therapy compared to LABA/ICS therapy and the withdrawal of ICS, then access the following articles in The New England Journal of Medicine:

- [*Indacaterol-glycopyrronium versus salmeterol-fluticasone for COPD*](#)
- [*Withdrawal of inhaled glucocorticoids and exacerbations of COPD*](#)

If you would like to look at the evidence for the triple inhalers access the following:

- The Pharmaceutical Journal, [*Role of dual and triple fixed-dose combination inhalers in the treatment of chronic obstructive pulmonary disease*](#)
- The Lancet article, [*Extrafine inhaled triple therapy versus dual bronchodilator therapy in chronic obstructive pulmonary disease \(TRIBUTE\): a double-blind, parallel group, randomised controlled trial*](#)
- The New England Journal of Medicine article, [*Once-daily single-inhaler triple versus dual therapy in patients with COPD*](#)

CPPE has the following resources to support your COPD learning:

[*Inhaler technique for health professionals: getting it right*](#) e-learning. In this e-learning programme, we explore the reasons why we need to improve how we help patients with their inhaler devices. We look at how the devices work and why making simple changes when we are counselling patients could improve outcomes for both the patient and the health professional.

CPPE's [*Smoking*](#) learning gateway is a collection of content relating to smoking cessation.

[Return to contents](#)

External websites

CPPE is not responsible for the content of any non-CPPE websites mentioned on this page or for the accuracy of any information to be found there.

All web links were accessed on 15 August 2023.

[Return to contents](#)

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[Return to contents](#)

Last review: August 2023

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