Patient education: Chronic obstructive pulmonary disease (COPD) treatments (Beyond the Basics)

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All topics are updated as new evidence becomes available and our peer review process is complete.

Literature review current through: **Dec 2024.**
This topic last updated: **Apr 11, 2024.**

COPD OVERVIEW

Chronic obstructive pulmonary disease (often called "COPD") is a condition in which the airways in the lungs become inflamed and narrowed (chronic bronchitis) and the air sacs become damaged (emphysema).

Cigarette smoking is the most common cause of COPD. As the lungs become more damaged over time, it becomes increasingly difficult to breathe. When the damage is extensive, it may also become harder for the lungs to get enough oxygen into the blood and to get rid of excess carbon dioxide. These changes all lead to shortness of breath and other symptoms.

Treatment of COPD can often help control shortness of breath and cough and can sometimes slow the progression of the disease. But the most important thing you can do to improve how you feel is to stop smoking and avoid breathing smoke.

This article discusses treatment options for people with COPD. The causes, symptoms, and diagnosis of COPD are discussed separately. (See "Patient education: Chronic obstructive pulmonary disease (COPD) (Beyond the Basics)".)

GENERAL MEASURES

There are several things all people with COPD should do to improve their health and reduce their risk of complications.

Quitting smoking — The first and most important part of any treatment plan for COPD is to **stop smoking**. This is true regardless of how advanced your disease is. Stopping smoking can help slow progression of COPD, no matter how long you have had it. Quitting smoking can be challenging, but your health care provider can help. (See "Patient education: Quitting smoking (Beyond the Basics)".)

Learning proper inhaler technique — Many of the medications used to treat COPD come in inhalers (see 'Bronchodilators' below). Some also come in a nebulizer, which is a device that turns the medication into a fine mist that you breathe in. There are different types of inhaler devices and nebulizers, and each requires a slightly different technique for effective use. Your health care provider can help teach you how to use your inhaler to make sure all the medication gets delivered to your lungs. You will get more comfortable using your inhaler with practice. (See "Patient education: Inhaler techniques in adults (Beyond the Basics)".)

Pulmonary rehabilitation — Pulmonary rehabilitation (or "pulmonary rehab") programs teach you ways to help improve your symptoms. This may involve education about your condition, exercise training, social support, and instruction on breathing techniques.

Programs vary, but many involve attending meetings once or twice a week for 8 to 12 weeks. At the end of a program, you will be given a "prescription" for continuing the exercises on your own.

Pulmonary rehabilitation programs have been shown to improve a person's ability to exercise, enhance quality of life, and decrease the frequency of COPD exacerbations (when symptoms flare up more than usual). Even people with severe shortness of breath can benefit from a rehabilitation program.

Preventing and treating infections — Getting sick with a respiratory infection can lead to COPD exacerbations. Getting all of your recommended vaccines is an important part of managing your COPD. This includes:

- **Pneumococcal vaccine** – This vaccine helps prevent one of the most common causes of pneumonia; two types of vaccine are available. One type is referred to as pneumococcal polysaccharide vaccines, under the trade name Pneumovax. The other type are pneumococcal conjugate vaccines, with the most common being Prevnar 13 and Prevnar 20. Specific vaccination recommendations depend on your age and what prior vaccines you have already had. Your provider will help decide what vaccine(s) you need and when you should have it (the vaccine may need to be repeated at 5- to 10-year intervals). (See "Patient education: Pneumonia prevention in adults (Beyond the Basics)".)

- **Flu vaccine** – You should get the flu vaccine every year before flu season (generally in the fall or early winter in the northern hemisphere). (See "Patient education: Influenza

prevention (Beyond the Basics)".)

- **Pertussis vaccine** – This vaccine protects against whooping cough; you should get a dose if you have not had one at age 19 or older. (See "Patient education: Vaccines for adults (Beyond the Basics)", section on 'Tetanus, diphtheria, pertussis'.)

- **Shingles vaccine** – This vaccine protects against shingles and the complications from the disease and is recommended for all adults 50 years of age and older. People with COPD may be at a higher-than-average risk for developing shingles.

- **RSV vaccine** – This recently developed vaccine protects against serious respiratory infection from respiratory syncytial virus. If you are over the age of 60 and experience exacerbations with viral infections, this vaccine may be helpful.

- **COVID-19 vaccine** – This vaccine protects against COVID-19 and is recommended for all adults and children over six months of age. People with COPD are at higher risk for developing severe disease.

If you do get sick with an infection, your health care provider may prescribe medication. If you have severe symptoms or your infection is likely bacterial, you might get antibiotics; however, these are not helpful in all situations, as most respiratory infections are caused by viruses, not bacteria. If you think you might have the flu, let your health care provider know, as you may need an antiviral medication.

In general, continuous use of antibiotics to prevent infection is **not** recommended. However, if you have frequent exacerbations (two or more per year) despite treatment, your health care provider may suggest preventive therapy with an antibiotic called azithromycin.

Nutrition — Some people with advanced COPD are not able to eat enough because of their symptoms. Unintended weight loss usually occurs in people with more advanced lung disease. Not eating enough can lead to malnutrition, which can make symptoms worse and increase the likelihood of infection. Talk to your health care provider if you are having trouble eating enough, or if you lose weight without trying.

If you need to increase the number of calories you eat, you can:

- Eat small, frequent meals with nutrient-dense foods (such as eggs)
- Eat meals that require little preparation (for example, microwaveable meals)
- Rest before meals
- Take a daily multivitamin
- Add nutritional supplements (drinks or bars that contain a lot of calories and nutrients)
- Take prescription medication to stimulate your appetite, if your provider recommends this

On the other hand, if you are overweight, this can also make COPD symptoms worse. Your provider can help you lose weight safely if this is a concern.

Regular monitoring — Seeing your health care provider regularly is an important part of managing your COPD. Your provider will talk to you about your symptoms, how well your treatments are working, and whether you have other health problems that may be affecting your COPD. How often you should see your provider will depend on your specific situation and health, but you will likely have appointments at least every few months.

ASSESSING DISEASE SEVERITY

The best approach to treatment (including what medications your health care provider will prescribe) will depend, in part, on how severe your COPD is. This is determined based on your symptoms, risk of future exacerbations, and the results of your spirometry testing. (See "Patient education: Chronic obstructive pulmonary disease (COPD) (Beyond the Basics)", section on 'Pulmonary function tests (PFTs)'.)

COPD MEDICATIONS

In addition to the measures discussed above (see 'General measures' above), the treatment of COPD involves medication therapy. Several different medications may be used, depending on your situation and the severity of your symptoms (table 1).

Bronchodilators — Medications that help open the airways, called bronchodilators, are a mainstay of treatment for COPD. Bronchodilators help to keep airways open and may decrease the amount of mucus in the lungs.

Bronchodilators typically come in an inhaled form delivered using a metered dose inhaler (MDI), dry powder inhaler (DPI), soft mist inhaler (SMI), or nebulizer (a device that turns liquid medication into a fine mist that you breathe in). Inhalers are used most often. It is important to follow inhaler instructions carefully to ensure that the correct dose of medication reaches your lungs. (See "Patient education: Inhaler techniques in adults (Beyond the Basics)".)

There are several types of bronchodilators. "Short-acting" medications relieve symptoms quickly and are prescribed for use as needed when symptoms flare up. They include (table 1):

- Short-acting beta agonists – Short-acting beta agonists (SABAs), sometimes called rescue inhalers, can quickly relieve shortness of breath and can be used as needed.

- Short-acting muscarinic antagonists – Short-acting muscarinic antagonists (SAMAs), also known as anticholinergics, help improve lung function and symptoms. If your symptoms are mild and infrequent, a SAMA may be recommended for use only when you need it. SAMAs work more slowly than SABAs, so SABAs are generally preferred, unless you have jitteriness or a rapid heart rate with a SABA.

- Short-acting combinations – An inhaler that combines a SABA and a SAMA may be used as needed or regularly, depending on the frequency and severity of your symptoms.

"Long-acting" bronchodilator medications help control symptoms over time. Each medication comes with specific instructions for how to use it and how often to take it (for example, once daily or twice daily). Long-acting medications used to treat COPD include (table 1):

- Long-acting muscarinic antagonists – The long-acting muscarinic antagonists (LAMAs), also called anticholinergics, improve lung function while decreasing shortness of breath and flares of COPD. Your health care provider may recommend a LAMA if your symptoms are not adequately controlled with other treatments, such as short-acting bronchodilators.

- Long-acting beta agonists – Long-acting beta agonists (LABAs) may be recommended if your symptoms are not adequately controlled with other treatments.

- Combination medications – Combinations of LAMAs and LABAs are often used when symptoms are not completely controlled with one medication. The individual medications may be taken in separate inhalers, or in a combination inhaler where available.

Glucocorticoids — Glucocorticoids are a class of medication that has anti-inflammatory properties. They are also called corticosteroids or just steroids, although they are very different from the steroids some athletes take to build muscle. Glucocorticoids can be taken in different forms, including with an inhaler, as a pill, or through an IV (a thin tube that goes into a vein).

Inhaled glucocorticoids can be used for long-term symptom control, in combination with a long-acting bronchodilator, if symptoms are not completely controlled with bronchodilators alone or if you have frequent exacerbations or "flare-ups." Several such combinations are available; there is also a combination inhaler that contains an inhaled glucocorticoid, a LABA, and a LAMA (table 1).

Glucocorticoids taken in oral (pill) form or through an IV are most commonly used for short-term treatment for COPD exacerbations (IV glucocorticoids are given in the hospital). However, they are not generally used long-term because of the risk of side effects.

Medications for persistent COPD — Some medications, like roflumilast and theophylline, are only used for people who still have symptoms even after trying the usual therapies.

Roflumilast is a pill that may be prescribed for people who have chronic cough and phlegm production (chronic bronchitis) and frequent exacerbations despite using inhaled bronchodilators and glucocorticoids. (See 'Bronchodilators' above and 'Glucocorticoids' above.)

Theophylline is a pill that can sometimes help with shortness of breath. It is not used very often due to its side effects.

Azithromycin is an antibiotic that can help reduce the frequency of exacerbations and may be considered in some cases.

Cough medicines not recommended — Some medications are **not** recommended for people with COPD, including cough suppressants. Although cough can be a bothersome symptom, cough suppressant medicines should be avoided, as suppressing cough may increase your risk of developing an infection.

SUPPLEMENTAL THERAPIES FOR COPD

As mentioned above, there are things that everyone with COPD should do to manage their disease; quitting smoking (if you smoke) is the most important (see 'General measures' above). In addition, there are other non-medication treatments that can help relieve symptoms and improve quality of life.

Oxygen — People with severe or advanced COPD can have low oxygen levels in the blood. This condition, known as hypoxemia, can occur even if you do not feel short of breath or have other symptoms. The oxygen level can be measured with a device placed on the finger (pulse oximeter) or with a blood test (arterial blood gas). People with hypoxemia may be placed on oxygen therapy, which can improve survival and quality of life.

If you need oxygen at home, you will have a small tube that goes into your nostrils (called a "cannula") and carries oxygen from an oxygen tank or machine. Your health care provider will show you how to use your devices, as well as how (and when) to clean and replace them.

Supplemental oxygen must **never** be used while smoking. Oxygen is explosive, and smoking while using oxygen can lead to severe burns. Fatal fires have occurred in people attempting to smoke while using oxygen.

Some people with COPD may be prone to hypoxemia during air travel because of the changes in air pressure inside the plane. If your provider determines that you are at risk for

hypoxemia during a flight, oxygen can be prescribed for use during air travel. (See "Patient education: Supplemental oxygen on commercial airlines (Beyond the Basics)".)

Noninvasive ventilation – Some people with advanced or severe COPD may develop high levels of carbon dioxide in the blood (hypercapnia) due to impaired gas exchange. This can be determined by a blood test (arterial blood gas). Those with elevated carbon dioxide in the blood may be helped by use of "positive airway pressure" (PAP) devices to help improve breathing, particularly during sleep when carbon dioxide levels are often the highest; studies have shown benefit in daytime sleepiness and quality of life, reductions in hospitalizations, and possibly decreased mortality.

If you are found to have elevated blood levels of carbon dioxide, usually a sleep study (called a "polysomnogram") will be performed to help determine the best kind of equipment and correct settings for you to use at night. During the sleep study, they also may help you try out different types of face mask to ensure effective support and a comfortable fit. Additional patient information about using PAP devices may be found separately. (See "Patient education: How to use a PAP device (The Basics)".)

Endobronchial valves — Endobronchial valves (EBVs) are small devices that are implanted in the airways using a bronchoscope (a tube that is inserted through your mouth or nose and down your throat). The valves allow air to exit the diseased area but not re-enter. As a result, the healthier parts of the lung are able to do more of the work of breathing. EBVs may be an option for people who continue to have emphysema symptoms despite medication and pulmonary rehabilitation.

Surgery — Surgery, such as lung volume reduction surgery or lung transplantation, may be helpful in reducing symptoms in some people with advanced emphysema.

Lung volume reduction surgery involves removing the areas of lung that are most damaged, which allows the remaining lung to expand and function more normally. This may be an option for people who have severe symptoms after trying all other routine therapies, including pulmonary rehabilitation. Not everyone will benefit from this surgery, and some people may actually become worse. A health care provider may recommend an imaging test, such as a CT scan, to help determine if this procedure is likely to be of benefit.

Lung transplantation may be considered in cases of advanced COPD. If successful, transplantation is likely to improve symptoms. However, lung transplantation has not yet been shown to prolong the life of people with COPD.

COPD AND COVID-19

COVID-19 stands for "coronavirus disease 2019." It is caused by a virus called SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2), which first appeared in late 2019 and has since spread throughout the world.

People with COVID-19 can have fever, cough, and other symptoms. In severe cases, it can cause pneumonia and trouble breathing. Some people with COPD are more likely to have serious symptoms if they get COVID-19. If you have COPD, it's especially important to take measures to avoid getting sick. This includes COVID-19 vaccination, which is one of your best protections from contracting the virus. As people with chronic conditions are still at increased risk for severe disease, even vaccinated individuals may want to consider wearing a well-fitted mask when interacting with groups of individuals indoors.

If you take medications for your COPD, it's important to **keep taking them** as usual. If you have symptoms of COVID-19, or think you might have been exposed to the virus, call your health care provider for treatment options.

COPD PROGNOSIS

Although COPD usually worsens over time, it is difficult to predict how quickly it will progress and how long you will live (your prognosis). A number of factors play a role in the severity of COPD symptoms, including whether you continue to smoke, are underweight, or have other medical problems, and how your lungs function during exercise. People with COPD who have less severe symptoms, are a healthy weight, and do not smoke tend to live longer.

The "BODE index" is an example of a tool that clinicians use to predict survival and to make decisions about timing when lung transplantation is being considered. It involves a calculation using data including body mass index (BMI), severity of airflow obstruction on spirometry, degree of shortness of breath with exertion, and distance walked in six minutes. The calculation results in a number that your provider can use to help predict your prognosis.

ADVANCED COPD AND END-OF-LIFE CARE

Although discussions about death and dying can be uncomfortable for patients, family members, and health care providers, the subject is important, especially for people with serious chronic illnesses like COPD.

Advance care planning — Not everyone with COPD will die as a result of their disease. However, it's important to start talking about what you want at the end of your life well **before** you become seriously ill. Different people have different values and preferences about things like whether they want to be placed on a ventilator (breathing machine) when

they can no longer breathe on their own. You should let your family and loved ones know how you feel about this.

Important questions to consider and discuss include:

- Who do I want to make medical decisions for me if I cannot communicate?
- Are there specific treatments that I do or do not want at the end of my life?
- Will I want to spend my last days or weeks at home or in a hospital?

Certain legal documents, called a healthcare proxy and living will, are used to communicate your preferences. The document you need depends upon where you live. In the United States, state-specific documents can be downloaded from the internet (such as www.caringinfo.org) and do not require a lawyer.

Palliative care — Palliative care refers to treatments that do not cure disease or stop disease progression, but may relieve symptoms and improve quality of life. People with COPD can benefit from palliative care at any stage of their disease, not only at the end of life. Palliative care can include treatments to help with breathing problems, cough, fatigue, insomnia, anxiety, depression, and pain.

When COPD becomes advanced and symptoms (such as difficulty breathing) can no longer be controlled with the standard treatments, other medications such as opioids (for example, morphine) may be offered. People may also get noninvasive ventilation to help them breathe.

Hospice care — Hospice care may be recommended when a person is unlikely to live longer than six months. It involves treatment of all aspects of a patient and family's needs, including the physical, psychological, social, and spiritual aspects of suffering.

Hospice care may be given at home or in a nursing home or hospice facility, and it usually involves multiple care providers, including a physician, registered nurse, nursing aide, chaplain or religious leader, social worker, and volunteers. Having support and help can ease the burdens for caregivers and families who have a loved one in hospice care.

WHERE TO GET MORE INFORMATION

Your healthcare provider is the best source of information for questions and concerns related to your medical problem.

This article will be updated as needed on our web site (www.uptodate.com/patients). Related topics for patients, as well as selected articles written for healthcare professionals, are also available. Some of the most relevant are listed below.

Patient level information — UpToDate offers two types of patient education materials.

The Basics — The Basics patient education pieces answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials.

Patient education: Chronic obstructive pulmonary disease (COPD) (The Basics)
Patient education: Medicines for COPD (The Basics)
Patient education: Chronic bronchitis (The Basics)
Patient education: Inhaled corticosteroid medicines (The Basics)
Patient education: How to use your soft mist inhaler (adults) (The Basics)
Patient education: COPD exacerbation (The Basics)

Beyond the Basics — Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are best for patients who want in-depth information and are comfortable with some medical jargon.

Patient education: Chronic obstructive pulmonary disease (COPD) (Beyond the Basics)
Patient education: Inhaler techniques in adults (Beyond the Basics)
Patient education: Quitting smoking (Beyond the Basics)
Patient education: Supplemental oxygen on commercial airlines (Beyond the Basics)
Patient education: Pneumonia prevention in adults (Beyond the Basics)
Patient education: Influenza prevention (Beyond the Basics)

Professional level information — Professional level articles are designed to keep doctors and other health professionals up-to-date on the latest medical findings. These articles are thorough, long, and complex, and they contain multiple references to the research on which they are based. Professional level articles are best for people who are comfortable with a lot of medical terminology and who want to read the same materials their doctors are reading.

Bullectomy for giant bullae
Chronic obstructive pulmonary disease: Diagnosis and staging
Chronic obstructive pulmonary disease: Risk factors and risk reduction
Management of infection in exacerbations of chronic obstructive pulmonary disease
Dynamic hyperinflation in patients with COPD
Lung volume reduction surgery in COPD
COPD exacerbations: Management
Stable COPD: Initial pharmacologic management
Chronic obstructive pulmonary disease: Prognostic factors and comorbid conditions
Pulmonary rehabilitation
The evaluation, diagnosis, and treatment of the adult patient with acute hypercapnic respiratory failure

Malnutrition in advanced lung disease

Lung transplantation: General guidelines for recipient selection

The following organizations also provide reliable health information.

- National Library of Medicine

(https://medlineplus.gov/copd.html, available in Spanish)

- National Heart, Lung, and Blood Institute

(www.nhlbi.nih.gov/health/dci/Diseases/Copd/Copd_WhatIs.html)

- American Lung Association

(https://www.lung.org/)

- Alpha-1 Foundation

(www.alphaone.org)

- COPD Foundation

(www.copdfoundation.org)

Patient Support — There are a number of online forums where patients can find information and support from other people with similar conditions.

- Verywell Health COPD Forum

(https://www.verywellhealth.com/copd-4014741)

- COPD Foundation

(www.copdfoundation.org)

ACKNOWLEDGMENT

The editorial staff at UpToDate would like to acknowledge Stephen Rennard, MD, who contributed to earlier versions of this topic review.

Topic 4647 Version 40.0

GRAPHICS

Commonly prescribed medicines for COPD

	Generic name	Sample US brand names	How it's given
Short-acting beta agonists (SABAs)	Albuterol*	ProAir Digihaler, ProAir RespiClick, Proventil HFA, Ventolin HFA	Metered dose inhaler, dry powder inhaler, nebulizer
	Levalbuterol*	Xopenex HFA	Metered dose inhaler, nebulizer
Short-acting muscarinic antagonist (SAMA)	Ipratropium	Atrovent HFA	Metered dose inhaler, nebulizer
SABA-SAMA combinations	Albuterol* and ipratropium	Combivent Respimat	Soft mist inhaler, nebulizer
Long-acting beta agonists (LABAs)	Arformoterol	Brovana	Nebulizer
	Formoterol	Perforomist	Nebulizer
	Olodaterol	Striverdi Respimat	Soft mist inhaler
	Salmeterol	Serevent Diskus	Dry powder inhaler
Long-acting muscarinic antagonists (LAMAs)	Aclidinium	Tudorza Pressair	Dry powder inhaler
	Revefenacin	Yupelri	Nebulizer
	Tiotropium	Spiriva HandiHaler	Dry powder inhaler (medicine comes in a pill you put into the inhaler when it's time to take a dose)
		Spiriva Respimat	Soft mist inhaler
	Umeclidinium	Incruse Ellipta	Dry powder inhaler
Steroid and LABA combinations	Budesonide and formoterol	Breyna, Symbicort	Metered dose inhaler
	Fluticasone propionate and salmeterol	Advair Diskus, AirDuo Digihaler, AirDuo RespiClick, Wixela Inhub	Dry powder inhaler
		Advair HFA	Metered dose inhaler
	Fluticasone furoate and vilanterol	Breo Ellipta	Dry powder inhaler

	Mometasone and formoterol	Dulera	Metered dose inhaler
LAMA and LABA combinations	Aclidinium and formoterol	Duaklir Pressair	Dry powder inhaler
	Glycopyrrolate¶ and formoterol	Bevespi Aerosphere	Metered dose inhaler
	Tiotropium and olodaterol	Stiolto Respimat	Soft mist inhaler
	Umeclidinium and vilanterol	Anoro Ellipta	Dry powder inhaler
Steroid-LAMA-LABA combinations	Budesonide, glycopyrrolate¶, and formoterol	Breztri Aerosphere	Metered dose inhaler
	Fluticasone furoate, umeclidinium, and vilanterol	Trelegy Ellipta	Dry powder inhaler

These are some commonly used medicines (and combinations of medicines) for COPD available in the US and other areas. Some sample US brand names are listed. Some medicines are also available as "generics" (no brand).

Metered dose inhalers and soft mist inhalers need to be "primed" before first use; refer to the information that came with your inhaler for exact instructions. Dry powder inhalers do not need to be shaken or primed.

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* Albuterol is known as salbutamol outside of the US. Levalbuterol is known as levosalbutamol outside of the US.

¶ Glycopyrrolate is known as glycopyrronium outside of the US.

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