Patient information from the BMJ Group

Chronic obstructive pulmonary disease

In this section

Chronic obstructive pulmonary disease

Chronic obstructive pulmonary disease is often called COPD for short. Your doctor may also call it chronic bronchitis, emphysema, or chronic obstructive lung disease.

COPD affects your lungs. It can cause a bad cough and make you feel out of breath. It's usually caused by smoking. But whatever the cause of your COPD, giving up cigarettes can help slow down how quickly the disease gets worse. There are also treatments that will help you feel better and breathe more easily.

We've brought together the best research about COPD and weighed up the evidence about how to treat it. You can use our information to talk to your doctor and decide which treatments are best for you.

What is chronic obstructive pulmonary disease (COPD)?

COPD is a lung disease that's usually caused by smoking. If you have a bad cough that never seems to go away, and if you get out of breath without doing very much, you may have this condition.

This condition is also known as chronic bronchitis, emphysema, or chronic obstructive lung disease.

If you have COPD and you smoke, the best thing you can do is stop smoking. This can help slow down how quickly the disease gets worse. To learn more, see Why stop smoking?

You can also take drugs to help you breathe more easily and do exercises to make you stronger and more fit. If you're underweight, eating well so that you gain weight can also help.

Smoking is the main cause of COPD.

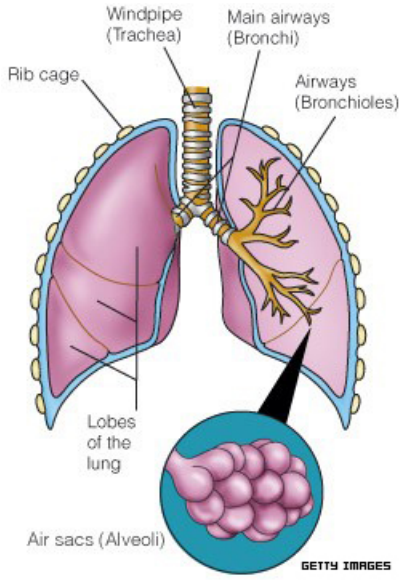
Key messages for people with COPD

- If you have a smoker's cough or get out of breath easily, you could have COPD.
- It's important not to ignore a cough or breathing problems. See your doctor as soon as possible.
- You can get COPD even if you gave up smoking some years ago.
- There are treatments that can help you breathe more easily and live a more active life.
- If you stop smoking , it will slow down how quickly your lungs get worse.

How your lungs work

To understand what happens in COPD and how to treat it, it helps to know something about your lungs.

Your lungs are in the centre of your chest, behind your ribs. They are like two spongy, stretchy bags that fill up with air when you breathe in and empty when you breathe out.



When you breathe in, air goes into your lungs through your windpipe.

- When you take a breath, air travels down your windpipe and goes into your lungs.
- The air passes into your lungs through a network of thin tubes.
- These tubes are lined with fine hairs (called cilia) that help to push the air through your lungs. The hairs also help to sweep tiny specks of dust, or dirt and germs, out of your lungs.
- Your lungs make small amounts of a thick fluid, called mucus. It keeps your airways moist and helps get rid of dirt and germs.
- The air you breathe in goes into tiny sacs at the end of each airway. Your doctor may call these sacs alveoli.
- Each little sac is covered with tiny blood vessels. Oxygen from the air passes through the wall of the air sac and into your blood vessels.
- Your blood carries oxygen all around your body. Oxygen is released into your body's tissues to be used as food. After your tissues use the oxygen, waste gases pass from the tissues back to your blood.
- Your blood returns to your lungs with these waste gases. The gases move through the air sacs and back into your lungs. These are gases that your cells don't need any more, mainly carbon dioxide. When you breathe out, you get rid of these gases.

What happens in COPD

If you have COPD, your lungs are damaged, usually by cigarette smoke. Occasionally, people get COPD from breathing in harmful chemicals at work or they inherit the disease from their family.

This is how the poisons in cigarette smoke and in other chemicals damage people's lungs. [5]

- They irritate the airways in your lungs and make them produce more mucus.
- They stop the tiny hairs in your airways (cilia) working properly. This means mucus stays trapped in your lungs instead of being forced out when you cough. Too much mucus in your airways makes it hard to breathe.
- They make the walls of your airways swell and get thicker. When this happens, your airways get narrower. This makes it harder to breathe.
- They damage the walls of the small sacs in your lungs that hold air (the alveoli). Less oxygen can get through the walls and into your blood. When you don't have enough oxygen in your blood, you get out of breath and tired faster.

There are two types of COPD: **chronic bronchitis** and **emphysema**. Some people with COPD have just chronic bronchitis, others have just emphysema. Many people have both.

- In chronic bronchitis, your airways get clogged with mucus, and that's why it's hard to breathe. See Chronic bronchitis to learn more.
- In emphysema, the air sacs lose their stretchiness and get damaged permanently, so they can't expand and contract well. The air gets trapped in the air sacs. See Emphysema to learn more.

COPD: why me?

Things that increase your chance of getting a disease are called risk factors. The main risk factor for COPD is smoking, but there are other risk factors as well, including air pollution, infection, your genes, and possibly your job.

Smoking

About 9 in 10 people who have chronic obstructive pulmonary disease (COPD) are, or used to be, heavy smokers. [5] Breathing in smoke from a smoker near you (second-hand smoke) can also cause COPD.

The poisons in cigarette smoke harm the lungs in many ways. The damage they do leads to COPD. For example, they can make your airways swell up and make them rough and sore on the inside. Then your airways make more mucus and get blocked.

If you give up smoking, your chances of getting COPD go down. But even after about 10 years of not smoking, 1 in 10 people who used to smoke get COPD.

Not all smokers get COPD. A lot depends on how your body handles smoke and poisons. This is controlled by the genes you've inherited from your parents.

Air pollution

Although smoking is the biggest cause of COPD, air pollution can play a part, especially in places where there is a lot of heavy industry. [5] In these areas, there tend to be more harmful particles and harmful gases in the air, such as sulphur dioxide.

Like cigarette smoke, these gases irritate your airways and make them swollen. Then the airways make more mucus. The chemicals also damage the walls of the tiny sacs in your lungs so that they can't hold air so well.

Inside the home, using solid fuel seems to increase the risk of COPD. One study found that breathing in wood smoke while doing domestic chores increased the chances of COPD more than other fuels. [8]

Your job

People who work near harmful dusts, chemicals, or gases are more likely to get COPD than those who don't. [5] Like cigarette smoke, these things irritate your airways and make them swell. They also increase mucus in your airways and damage the walls of the sacs in your lungs so that they can't hold air so well.

If you work in an industry like farming or mining, where you could be exposed to harmful substances, be certain to follow safety advice to protect your lungs.

Infections

If you get a lot of chest infections, you may be more likely to get COPD, especially if you smoke. Getting bacterial or viral infections can lead to chronic bronchitis. If you have that, your lungs produce too much mucus. That makes it harder for you to breathe. [5] See Chronic bronchitis to learn more about this disease.

Your genetic makeup

Smoking is such an important risk factor for COPD, you might think that nearly everyone who smokes would get it. But only about 1 in 5 smokers develop COPD. [5] It seems that some people are more likely to be hurt by cigarette smoke than others.

Doctors think that, somehow, the genes these people inherited from their parents make their risk greater. If you smoke (or used to smoke), and if you have a close relative (mother, father, brother, or sister) with COPD, you are more likely to get COPD than

someone who smokes but doesn't have a relative with COPD. Scientists don't know yet which genes are involved.

One rare type of COPD is definitely linked to your genes. It is called alpha-1 antitrypsin deficiency, and it causes emphysema, but not chronic bronchitis. See Emphysema for more.

Alpha-1 antitrypsin is a chemical that is made mainly in the liver. Its job is to destroy a protein in the lungs called elastase. Elastase helps to repair old tissue and get new tissue to grow. But it needs to be kept under control by alpha-1 antitrypsin and other chemicals like it. If there is little or no alpha-1 antitrypsin around, elastase can be very destructive. It punches holes in the walls of the little air sacs in your lungs. This leads to emphysema.

Between 1 in 2,000 and 1 in 7,000 people of European descent have alpha-1 antitrypsin deficiency, which they inherited from their parents. The condition is very rare in people of Asian or African descent. [5]

Grading COPD

You can have COPD that's quite mild, a little worse, or very bad. If it looks as if you might have COPD, your doctor will give your illness a grade to show how mild or severe it is. The grade helps your doctor decide what treatment you need. [9]

There are four grades, and the table below shows what they are and what each one means. If your doctor gives your illness a 0, it means you might get COPD, but you don't actually have the disease yet. The highest grade, 4, means you have COPD and it's very serious.

You'll see two abbreviations in the table below: FVC and FEV1 . These are measurements used in spirometry tests.

- FVC stands for forced vital capacity. It is the total amount of air you can blow out after taking a deep breath.
- FEV1 stands for forced expiratory volume in one second. It shows how much air you can blow out in the first second of the test.

To grade your COPD, doctors look at your FEV1 score. They also divide your FEV1 by your FVC (often written as FEV1/FVC). This gives them a percentage that helps them find out how well your lungs are working. To learn more, see Spirometry .

Some doctors may just use the percentages, instead of talking about stages.

Stage of COPD	Test results	Signs
0: At risk	Your lung test is normal.	You have had symptoms, like coughing up mucus, every day for some time.

1: Mild	You have one abnormal lung test result (your FEV1/FVC is less than 70 percent). You have one normal lung test result (your FEV1 is at least 80 percent of what it should be).	You may cough a lot. Sometimes you cough up mucus. You feel a little breathless if you walk quickly.
2: Moderate	Both your lung test results are abnormal. Your FEV1/FVC is less than 70 percent and your FEV1 is between 50 percent and 80 percent of what it should be.	You cough more. You may get breathless if you work hard, walk quickly, or do household jobs. You may take a few weeks to recover from a chest infection.
3: Severe	Both your lung test results are abnormal. Your FEV1/FVC is less than 70 percent and your FEV1 is between 30 percent and 50 percent of what it should be.	You may not be able to work and probably find it harder to do jobs around the house. You cannot walk upstairs or across the room very well. You get tired easily. You may show signs of a weak heart.
4: Very severe	Both your lung test results are abnormal. Your FEV1/FVC is less than 70 percent. Also, your FEV1 is less than 30 percent of what it should be or it's less than 50 percent of what it should be and you have other signs that your lungs are failing.	You can no longer go to work or do jobs around the house. You cannot walk upstairs or across the room very well. You may show signs of a weak heart.

What are the symptoms of COPD?

The two main symptoms of chronic obstructive pulmonary disease (COPD) are coughing and getting out of breath.

People who have COPD often cough up a lot of mucus (also called sputum or phlegm). You may think a cough is a sign that you have a cold. But if you have COPD, your cough doesn't go away.

If you smoke, you may think that your 'smoker's cough' is normal. You may not want to go to the doctor in case he or she nags you to give up smoking. But your cough could be a sign that you have lung damage, and you should see your doctor.

If you have COPD, you may also:

- Lose weight
- Get tired easily
- Have bones that break easily
- Have swollen ankles.

For information about these and other signs, see More about the symptoms of COPD .

COPD attacks

If you have COPD, you may have attacks every so often. Doctors call these **exacerbations**. If you have an attack, your symptoms get worse suddenly over a few days or weeks. This is what happens:

- It gets very hard for you to breathe
- You may cough more and bring up more mucus
- The mucus will probably be thicker than usual and have a different colour.

Normally, the mucus people cough up is clear, but if you have a COPD attack, it may be yellow or greenish. This usually means that the attack is being caused by an infection, usually because of bacteria. Many people with COPD get a bacterial infection and have attacks after they've caught a cold or had a bout of flu, even though these illnesses are caused by viruses. But sometimes attacks happen without any sign of infection.

When you're having an attack, your doctor may want you to take these extra medicines:

- Antibiotics to kill any bacteria that are causing an infection
- More of the drugs you take to help you breathe
- Drugs called corticosteroids to reduce the inflammation and swelling in your airways.

You may need to go to hospital.

How do doctors diagnose COPD?

To find out if you have chronic obstructive pulmonary disease (COPD), you will need to see your GP and possibly a hospital specialist. They will look at these things:

- Whether you smoke
- Whether you work with harmful gases or chemicals
- Your symptoms
- Your health now (you'll have a physical examination)
- Your health in the past and any health problems in your family (this is your medical history)
- Results from tests that measure how well your lungs work.

Seeing your GP

To find out if you are at high risk of having COPD, your GP will ask whether you smoke now or whether you did in the past. Nearly everyone who has COPD is a smoker or used to smoke. But some people have inhaled only second-hand smoke.

Information about where you work and what you do will help your doctor know how likely it is that you have this disease. Your GP will also ask about your symptoms and about any other illnesses you've had.

He or she will examine you and listen to your chest to see how well you are breathing and if you have any signs of a chest infection.

Here are some questions your GP may ask.

- Do you cough every day? How often?
- How long have you been coughing like this?
- Do you cough up mucus (also called phlegm)? What does it look like?
- Do you feel out of breath a lot? What makes you feel breathless?
- Do you get a lot of chest infections?
- Are you losing weight?
- Does anyone in your family have chronic bronchitis? Emphysema? COPD? Any other breathing problem?
- Have you had, or do you have, heart trouble or lung problems of any kind? Do you have any other illnesses?
- Are your symptoms affecting your work, sleep, leisure, or other everyday activities?

To see how healthy your lungs are, you will need some of the tests listed below. Your GP may do some of them, or your GP may refer you to your local hospital for tests.

- Spirometry: This helps to find out how well your lungs work by measuring how much air you can breathe in and out. To read more, see Spirometry. Your doctor will use it to find out if you have COPD and, if you do have it, how bad it is.
- Walking test: This will measure how fast you get out of breath.
- Chest x-ray: This will usually show whether you have (or don't have) any other lung diseases.

- Electrocardiogram (ECG) or echocardiogram ('echo'): These tests will tell the doctor if your heart is not beating or pumping properly and if this is making you breathless.
- CT scan: Your doctor might want to use this test to get a more detailed picture of your lungs.
- A blood test to measure blood gases: This shows how much oxygen and carbon dioxide you have in your blood. See Blood gases to find out more.

Seeing a specialist

Your GP may diagnose COPD on the basis of your symptoms, examination, and test results. Or your GP may prefer that a specialist makes the diagnosis. Like your GP, the specialist will ask you about your symptoms and examine you. You may have new tests or tests that you've already had. The specialist will then be able to tell you and your GP whether you have COPD.

How common is COPD?

Chronic obstructive pulmonary disease (COPD) is very common, and it's getting more common, especially among women. It's possible to have COPD without knowing you have it.

Here are some facts about this disease.

- In the UK, COPD affects 2 in 100 men and 1 in 100 women. [11]
- Around 900,000 people in the UK have been diagnosed with COPD. It's thought that another 2 million people don't know they have it. Most people are not diagnosed until they are in their 50s. [12]
- More than half of the people with COPD are men. But more and more women are being diagnosed with the disease. [13] Experts think this is because more women started smoking after World War II.
- COPD is more common in older people than in younger people. [13]
- About one-third of people with COPD have mild disease, over half have moderate disease, and a small number have severe disease. [11]
- COPD is very serious. It causes more than 30,000 deaths each year in the UK. [14]

What treatments work for COPD?

Chronic obstructive pulmonary disease (COPD) is a lung disease that's usually caused by smoking.

If you have COPD and smoke, the best thing you can do is stop smoking . This can help slow down how quickly the disease gets worse.

There aren't any cures for COPD, but doctors and therapists can do a lot to help you breathe more easily and to make you feel better.

Key messages about treating COPD

- Stopping smoking is the best thing you can do for COPD.
- Treatments to help you stop smoking include counselling, nicotine gum, or a drug called bupropion.
- Taking regular exercise can make you fitter and improve your symptoms.
- Medicines that you breathe in (inhalers or nebuliser treatments) may help your lungs work better and should help you feel less breathless.
- Taking two drugs that you breathe in, one to open up the airways and one to reduce inflammation , may also help to prevent attacks of COPD (when your symptoms suddenly get worse).
- Taking a drug to break up the mucus in your lungs, so it's easier to cough up, may reduce your risk of having an attack.
- If your COPD is very bad, having extra oxygen to breathe at home can help you live longer.

What you can expect from the NHS

If you've got COPD, you'll be cared for mainly by your GP. But you may also get help from a team of specialists, such as a specialist lung nurses, physiotherapists, occupational therapists, and dietitians. If your COPD gets very bad, you may need to be treated in hospital.

The National Institute for Health and Care Excellence (NICE), the government body that advises doctors about which treatments should be available on the NHS, has published guidance for doctors on how to treat COPD. [12] This can give you some idea about what treatment you can expect.

- If you smoke, your doctor will probably encourage you to stop and offer you some help. For example, you might be offered nicotine replacement therapy or the drug bupropion (Zyban). And you might be encouraged to attend a local group for people who are trying to give up smoking.
- The first treatment you'll get to help your COPD symptoms is an inhaler that helps open up the airways in your lungs (called a bronchodilator). This will be a short-acting

inhaler, which means it works for about 4 hours. You might get one that contains a drug called a beta-2 agonist (salbutamol or terbutaline) or an anticholinergic drug (tiotropium or ipratropium).

- Your doctor will consider various inhaled drugs, and combinations of drugs, to help you to breath better. If your symptoms are not improving, it's important to tell your doctor.

- If your COPD is so bad that it stops you doing the things you used to do, such as going to the shops or meeting up with friends, then you should be offered a programme of treatment called pulmonary rehabilitation. This involves learning about COPD and how it's treated, advice about diet and exercise, and support to help you cope with your condition.

- If you cough up phlegm, your doctor might try you on tablets to help clear it up. These might be carbocisteine or mecysteine.

- You might get oxygen to breathe at home. You usually have to do this for 15 hours a day for it to help, though if you use it for longer, it might help more.

- You may be referred to a specialist to see if surgery could help you. This usually involves removing some of your lungs or a lung transplant.

- It is common to get depressed when you have COPD. Your doctor may ask you questions to see how you are feeling. If you are depressed, you should be offered treatment for it.

- You should get a vaccination every year against flu and pneumococcal disease. These conditions can make your COPD worse.

If you have a bad COPD attack (when your symptoms get suddenly much worse), you may get some other treatments.

- Your doctor might put up your dose of bronchodilator. Or you may breathe this in through a mask using a machine called a nebuliser rather than an inhaler.

- You might get a course of antibiotics.

- If you are very breathless, your doctor might prescribe a course of steroid tablets.

- Depending on how these treatments work, your doctor will decide whether you can stay at home or if you need to be treated in hospital.

- In hospital you might get oxygen to breathe in through a mask, or you may be put on a ventilator to help you breathe.

Treatments for COPD

Which treatments work best? We've looked at the research and given each treatment a rating according to how well it works. We've looked separately at the different kinds of treatment you might be offered.

- Drug treatments for COPD
- Lifestyle treatments for COPD
- Surgery for COPD

The National Institute for Health and Care Excellence (NICE), the government body that decides which treatments should be available on the NHS, has published guidance on COPD. To read more, see What you can expect from the NHS .

For help deciding which treatment is best for you, see How to make the best decisions about treatment.

Treatment Group 1

Drug treatments for COPD

Treatments that work

- Beta-2 agonist inhalers : Breathing in these drugs helps to open up your airways. Examples (and their brand names) include salbutamol (Ventolin), formoterol (Foradil, Oxis), salmeterol (Serevent), and terbutaline (Bricanyl). More...
- Anticholinergic inhalers : Breathing in an anticholinergic drug helps to open up your airways. Examples are ipratropium (brand name Atrovent) and tiotropium (Spiriva). More...
- Steroid inhalers : You breathe these drugs in to reduce inflammation in your airways. Examples (and their brand names) include beclometasone (Beclotide, Qvar), budesonide (Pulmicort), and fluticasone (Flixotide). More...
- Combining a beta-2 agonist with an anticholinergic drug : Breathing in two drugs together can work better than using just one on its own. Your doctor may recommend using two inhalers, or you can get combination inhalers that include two different drugs. Brand names for combination inhalers include Combivent and Duovent. More...
- Combining a steroid with a beta-2 agonist : Combining a steroid with a beta-2 agonist can work better than using either drug on its own. You might have two inhalers, or one inhaler that contains two drugs. Inhalers with the brand names Symbicort and Seretide contain this combination of drugs. More...

Treatments that are likely to work

- Oxygen : If you have severe COPD, you may need to breathe oxygen at home through a face mask or through tubes in your nose. More...

Treatments that work but whose harms may outweigh the benefits

- Theophylline : Tablets or syrups containing theophylline help to relax the muscles in your lungs, causing your airways to open up. But this treatment can cause unpleasant side effects. Some brand names are Nuelin SA, Slo-Phylline, and Uniphyllin. More...

Treatments that need further study

- Alpha-1 antitrypsin : This treatment is for people with emphysema who have low levels of an important chemical called alpha-1 antitrypsin. You can have a drip to replace this chemical. In the UK, this treatment is not recommended for COPD. More...

- Antibiotics : Antibiotics can help if you get a lung infection. If you're prone to lung infections, your doctor might recommend taking antibiotics regularly, to prevent them. Examples include oxytetracycline and ampicillin. More...

- Drugs that break up mucus : These medicines are called mucolytics. They help you clear your airways when you cough. Common mucolytics are carbocisteine (Mucodyne) and mecysteine (brand name Visclair). More...

Treatments that are unlikely to work

- Corticosteroid tablets : These are medicines that reduce inflammation in the airways. They're often used to treat people having attacks of COPD, but they don't seem to help as a day-to-day treatment. Prednisolone is a commonly used steroid. More...

Other treatments

We haven't looked in detail at the research on these treatments. We've included some information because you might be interested in them. (For more on how we rank treatments, see Our method.)

- Flu and pneumonia jabs

Treatment Group 2

Lifestyle treatments for COPD

Treatments that work

- Nicotine replacement therapy and professional help : Giving up smoking can help improve the symptoms of COPD. It's easier to give up if you get professional help and use nicotine replacement therapy. You can get nicotine gum, lozenges, tablets that you put under your tongue, nasal sprays, inhalers, and skin patches. More...

- Bupropion and professional help : Bupropion (brand name Zyban) was originally used to treat depression. Now it is being used, with advice and support from a GP, nurse, or counsellor, to help people stop smoking. More...

- Lung care programmes : Learning about how your lungs work and doing breathing exercises can help improve your symptoms. More...

Treatments that are likely to work

- Exercise : Taking regular exercise such as swimming, walking, and cycling can help to improve your fitness and improve your health. More...

- Muscle training : Exercises that build up the muscles around your lungs and in your arms and legs can improve your fitness and health. More...

Treatments that are unlikely to work

- Nutritional supplements : You can take nutritional supplements to help you gain weight. But these are unlikely to improve your health. More...

Treatment Group 3

Surgery for COPD

Other treatments

We haven't looked in detail at the research on these treatments. We've included some information because you might be interested in them. (For more on how we rank treatments, see Our method.)

- Lung transplant operations

- Surgery on the lung

What will happen to me?

There is no cure for chronic obstructive pulmonary disease (COPD), but there are treatments that can help your symptoms.

COPD gets worse slowly. But everyone is different. Some people's COPD stays the same for years. For other people, the disease gets worse more quickly, especially if they go on smoking. [15]

If you stop smoking, there's a good chance that you can slow down how quickly the disease gets worse. Your GP can help you stop smoking.

See Why stop smoking? for more information. You may also want to read our section on smoking for advice about how to give up smoking.

When COPD becomes severe

If your COPD gets very bad, you will find it hard to breathe and you will need to make a big effort to get air in and out of your lungs. If you can't get enough oxygen into your bloodstream, you will feel tired and you may not be able to walk very far.

You may need to breathe oxygen through a mask or through tubes that go into your nostrils. If you're finding it very hard to breathe during a severe attack, you may need to use a machine called a ventilator to help you breathe.

Some people with COPD die as a result of their disease. It's difficult to predict what will happen to you. But you can live longer with COPD if you stop smoking. [15]

Questions to ask your doctor

Here are some things you may want to talk to your doctor about if you have (or think you may have) chronic obstructive pulmonary disease (COPD).

- How can you tell if I have COPD?
- What do my test results mean?
- What treatment should I have?
- How will the treatments help me?
- Does my treatment have any side effects?
- What should I do if I get any of these side effects?
- How often should I come back to see you if my treatment is helping?
- How will you know if my treatment is working?

- What should I do if my symptoms get worse?
- Is there anything you can give me to help me stop smoking?
- Besides giving up smoking, is there anything I can do to help myself?

Treatments:

Beta-2 agonist inhalers

In this section

This information is for people who have chronic obstructive pulmonary disease (COPD). It tells you about inhalers containing drugs called beta-2 agonists, which are used to treat COPD. This information is based on the best and most up-to-date research.

Do they work?

Yes. Using an inhaler containing a beta-2 agonist can help your symptoms if you have chronic obstructive pulmonary disease (COPD). There's a good chance that it will help you feel less out of breath.

There are two main types of inhaler that help breathlessness in COPD. The type we talk about here contain drugs called beta-2 agonists. The other contains anticholinergic drugs. Both types relax and open up your airways, but they work in different ways. The research doesn't say which one is best. You may have to try both to find out which works best for you.

Beta-2 agonists come as two types: long-acting and short-acting. There's a risk that the long-acting kind could make some people's breathing worse. People taking these drugs for COPD seem to have a higher chance of dying from breathing problems. [17] If your breathing gets worse while you're using a long-acting beta-2 agonist, talk to your doctor.

What are they?

Beta-2 agonists such as salbutamol relax and open up the airways. This should help you breathe more easily. Beta-2 agonists come in two types.

Short-acting drugs work quickly and last for three to four hours. Examples (with brand names) include:

- salbutamol (Ventolin, Salamol, Easi-Breathe, Airomir)
- terbutaline (Bricanyl)

Long-acting drugs may take longer to start working (15 to 30 minutes) but go on working for up to 12 hours. Examples (with brand names) include:

- formoterol (Foradil, Oxis)
- salmeterol (Serevent).
- indacaterol (Onbrez Breezhaler).

You usually use short-acting inhalers whenever you're having trouble breathing. Alternatively, your doctor might advise you to use your inhaler at regular intervals, three or four times a day, to keep your airways open.

Long-acting inhalers don't work very quickly, so they aren't used for fast relief when you have a sudden breathing problem. Instead, you take them regularly, twice a day, to keep your airways open.

The National Institute for Health and Care Excellence (NICE) is the organisation that decides which treatments should be available on the NHS. NICE recommends that doctors prescribe a short-acting inhaler, such as salbutamol or terbutaline, to make you less breathless and able to be more active. If you still have problems, a long-acting drug, such as formoterol or salmeterol, may be better for you. [12]

Inhalers

You take beta-2 agonists using an inhaler. The metered-dose inhaler (MDI) is the most common kind. It's a small plastic holder with a slot where you put an aerosol canister. Pressing on the canister releases exactly one dose of the medicine. It comes out as a puff of tiny droplets that you slowly breathe in through your mouth.

There are also other kinds of inhaler that some people find easier to use. These include breath-activated inhalers, which release the drug as you breathe in, and dry powder devices.

Most inhalers now are CFC-free. CFCs are chemicals that used to be widely used in aerosols. CFC-free inhalers work just the same as older models but are less harmful to the environment. You might notice that your medicine tastes slightly different.

Nebulisers

If you have more severe COPD, you can also take beta-2 agonists through a compressed-air sprayer called a nebuliser. It turns the medicine into a mist that you can breathe in through a mask.

Nebulisers are bulky, but they let you get a much bigger dose of medicine than an ordinary inhaler. Some people also find them easier to use, because all you need to do is breathe through the mask.

How can they help?

If you use a short-acting inhaler, such as salbutamol: [18]

- You may become less breathless and wheezy
- Your doctor may find that your lung test results are better. See Spirometry to read about testing your lungs.

If you use a long-acting inhaler, such as salmeterol:

- You may be able to do more before you get tired [19] [20]
- You may have fewer COPD attacks (when your symptoms suddenly get worse) and have an improved quality of life [21] [22] [23]
- You are less likely to need extra treatments or need to go to hospital because of a COPD attack [24]
- Your lungs may work better if you take one of these drugs for a long time. [19] [20] [21]

How do they work?

Beta-2 agonists relax the muscles in your lungs, so your airways open up more.

The long-acting kind may also help to clear away mucus in your airways. They seem to speed up the sweeping movement of the tiny hairs (cilia) in the airways so that they move the blockage better.

Can they be harmful?

Although long-acting beta-2 agonists aim to improve your breathing, for some people these drugs might actually increase the risk of serious breathing problems. In a study that looked at 2,404 people: [17]

- About 2 in 100 people taking a long-acting beta-2 agonist died because of breathing problems
- Only 1 in 100 people taking a dummy treatment (a placebo) died of breathing problems.

People with asthma who take long-acting beta-2 agonists can sometimes get more severe asthma attacks. [25] Make sure you tell your doctor if you have asthma as well as COPD.

You may find that your hands tremble if you use a beta-2 agonist inhaler. This is the most common side effect, especially in the first few days of treatment. For some people, this is a big enough problem that they can't hold a glass.

If you're taking any type of beta-2 agonist (either long-acting or short-acting), you may notice that your heart beats faster or in an abnormal way, especially if you already have a heart problem and you take high doses. [26] [27] [28] If you use one of these drugs for a long time, you may be at increased risk of other heart problems. [26] [29]

However, follow-up studies show that people with COPD taking beta-2 agonists are no more likely to have a heart attack than people with COPD who are not taking these drugs. [30]

If you are taking this type of inhaler, you should try to avoid taking a beta-blocker. Beta-blockers are commonly used to lower blood pressure and correct abnormal heart rhythms. This kind of drug will block the effects of the beta-2 agonist.

How good is the research on beta-2 agonist inhalers?

There is good evidence that these drugs help chronic obstructive pulmonary disease (COPD). We found seven summaries of the research (called systematic reviews). [17] [18] [21] [22] [23] [26] [24]

One summary covered nine studies of short-acting inhalers, which are used to relieve symptoms quickly. The studies found that these drugs helped the lungs work better and made people feel less breathless. [18] However, another summary of the research into short-acting beta-agonists looked at safety and found they may increase the risk of heart problems for some people. [26]

Five summaries looked at treatment with long-acting beta-2 agonist inhalers. [17] [21] [22] [23] [24] The studies found that people who used these inhalers had fewer COPD attacks and an improved quality of life, compared with people who used a dummy treatment (a placebo).

There are also lots more smaller studies looking at these drugs. Most of them had similar results.

Anticholinergic inhalers

In this section

This information is for people who have chronic obstructive pulmonary disease (COPD). It tells you about inhalers containing anticholinergic drugs, a treatment for COPD. It is based on the best and most up-to-date research.

Do they work?

Yes. Using an inhaler containing an anticholinergic drug can help you if you have chronic obstructive pulmonary disease (COPD). There's a good chance that with this medicine you'll be able to breathe more easily. You may find that these drugs help you feel less breathless and that you wheeze less.

There are two main types of inhaler that help breathlessness in COPD. The type we talk about here contain anticholinergic drugs. The other contains beta-2 agonists . Both types relax and open up your airways, but they work in different ways. The research doesn't say which one is best. You may have to try both to find out which works best for you.

What are they?

Anticholinergic drugs open up your airways by relaxing the muscles in your lungs. You may hear them called bronchodilators, because they open up (dilate) the airways (bronchial tubes).

Your doctor needs to prescribe them for you. You can't buy them over the counter. There are two types.

- Short-acting anticholinergics work quickly and the effect lasts for three hours to four hours. The one that's usually used is called ipratropium (Atrovent).

- Long-acting anticholinergics last longer, so you only need to take them once a day. The only type available in the UK is called tiotropium (Spiriva). It's available as capsules, which you put into an inhaler called a HandiHaler. It also comes in an inhaler that delivers the drug as a mist (Respimat Soft Mist inhaler).

You usually use short-acting inhalers whenever you're having trouble breathing. Alternatively, your doctor might advise you to use your inhaler at regular intervals, three or four times a day, to keep your airways open.

Long-acting inhalers don't work very quickly, so they aren't used for fast relief when you have a sudden breathing problem. Instead, you take them regularly, once a day, to keep your airways open.

The National Institute for Health and Care Excellence (NICE) is the organisation that decides which treatments should be available on the NHS. NICE recommends that doctors prescribe a short-acting drug, such as ipratropium, to make you less breathless and able to be more active. If you still have problems, a long-acting drug, such as tiotropium, may be better for you. [12]

Inhalers

You take anticholinergic drugs using an inhaler. The metered-dose inhaler (MDI) is the most common kind. It's a small plastic holder with a slot where you put an aerosol canister. Pressing on the canister releases exactly one dose of the medicine. It comes out as a puff of tiny droplets that you slowly breathe in through your mouth.

There are also other kinds of inhaler that some people find easier to use. These include breath-activated inhalers, which release the drug as you breathe in, and dry powder devices.

Most inhalers now are CFC-free. CFCs are chemicals that used to be widely used in aerosols. CFC-free inhalers work just the same as older models but are less harmful to the environment. You might notice that your medicine tastes slightly different.

Nebulisers

If you have more severe COPD, you can also take anticholinergic drugs through a compressed-air sprayer called a nebuliser. It turns the medicine into a mist that you can breathe in through a mask.

Nebulisers are bulky, but they let you get a much bigger dose of medicine than an ordinary inhaler. Some people also find them easier to use, because all you need to do is breathe through the mask.

How can they help?

Here are some of the ways these drugs can help fight the symptoms of COPD.

- Taking an anticholinergic drug can improve the way your lungs work. [31] [32] [33]
- You won't feel so out of breath. [31] [32] [33]
- You will be able to exercise for longer without getting breathless. [34]
- If you take an anticholinergic regularly for a long time (say around a year), it may help you have fewer attacks and help you enjoy life more. [35] [36] [37]

We don't know whether anticholinergic drugs are better for COPD than beta-2 agonists. The research isn't clear enough to say. [38]

How do they work?

These drugs relax the muscles in your lungs. This helps the airways open up, and that makes it easier for you to breathe.

Can they be harmful?

About 1 in 10 people who take anticholinergic drugs get a dry mouth. [39] But most people don't find this a big enough problem to stop their treatment.

A study found that people with COPD taking either ipatropium or tiotropium were more likely to have a heart attack or stroke, or to die from heart or circulation problems, compared with people with COPD who are not taking these drugs. [40]

These are the figures from the study: [40]

- 18 in 1,000 people taking ipatropium or tiotropium had a heart attack or stroke, or died from heart and circulation problems. People had been taking the drugs for up to five years
- 12 in 1,000 people not taking these drugs had a heart attack or stroke, or died from heart and circulation problems.

The risks were slightly bigger for ipatropium than tiotropium.

It's alarming to think about an increased risk of heart attack or stroke. But the increase in risk seems to be quite small, amounting to around six extra people having these problems out of every 1,000 who take ipatropium or tiotropium.

A review of studies also found that people taking the standard daily dose of tiotropium using the Respimat mist inhaler were more likely to die over the course of a year, compared with those taking a dummy (placebo) drug. However, the overall risk of death in the study was still quite low, with 26 in 1,000 people taking tiotropium using the Respimat inhaler dying, compared with 18 in 1,000 taking a placebo. The researchers calculated that, over one year, this might mean one extra death for every 124 patients using the Respimat inhaler. [41] However, we still need more research to confirm these findings and explore why the Respimat inhaler might raise the risk of dying. [42] These findings don't apply to the HandiHaler inhaler. [43] [44]

Your doctor will be able to help you weigh up the risks and benefits of your treatment.

How good is the research on anticholinergic drugs?

There is quite a lot of evidence to show that anticholinergic drugs help people who have chronic obstructive pulmonary disease (COPD).

We found one summary of the research, which looked at the results of 17 good studies (called randomised controlled trials). [34] All but one of them found that taking an anticholinergic drug helped people exercise for longer.

We found many other small studies that focused on the way that the drugs affect the lungs. In general, the studies found that these drugs will make your lungs work better.

Anticholinergic drugs may also make you less breathless, help you get on with your life, reduce your need for other medicines, and help you breathe more easily. [31] [32]

Taking anticholinergics for a long time

Four large reviews have looked at lots of studies on taking anticholinergics for a long time (from a few months to a year, or even longer). [35] [36] [37] [45] Taking these drugs in the long term can reduce the number of COPD attacks people have. Anticholinergics may also help people do more things and enjoy life more. But they don't seem to help people live longer.

Steroid inhalers

In this section

This information is for people who have chronic obstructive pulmonary disease (COPD). It tells you about steroid inhalers, a treatment for COPD. It is based on the best and most up-to-date research.

Do they work?

Yes, but only after taking them for at least six months and maybe much longer (12 months to 24 months). If you have moderate or severe chronic obstructive pulmonary disease (COPD), breathing in these drugs every day can help your lungs work slightly better. They may also help prevent attacks (when your symptoms suddenly get worse). [46]

But there are drawbacks to taking steroids. You may get a yeast infection in your mouth (this is called thrush), and you may get bruising on your skin. You can also get more serious side effects if you take them for a long time.

What are they?

Steroids help reduce inflammation in your airways so that you can breathe more easily. They're a long-term treatment. Your doctor will recommend another type of inhaler if you need quick relief from breathing problems.

The steroids used for COPD aren't the same drugs that some athletes and bodybuilders use. Those are called anabolic steroids. The steroids used to treat COPD are called corticosteroids. They are like chemicals your body makes to fight inflammation.

You can get several different kinds of steroid inhaler. We've listed some of these below (with their brand names):

- Beclometasone (Qvar)

- Budesonide (Pulmicort)
- Fluticasone (Flixotide).

Inhaling steroids puts the medicine into your lungs, where it is needed. Your doctor may advise you to try a steroid inhaler in addition to other treatments for COPD.

The National Institute for Health and Care Excellence (NICE) is the organisation that decides which treatments should be available on the NHS. NICE recommends that you should start using a steroid inhaler if tests show your lungs are working very poorly, or if you need two or more courses of antibiotics or steroid tablets in a year. [12]

Inhalers

The metered-dose inhaler (MDI) is the most common kind. It's a small plastic holder with a slot where you put an aerosol canister. Pressing on the canister releases exactly one dose of the medicine. It comes out as a puff of tiny droplets that you slowly breathe in through your mouth.

There are also other kinds of inhaler that some people find easier to use. These include breath-activated inhalers, which release the drug as you breathe in, and dry powder devices.

Most inhalers now are CFC-free. CFCs are chemicals that used to be widely used in aerosols. CFC-free inhalers work just the same as older models but are less harmful to the environment. You might notice that your medicine tastes slightly different.

Nebulisers

If you have more severe COPD, you can also take steroids through a compressed-air sprayer called a nebuliser. It turns the medicine into a mist that you can breathe in through a mask.

Nebulisers are bulky, but they let you get a much bigger dose of medicine than an ordinary inhaler. Some people also find them easier to use, because all you need to do is breathe through the mask.

How often should you use them?

People with COPD usually take inhaled steroids at least twice a day. Regular doses work best to keep the inflammation in your airways under control.

How can they help?

You may have to take inhaled steroids for six months or more before they help. If they do help, these are some of the things you can expect to happen.

- Your quality of life may be better. [47] [48]

- You may get fewer attacks (when your symptoms suddenly get worse). [22] [49] [50]

But it's important to bear in mind that these drugs don't help everyone who takes them. Researchers looking at the evidence for people having fewer attacks while taking inhaled steroids said the benefits were 'overstated' and any improvement was likely to be small. [51]

Studies have not found any improvement in how long people live if they take inhaled steroids. [52] [53]

How do they work?

Steroids reduce the inflammation in your airways so that they can open up properly. This should make it easier for you to breathe.

Can they be harmful?

Steroids can cause side effects. Your doctor should explain the benefits and risks of steroids before you start taking them.

You may get bruising on your skin or a yeast infection in your mouth if you use inhaled steroids. [22] [49] In one study, 1 in 10 people got a yeast infection. [54]

There's also a chance that your bones will become weaker and break more easily, especially if you take inhaled steroids for a long time. [22] However, one summary of the research found no major increase in the risk of broken bones after people used inhaled steroids for three years. [47]

Some research has found that people who take steroids for COPD are more likely to get lung infections [55] such as pneumonia. [56] One study found that, over three years, 14 in 100 people taking the steroid fluticasone got pneumonia. [57] This compared with 11 in 100 people just taking salmeterol and 9 in 100 people taking a dummy treatment (a placebo).

Generally, inhaled steroids have fewer side effects than steroids you take as tablets, because less of the drug gets into your bloodstream if you breathe it in. But they can cause problems if you take them for a long time and at high doses. Other side effects that have been reported include problems with sight and cataracts.

Taking steroids for a long time can stop your body making as many of its own steroids. [58] Don't stop taking your treatment suddenly. Your doctor will want to check on you as you stop taking this treatment.

If you get any worrying symptoms while you're taking steroids, see your doctor straight away.

How good is the research on inhaled steroids?

There's some good evidence that taking inhaled steroids can help people with chronic obstructive pulmonary disease (COPD). But we also know that these drugs can have side effects if you take them for a long time.

We found six summaries (called systematic reviews) that looked at studies on using inhaled steroids for at least six months. [47] [49] [51] [52] [59] [60]

One summary found that inhaled steroids were not helpful, but other summaries found that they slowed the decline in the way people's lungs worked, and reduced the number of COPD attacks that people had. [49] [59] [60] [22]

A fifth summary looked at using inhaled steroids for two to six months, and for six months or more. It found that people taking these drugs had a small improvement in their breathing early on, but there was no slowing in the decline of their lung function long term. However, they did have fewer COPD attacks and a better quality of life. [47]

Combining a beta-2 agonist with an anticholinergic drug

In this section

This information is for people who have chronic obstructive pulmonary disease (COPD). It tells you about combining two drugs for COPD, called beta-2 agonists and anticholinergic drugs. This information is based on the best and most up-to-date research.

Does it work?

Yes. Taking two drugs to open up your airways can help you if you have chronic obstructive pulmonary disease (COPD). Taking a beta-2 agonist and an anticholinergic drug may help your breathing more than using just one of them on its own.

What are they?

If you've tried using an inhaler to help you breathe and you still get symptoms, your doctor might suggest using two different types of drug. You can use two inhalers together, or you may be able to use an inhaler that contains two drugs.

You might be prescribed a combination of drugs including a beta-2 agonist and an anticholinergic drug. Both come in short- and long-acting versions.

You usually use short-acting inhalers whenever you're having trouble breathing. Alternatively, your doctor might advise you to use your inhaler at regular intervals, three or four times a day, to keep your airways open.

Long-acting inhalers don't work very quickly, so they aren't used for fast relief when you have a sudden breathing problem. Instead, you take them regularly, maybe twice a day, to keep your airways open.

Anticholinergic drugs

This type of drug opens up your airways by relaxing the muscles in your lungs. Sometimes anticholinergic drugs are called bronchodilators because they open up (dilate) your airways (bronchial tubes).

Short-acting anticholinergics work quickly and last for three to four hours. The one that's usually used is called ipratropium (Atrovent).

Long-acting anticholinergics last for a long time. So you need to take them only once a day. The only type available in the UK is called tiotropium (Spiriva). It comes as capsules that you put into an inhaler called a HandiHaler.

Beta-2 agonists

These inhalers relax the muscles in your lungs so that your airways can open up. This should help you breathe more easily.

Short-acting beta-2 agonists work quickly and last for three to four hours. Examples (with brand names) include:

- Salbutamol (Ventolin)
- Terbutaline (Bricanyl)
- Bambuterol (Bambec)
- Fenoterol (Duovent).

Long-acting beta-2 agonists take longer to start working (15 minutes to 30 minutes) but go on working for up to 12 hours. Examples (with brand names) include:

- Formoterol (Oxis, Foradil)
- Salmeterol (Serevent)
- Indacaterol (Onbrez Breezhaler)

Combination inhalers

You can get inhalers that contain both an anticholinergic drug and a beta-2 agonist.

- Combivent contains ipratropium and salbutamol. You can't get this combination as an inhaler. It comes as capsules of liquid that you use with a compressed air spray (a nebuliser).

- Duovent contains ipratropium and fenoterol.

Inhalers and nebulisers

The metered-dose inhaler (MDI) is the most common kind. It's a small plastic holder with a slot where you put an aerosol canister. Pressing on the canister releases exactly one dose of the medicine. It comes out as a puff of tiny droplets that you slowly breathe in through your mouth.

There are also other kinds of inhaler that some people find easier to use. These include breath-activated inhalers, which release the drug as you breathe in, and dry powder devices.

Most inhalers now are CFC-free. CFCs are chemicals that used to be widely used in aerosols. CFC-free inhalers work just the same as older models but are less harmful to the environment. You might notice that your medicine tastes slightly different.

If you have more severe COPD, you can also take steroids through a compressed-air sprayer called a nebuliser. It turns the medicine into a mist that you can breathe in through a mask.

Nebulisers are bulky, but they let you get a much bigger dose of medicine than an ordinary inhaler. Some people also find them easier to use, because all you need to do is breathe through the mask.

How can they help?

If you take an anticholinergic drug with a short-acting beta-2 agonist:

- You may have fewer COPD attacks (when your symptoms get suddenly worse) than if you just take a short-acting beta-2 agonist [22]
- Your lungs may work slightly better [61]
- But there's very little information about whether your symptoms will improve. You might not feel any less tired or find breathing any easier. [61]

It's not clear whether the two drugs together are better than an anticholinergic drug on its own. [22]

If you take an anticholinergic drug with a long-acting beta-2 agonist (such as formoterol):

- Your lung function test results may be better than if you take either drug alone. [61] [62] [63]

How do they work?

Anticholinergic drugs and beta-2 agonists both relax muscles to help open up your airways, but they work in different ways. That means that taking the two drugs together should help more than taking either drug on its own.

Can they be harmful?

There's no evidence to suggest that the side effects of anticholinergic and beta-2 agonist drugs are more common when they are taken together than when they are taken on their own.

Anticholinergic drugs

Dry mouth is a common side effect of anticholinergic drugs. It affects about 1 in 10 people who take these drugs. [39] But most people don't find it such a big problem that they stop taking the medicine.

A recent study found that people with COPD taking either ipatropium or tiotropium were more likely to have a heart attack or stroke, or to die from heart or circulation problems, compared with people with COPD who are not taking these drugs. [40]

These are the figures from the study: [40]

- About 18 in 1,000 people taking ipatripium or tiotropium had a heart attack or stroke, or died from heart and circulation problems. People had been taking the drugs for up to five years
- About 12 in 1,000 people not taking these drugs had a heart attack or stroke, or died from heart and circulation problems.

The risks were slightly bigger for ipatropium than tiotropium.

It’s alarming to think about an increased risk of heart attack or stroke. But the increase in risk seems to be quite small, amounting to around six extra people having these problems out of every 1,000 who take ipatropium or tiotropium. Your doctor will be able to help you weigh up the risks and benefits of your treatment.

Beta-2 agonists

Although long-acting beta-2 agonists aim to improve your breathing, for some people these drugs might actually increase the risk of serious breathing problems. In a study that looked at 2,404 people: [17]

- About 2 in 100 people taking a long-acting beta-2 agonist died because of breathing problems

- Only 1 in 100 people taking a dummy treatment (a placebo) died of breathing problems.

People with asthma who take long-acting beta-2 agonists can sometimes get more severe asthma attacks. [25] Make sure you tell your doctor if you have asthma as well as COPD.

The most common side effect that people get when they take beta-2-agonists (either long-acting or short-acting) is that their hands shake. It's most likely to happen in the first few days after you start on this medicine. For some people, the shaking is so strong that they can't do things like hold onto a glass.

If you're taking any type of beta-2 agonist (either long-acting or short-acting), you may notice that your heart beats faster or in an abnormal way, especially if you already have a heart problem and you take high doses. [26] [27] [28] If you use one of these drugs for a long time, you may be at increased risk of other heart problems such as a heart attack, an abnormal heartbeat, or heart failure. [26]

If you are taking a beta-2 agonist, you should try to avoid taking a beta-blocker, which is a kind of drug used to lower blood pressure and correct an uneven heartbeat. This kind of drug blocks the good effects of beta-2 agonists.

How good is the research on combining a beta-2 agonist with an anticholinergic drug?

Two reviews of the research looked at short-term treatment with a short-acting anticholinergic drug, and a short-acting beta-2 agonist.

One review found that both drugs together weren't any better than the anticholinergic drug on its own. [22] However, the second review found that people's lungs might work slightly better if they took two drugs together. [61] Even so, people didn't feel any less tired or find breathing any easier.

Another review compared a short-acting anticholinergic drug with a long-acting beta-2 agonist.

Again, people's lungs worked slightly better if they took two drugs rather than one, but there wasn't a big difference in their everyday symptoms. [61]

A third review of research (a systematic review) compared a long-acting beta-2 agonist in addition to tiotropium with either tiotropium or a long-acting beta-2 agonist on its own. [64] The review found that people who took both drugs felt better than people who only took tiotropium. However, there were some problems with the studies that had these results, and the improvement was very small, so it is hard to say whether this combination of treatment is better than the single treatment with tiotropium. [64]

A further study (a randomised controlled trial) looked at the long-acting beta-2 agonist (indacaterol) given at the same time as tiotropium, compared with tiotropium treatment

on its own. [65] The study included over 2,000 people with moderate to severe chronic obstructive pulmonary disease. It found that the lungs of people who took both drugs worked better than the lungs of people who took tiotropium on its own. [65]

Combining a steroid with a beta-2 agonist

In this section

This information is for people who have chronic obstructive pulmonary disease (COPD). It tells you about combining steroids with a drug called a beta-2 agonist. This information is based on the best and most up-to-date research.

Does it work?

Yes. Using a steroid together with a long-acting beta-2 agonist will help you if you have moderate or severe chronic obstructive pulmonary disease (COPD).

You should be able to breathe and feel better, and your lungs should work better. You may also have fewer bad attacks (when your symptoms get worse).

What are they?

Long-acting beta-2 agonists

These are drugs that you breathe in through an inhaler. They relax the muscles in your lungs so that your airways can open up. This should help you breathe more easily. They take about 15 minutes to 30 minutes to start working but go on working for up to 12 hours. Examples (with brand names) include:

- Formoterol (Foradil)
- Salmeterol (Serevent).

Steroids

Steroids reduce inflammation in your airways so that you can breathe more easily.

The steroids used for COPD aren't the same drugs that some athletes and bodybuilders use. Those are called anabolic steroids. The steroids used to treat COPD are called corticosteroids. They are like chemicals your body makes to fight inflammation.

There are several different kinds of steroid inhaler. We've listed some of these below (with their brand names):

- beclometasone (QVAR)

- budesonide (Pulmicort)
- fluticasone (Flixotide)

Combination inhalers

You can take a long-acting beta-2 agonist and an inhaled steroid from two separate inhalers. Or you can take them in a single inhaler. There are two kinds of combined treatment:

- formoterol plus budesonide (Symbicort)
- salmeterol plus fluticasone (Seretide).

Inhalers and nebulisers

The metered-dose inhaler (MDI) is the most common kind. It's a small plastic holder with a slot where you put an aerosol canister. Pressing on the canister releases exactly one dose of the medicine. It comes out as a puff of tiny droplets that you slowly breathe in through your mouth.

There are also other kinds of inhaler that some people find easier to use. These include breath-activated inhalers, which release the drug as you breathe in, and dry powder devices.

Most inhalers now are CFC-free. CFCs are chemicals that used to be widely used in aerosols. CFC-free inhalers work just the same as older models but are less harmful to the environment. You might notice that your medicine tastes slightly different.

If you have more severe COPD, you can also take steroids through a compressed-air sprayer called a nebuliser. It turns the medicine into a mist that you can breathe in through a mask.

Nebulisers are bulky, but they let you get a much bigger dose of medicine than an ordinary inhaler. Some people also find them easier to use, because all you need to do is breathe through the mask.

How can they help?

If you take both a long-acting beta-2 agonist and a steroid: [66]

- You may be able to breathe better
- Your lungs may work better
- Your quality of life may be better
- You may have fewer attacks of COPD.

Taking the two drugs together may work better than taking just one of the drugs on its own. [66] [67]

People may also live slightly longer if they use both drugs rather than just an inhaled steroid. [66] However, researchers have not found that taking both drugs helps people live longer than taking just a long-acting beta-2 agonist. [67]

How do they work?

Long-acting beta-2 agonists relax the muscles in your lungs, and that lets your airways open up more. They may also help to clear away mucus in your airways. They seem to speed up the sweeping movement of the tiny hairs in the airways so that they move the blockage better.

Steroid inhalers reduce the inflammation in your airways so that they can open up properly. This should make it easier for you to breathe.

Taking both long-acting beta-2 agonists and inhaled steroids together appears to boost the effects of each treatment on your lungs, so you are likely to get more benefit than using just one treatment on its own.

Can they be harmful?

You're more likely to get a yeast infection in your mouth if your treatment includes a steroid inhaler. [66] And you may be more likely to get pneumonia if you use a steroid with a long-acting beta-2 agonist. [67]

Overall, people taking long-acting beta-2 agonists and steroids together don't seem to get more side effects than people taking one drug on its own.

Long-acting beta-2 agonists

Although long-acting beta-2 agonists aim to improve your breathing, for some people these drugs might actually increase the risk of serious breathing problems. In a study that looked at 2,404 people: [17]

- About 2 in 100 people taking a long-acting beta-2 agonist died because of breathing problems
- Only 1 in 100 people taking a dummy treatment (a placebo) died of breathing problems.

People with asthma who take long-acting beta-2 agonists can sometimes get more severe asthma attacks. [25] Make sure you tell your doctor if you have asthma as well as COPD.

You may find that your hands tremble if you take these medicines. This is the most common side effect, especially in the first few days of treatment. For some people, this is a big enough problem that they can't do things like hold on to a glass properly.

If you're taking a beta-2 agonist, you may notice that your heart beats faster or in an abnormal way, especially if you already have a heart problem and you take high doses. [26] [27] [28] If you use one of these drugs for a long time, you may be at increased risk of other heart problems, such as a heart attack, an abnormal heartbeat, or heart failure. [26]

If you're using this type of inhaler, you should try to avoid taking a beta-blocker. Beta-blockers are commonly used to treat high blood pressure and correct abnormal heart rhythms. This kind of drug may block the good effects of the beta-2 agonist.

Inhaled steroids

You may get bruising on your skin and a yeast infection in your mouth (called thrush) if you use inhaled steroids. [49] In one study, 1 in 10 people got a yeast infection. [54]

There's also a chance that your bones will become weaker and break more easily, especially if you take these drugs for a long time. [22]

Generally, inhaled steroids have fewer side effects than steroids you take as tablets, because less of the drug gets into your bloodstream if you breathe it in. Still, they can cause problems if you take them for a long time and at high doses. Other side effects that have been reported with inhaled steroids include problems with sight and cataracts .

How good is the research on combining a steroid with a beta-2 agonist?

We found five systematic reviews with several thousand people who had moderate to severe chronic obstructive pulmonary disease (COPD). [66] [68] [69] [70] [67]

Overall, people had fewer attacks of COPD when taking both an inhaled steroid and a long-acting beta-2 agonist, compared with taking just one of these drugs or a dummy treatment (a placebo). [66] [67] Their lungs also worked better if they took both drugs, and their quality of life was better.

Taking both drugs may also help people live longer than taking just an inhaled steroid or a placebo. However, researchers found no difference in how long people lived whether they took both drugs or just a long-acting beta-2 agonist. [66]

Oxygen

In this section

This information is for people who have chronic obstructive pulmonary disease (COPD). It tells you about breathing in extra oxygen, a treatment used for COPD. It is based on the best and most up-to-date research.

Does it work?

Probably. If you have chronic obstructive pulmonary disease (COPD) that is very bad, you may not have enough oxygen in your blood. Breathing in extra oxygen for as many hours a day as possible may help you live longer. But you have to keep doing this for a long time (a few years) for it to help you.

If your COPD isn't bad, breathing in extra oxygen won't help you.

What is it?

Breathing extra oxygen into your lungs helps get more of it into your bloodstream. If you don't have enough oxygen in your blood, your heart and other parts of your body can't work properly. If oxygen levels get very low, you can die.

People who need this kind of treatment are people who have had COPD for a long time, whose COPD is quite bad, and who don't have enough oxygen in their blood.

You can breathe oxygen through a face mask or through tubes that go into your nose (called a nasal cannula). You can get oxygen in the following forms and containers.

- A cylinder containing compressed oxygen: This can be delivered to your home.
- An oxygen concentrator: This is a machine that pulls oxygen out of the ordinary air in your home and concentrates it for you to breathe.
- A container of liquid oxygen: When you go out, this type of container is easier to use than a cylinder of oxygen in gas form.

You may also be treated with oxygen if your symptoms get bad suddenly (you have an attack). For more, see Using extra oxygen during an attack .

How can it help?

Getting extra oxygen into your lungs and bloodstream can help in different ways:

- If the amount of oxygen in your blood is low, breathing in extra oxygen at home may help you live longer [72]
- Getting extra oxygen may help you feel better, be more alert, and have a better appetite [72]
- To get the most benefit, you will need to breathe oxygen from a cylinder or concentrator both day and night. [73]

Extra oxygen won't help if you don't have low levels of oxygen in your blood. [74] People who aren't breathless while resting do not benefit from extra oxygen. [75]

How does it work?

Normally, the level of oxygen in your lungs is higher than the level in your blood. This means oxygen gets pushed through the tiny blood vessels in the air sacs (alveoli) in your lungs and into your blood.

If you have severe COPD, the level of oxygen in your lungs may get so low that not enough oxygen is pushed into your blood.

Breathing in extra oxygen means more gets pushed into your bloodstream.

With a better supply of oxygen going to your heart, lungs, and other organs, your body should work better. That should help you to live longer.

Can it be harmful?

No, but your doctor needs to show you how to use it properly. However, you must be careful not to smoke near an oxygen container, or while you are using an oxygen concentrator, because there is a risk of fire and explosions. [76]

How good is the research on oxygen?

There is some evidence that breathing in oxygen helps some people with chronic obstructive pulmonary disease (COPD) to live longer.

The most important evidence about how oxygen therapy can help comes from two studies that were done in the 1980s.

In the first study, 203 people took part. [73] They all had severe COPD and low oxygen levels in their blood. They all breathed in extra oxygen every day.

- After two years, 22 percent of the people who had breathed in oxygen for 19 hours or more every day had died.
- In comparison, 41 percent of those who had used oxygen only at night (for less than 13 hours) had died.

The second study also looked at the effects of extra oxygen for people with severe COPD and low levels of oxygen in their blood. [72]

- After five years, 19 out of 42 people (45 percent) who breathed in oxygen for at least 15 hours a day had died.
- In comparison, 30 out of 45 people (66 percent) who had not received extra oxygen had died.

Theophylline

In this section

This information is for people who have chronic obstructive pulmonary disease (COPD). It tells you about theophylline, a treatment used for COPD. It is based on the best and most up-to-date research.

Does it work?

Yes and no. Some people with chronic obstructive pulmonary disease (COPD) find that theophylline helps their breathing, but others don't. The drug has some bad side effects, and you may not want to put up with them to get just a small improvement in your breathing.

What is it?

Theophylline is a drug that helps your airways open up so you can breathe more easily. It's known as a long-acting bronchodilator because it works for a long time, and it opens (dilates) the airways (bronchial tubes). It seems to work by relaxing the muscles in your airways. Theophylline starts working very slowly, so it should not be used for quick relief.

You can take theophylline as a pill or as syrup. It can also be injected. Brand names include:

- Nuelin SA
- Slo-Phyllin
- Uniphyllin Continus

The National Institute for Health and Care Excellence (NICE) is the organisation that decides which treatments should be available on the NHS. NICE advises that you should take theophylline only if other bronchodilators don't help you, or if you can't use an inhaler. [12]

How can it help?

Taking theophylline for a short time (a week to three months) might help your lungs work better. [77] [78] But the improvement might not be big enough to affect your life very much. For example, you might not be able to walk any further without resting than you did before.

If you take theophylline for a long time (say a year), you may get fewer attacks of COPD symptoms. [79] One study found that people taking theophylline got symptoms for around four or five days a year. This compared with 12 or 13 days of symptoms for people taking a dummy treatment (a placebo).

How does it work?

The main job of theophylline is to help keep the air passages in the lungs open, making it easier for air to get into your lungs. Experts are not sure exactly how theophylline works. It seems to keep the muscles relaxed.

Theophylline also seems to help calm down irritation in the airways and stop them getting inflamed. But it isn't as good at doing this as other drugs.

Can it be harmful?

Some of the side effects you can get from this drug are queasiness, diarrhoea , and headaches. Theophylline can also make you irritable and can cause seizures and abnormal heart rhythms. [80]

There isn't much difference between the dose of theophylline that might help you breathe better and the dose that might cause side effects. This is the main problem with this drug.

Elderly people are especially at risk of side effects. [80] That's because an older person's liver doesn't get rid of theophylline as well as a younger person's liver does. The amount of theophylline can build up to a dangerous level and cause serious side effects.

To reduce side effects, your doctor will need to adjust your dose of theophylline very carefully. This usually means having blood tests to see how much of the drug is in your body.

How good is the research on theophylline?

There is good evidence that if you have chronic obstructive pulmonary disease (COPD), theophylline might help your lungs work better. [81] But the improvement may be so small that you won't be able to tell if this drug helps you do more or feel better. Plus, theophylline can cause a lot of side effects that can actually make you feel worse.

We found one summary of the research (a systematic review) on taking theophylline for a short time (up to three months). [81] The summary looked at 22 small studies.

When researchers looked at all the results of these studies, they found that people who took theophylline did better on lung tests than people who took a dummy treatment (a placebo). But people's symptoms didn't improve. For example, people who took theophylline couldn't walk any farther than people who took the placebo.

If you take theophylline in the long term, you may get fewer attacks of COPD symptoms. [79] The attacks you do get are also likely to be shorter. But, again, you'll need to weigh these advantages against the side effects.

Alpha-1 antitrypsin

In this section

This information is for people who have chronic obstructive pulmonary disease (COPD). It tells you about alpha-1 antitrypsin, a treatment used for COPD. It is based on the best and most up-to-date research.

Does it work?

We don't know. Some people get chronic obstructive pulmonary disease (COPD) because they are missing a chemical in their body called alpha-1 antitrypsin. But there isn't any evidence that giving this chemical to people with COPD is helpful.

At the moment in the UK, this treatment is not recommended for people with COPD.

What is it?

Alpha-1 antitrypsin is a chemical that your body makes to repair your lungs. Some people don't make enough of this chemical because of the genes they've inherited from their parents.

Your doctor can do a blood test to see how much alpha-1 antitrypsin your body is making. If the test shows that your levels are low, or that you don't have any alpha-1 antitrypsin, your doctor may suggest you try this treatment.

When you are given a dose of alpha-1 antitrypsin, the medication is dissolved in a lot of fluid, so it has to go into your vein slowly. This is done using a drip (also called an intravenous infusion, or IV). Your doctor will tell you how often you should have an infusion. It may be once every one, two, or four weeks.

How can it help?

We're not certain that it can help, whether you have a low amount of alpha-1 antitrypsin to begin with or not. There hasn't been enough research to tell us.

How does it work?

Alpha-1 antitrypsin is a chemical made by your liver. Your blood carries it to your lungs, and it helps to repair any problems there. If you have too little alpha-1 antitrypsin (or

none at all), a protein called elastase gets out of control. It punches holes in the tiny air sacs in your lungs (your alveoli). That can lead to emphysema, which is a type of COPD.

Having too little alpha-1 antitrypsin is a problem you inherit from your parents. It isn't something you can catch, or that is caused by something else.

If you have regular infusions of alpha-1 antitrypsin, in theory it could help prevent further damage to the air sacs in your lungs. It won't repair damage that has already been done, but it might stop it getting worse.

If you have emphysema but you have the normal amount of alpha-1 antitrypsin, infusions of the chemical probably won't help you.

Can it be harmful?

In one small study, no one got any side effects. [82] It's hard to be sure how safe this treatment is without bigger trials.

How good is the research on alpha-1 antitrypsin infusion?

There is very little research on the effects of alpha-1 antitrypsin in people with chronic obstructive pulmonary disease (COPD).

We found only one good study (called a randomised controlled trial). There were 56 people in the study. They all had low levels or a lack of alpha-1 antitrypsin and they all had moderately bad emphysema (a type of COPD). [82]

Half of the people were given infusions of alpha-1 antitrypsin and half were given a dummy treatment (a placebo). (An infusion slowly delivers medication or fluid into a vein.) Everyone who was getting alpha-1 antitrypsin was given an infusion about once a month for at least three years.

- CT scans showed that people treated with alpha-1 antitrypsin lost less lung tissue during the study than people who were given the placebo.
- But there were big variations among those who got the alpha-1 antitrypsin, so it wasn't possible to say that the treatment was stopping lung damage.
- Also, the treatment was given only once a month, not once a week as recommended by some specialists. So it may not have been given often enough.
- Most importantly, the results of spirometry tests showed that the treatment had no effect on how well the lungs were working.

Antibiotics

In this section
Do they work?

This information is for people who have chronic obstructive pulmonary disease (COPD). It tells you about antibiotics, a treatment used for COPD. It is based on the best and most up-to-date research.

Do they work?

If you have chronic obstructive pulmonary disease (COPD) and have signs of a lung infection, your doctor will probably prescribe antibiotics. However, we're not certain whether taking antibiotics every day will prevent lung infections.

What are they?

Antibiotics are drugs that attack bacteria. Bacteria can cause infections in many parts of the body, including the lungs. Types of antibiotics include amoxicillin, erythromycin, and tetracycline.

People with COPD sometimes get lung infections. An infection could make your symptoms worse. If you're coughing up mucus with pus in it, or if you have signs of an infection like pneumonia, your doctor will probably prescribe antibiotics.

Researchers have also looked at whether it's worthwhile taking antibiotics every day if you have COPD, to prevent lung infections.

How can they help?

We know that antibiotics help to get rid of infections. [83] We don't know whether taking them regularly will prevent lung infections for people with COPD. Most of the studies on this are more than 30 years old and looked at antibiotics that aren't in use any more. [83] [84] So we don't know if the results are relevant to people who have COPD now.

The National Institute for Health and Care Excellence (NICE) is the organisation that decides which treatments should be available on the NHS. NICE only recommends antibiotics for COPD when there are signs of an infection. [12] This might mean you are coughing up infected-looking mucus, your doctor spots signs of pneumonia, or an x-ray shows signs of a lung infection. NICE says there hasn't been enough research to recommend using regular antibiotics to prevent infections.

How do they work?

Lung infections can cause COPD attacks (where your symptoms suddenly get worse). Antibiotics kill the bacteria that cause many lung infections.

Doctors hope that if people with COPD take antibiotics regularly, it might help protect them against infections and lower their risk of having attacks. But there isn't enough research to know whether this works or not.

Can they be harmful?

Side effects of antibiotics include stomach upsets, queasiness, fever, diarrhoea, and skin rashes.

Also, when people take antibiotics too often, or for too long, bacteria can become resistant to the drugs. Then, when you have an infection and need the antibiotics to kill the bacteria, the drugs don't work anymore.

How good is the research on antibiotics to prevent infections?

There hasn't been much recent research on the effects of antibiotics in chronic obstructive pulmonary disease (COPD).

A summary (called a systematic review) of nine studies found that taking antibiotics for three months to five years did reduce the risk of having an attack. [84] Antibiotics also reduced the number of days people were badly affected by their COPD by 22 percent.

Although the review is quite recent, all the studies it looked at are more than 30 years old. The bacteria that cause infections today are likely to be quite different from those of 30 years ago. This means they probably respond differently to the antibiotics used in the studies compared with the antibiotics used now. So the results of the summary don't mean much for people who have COPD now.

A second summary of 16 studies looked at whether antibiotics helped people with COPD who were having an attack. [83] The studies included over 2,000 people with COPD. Overall, taking antibiotics helped people who were very ill in hospital with a COPD attack. But antibiotics didn't help other people with COPD. Most of the studies were very old and looked at antibiotics that doctors don't use anymore.

Drugs that break up mucus

In this section

This information is for people who have chronic obstructive pulmonary disease (COPD). It tells you about drugs to break up the mucus in your lungs, a treatment used for COPD. It is based on the best and most up-to-date research.

Do they work?

We're not certain. If you have the type of chronic obstructive pulmonary disease (COPD) called chronic bronchitis, drugs that break up the mucus in your lungs may help. But we need more research to be certain.

What are they?

Medicines that break up mucus are called mucolytic drugs, or mucolytics. They make the mucus in your lungs less sticky, so it's easier to cough out of your airways.

The National Institute for Health and Care Excellence (NICE) is the organisation that decides which treatments should be available on the NHS. NICE recommends that you should be prescribed mucolytic drugs if you have COPD and cough up a lot of mucus. [12]

Mucolytic drugs usually come as tablets that you take two to four times a day. In the UK, most doctors use mucolytics called carbocisteine and mecysteine (brand name Visclair). A new type, called erdosteine (Erdotin), can be used if you have a COPD attack (exacerbation). You take capsules twice a day, for up to 10 days. [85]

How can they help?

If you take a mucolytic drug, you may have slightly fewer attacks than if you don't take this kind of medicine. [86] [87] An attack is when symptoms like breathlessness suddenly get worse.

You can also expect to have about six fewer 'sick days' each year (days off work or days when you can't do much because of your COPD). [86]

How do they work?

Mucolytic drugs make the mucus in your lungs thinner so that it's easier to cough up. If you have less mucus in your lungs, you are less likely to get chest infections that can make you feel sick and out of breath. Infections can also affect how well your lungs work, and cause a drop in how you score on lung function tests. See Spirometry for more information about these tests.

Can they be harmful?

Mucolytic drugs don't seem to cause many side effects. In studies, people were no more likely to get side effects from a mucolytic drug than from a dummy treatment (a placebo). [88]

How good is the research on drugs that break up mucus?

We found two reviews of the research (called systematic reviews) that looked at the results of several good studies (called randomised controlled trials). [86] [87] The two reviews included many of the same studies.

The larger and more recent review looked at more than 7,000 people. [86] However, some of these people probably had other lung problems, and not chronic obstructive pulmonary disease, which makes it difficult to rely on the results.

The studies showed that people who took drugs that break up mucus (mucolytics) had slightly fewer attacks (where symptoms suddenly got worse) than people who took a dummy treatment (a placebo).

People taking the drugs also had fewer 'sick days', when they couldn't go to work or take part in their usual activities. They averaged about half a day less sick time a month (about six fewer days a year) than people taking the placebo.

Corticosteroid tablets

In this section

This information is for people who have chronic obstructive pulmonary disease (COPD). It tells you about steroid tablets, a treatment used for COPD. It is based on the best and most up-to-date research.

Do they work?

Steroids may help if you have an attack of COPD (your symptoms suddenly get worse). But there isn't much of a benefit if you carry on taking them regularly. Taking steroid tablets regularly can also cause some serious side effects.

If you use a steroid inhaler, you're less likely to get side effects. If you need to take steroids regularly, your doctor will probably prescribe inhaled steroids rather than tablets.

What are they?

Steroids are medicines that help fight inflammation. They calm down and prevent swelling in the airways of people with COPD. You can get them as tablets, or breathe them in through an inhaler.

The steroids used for COPD aren't the same drugs that some athletes and bodybuilders use. Those are called anabolic steroids. The steroids used to treat COPD are called corticosteroids. They are like chemicals your body makes to fight inflammation.

Prednisolone is a steroid tablet that's often used in the UK.

Doctors usually prescribe steroid tablets only if your symptoms, like breathlessness, suddenly get a lot worse.

The National Institute for Health and Care Excellence (NICE) is the organisation that decides which treatments should be available on the NHS. NICE recommends that doctors prescribe a short course of steroid tablets if you need hospital treatment for your COPD, or if you suddenly become much more breathless than usual. [12]

How can they help?

If you take steroid tablets for two to four weeks when your COPD is stable (you aren't having attacks), it can help your lungs work slightly better. [89] It might help you walk farther without getting breathless, and it might improve your other symptoms.

But there's no evidence from the research that taking steroid tablets will make a difference to your COPD in the long term.

How do they work?

Steroids may help because they reduce inflammation in your airways. This should make it easier for you to breathe.

Can they be harmful?

Yes. Steroids can cause serious side effects, so doctors usually prescribe them at the lowest dose possible, and for the shortest time possible. [58] Your doctor should explain the benefits and risks of your treatment before you start taking it. If you get any worrying symptoms while you're taking steroids, see your doctor straight away.

If you take steroid tablets for a long time, your bones may become weaker and more likely to break. This condition is called osteoporosis.

Taking steroid tablets for a long time can also cause a disease called diabetes. If you have diabetes, your body can't control the amount of sugar in your bloodstream. [90]

Other problems that can happen if you take steroid tablets for a long time are:

- Stomach ulcers
- Obesity
- Increased body hair
- Eye problems, such as cataracts or glaucoma
- Problems with your adrenal glands. Your adrenal glands make hormones, including adrenaline
- A weaker immune system. This can mean you're at risk of illnesses such as chickenpox.

About 1 in 20 people find that steroid tablets affect their mood. [91] This can happen a few days or weeks after you start treatment. You may be irritable, anxious, confused, or have trouble sleeping. Or you can get an unusually high mood (euphoria). Some people get more serious side effects, such as thinking about suicide or seeing things that aren't really there. It's also possible to get these side effects when you stop taking steroids.

Taking steroids for a long time can stop your body making as many of its own steroids. [58] Don't stop taking your treatment suddenly. Your doctor will want to check on you as you stop taking this treatment.

Steroid tablets are usually recommended if your COPD suddenly gets worse. If you need to take a steroid regularly, your doctor will probably recommend an inhaler. Inhalers tend to cause fewer side effects, because the medicine goes straight to your lungs, and less of it gets into your bloodstream.

How good is the research on steroid tablets?

Doctors usually prescribe steroid tablets for a short time when someone's chronic obstructive pulmonary disease (COPD) gets very bad. Research shows that continuing to take steroid tablets regularly doesn't help very much. There's also a risk of side effects. If you need steroids regularly, you'll probably have an inhaler rather than tablets.

We found one systematic review that examined the results from 10 good studies (called randomised controlled trials). [89] In all, about 445 people with stable COPD took part in these studies. For two to four weeks, some of the people were given steroid tablets and some were given dummy tablets (placebos).

The reviewers looked to see if people's lung function got better, mainly by comparing the results of spirometry tests. They defined a good response as one where a person's test results improved by 20 percent.

Overall, they found that about 10 percent more people had this kind of good response when they were taking steroid tablets than when they were taking a placebo. Doctors don't see that as a very big improvement. Also, these drugs can have serious side effects.

There was no information about people's symptoms or how well they felt.

Flu and pneumonia jabs

In this section

This information is for people who have chronic obstructive pulmonary disease (COPD). It looks at flu and pneumonia jabs, which your doctor may recommend to prevent lung infections.

Do they work?

We haven't looked at the research on flu and pneumonia jabs in the same detail we have for the other treatments we cover. (To read more, see Our method.) But we've included some information in case you're interested.

What are they?

Flu jabs

Flu, or influenza, is a common infection. It can make it harder for you to breathe, and make other symptoms of chronic obstructive pulmonary disease (COPD) worse as well. Your doctor may advise you to have an injection to prevent flu.

You need to have a new injection every year. That's because the viruses that cause influenza change from year to year. The jab you had last year may not protect you from this year's virus.

The best time for a flu jab is between late September and early November.

Pneumonia jabs

You can also have an injection to protect you against a type of pneumonia called pneumococcal pneumonia. It's caused by a type of bacteria called pneumococcus. It's the most common form of pneumonia. If you have COPD, your doctor may recommend an injection to protect against pneumococcal pneumonia.

You may only need one dose of the pneumonia vaccine. You won't need a new jab every year. Some people with a weak immune system need a second dose, usually after five years. Ask your doctor if you think this might apply to you.

How can they help?

If you have COPD, catching flu can bring on an attack of symptoms. Having a flu jab each year can help stop you getting flu. Some research shows that having a flu jab can also reduce the number of COPD attacks you get. [92]

The research on pneumonia jabs is mixed.

- Some research shows that the jab can stop people getting pneumonia. [93] But we're not certain whether it works if you have COPD.
- Some studies show that having this injection won't reduce your chances of getting pneumonia if you have COPD, or stop you having attacks and needing to go to hospital. [94] [95]

How do they work?

Vaccines help your immune system fight off infections. They contain dead or weakened viruses or bacteria. Your body learns how to fight the infection. When you come into contact with the infection again, your body already knows how to fight it.

Can they be harmful?

The flu vaccine is made in eggs, so people who are allergic to eggs shouldn't have the vaccine. Talk to your doctor if you aren't sure whether the vaccine is safe for you.

Having a flu jab can't give you flu. The viruses in the vaccine are dead and can't cause you any harm. [96] But the injection may cause a sore arm. Some people have muscle aches or a mild fever after their jab.

The pneumococcal vaccine is also very safe. It can't give you pneumonia or any other illness. Some people get minor side effects, like soreness where the needle goes in. [97]

Nicotine replacement therapy and professional help

In this section

This information is for people who have chronic obstructive pulmonary disease (COPD). It tells you about how nicotine replacement therapy, combined with help from a health professional, can make it easier to give up smoking. Stopping smoking should improve your symptoms of COPD. This information is based on the best and most up-to-date research.

Does it work?

Yes. If you have mild chronic obstructive pulmonary disease (COPD), using nicotine replacement therapy (NRT) and getting help from a doctor, nurse, or trained counsellor can help you stop smoking. It will also reduce the chances that you will start again.

Stopping smoking will slow down the damage to your lungs. This means your breathing will not get worse as quickly as it would if you continued to smoke. And your lungs are likely to work better, for longer.

What is it?

Nicotine replacement therapy

Nicotine replacement therapy (sometimes called NRT) provides a supply of nicotine to your body. Getting some nicotine should should stop you getting cravings or withdrawal symptoms while you stop smoking.

Most people use nicotine replacement for the first three months after stopping smoking, although you can use it for as long as you need to.

Nicotine replacement therapy comes as patches, gum, inhalers, tablets that you put under your tongue, lozenges, and a nasal spray. You can buy products from your chemists or supermarket, but your GP can also prescribe them for you.

It's important not to smoke while you're using nicotine replacement therapy. If you smoke, you might get too much nicotine in your blood. [98] Nicotine is a powerful drug, and getting too much can make you feel light-headed and dizzy, make your pulse race, and make your heart pound.

Doctors agree that it's better to use a nicotine replacement product than to keep on smoking. [99] Almost everyone can use these products. Even if you're pregnant or breastfeeding, nicotine replacement is probably safer than smoking. [100] Even if you've had a heart attack, have angina, or have other heart problems, it's probably safe for you to use nicotine replacement therapy, as long as your heart condition is under control. [101]

However, if you've recently had a heart attack or you have an unusual heart rhythm (a condition called arrhythmia), you should talk to your doctor before trying nicotine replacement therapy.

You may have seen nicotine lollipops and nicotine lip balm for sale on the internet. They haven't been tested to show whether they're safe and actually work. [102]

To find out more about nicotine products, see How to use nicotine replacement therapy products in our section on smoking.

Getting professional help

Getting advice, counselling, and support from a doctor, pharmacist, nurse, or trained counsellor can help you stop smoking.

There are several different types of counselling.

- The NHS offers a smoking helpline, which smokers and their families can call for free, expert advice. It's open from 7 a.m. to 11 p.m. every day. The number is 0800 022 4 332.
- Your doctor might tell you about the benefits of stopping, and give you leaflets with useful advice and phone numbers in them.
- You might be offered a weekly session with someone who has been trained to help people stop smoking (this could be a nurse, pharmacist, psychologist, or counsellor).
- You might have group therapy with a counsellor, where you and other people in the programme talk through problems and share tips on how to cope when you're tempted to smoke.

For more advice on giving up, see Tips to help you give up smoking .

How can it help?

If you use nicotine replacement therapy and have professional help to stop smoking:

- You are less likely to start smoking again, even after many years [103]
- Your lungs are likely to work better for longer [104]
- You may have fewer colds or chest infections and need to see the doctor less often [105]
- You may have fewer breathing problems, and you may cough and wheeze less [106]
- You may live longer if you stop smoking. [107]

How does it work?

If you stop smoking, you'll no longer be putting smoke and poisons into your lungs. This should reduce the damage to your lungs and make it easier to breathe.

Nicotine replacement therapy gives your body some of the nicotine that you used to take in from smoking cigarettes. This should stop you feeling the withdrawal symptoms when you stop. Without any nicotine, you may:

- Feel depressed
- Have trouble sleeping
- Feel more irritable, or more frustrated and angry, than normal
- Feel anxious
- Find it more difficult to concentrate
- Feel restless
- Crave cigarettes.

These feelings are often very bad for the first few days after you stop smoking, but they gradually get better over three or four months. Nicotine replacement therapy helps you get through the first 12 weeks after stopping, when withdrawal is the worst.

Getting advice from a health professional can boost your willpower to stop smoking.

Can it be harmful?

If you stop smoking, you may put on weight. Five years after stopping smoking, men and women with mild COPD put on about 18 pounds more, on average, than those who continue to smoke. [108] But remember that they could breathe more easily, their lungs worked better, and they had fewer chest infections.

Nicotine replacement therapy

You may get some side effects while using nicotine replacement therapy, but they aren't common. [106] This treatment goes on for only about three months, and the side effects stop when the treatment stops.

- If you use nicotine gum, you may get indigestion, hiccups, or mouth problems such as ulcers, or you may feel sick. [105] These problems are less common if you chew slowly. [109]
- If you use a nicotine patch, your skin may get red or itchy where you wore the patch. [106] To avoid getting a rash, put the patch in a different place each day. You can treat mild reactions with hydrocortisone cream (1 percent).
- The nasal spray may give you a runny nose, or irritate your nose and throat. [106]
- If you use nicotine tablets that you put under your tongue, you may get a cough, hiccups, burning and soreness in your mouth, a sore throat, dry lips, or mouth ulcers. [106]

Professional help

Advice about giving up smoking doesn't have any side effects as such. Some people don't like being told by their doctor that they ought to stop smoking. But a study of almost 3,000 people found they were generally glad that their doctor advised them to stop smoking. This was true whether people wanted to stop or not. [110]

How good is the research on nicotine replacement therapy and professional help?

A lot of research has shown that nicotine replacement therapy, with or without professional support, can help people stop smoking. There's less research looking particularly at people with chronic obstructive pulmonary disease (COPD). However, we found one good-quality study (called a randomised controlled trial) of 5,887 smokers with mild COPD. [104]

After five years:

- About 4 in 20 people who used the nicotine gum and had professional support were non-smokers, compared with 1 in 20 of those who had no special help to give up [103]

- The lungs of people who used nicotine gum and had help to give up smoking worked better than those of people who hadn't used the gum or had professional help [104]

- People who used nicotine gum and had professional support to stop smoking had better control of their symptoms than those who were given no special help to give up. The benefits were greatest in people who had stopped smoking the longest. [106]

After around 14 years, death rates were lower in the group who'd used nicotine gum and had professional support. [107]

Bupropion and professional help

In this section

This information is for people who have chronic obstructive pulmonary disease (COPD). It tells you about how the drug bupropion, combined with help from a health professional, can make it easier to give up smoking. Stopping smoking should improve your symptoms of COPD. This information is based on the best and most up-to-date research.

Does it work?

Yes. If you have mild to moderate chronic obstructive pulmonary disease (COPD), taking bupropion and getting help from a doctor, nurse, or counsellor will help you to stop smoking. It's likely that your breathing will improve when you give up, although the research on bupropion hasn't looked at this particularly.

What is it?

Bupropion

Bupropion was first used to treat depression. But doctors soon noticed that many of their patients who smoked gave up cigarettes while they were taking this drug. After this, bupropion was used to help people stop smoking. It's available only with a prescription from your GP. The brand name for the kind of bupropion that's used to help people stop smoking is Zyban.

You start taking bupropion for one or two weeks before you plan to stop smoking. [109]

If you're pregnant or breastfeeding, you shouldn't take bupropion. If you get pregnant while you're taking bupropion, you need to tell your GP.

Bupropion isn't usually given to smokers under the age of 18 years because it's not licensed for use by young people. [109]

Getting professional help

Getting advice, counselling, and support from a doctor, pharmacist, nurse, or trained counsellor can help you stop smoking.

There are several different types of counselling.

- The NHS offers a smoking helpline, which smokers and their families can call for free, expert advice. It's open from 7 a.m. to 11 p.m. every day. The number is 0800 022 4 332.
- Your doctor might tell you about the benefits of stopping, and give you leaflets with useful advice and phone numbers in them.
- You might be offered a weekly session with someone who has been trained to help people stop smoking (this could be a nurse, pharmacist, psychologist, or counsellor).
- You might have group therapy with a counsellor, where you and other people in the programme talk through problems and share tips on how to cope when you're tempted to smoke.

For more advice on giving up, see Tips to help you give up smoking .

How can it help?

Bupropion makes it easier to give up smoking. One study looked at how people with mild or moderate COPD were doing six months after trying to stop. Around 16 in 100 people who'd taken bupropion and had professional help were still not smoking. [111] This compared with 9 in 100 people who took a dummy pill (a placebo) and had counselling.

How does it work?

We don't know how bupropion helps people stop smoking. We do know that it increases the amounts of two chemicals that carry messages between brain cells (neurotransmitters). When people are depressed, bupropion helps them by increasing the levels of these chemicals.

Getting advice from a health professional can boost your willpower to stop smoking.

Can it be harmful?

If you stop smoking, you may put on weight. Five years after giving up smoking, men and women with mild COPD put on about 8 kilograms (18 pounds) more than those who

continued to smoke. [108] But remember that those who stop smoking can breathe more easily, have fewer chest infections, and have improvements in how their lungs work.

Bupropion

You may get headaches, feel sick, or get a dry mouth while you take bupropion. [112] You may also have trouble sleeping. But these effects should go away as soon as you stop taking the drug.

One risk with bupropion is that it might cause seizures (fits). The higher the dose, the higher the risk. [113]

The chances of a seizure may be higher for people with epilepsy and for people with some illnesses (like eating disorders and alcoholism). People taking other drugs, especially antipsychotic and antidepressant drugs, or glucose-lowering drugs for diabetes, may be more likely to have seizures. There is also concern that bupropion may have caused the deaths of some people.

For more, see Bupropion: more about side effects .

Professional help

Advice about giving up smoking doesn't have any side effects as such. Some people don't like being told by their GP that they ought to stop smoking. But a study of almost 3,000 people found that they were generally glad that their doctor advised them to stop smoking. This was true whether people wanted to stop or not. [110]

How good is the research on bupropion and professional help?

Several studies have shown that bupropion, with or without professional support, can help people give up smoking. However, there's not much research looking directly at people with chronic obstructive pulmonary disease (COPD).

We found one good study (a randomised controlled trial) that compared bupropion plus counselling with a dummy pill (a placebo) plus counselling. [111] It looked at 404 people with mild or moderate COPD, all of whom smoked.

After 12 weeks, 18 in 100 people who'd taken bupropion had stopped smoking, compared with 10 in 100 people taking the placebo. But the study didn't follow people up in the long term, so we don't know if their breathing improved.

Lung care programmes

This information is for people who have chronic obstructive pulmonary disease (COPD). It tells you about lung care programmes, a treatment for COPD. This information is based on the best and most up-to-date research.

Do they work?

Yes. Taking part in a lung care programme can help you become less breathless and help you do more.

What are they?

Lung care programmes are designed to help your lungs work better. They're usually organised in hospitals. You may hear them called pulmonary rehabilitation programmes.

What's included in the programme may vary from one hospital to another. For example, you may learn about exercises for your lungs, and breathing techniques. [114]

How can they help?

Taking part in a lung care programme can help you by: [115] [116] [117]

- Making you feel less tired
- Making you feel less breathless
- Reducing the pain you get when you breathe
- Improving your mood
- Increasing the time you can do things before you need a rest.

But you might need to keep doing the programme's exercises if you want to carry on getting the benefits.

People who do a lung care programme are less likely to need to go to hospital in future. [118] The chances of getting depression or anxiety are also reduced if you do a lung care programme. [119]

How do they work?

Lung care programmes usually involve exercises that strengthen the muscles in and around your lungs. This should help them work better, so that more oxygen is circulated around your body. This should help you feel better and allow you to do more. You may also find it easier to manage your illness, which can improve your mood.

Can they be harmful?

Lung care programmes don't seem to have any unwanted side effects. [115] [116]

How good is the research on lung care programmes?

There's good evidence that taking part in a lung care programme can help people with chronic obstructive pulmonary disease (COPD). We found two large summaries of the research (called systematic reviews). The summaries looked at about 30 studies altogether.

The first summary found that lung care programmes improved many of the symptoms caused by COPD, such as being tired, being unable to catch your breath, and finding it hard to cope with illness. Lung care programmes also improved how long for, and how well, people could exercise. [116]

The second summary also found that lung care programmes improved symptoms. [115]

One summary looked specifically at the effect of lung care programmes on depression and anxiety. It found they tended to improve people's mood. [119]

A smaller study found people could walk further without resting and got less discomfort from breathing after taking part in a lung care programme. [117]

We are not certain if the benefits from lung care programmes last more than a year if you don't continue with the exercises.

Exercise

In this section

This information is for people who have chronic obstructive pulmonary disease (COPD). It tells you about how exercise can be used as a treatment for COPD. This information is based on the best and most up-to-date research.

Does it work?

Yes. Taking regular exercise can help you get fitter, so that you can do more without getting breathless.

What is it?

Exercising regularly means being active for a certain amount of time, a few times a week. You don't have to exercise hard, and you can start slowly. Any form of exercise that uses your body's large muscle groups can be helpful. This includes swimming, walking, and cycling. [114] [120]

A growing number of hospitals run programmes to show you how to exercise safely and encourage you to keep going.

These programmes may include physiotherapy to get rid of the mucus in your lungs and help you breathe more easily. They may also include counselling to help you cope with your illness.

How can it help?

Taking regular exercise like swimming can help you feel less breathless, improve how you feel about your life, and reduce any pain you have when you breathe. [114] [120]

How does it work?

Exercising helps to improve how well your heart and lungs work, which might improve your health and how you feel.

Can it be harmful?

The research doesn't talk about side effects. Sprains, strains, and injuries are the most likely downsides of exercising.

How good is the research on exercise?

We found one summary of the research (called a systematic review). [114] It looked at the results of five good studies (called randomised control trials, or RCTs).

- Three of the studies found that exercise, such as cycling, walking, or swimming, helped people be active for a longer period of time. But one study found that exercise made no difference.
- One of the studies found that exercise helped to improve people's quality of life. But another study reported that there was no difference.
- One of the studies found that exercise helped improve people's ability to catch their breath. But an additional study found no difference.

Muscle training

In this section

This information is for people who have chronic obstructive pulmonary disease (COPD). It tells you about how muscle training can be used as a treatment for COPD. This information is based on the best and most up-to-date research.

Does it work?

Yes. Doing exercises to strengthen the muscles around your lungs and in your arms and legs can help reduce some of the symptoms of chronic obstructive pulmonary disease (COPD).

What is it?

There are two main types of muscle training for people with COPD:

- Exercises that focus on improving the strength of the muscles around the lungs and rib cage. This is called inspiratory muscle training
- Exercises that focus on strengthening the muscles in the arms and legs, like knee extensions and weight training. This is called peripheral muscle training.

You might be given advice about these types of exercises in a rehabilitation programme for people with COPD. These are often run by hospitals.

How can it help?

Exercises that work on the muscles around your lungs help you feel less breathless so that you can keep doing things for longer. [121] [122] For example, you may be able to walk further. [123] [124]

Strengthening the muscles in your arms and legs can also help you exercise or do general activities for longer. [125]

How does it work?

The muscles of the legs and arms in people with COPD are often weak and wasted. Muscle training can improve the strength of these muscles, which can help you feel fitter.

If the muscles around the lungs are stronger, your lungs might work better, which can reduce symptoms of COPD.

Can it be harmful?

The research doesn't talk about side effects. Sprains, strains, and injuries are the most likely downsides of muscle training.

How good is the research on muscle training?

There's good evidence for muscle training. We found three reviews of the research that looked at several studies on lung exercises. [121] [123] [126] Muscle training reduced breathlessness, improved muscle strength, and increased the length of time people could exercise for. People with the weakest muscles benefited the most.

We found another systematic review that looked at eight studies in limb exercises. [122] This showed that muscle training can strengthen the limb muscles. A second review looked at 18 studies on using weights and other types of resistance training to strengthen muscles. It found that people who did these exercises were stronger and better able to do some everyday tasks, such as walk up stairs. [125]

Nutritional supplements

In this section

This information is for people who have chronic obstructive pulmonary disease (COPD). It looks at whether nutritional supplements can help keep your weight up if you have COPD. This information is based on the best and most up-to-date research.

Do they work?

Probably not. There's no good research showing that vitamin and mineral supplements help you stay at a healthy weight if you have chronic obstructive pulmonary disease (COPD).

What are they?

If you have COPD, you may find it hard to keep your weight up. There are at least three reasons for this: [12]

- You may find it hard to eat enough because you are so breathless
- You may not absorb enough nutrients from your food
- You may use up more energy (calories) than usual to breathe.

You can find out if you weigh enough by measuring your body mass index (BMI). Your BMI is a single number that's worked out from your height and weight. You can work out your own BMI .

This table shows what the different BMI scores mean.

BMI	What it means
Less than 18.5	Underweight
18.5 to 24.9	Healthy weight
25 to 29.9	Overweight
30 or greater	Obese

If you need to keep your weight up, you can try nutritional supplements. These are foods and liquids that contain protein, vitamins, minerals, and calories. You take them in addition to your regular meals. The additional calories and protein will help you gain muscle mass and weight.

The National Institute for Health and Care Excellence (NICE), the government body that advises doctors about NHS treatments, says that doctors should check the weight of people with COPD. [12]

- If your BMI is low or high, or is changing, your doctor should refer you to a dietitian for advice about what you can do to improve your weight.
- If your BMI is low, you should be given nutritional supplements to increase your calorie intake.
- Older people with COPD should get special help with their diet if their weight changes by more than 3 kilograms.

How can they help?

We're not certain they can. Some studies have found people who take nutritional supplements gain weight. But we're not certain whether this helps people's symptoms of COPD. [127]

How do they work?

Some people with COPD find it hard to maintain a healthy weight. So doctors thought that nutritional supplements, which can help people put on weight, might help to improve people's health. Unfortunately, this idea hasn't been supported by the research.

Can they be harmful?

The research on supplements doesn't talk about side effects.

How good is the research on nutritional supplements?

We found two research summaries called systematic reviews. [128] [127]

The first summary found that people who took nutritional supplements for two weeks gained no more weight than people who took a dummy treatment (placebo). There was no difference in how well people's lungs worked. [128]

The second summary included 21 studies (called randomised control trials). [127] Some studies found that nutritional supplements helped people put on weight. But the results about lung function were unclear.

Lung transplant operations

In this section

This information is for people who have chronic obstructive pulmonary disease (COPD). It looks at lung transplant surgery, which is sometimes used as a treatment for severe COPD.

Do they work?

We haven't looked at the research on lung transplant surgery in the same detail we have for the other treatments we cover. (To read more, see Our method.) But we've included some information in case you're interested.

What are they?

During a lung transplant operation, surgeons take out one damaged lung and replace it with a healthy lung from a donor. The tissue in the donor lung needs to match the tissue in the person who gets the new lung. It can be hard to find a good match.

Lung transplant operations are only recommended for people with very severe chronic obstructive pulmonary disease (COPD). This kind of surgery might be used to try to help someone who has given up smoking and who might not live more than a few years without this operation.

Can they be harmful?

There are risks with any operation, including this one. For example, you might have breathing problems and bleeding during surgery.

If you have a lung transplant, you will need to take drugs for the rest of your life to keep your body from rejecting the new lung. These drugs are called immunosuppressants. They have serious side effects.

Surgery on the lung

In this section

This information is for people who have chronic obstructive pulmonary disease (COPD). It looks at surgery to remove a damaged section of your lung (lung volume reduction surgery), which is sometimes used as a treatment for severe COPD.

Does it work?

We haven't looked at the research on lung volume reduction surgery in the same detail we have for the other treatments we cover. (To read more, see Our method.) But we've included some information in case you're interested.

What is it?

If you have severe emphysema (a type of COPD), your doctor may suggest that you have an operation to remove some damaged tissue from your lungs. Doctors call it lung volume reduction surgery (LVRS).

During a lung reduction operation, the surgeon carefully removes some of the damaged lung tissue. Removing the damaged tissue gives the healthy parts of your lungs more space to work. This should make it easier to breathe.

People who are very seriously ill, have emphysema in other parts of their lungs, or can still walk a little way are unlikely to benefit from an operation to remove damaged lung tissue. [129]

How can it help?

A round-up of all the research so far found that, if people were suitable for surgery, this treatment helped them live longer, get more out of life, exercise for longer, and breathe more easily. [130]

One study compared lung volume reduction surgery with drug treatments for COPD. [131] It found that surgery helped people exercise for longer. However, in this study, people who had surgery didn't live for longer than people who had drug treatments instead.

How does it work?

To understand how lung volume reduction surgery works, it helps to know what happens if you have emphysema. If you have this condition, air gets trapped inside the sacs at the ends of your airways (the alveoli). When these sacs are healthy, they are stretchy. They get bigger when air flows into them, and smaller when you breathe out. That stretchiness helps the air move in and out of your lungs.

You also have a muscle that helps you breathe. It's called your diaphragm. It goes across the inside of your chest, just below your lungs. It stretches down to let your lungs expand when you breathe in. When you breathe out, it goes up again. This helps squeeze air out of your lungs.

Emphysema damages the tiny air sacs in your lungs so that they can't deflate and let the air get out. As a result, your lungs are permanently full of air. When you try to breathe in, your diaphragm can't stretch any further downwards because your air-filled lungs are already pressing on it. And your diaphragm can't help squeeze the air out because the air that's trapped inside the little sacs makes your lungs stay full. Every breath is a big struggle.

Getting rid of some damaged tissue in your lungs creates more space for your diaphragm to move down. It also gives the healthy lung tissue room to work better. All this should help your breathing.

Can it be harmful?

Lung volume reduction surgery is a serious operation, and some people do not survive it. The more damaged the lungs are, the more likely the person is to die soon after surgery. [132]

During the operation, people may have trouble breathing. There can be other problems too, like bleeding and blood clots. There is also a risk of infection and of heart and breathing problems afterwards.

Further informations:

Why stop smoking?

If you have COPD and smoke, you can slow down the damage it does to your lungs if you stop smoking.

Everybody's lungs naturally work less well as they get older. But if you have COPD and smoke too, the extra damage smoking does will make your lungs get worse faster.

If you stop smoking, your lungs will still get weaker, but not as fast as they would if you kept smoking. [1]

A lot of products are available now that can help you stop smoking.

- Nicotine gums and skin patches replace some of the nicotine you miss when you stop smoking. You can buy some of these products in pharmacies and supermarkets.
- Another treatment that has helped a lot of people is a drug called bupropion (brand name Zyban). You'll need a prescription from your doctor to get this medicine. Bupropion doesn't give you any nicotine, but it cuts down your cravings for it. [2] [3]
- Varenicline (brand name Champix) is a newer drug that aims to help you stop smoking. Research shows that it works, but for some people it might cause severe mood swings as a side effect. [4]

For more about these treatments and how to give up smoking, see our section on smoking .

Chronic bronchitis

Your doctor may say that you have chronic bronchitis if: [6]

- You have a cough that brings up mucus
- The cough lasts for three months or more
- You get this kind of cough (one that that brings up mucus and lasts at least three months) at least twice in two years.

Here's what happens if you have chronic bronchitis: [7]

- The airways in your lungs are swollen and they get irritated easily (they're inflamed)
- Because they're irritated, your airways make extra mucus
- It's harder for you to breathe because the extra mucus clogs up your airways
- All that sticky mucus in your breathing tubes stops the tiny hairs in your airways (the cilia) doing their job. They can't sweep dirt and germs out of your lungs because the mucus stops them moving very well
- Bacteria or viruses from the air you breathe can get trapped in the mucus. That can lead to infections , which can make the bronchitis worse. To find out more, see What are the symptoms of COPD?

The word chronic in chronic bronchitis means that you have had the condition for a long time. This is different from acute bronchitis, which lasts just a few days or weeks.

Acute bronchitis is usually caused by an infection. When the infection clears up, the swelling in your lungs goes down and your breathing improves.

If you have chronic bronchitis, your lungs are always swollen, and there is always too much mucus in your airways.

Emphysema

Emphysema makes it very hard for you to breathe. It causes other kinds of problems too, because it affects the air sacs in your lungs.

There are more than 300 million tiny air sacs in each lung. [7] They are known as alveoli. They're stretchy, like tiny balloons. They get bigger when you breathe in air and then get smaller when you breathe out. The tubes that carry air to the sacs are rubbery and stretchy too.

If you have emphysema:

- The walls of some of the sacs start to fall apart
- When this happens, the airways (tubes) can no longer stay open very well
- The remaining air sacs fill up with air, but they can't empty out
- Air gets trapped in your lungs instead of passing into your blood the way it's supposed to.

After a while, the remaining air sacs start to grow together. Then, what started as a lot of small air sacs turns into one big air sac. This makes it harder for your blood to pick up enough oxygen when it flows through your lungs.

More about the symptoms of COPD

If you have chronic obstructive pulmonary disease (COPD), you may have some of the problems described below.

Cough

Certain things are special about the cough you get when you have COPD. Here are some of them:

- A COPD cough is a deep, rough cough that brings up mucus (also called phlegm or sputum)
- The mucus may be thin or thick, clear or yellow-green
- Your cough is often worse first thing in the morning
- You may cough a little or a lot during the day
- You may cough more when you exercise or smoke a cigarette
- But you probably cough every day, even though you don't have any of the other symptoms of a cold or flu.

Breathlessness

COPD can make you feel breathless, but so can several other lung and heart conditions. If you get out of breath more than you used to, you should find out why. Most people get out of breath if they run up a hill. But if you feel breathless when you go up a few stairs, walk a little way uphill, or run a short distance, you may need tests to find out why.

If you have COPD, you can feel out of breath because:

- Your lungs don't pump air in and out very well
- Your airways may be blocked with mucus, and air may be getting trapped
- There may be less room for new air to get in because your lungs aren't emptying the way they should.

Weight loss

You might notice that you're losing weight if you've had COPD for a long time. [5] If it's hard for you to breathe, you have to use lots of energy just to get air in and out of your lungs. If you use up more energy than you get from the food you're eating, you may lose weight.

Tiredness

Another sign that you've had COPD for a long time is feeling tired a lot. Everything seems like a big effort and you may not feel as if you have the energy for everyday activities, like walking, shopping, or going to work. You feel tired because your body isn't getting enough oxygen from your lungs to work the way it should, or your lungs need to work very hard to get that oxygen in.

Swollen ankles

There are a lot of reasons why people's ankles can swell up, but the basic problem is that blood isn't moving around in the body very well. If you've had COPD for a long time, your heart may be working so hard that it becomes strained. A tired heart doesn't work very well. If your heartbeat isn't very strong, your blood moves along slowly, causing fluid to back up. That can make your ankles swell.

You may have been told you have heart failure.

Broken bones

Your bones may get brittle so that they break easily. One cause of thin bones is taking drugs called steroids over and over again or for a long time. [10] These drugs help treat COPD, but they can also make bones weaker. Not getting enough exercise can make your bones weaker as well. Other reasons why people with COPD get thin bones include smoking and losing weight.

Spirometry

Your doctor will need to test your lungs to find out if you have chronic obstructive pulmonary disease (COPD). To do this, doctors usually use a machine called a spirometer. Some GPs have a spirometer in their surgery. Others will refer you to a chest specialist at your local hospital.

In a spirometry test, you take a big breath and then breathe out into a machine.

When you have this test, you take as big a breath as you can and then blow out, as hard as you can, into a mouthpiece. The machine will print out the results, including two very important measurements: [16]

- The total amount of air you were able to breathe out, which is called forced vital capacity, or FVC
- The amount of air you breathed out during the first second of the test, which is called forced expiratory volume, or FEV1 .

After you do this test once, your doctor will ask you to breathe in a drug called a bronchodilator. This kind of drug can help make your airways wider so you can breathe more easily. Then you do the same test again, to see if your lungs work any better.

Why do it twice?

Having a spirometry test before and after you take a bronchodilator drug helps the doctor tell whether you have COPD or a different lung disease called asthma . This is important because it will affect your treatment.

If you have COPD, there may not be much difference between the test results before and after the bronchodilator. There is likely to be a greater difference if you have asthma.

What do the results tell you?

When you have done the test twice, your doctor will use the results to work out your lung function. The way the doctor does this is by dividing the FEV1 (the measurement of the air you breathed out in the first second of the test) by the FVC (the total amount of air you breathed out). You may see this written out as FEV1/FVC.

You may hear the results given as a percentage. That percentage is a way of comparing the results of your spirometry test with the results for other people of your age, height, and weight. So, for example, your doctor may tell you that 70 percent and above is normal. [9]

How often do you need to have this test?

If you have COPD, you will probably have regular spirometry tests. For example, if you're doing very well, you may have them once or twice a year. If your COPD causes you a lot of trouble, you'll probably have tests more often.

Your doctor will check the results to see how well your lungs are working. Everyone's lung function goes down as they get older. But the lung function of people with COPD usually goes down more quickly.

Blood gases

Usually, doctors test blood gases only if they think you have severe chronic obstructive pulmonary disease (COPD). Your doctor may think you have this because of your symptoms or because of the results of a spirometry test.

For this test a small amount of blood will be taken from an artery. It's important to get the blood from an artery (and not a vein) because the blood in arteries has the most oxygen. The test measures the oxygen and carbon dioxide in the blood sample.

The results tell the doctor:

- Whether enough oxygen is getting into your blood from the air you breathe into your lungs
- Whether enough carbon dioxide is getting out of your body after travelling through your bloodstream and into your lungs.

If you have severe COPD, your lungs are probably badly damaged. Because of this, your blood may not be able to absorb enough oxygen from them. With low levels of oxygen in your blood, you may feel out of breath and tired a lot, and many parts of your body may not be able to work properly.

Using extra oxygen during an attack

If you have chronic obstructive pulmonary disease (COPD), it may be very hard for you to breathe, especially if you are having an attack. As a result you may have too little oxygen or too much carbon dioxide in your blood, especially at night.

To help restore the right balance of gases in your blood, your doctor may suggest ways for you to get extra oxygen during an attack.

There are two options.

- You can wear a face mask that's linked to an oxygen tank by a tube. The tube connects to a pump that pushes oxygen gently into your lungs through the face mask. This method is usually used if you have a mild attack or if you have severe COPD that is not getting any worse. [71] You may not need to use oxygen all the time. But when you do, it will give your chest muscles a rest. That means they won't have to use so much energy to get air in and out of your lungs.

- Your doctor can put a tube into your throat or nose and down into your lungs. Then oxygen can be pumped directly into your lungs by a machine called a ventilator or respirator. This is usually used for people who are having an attack of COPD or who have severe COPD that's getting worse. They're usually being treated in hospital. You won't be able to eat or speak normally while you have this tube in your throat. You may need the ventilator only for a short time, until you recover from your attack. But once the machine takes over your breathing, it can be hard to start breathing for yourself again.

It's important to discuss using oxygen with your doctors and nurses before you start treatment. Everyone needs to understand what the treatment is supposed to do, how long it is likely to go on, and what will happen if it doesn't seem to be helping.

Glossary:

chronic bronchitis
Your doctor may say that you have chronic bronchitis if you have a cough that brings up phlegm, if it lasts for three months or more, and you have had it twice in two years. Smoking is a common cause of chronic bronchitis.

emphysema
Emphysema is a long-term disease of the lungs. The walls of the air sacs (alveoli) in the lungs become thin and less elastic. This makes it harder for oxygen to get in your blood and carbon dioxide to get out of your body. It makes you cough and feel short of breath. Smoking is the most common cause of emphysema.

inflammation
Inflammation is when your skin or some other part of your body becomes red, swollen, hot, and sore. Inflammation happens because your body is trying to protect you from germs, from something that's in your body and could harm you (like a splinter) or from things that cause allergies (these things are called allergens). Inflammation is one of the ways in which your body heals an infection or an injury.

bacteria
Bacteria are tiny organisms. There are lots of different types. Some are harmful and can cause disease. But some bacteria live in your body without causing any harm.

viruses
Viruses are microbes (tiny organisms) that need the cells of humans or other animals to exist. They use the machinery of cells to reproduce. Then they spread to other cells in the body.

infection
You get an infection when bacteria, a fungus, or a virus get into a part of your body where it shouldn't be. For example, an infection in your nose and airways causes the common cold. An infection in your skin can cause rashes such as athlete's foot. The organisms that cause infections are so tiny that you can't see them without a microscope.

genes
Your genes are the parts of your cells that contain instructions for how your body works. Genes are found on chromosomes, structures that sit in the nucleus at the middle of each of your cells. You have 23 pairs of chromosomes in your normal cells, each of which has thousands of genes. You get one set of chromosomes, and all of the genes that are on them, from each of your parents.

liver
Your liver is on the right side of your body, just below your ribcage. Your liver does several things in your body, including processing and storing nutrients from food, and breaking down chemicals, such as alcohol.

bacterial infection
You get a bacterial infection when bacteria invade a part of your body. There are many different types of bacteria, some of which are harmful and cause disease.

antibiotics
These medicines are used to help your immune system fight infection. There are a number of different types of antibiotics that work in different ways to get rid of bacteria, parasites, and other infectious agents. Antibiotics do not work against viruses.

corticosteroids
Corticosteroids are substances that your body makes naturally. But they can also be made in a laboratory to treat certain conditions. Corticosteroids have many different effects, including helping the body to use sugar and to control the amount of fluid it retains. They also reduce inflammation in the body, which is why they are sometimes used to treat diseases like asthma. (Asthma is caused by inflammation in the tubes that carry air in the lungs.)

steroids
Steroids are a type of chemical. Your body naturally produces steroids, which play a part in many of its processes. For example, steroids are involved in how your immune system, reproductive system and metabolism work. Steroids can also be given as medicines and are used for a number of different conditions: including asthma, rheumatoid arthritis and eczema. Corticosteroids are not the same as the steroids used by some body builders and athletes. Those steroids are called 'anabolic steroids'.

asthma
Asthma is a disease of the lungs. It makes you wheeze, cough and feel short of breath. Asthma attacks are caused by inflammation and narrowing of your airways, which makes it hard for air to pass in and out of your lungs.

arteries
Arteries are the blood vessels that take blood that is rich in oxygen and food away from your heart. The arteries carry this blood to all the tissues in your body.

veins
Veins are blood vessels that carry blood back to your heart after your blood has delivered oxygen and food to the tissues.

placebo
A placebo is a 'pretend' or dummy treatment that contains no active substances. A placebo is often given to half the people taking part in medical research trials, for comparison with the 'real' treatment. It is made to look and taste identical to the drug treatment being tested, so that people in the studies do not know if they are getting the placebo or the 'real' treatment. Researchers often talk about the 'placebo effect'. This is where patients feel better after having a placebo treatment because they expect to feel better. Tests may indicate that they actually are better. In the same way, people can also get side effects after having a placebo treatment. Drug treatments can also have a 'placebo effect'. This is why, to get a true picture of how well a drug works, it is important to compare it against a placebo treatment.

Beta-blockers
These drugs work by blocking the effects of certain chemicals produced by your body (such as adrenaline). Beta-blockers slow your heart rate and improve the beating of your heart. They are often used in people with angina or heart failure.

systematic reviews
A systematic review is a thorough look through published research on a particular topic. Only studies that have been carried out to a high standard are included. A systematic review may or may not include a meta-analysis, which is when the results from individual studies are put together.

randomised controlled trials
Randomised controlled trials are medical studies designed to test whether a treatment works. Patients are split into groups. One group is given the treatment being tested (for example, an antidepressant drug) while another group (called the comparison or control group) is given an alternative treatment. This could be a different type of drug or a dummy treatment (a placebo). Researchers then compare the effects of the different treatments.

yeast infection
Infections with certain types of fungus are called yeast infections. These infections are common and can affect many different parts of your body. For example, a yeast infection called thrush can affect people's mouths or, if they're women, their vaginas. If you get infected with thrush in your mouth, it makes white spots appear on your tongue or on the roof of your mouth. If thrush affects your vagina, you can get itchy, sore and have a discharge. You're more likely to get a yeast infection if your immune system is weakened.

pneumonia
Pneumonia is an infection in your lungs. Anything that causes infections (bacteria, viruses or fungi, for example) can give you pneumonia.

cataract
A cataract is when your eye's lens, which is normally clear, gets cloudy. This makes your vision blurred or fuzzy, like trying to see through a fogged-up window.

high blood pressure
Your blood pressure is considered to be high when it is above the accepted normal range. The usual limit for normal blood pressure is 140/90. If either the first (systolic) number is above 140 or the lower (diastolic) number is above 90, a person is considered to have high blood pressure. Doctors sometimes call high blood pressure 'hypertension'.

diarrhoea
Diarrhoea is when you have loose, watery stools and you need to go to the toilet far more often than usual. Doctors say you have diarrhoea if you need to go to the toilet more than three times a day.

seizure
A seizure (or fit) is when there is too much electrical activity in your brain, which results in muscle twitching and other symptoms.

CT scan
A CT scan is a type of X-ray. It takes several detailed pictures of the inside of your body from different angles. CT stands for computed tomography. It is also called a CAT scan (computed axial tomography).

osteoporosis
Osteoporosis is when your bones get too brittle. It happens if not enough new bone tissue is growing to keep bones strong. If you have osteoporosis, the bones in your body may break easily.

diabetes
Diabetes is a condition that causes too much sugar (glucose) to circulate in the blood. It happens when the body stops making a hormone called insulin (type 1 diabetes) or when insulin stops working (type 2 diabetes).

obesity
If your body stores more energy than you need, this can make you overweight. The excess energy is stored in your fat cells. If your weight goes above a certain level, doctors call this obesity. Obesity is considered a medical condition. The excess weight can be a strain on your bones and joints. And if you are obese, you're more likely to get other diseases. Doctors have developed a scale for telling how much excess weight you have. This measure, called the body mass index (BMI), depends on your height.

glaucoma
Glaucoma is a condition that affects the eyes. If you have glaucoma, your vision slowly gets worse. It happens when certain nerves in your head get damaged. These nerves carry images of what you see to your brain. Glaucoma is often caused by high pressure inside your eye.

adrenaline
Adrenaline is a chemical that makes your heart race and makes you feel alert. It is sometimes called the 'fight-or-flight' hormone.

immune system
Your immune system is made up of the parts of your body that fight infection. When bacteria or viruses get into your body, it's your immune system that kills them. Antibodies and white blood cells are part of your immune system. They travel in your blood and attack bacteria, viruses and other things that could damage your body.

chickenpox
Chickenpox is a common childhood illness caused by a virus. It usually leads to a fever, tiredness and an itchy rash. The virus can easily spread from person to person, and people usually get it about two weeks after they were near someone with the illness. About two days before the rash starts, you can give the virus to others. Chickenpox clears up on its own in most children, but adults and some children may get complications such as pneumonia, kidney problems or heart problems. In the UK, people aren't usually immunised against chickenpox unless they have an immune disease (or another disease that would make infection dangerous for them).

angina
Angina is the name that doctors use for a pain in your chest that you get when your heart muscle isn't getting enough oxygen.

ulcer
An ulcer is an open sore. Ulcers can happen in many parts of your body, such as in your stomach, and the skin of your legs, mouth, or genitals.

neurotransmitters
Neurotransmitters are chemicals that help to carry messages between nerve cells. Serotonin, dopamine, and norepinephrine (noradrenaline) are all neurotransmitters.

immunosuppressants
Immunosuppressants are medicines that reduce your body's natural immune response. You're given these medicines if you've had an organ transplant, so your immune system doesn't react to your new organ and attack it. But immunosuppressants can also put you at risk of some types of cancer, such as squamous cell skin cancer.

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