

Patient information from the BMJ Group

Asthma in adults

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Asthma in adults

If you have asthma, you sometimes find it hard to breathe. These breathing problems happen when the airways in your lungs get narrower. Asthma is a very common condition.

There are many treatments that work well for asthma. They can help you breathe more easily and allow you to do the things you normally do.

Many children get asthma. To read more, see [Asthma in children](#) .

We've brought together the best research about asthma 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 asthma?

If you have asthma, the tubes that carry air in and out of your lungs become swollen and narrow. This makes it difficult to breathe. You may have had asthma since you were a child, or you may have got it as an adult. Some people get asthma for the first time later in life, in their 60s or 70s.

There are many treatments that work well. They can help you breathe more easily.

Key points about asthma in adults

- Asthma can make you feel breathless. Your chest may feel tight and you may cough or wheeze.
- With the right treatment, asthma can be controlled well.
- Even if your asthma is mild, it's important to get the right treatment.
- An asthma attack can become serious. If you can't control your symptoms with the medicines you usually use, you should see a doctor straight away.
- You may be able to avoid the things that make your asthma worse.
- Having asthma shouldn't stop you holding down a job, doing sports and being active.

Asthma in adults

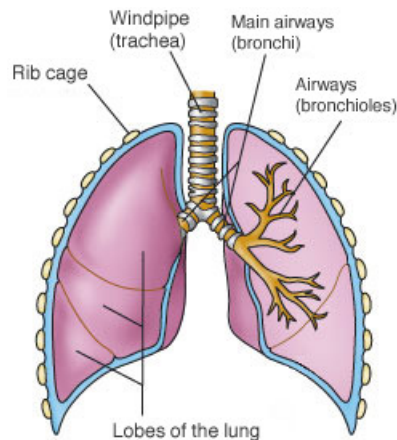
- Learning about asthma can help you to control it better.

How your lungs work

To understand what happens in asthma, it's useful to know what your lungs do.

Your lungs sit in the centre of your chest, behind your ribs. Their main job is to get oxygen from the air into your body.

Your blood vessels carry oxygen from your lungs to the rest of your body. Every cell in your body needs oxygen to work.



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

- When you breathe in, air goes into your lungs.
- The main tube that goes from your throat to your lungs is called your windpipe (**trachea**).
- Your windpipe divides into two tubes called **bronchi** (each tube is called a **bronchus**).
- Inside each lung, the air moves down a network of tubes called bronchioles.
- At the end of each tube is a tiny pouch (called an **alveolus**) surrounded by blood vessels.
- Oxygen in the air passes through these pouches into the blood vessels.
- Carbon dioxide passes the other way back into your lungs. This is a waste product that you get rid of when you breathe out.

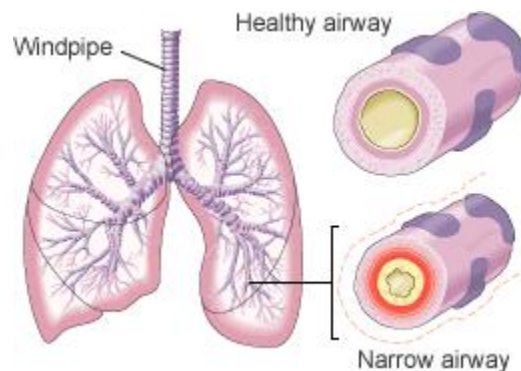
Asthma in adults

What happens in asthma

If you have asthma, you can't always breathe normally. The tubes inside your lungs get narrower, so you can't get enough air in and out of your lungs. This makes you gasp for breath. Or it may make you cough or wheeze.

To learn more, see [What are the symptoms of asthma in adults?](#)

Three things happen in your lungs to make the air passages narrower:



If you have asthma, the tubes inside your lungs get narrower.

- Muscles in the walls of your airways get tighter
- The walls of the airways become swollen
- Mucus is released into the airways, partially blocking them.

We're not exactly sure why some people have asthma and others don't. But two things seem to be important:

- The **genes** you inherit from your parents (asthma often runs in families)
- An infection or other things in the air. For example, you may have first had asthma symptoms when you had a cold or a chest infection. Or you may be allergic to certain things in the air. These things are called **allergens**. Common allergens are pollen, house dust mites, mould, and bits of fur and skin from pets.

After you've had asthma symptoms once, your airways are extra-sensitive to things that make them swollen. Whenever you come into contact with an asthma trigger (see below), your **immune system** overreacts. Your airways become inflamed and full of mucus. This is what causes your symptoms.

It might be that the thing that first gave you asthma symptoms (for example, dog hair) always brings on asthma symptoms. Or you may find that other things give you symptoms as well.

Asthma triggers

Certain things can bring on your asthma symptoms. These things are called triggers.^[1] It's useful to know what triggers your symptoms. If you can avoid triggers, you may be able to prevent your asthma symptoms. The most common triggers are:^[1]

- Allergens (such as house dust mites, bits of fur and skin from animals, or pollen)
- Smoke and air pollution
- Exercise
- Certain medicines
- Chemicals that may trigger an asthma attack
- Illnesses (such as colds)
- Stress.

To read more about these triggers, see [Some common triggers for asthma](#) .

Asthma: why me?

Some people are more likely to get asthma than others. Asthma tends to run in families.

For example, if a child has one parent with asthma, they are twice as likely to have asthma themselves than a child whose parents don't have asthma.^[8]

Diseases run in families because of **genes** that are passed from parents to their children. Asthma is not caused by a single gene, but by particular combinations of genes that increase the risk. Some of these genes change the way your **immune system** works. But we don't know in any detail how these genes work together to cause asthma.^[5]

If you inherit asthma from your parents, you may also inherit [eczema](#) , [hay fever](#) , or both.

What are the symptoms of asthma in adults?

If you have asthma, you sometimes have trouble breathing. This happens when the air passages in your lungs become narrower. So it's harder for air to go in and out of your lungs.

We've listed the main symptoms of asthma in adults.^[9]

- **Feeling out of breath:** This happens because air can't get out of your lungs. So there isn't enough room to get fresh air in. That's why you feel breathless and gasp for breath.

Asthma in adults

- Tightness in your chest: Many people with asthma describe how their chest feels tight. It feels like a band is being pulled tight around their chest, or something heavy is sitting on it. It's uncomfortable and can be quite frightening.
- Wheezing: This is a whistling sound that happens when you breathe. It's the noise of air moving through the narrowed air passages in your lungs.
- Coughing: This is the most common symptom in [children with asthma](#), but it's less common in adults. It happens because your lungs are trying to get rid of the thing that's triggering your asthma (pollen or dust, for example). You may find that you cough more at night or in the early morning.

You may get just one of these symptoms, but you're more likely to get two or more together.

Your symptoms may vary from day to day, depending on what's causing them. Many people find their breathing problems are worse at night. This is because your lungs don't work so well at night. And you may react more to triggers at night.

What's an asthma attack?

When you get asthma symptoms it's called an **asthma attack**. It can be mild or severe.

Mild attacks

Mild attacks are common. You may start to cough or feel tightness in your chest. You may make a whistling sound when you breathe (called a wheeze). When you notice these symptoms you should use your [quick-relief inhaler](#) (this contains a drug to open up your airways called a short-acting beta-2 agonist). Relievers are usually blue and should work quickly. As your airways open it should become easier to breathe.

If your medicine doesn't help or your symptoms get worse, you should call your doctor.

Sometimes your symptoms may ease but then get worse again a few hours or days later. This second set of symptoms is called a **late reaction**. It can be worse than the first attack.

It happens because your airways have become more sensitive to the things that are triggering your asthma. So you may get more attacks. You may need to keep taking your asthma medicines for a few days. Call your doctor if you can't seem to control your symptoms.

For more information, see [How can I tell when my asthma is getting out of control?](#)

Severe attacks

When you get a severe asthma attack, your symptoms get worse quickly. You'll find it more and more difficult to breathe. You may also notice:

- It's hard to talk because of your asthma

Asthma in adults

- Your lips or fingernails turn grey or blue
- Your nose opens wide when you breathe
- Your skin is pulled in around your ribs and neck when you breathe
- Your heartbeat or pulse is very fast
- You find it hard to walk.

If this happens, call an ambulance or go to the hospital Accident and Emergency (A&E) department as quickly as you can. Your normal asthma medicines probably won't help. You'll need emergency treatment.

How do doctors diagnose asthma in adults?

Most adults with asthma have had the disease since they were children.^[23] Some people seem to 'grow out' of their asthma as teenagers but start getting symptoms again as an adult.^[24] A few people get asthma for the first time as an adult.

Questions about your symptoms

Your doctor will want to know what symptoms you get, when you get them and how long you've been having them.

To learn more, see [Questions your GP may ask](#) .

Examination

Your doctor will probably examine your chest and listen to your breathing through a stethoscope. However, if you are not having an asthma attack at the time, your doctor might find nothing unusual.

Tests

There are several tests that can help your doctor find out what's causing your breathing problems. For example, you might have a test that measures how quickly you can breathe out.

To learn more, see [Tests for asthma](#) .

Ruling out other conditions

Not many people get asthma for the first time as an adult. So doctors may check for other conditions before checking for asthma. Your doctor may think you have a condition called **COPD** (short for chronic obstructive pulmonary disease), especially if you smoke.

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The symptoms of COPD are similar to the symptoms of asthma. COPD usually happens in people over 40 who smoke. So if you have breathing problems, it's important that your doctor finds out whether you have asthma or COPD.

To learn more, see our information on [COPD](#) .

Other conditions with similar symptoms to asthma are:

- Hyperventilation syndrome (when you breathe in and out too fast)
- Bronchiectasis (when the airways in your lungs have become damaged)
- Some rare allergies or diseases of the **immune system** that affect your lungs.

If your doctor is still unsure if you have asthma, you may be given a trial of asthma drugs (a [steroid inhaler](#) or a [quick-relief inhaler](#)) to see if they help. If the drugs help you, your doctor will then know you have asthma and will work out a treatment plan for you.

How common is asthma in adults?

About 4.3 million British adults have asthma. ^[8]

Asthma is more common now than it used to be. ^[11] There are probably several reasons why.

- Some doctors think that children who don't get many colds and other infections are more likely to get asthma than children who often get colds. ^[12] This is called the **hygiene hypothesis**. The idea is that getting colds and other infections keeps the immune system busy. If your immune system isn't kept busy, it may overreact to harmless things, such as pollen. This may cause asthma.
- Another theory is that our homes contain more triggers (such as house dust mites) that may cause asthma. ^[12] This may happen because we have central heating and air our homes less than we used to. There are also more man-made chemicals in our food. These cause asthma in some people.

Asthma usually starts in childhood. But not everyone who has asthma as a child will still have it as an adult. Up to three-quarters of children grow out of it. ^[13] However, children who get symptoms more often are more likely still to have asthma in later life.

What treatments work for asthma in adults?

Treatments for asthma work well. If you get the right treatment, your asthma shouldn't stop you from living an active life.

The treatment you have will depend on:

Asthma in adults

- How often you have symptoms
- How bad your symptoms are.

Key points about asthma treatments for adults

- Asthma can be well controlled with the right treatment.
- Most asthma drugs are breathed in using an inhaler.
- You'll probably use two inhalers: one to help you breathe more easily when you get symptoms (sometimes called a reliever) and one to prevent symptoms (sometimes called a preventer). To learn more, see [Treating your asthma from day to day](#) .
- You can try to avoid things that trigger your asthma symptoms. To learn more, see [Avoiding allergens](#) .
- You'll need to see your doctor regularly to check that your asthma is under control. You may need to change your treatment if your asthma isn't under control.
- If your asthma gets out of control and your symptoms are very bad, you may need to go to the hospital Accident and Emergency (A&E) department. You'll probably need to use a type of inhaler called a spacer or a nebuliser, take tablets or have injections. For more, see [Treating asthma in hospital](#) .
- Learning about asthma can help you to control it better.
- You should be given a written action plan about your treatments from your doctor.

Treatments for asthma

Which treatments work best? We've looked at the best research and given a rating for each treatment according to how well it works.

There are two groups of treatments:

- [Everyday treatments for asthma](#)
- [Emergency treatments for asthma](#) .

For an overview of the treatments that are usually used, see [Treating your asthma from day to day](#) and [Treating asthma in hospital](#) .

For more help in deciding which treatment is best for you, see [How to make the best decisions about treatment](#).

Treatment Group 1

Everyday treatments for asthma

Treatments that work

- [Quick-relief inhalers \(usually blue\)](#) : You use this inhaler to treat symptoms. The most common quick-relief inhalers (and their brand names) are salbutamol (Ventolin) and terbutaline (Bricanyl). [More...](#)
- [Steroid inhalers \(preventer, usually brown\)](#) : The full name for the medicines in these inhalers is corticosteroids. They are not the same as the anabolic steroids used by some bodybuilders and athletes. You use this inhaler regularly to prevent symptoms and help keep your asthma under control. Common steroid inhalers (and their brand names) include beclometasone (Beclazone, Qvar), budesonide (Pulmicort), and fluticasone (Flixotide). [More...](#)
- [Long-acting inhalers plus a steroid inhaler](#) : You can use two different inhalers to help control your symptoms. There are also inhalers that combine two drugs in one inhaler. An example is Seretide, which contains salmeterol and fluticasone. [More...](#)
- [Learning about asthma](#) : Learning more about your asthma and how to treat it may help to control your condition better. [More...](#)

Treatments that are likely to work

- [Leukotriene antagonists](#) : Examples of leukotriene tablets (with brand names) are montelukast (Singulair) and zafirlukast (Accolate). [More...](#)
- [Theophylline tablets plus a steroid inhaler](#) : These tablets can help prevent asthma when used with a steroid inhaler. But they can also have nasty side effects. [More...](#)
- [Being treated by a specialist](#) : You may see a doctor or nurse who has been specially trained in how to look after people with asthma. [More...](#)
- [Omalizumab \(brand name Xolair\)](#) : This is an injection against allergic asthma, that is given to some people with severe asthma. [More...](#)

Treatments that need further study

- [Leukotriene antagonists plus a steroid inhaler](#) : This combination is used to prevent symptoms. Leukotriene antagonists (with their brand names) include montelukast (Singulair) and zafirlukast (Accolate); common steroid inhalers (with brand names) include beclometasone (Beclazone, Qvar) and budesonide (Pulmicort). [More...](#)

Other treatments

We haven't looked at the research on these treatments in the same detail we have for the other treatments we cover. (To read more, see Our method.) But we've included some information because you may be interested in them.

- [Avoiding allergens](#)
- [Breathing techniques](#)

Treatment Group 2

Emergency treatments for asthma

Treatments that work

- [Quick-relief medicines](#) : You should use your usual, quick-relief inhaler if you're having an asthma attack. If you need treatment in hospital, you may take a similar medicine using a special type of inhaler. [More...](#)
- [Steroids](#) : These drugs reduce the inflammation of the airways and so can help you breathe more easily. The full name for the medicines is corticosteroids. They are not the same as the anabolic steroids used by some bodybuilders and athletes. When steroids are given as an emergency treatment in hospital, they're often given as tablets. A common tablet is prednisolone. [More...](#)
- [Ipratropium and a quick-relief inhaler](#) : These two drugs help you breathe by widening the airways in different ways. The brand name for ipratropium is Atrovent. Quick-relief inhalers (with their brand names) include salbutamol (Ventolin) and terbutaline (Bricanyl). [More...](#)
- [Oxygen](#) : If you have emergency treatment for an asthma attack, you may be given extra oxygen to breathe through a mask or through tubes in your nose. [More...](#)

Treatments that are likely to work

- [Using a ventilator](#) : This is a machine that helps you breathe. It can save your life if your breathing gets very bad. [More...](#)

Treatments that need further study

- [Magnesium sulfate](#) : This may help you breathe. You have it as a drip (also called an IV) straight into your veins. [More...](#)

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Treatments that are unlikely to work

- [Helium and oxygen](#) : You can breathe a mixture of helium and oxygen (heliox) through a mask or through tubes in your nose. [More...](#)

What will happen to me?

Treatments for asthma work well, and most people are able to lead a full and active life. Asthma isn't usually life-threatening, but you should take it seriously.

Some people worry that their asthma will get worse as they get older. But if you have mild asthma, it will probably stay mild. It's unlikely to become severe. Only about 1 in 20 people with asthma have severe asthma.

To learn more, see [How bad is my asthma?](#)

As you get older, your lungs don't work as well as they did when you were young. This happens to everyone, not just people who have asthma. But it happens sooner if you have asthma. From the age of about 30, your lungs will probably work as well as someone 10 years older than you who doesn't have asthma. ^[14] If you smoke, your breathing will get worse more quickly. But if you don't smoke, you'll probably have better lungs than a smoker who doesn't have asthma.

Your asthma may stop altogether. But if you get asthma for the first time when you're an adult, you're less likely to grow out of it than if you got it as a child.

Although most people with asthma lead full and active lives, it does need to be properly treated. It's possible to die of asthma, although deaths are rare given the large number of people who have it. About 1,400 people in the UK die of asthma each year. ^[8] About two-thirds of these people are over 65.

Better treatments mean that fewer people die of asthma now than in the past. And the charity Asthma UK says that 9 in 10 deaths from asthma could still be prevented. ^[8] It's important to recognise when your symptoms are getting worse and use your treatments properly.

If your symptoms get worse and your normal treatments don't help, or you're worried for any reason, you may need emergency treatment. Talk to your doctor or call 999 straight away.

To learn more, see [How can I tell when my asthma is getting out of control?](#)

Questions to ask your doctor

- How bad is my asthma?
- Do I need to take medicine regularly to prevent the symptoms?
- Do I need to use inhalers or take tablets, or both?

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- What are the side effects of asthma medicines?
- Will I need to take steroids?
- I've heard that steroids can give you long-term side effects. Will these happen to me? Do they only happen with steroid tablets or can you get them with steroid inhalers?
- What should I do when I have an asthma attack?
- How often will I need to use my inhaler? What should I do if I'm using it more than that?
- What happens if my medicine doesn't seem to be helping?
- How often will you want to see me to check my asthma?
- Will I need to take more medicine as I get older?
- Is there anything I can do to stop my children getting asthma?
- Are there any jobs I can't do because of my asthma?
- I know someone who died from an asthma attack. Could that happen to me? What can I do to reduce this risk?
- Is there anything you think may be triggering my asthma attacks?

Treatments:

Quick-relief inhalers to treat symptoms

In this section

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[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on quick-relief inhalers to treat symptoms?](#)

This information is for people who have asthma. It tells you about quick-relief inhalers, a treatment used for asthma. It is based on the best and most up-to-date research.

Do they work?

Yes. Using a quick-relief inhaler can help relieve asthma symptoms.

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Most people with asthma only use this kind of inhaler when they get symptoms (an attack). There's no advantage in taking it regularly, say every four hours, when you don't have symptoms. ^[26]

What are they?

Quick-relief inhalers (also just called 'relievers') are used when you are having symptoms of asthma. As their name suggests, they get to work quickly. They should help your symptoms within a few minutes.

If you use your reliever just before doing sport or other exercise, it can also prevent asthma symptoms that sometimes develop during exercise. That type of asthma is called **exercise-induced asthma**. However, if you use your reliever frequently to prevent exercise-induced asthma, it may work less well for this. ^[6]

Quick-relief inhalers don't work to prevent asthma symptoms in the long term.

Quick-relief inhalers usually contain one of these drugs:

- salbutamol (brand name Ventolin)
- terbutaline (Bricanyl).

Both of these drugs belong to a type called **short-acting beta-2 agonists**.

Your doctor may refer to these drugs as **bronchodilators** because they dilate (open up) the bronchial tubes (airways).

You normally breathe in these drugs using an inhaler. The drug is stored in a small aerosol can attached to a mouthpiece. When you breathe in, some of the drug is released as a spray or a powder. Taking the drug this way means it gets straight to your lungs.

You'll probably use a **metered-dose inhaler** (or MDI for short). You'll press down on the aerosol can to release a dose of the drug while you breathe in.

To learn more, see [How to use an inhaler](#) .

If you find it difficult to use your inhaler, you may like to try another type of inhaler. For instance, some inhalers use a spray, others use a powder. Your doctor can explain the different kinds.

Or you may need to use special equipment to help you breathe the drugs in. To learn more, see [Spacers and nebulisers](#) .

Your doctor or nurse will probably tell you to use your inhaler when you feel you need to. So if you suddenly find it harder to breathe, or your chest feels tight, your inhaler should be the first thing you reach for. Make sure you have it with you all the time. If you find that you're using your inhaler more often than you used to, tell your doctor. You may need a different treatment.

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You can also take these drugs as tablets or in syrup. But these won't work as fast as an inhaler.

How can they help?

You should feel better a few minutes after using your inhaler. Your symptoms should go away. And the drug will help your lungs work better. ^[26]

You can use your inhaler whenever you need it. ^[26] If you need to use your quick-relief inhaler three times a week or more, you should tell your doctor. You may need another inhaler to prevent asthma symptoms. ^[27] To learn more, see [Steroid inhalers to prevent symptoms](#) .

How do they work?

You get symptoms of asthma because the air passages in your lungs have become narrower. The small muscles in the walls of your air passages squeeze together and close up the passages.

Quick-relief inhalers work by loosening these muscles. So the air passages open wider, making it easier for air to get in and out of your lungs.

Breathing in the medicine through an inhaler means that the drug goes straight to your air passages and gets to work straight away.

Can they be harmful?

The most common side effect is shaking or trembling, especially in your hands. ^[28] It's called **tremor**. It's normally quite gentle and most people don't find it a problem.

It's most likely to happen when you first start using your inhaler. It usually goes away after you've used the inhaler a few times. And it's more likely to happen if you take a lot of medicine. ^[29] So make sure you keep to the dose that your doctor recommends.

If you use your quick-relief inhaler a lot, the muscles in your airways may not respond to it as well as they used to, and your symptoms may not go away as easily. The results of your breathing tests may get worse too. ^[30] If you're needing to use your quick-relief inhaler more and more, you should tell your doctor straight away. He or she can recommend treatment which will work better.

How good is the research on quick-relief inhalers to treat symptoms?

There's lots of research on quick-relief inhalers for asthma.

We found one big summary of the research (called a **systematic review**). ^[26] The summary included 30 studies, involving hundreds of people with asthma. It found:

- Short-acting inhalers that relieve symptoms (beta-2 agonists) helped people's symptoms

- They also helped people's lungs work better.

Steroid inhalers to prevent symptoms

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[How good is the research on steroid inhalers to prevent symptoms?](#)

This information is for people who have asthma. It tells you about steroid inhalers, a treatment used to prevent symptoms of asthma. It is based on the best and most up-to-date research.

Do they work?

Yes. Using a steroid inhaler regularly can help to prevent asthma symptoms.

It should also mean you don't have to use your [quick-relief inhaler](#) as often.

What are they?

Steroids are a type of anti-inflammatory drug. They reduce the amount of swelling in your air passages. This should prevent you getting symptoms.

You'll also have a [quick-relief inhaler](#) to treat asthma symptoms as they happen. You'll need to use your quick-relief inhaler to treat symptoms when you get them. And you'll use your steroid inhaler regularly to prevent asthma symptoms. To learn more, see [Treating your asthma from day to day](#) .

Your doctor may recommend a steroid inhaler if: ^[9] ^[31]

- You need to use your quick-relief inhaler three times a week or more
- Your asthma symptoms disturb your sleep
- You've had an asthma attack in the past two years that needed extra treatments, such as steroid tablets.

The steroids used to treat asthma are called **corticosteroids**. They are not the same as the **anabolic steroids** that athletes and bodybuilders use to build up muscle. In fact, asthma steroids are like the steroids produced naturally by our bodies to deal with inflammation.

Here are the different types of steroid inhaler (with their brand names):

- beclometasone (Beclazone, Qvar)

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- budesonide (Pulmicort)
- fluticasone (Flixotide)
- mometasone (Asmanex)
- ciclesonide (Alvesco).

Most people take inhaled steroids at least twice a day. This should stop your air passages becoming inflamed and narrower. The dose you take will depend on which drug you're taking. Your doctor or nurse will tell you which dose is right for you.

You normally breathe these drugs into your lungs with an inhaler. The drug is stored in a small aerosol can attached to a mouthpiece. When you breathe in, some of the drug is released. Taking the drug this way means it gets straight to your lungs.

You'll probably use a **metered-dose inhaler** (or MDI for short). You press down on the aerosol can to release a dose of the drug while you breathe in.

To learn more, see [How to use an inhaler](#) .

If you find it difficult to use your inhaler, you may like to try another type of inhaler. For instance, some inhalers use a spray, others use a powder. Your doctor will be able to explain the different kinds.

Or you may need to use special equipment to help you breathe in the drugs. To learn more, see [Spacers and nebulisers](#) .

As well as being used to prevent asthma attacks, steroids are also used in hospital to treat severe asthma attacks. To read more, see [Steroids in the A&E department](#) .

How can they help?

If you use a steroid inhaler every day, you're: ^[32] ^[33] ^[34]

- Less likely to get asthma symptoms
- More likely to sleep better (because you get fewer symptoms at night)
- Less likely to need to use a quick-relief treatment.

And you'll probably get better scores when you have [tests for asthma](#) . ^[32] ^[33] A higher score means your lungs are working better.

Using a steroid inhaler every day may also reduce the chances that you'll need hospital treatment for a bad asthma attack. ^[35]

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Also, using a steroid inhaler every day will help your lungs more than if you use a [quick-relief inhaler](#) regularly. ^[36]

How do they work?

If you have asthma, the walls of your air passages will often be swollen and the passages may have too much mucus in them. This makes them narrower than usual.

Steroids reduce the swelling. And they also help prevent further swelling. When the swelling goes down, the air passages will open up and you'll be able to breathe more easily. So you're less likely to wheeze, cough or have a feeling of tightness in your chest.

The cells in the lining of your air passages make chemicals that cause the swelling. Steroids go into these cells and stop them making these chemicals.

If your air passages are less swollen, they're less likely to react to the things that trigger your asthma symptoms. This may explain why people who take steroids have fewer symptoms (attacks).

Steroids also reduce the amount of mucus that builds up in your air passages.

Can they be harmful?

Using a steroid inhaler may give you: ^[33]

- A sore throat
- A hoarse or croaky voice
- An infection (thrush) in your mouth or your throat.

But not everybody gets these problems. For example, only about 1 in 50 people who take a drug called fluticasone get an infection in their mouth. ^[33] And it's also less common if you take ciclesonide. ^[34] A review of the research found that 3 in 100 people taking beclometasone got a mouth infection, which was the same as people who weren't taking it. ^[37]

You're less likely to get side effects if you: ^[31]

- Use a [spacer](#) to breathe in your treatment
- Rinse out your mouth after using your inhaler.

You might have heard that taking steroids for a long time can make your bones weaker. But this shouldn't happen if you use an inhaler with the normal dose. ^[38]

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If you're very ill, you may need to take higher doses of inhaled steroids. This increases your risk of side effects.

How good is the research on steroid inhalers to prevent symptoms?

There has been a lot of research on steroid inhalers. We found three [systematic reviews](#), one on each of the most commonly used steroids: budesonide, fluticasone, and beclometasone. ^[32] ^[33] We also found many good-quality studies called [randomised controlled trials](#).

In all the studies, people who used steroid inhalers were: ^[32] ^[33]

- Less likely to get symptoms
- More likely to get higher scores in tests that measure how well you're breathing
- Less likely to need to use a [quick-relief inhaler](#) to treat their symptoms.

We also found good-quality studies of two newer steroids, called mometasone and ciclesonide. ^[39] They found that the newer steroids work just well as the older steroid inhalers.

Long-acting inhalers and a steroid inhaler to prevent symptoms

In this section

[Do they work?](#)

[What are they?](#)

[How can they help?](#)

[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on long-acting inhalers and steroid inhalers to prevent symptoms?](#)

This information is for people who have asthma. It tells you about long-acting inhalers used together with a steroid inhaler, a treatment used to prevent symptoms of asthma. It is based on the best and most up-to-date research.

Do they work?

Yes. If you use a [steroid inhaler](#), but you still have breathing problems, you can use a long-acting inhaler as well. Drugs in these inhalers are called **long-acting beta-2 agonists**. Using both inhalers should help control your asthma better so that you don't get symptoms as often.

Using the two inhalers works better than increasing the dose of steroid that you're taking.

It's important to use your long-acting inhaler together with your steroid inhaler. Don't use your long-acting inhaler on its own, as this can be dangerous.

What are they?

Long-acting inhalers are drugs that help you breathe. They start working in 15 minutes to 30 minutes. And they work for up to 12 hours.

You'll also have a [quick-relief inhaler](#) to treat asthma symptoms as they happen. Quick-relief inhalers work fast, but the effects only last for three to four hours. So you'll need to use your quick-relief inhaler to treat symptoms when you get them. And you'll use your long-acting inhaler and your steroid inhaler regularly to prevent asthma symptoms.

To learn more, see [Treating your asthma from day to day](#) .

There are two common types of long-acting beta-2 agonist inhaler:

- formoterol (Foradil, Oxis)
- salmeterol (Serevent).

Long-acting beta-2 agonists aren't usually used on their own. They are used as an extra treatment if you're already using a steroid inhaler. Steroids are a type of anti-inflammatory drug. They reduce the amount of swelling in your air passages. This should prevent you getting symptoms.

Steroids used to treat asthma are not the same as the steroids that athletes and bodybuilders use to build up muscle. The full name for steroids used in asthma is **corticosteroids**. Your body makes corticosteroids naturally to reduce inflammation.

Here are the different types of steroid inhaler (with their brand names):

- beclometasone (Beclazone, Qvar)
- budesonide (Pulmicort)
- fluticasone (Flixotide)
- mometasone (Asmanex)
- ciclesonide (Alvesco).

Most people take steroids at least twice a day. This should prevent your air passages from becoming narrower (inflamed). The dose you take will depend on which drug you're taking. Your doctor or nurse will tell you which dose is right for you.

Inhalers are a way of breathing in your medicine. The drug is stored in a small aerosol can attached to a mouthpiece. When you breathe in, some of the drug is released as a spray or a powder. Taking the drug this way means it gets straight to your lungs.

Asthma in adults

You'll probably use a **metered-dose inhaler** (or MDI for short). You press down the aerosol can to release a dose of the drug while you breathe in. To learn more, see [How to use an inhaler](#) .

If you find it difficult to use your inhaler, you might want to try another type of inhaler. Your doctor will be able to explain the different kinds.

Or you may need to use special equipment to help you breathe the drugs in. To learn more, see [Spacers and nebulisers](#) .

You can get single inhalers that combine steroids and a long-acting beta-2 agonist. For example, Seretide contains salmeterol and fluticasone, and Symbicort contains formoterol and budesonide. But you shouldn't use an inhaler with a combination of drugs when you first start treatment for asthma.

How can they help?

If you take a long-acting inhaler and a steroid, you may: ^[40]

- Have fewer symptoms
- Feel better
- Sleep better
- Get higher scores in tests to see how well your lungs work
- Use your [quick-relief inhaler](#) less often
- Be less likely to have a bad asthma attack. ^[41]

Adding the long-acting inhaler to your steroid inhaler may control your asthma better than increasing the amount of steroids you take. ^{[42] [43]}

Also, adding a long-acting inhaler to your steroid inhaler will probably work better than adding another type of drug called a leukotriene antagonist. ^{[44] [45]}

There's no evidence that one type of long-acting inhaler works better than another. In studies, both seem equally likely to work. ^{[46] [47]}

How do they work?

When you get symptoms of asthma, it's because the air passages in your lungs have become narrower. The small muscles in the walls of your air passages squeeze together and close up the passages. And your air passages may be swollen and they may have too much mucus in them. This also makes them narrower than usual.

Asthma in adults

Beta-2 agonists (the drugs used in long-acting inhalers) and steroids both help your breathing. But they work in different ways. So taking both types together may be more likely to work than taking them on their own. You'll probably need a lower dose of steroids. You should also get better control of your asthma by taking both together.

Beta-2 agonists work by loosening the muscles in the walls of the air passages. So the air passages open wider, making it easier for air to get in and out of your lungs.

Steroids reduce the swelling and they also help prevent further swelling. When the swelling goes down, the air passages will open up and you'll be able to breathe more easily. So you're less likely to wheeze, cough or have a feeling of tightness in your chest.

The cells in the lining of your air passages make chemicals that cause the swelling. Steroids go into these cells and stop them making these chemicals.

If your air passages are less swollen, they're less likely to react to the things that trigger your asthma symptoms. This may explain why people who take steroids have fewer symptoms (asthma attacks).

Steroids also reduce the amount of mucus that builds up in your air passages.

Breathing in the medicine through an inhaler means that the drugs go straight to the air passages and get to work straight away.

Can they be harmful?

Long-acting inhalers

The most common side effect of long-acting inhalers is shaking or trembling, especially in your hands.^[28] It's called **tremor**. It's normally quite gentle and most people don't find it a problem.

It's more likely to happen if you take a lot of the drug.^[29] So, make sure you keep to the dose that your doctor or nurse recommends.

If you use a long-acting inhaler regularly:

- The muscles in your airways may not respond to it as well as they used to
- Your symptoms may not go away as easily.

The results of your breathing tests may get worse too.^[48]

There's a danger with long-acting beta-2 agonists that, although you get fewer asthma attacks, the attacks you do get are more severe.^[49]

We know that using salmeterol when you're not also using a steroid inhaler can actually increase the chances of having a fatal asthma attack.^[50] But it's not clear whether

Asthma in adults

salmeterol or formoterol increase the risk for people who are using a steroid inhaler. ^[50]
^[51] Research so far suggests it does not, but we need further studies to be sure. ^[52]

A review of the research looked at 33,826 adults and children. ^[53] About half were using a steroid inhaler. People in the studies who used a long-acting beta-2 agonist inhaler were more likely to need hospital treatment for an asthma attack. They were also more likely to have a life-threatening asthma attack.

Only one study in the review looked at deaths from asthma attacks. ^[54] People taking a long-acting beta-2 agonist had a higher risk. People using the inhaler had a 10 in 10,000 chance of dying from asthma, compared with 2 in 10,000 for people taking a dummy treatment (a placebo).

Leading asthma specialists in the UK are keeping a close watch on studies about the safety of long-acting inhalers. Their advice is: ^[55] ^[56]

- Long-acting beta-2 agonists should only be used if a steroid inhaler hasn't helped on its own
- You should make sure you use your steroid inhaler as well as your long-acting inhaler
- If your asthma doesn't get better when you use a long-acting inhaler and a steroid inhaler, tell your doctor.

Steroid inhalers

Using a steroid inhaler may give you: ^[33]

- A sore throat
- A hoarse or croaky voice
- An infection (thrush) in your mouth or your throat.

But not everybody gets these problems. For example, only about 1 in 50 people who take a drug called fluticasone get an infection in their mouth. ^[33]

You're less likely to get side effects if you: ^[31]

- Use a [spacer](#) to breathe in your treatment
- Rinse out your mouth after using your inhaler.

You might have heard that taking steroids for a long time can make your bones weaker. But this shouldn't happen if you use an inhaler with the normal dose. ^[38]

Asthma in adults

If you're very ill, you may need to take higher doses of inhaled steroids. This increases your risk of side effects.

How good is the research on long-acting inhalers and steroid inhalers to prevent symptoms?

There's lots of research to show that long-acting inhalers help to prevent asthma attacks. However, most of the research has looked at long-acting inhalers used together with a steroid inhaler. Long-acting inhalers can be dangerous if you use them on their own.

A large [review](#) of the research looked at more than 8,000 people.^[40] People using a long-acting beta-2 agonist inhaler and a steroid inhaler got fewer asthma attacks. Their lungs also worked better.

Learning about asthma

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on learning about asthma?](#)

This information is for people who have asthma. It looks at how learning about asthma can help you manage your condition better. It is based on the best and most up-to-date research.

Does it work?

Yes. If you learn about your asthma and how to treat it, you'll be less likely to need emergency treatment in hospital. You probably won't need to see your doctor as often because of your asthma. And you may need less time off work.

A written action plan with instructions about your treatment can also improve your asthma control.

What is it?

Your doctor may advise you to take part in an education programme. This may be run by a doctor, a nurse or a counsellor. There are many ways of learning about asthma. You may go to classes, or you may get information from DVDs, CDs or a website.

Most education programmes include information about:

- The causes of asthma
- Symptoms
- How doctors diagnose asthma

Asthma in adults

- Treatments
- How to check that your treatment is working.

Some education programmes also include an action plan. It may be called a **self-management plan**. It's a written plan designed specially for you. An action plan includes:^[10]

- What kind of asthma you have and how bad it is
- The treatments you're taking and how to take them
- When and how much of each treatment to take
- What to do if your breathing gets worse
- How to get help if you have problems with your asthma
- What to do in an emergency.

Most people find it easier to take their asthma drugs if the information is written down. They're less likely to forget their treatment. But many doctors don't yet give their patients a written action plan. So, you may have to ask your doctor for one.

To learn more, see [Treating your asthma from day to day](#) .

How can it help?

If you understand your asthma and know how to treat it, you'll have better control over your disease than if you didn't know much about it.

It works best if you have a written action plan that tells you how to change your treatment when you need to.

People who learn about their asthma and their treatments:^{[57] [58] [59] [60]}

- Are more likely to be able to do their normal activities
- Have fewer symptoms at night
- Have fewer days off work
- Have fewer unplanned visits to their doctor
- Have fewer visits to the Accident and Emergency (A&E) department
- Are less likely to need inpatient treatment in hospital

Asthma in adults

- Use their inhalers better
- Do better on lung tests.

How does it work?

The more you know about your asthma, the more likely you are to notice when your symptoms are getting worse. So you can quickly choose the right treatment to get your symptoms under control.

For instance, you may need to increase the dose of your drugs or take a different drug. Or you may know that you need to get help from your doctor straight away. The sooner you get the right treatment, the sooner you'll feel better. And this means that you can get on with your normal activities.

If you don't know much about your asthma, you may not realise when your symptoms are getting worse. You may think that your breathing problems are normal or something you have to put up with. And if these symptoms get worse, you may need emergency treatment in hospital.

An action plan explains how to manage your asthma. Having one makes it easier to remember to take your treatment. Most people find it easier to take their treatment if they have information about it written down.

Can it be harmful?

There's no evidence that education programmes are harmful.

How good is the research on learning about asthma?

We found one big summary of the research. This kind of summary is called a **systematic review**.^[57] Researchers carefully compared the results from 36 studies (called **randomised controlled trials**). The studies included about 6,000 people.

Some people were taught how to spot their symptoms and choose the right treatment. The others didn't get information about how to treat themselves.

- The people who learnt how to treat themselves were less likely to visit their doctor, less likely to go to the Accident and Emergency (A&E) department and less likely to stay in hospital.
- They also had fewer days off work because of their asthma.
- People who learnt how to treat themselves had fewer symptoms at night and said that their life was generally better.

Several other studies have also found that learning about asthma can help people cope with it better.^{[58] [59] [61]}

Leukotriene antagonists to prevent symptoms

In this section

[Do they work?](#)

[What are they?](#)

[How can they help?](#)

[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on leukotriene antagonists to prevent symptoms?](#)

This information is for people who have asthma. It tells you about leukotriene antagonists, a treatment used to prevent symptoms of asthma. It is based on the best and most up-to-date research.

Do they work?

Yes. If you are having to use your [quick-relief inhaler](#) more than once or twice a week, you can try using leukotriene antagonist tablets to prevent your asthma attacks.

These tablets might not work as well as [steroid inhalers](#) .

What are they?

Leukotrienes are chemicals that your body makes. They help your body deal with infections and things like dust or germs that you breathe in. If you have asthma, your body overreacts when you breathe in certain things. So you make extra leukotrienes. They're one of the chemicals that cause your breathing problems.

Leukotriene antagonists are drugs that stop leukotrienes from doing their job. You take them as tablets. We've listed the two leukotriene antagonists (and their brand names) available in the UK:

- montelukast (Singulair)
- zafirlukast (Accolate).

These drugs can stop you getting asthma symptoms (attacks). They won't help with symptoms when they happen. You'll still need your [quick-relief inhaler](#) to treat symptoms when they happen.

Your doctor or nurse may advise you to take a leukotriene antagonist if you've tried using a steroid inhaler but it didn't work. Or you may not want to use a steroid inhaler because of its side effects.

To learn more, see [Treating your asthma from day to day](#) .

How can they help?

If you still get symptoms when you use your quick-relief inhaler, then taking a leukotriene antagonist as well should reduce your symptoms. ^[62] ^[63] ^[64] ^[65] ^[66] And you shouldn't need to use your inhaler so often.

Asthma in adults

But a leukotriene antagonist probably doesn't help as much as a [steroid inhaler](#) .^[67] Steroid inhalers seem to be better than leukotriene antagonists at preventing asthma attacks.

How do they work?

When you get asthma symptoms, it may be because you've breathed in something that you are allergic to. Your **immune system** overreacts and releases chemicals into your blood. Some of these chemicals are leukotrienes. They make the walls of the air passages in your lungs swell, so the passages become narrower. So you find it harder to breathe. Leukotrienes also cause your air passages to make extra mucus, which makes you cough.

Leukotriene antagonists stop your body from making leukotrienes. So your air passages are more likely to stay open and you should find it easier to breathe. You won't have as much mucus in your lungs, so you're less likely to get a cough.

Can they be harmful?

Side effects from leukotriene antagonists aren't common. But leukotriene antagonists can cause mild side effects, including:^[63]

- Headaches
- Feeling sick.

About 3 in 100 people stop taking leukotriene antagonists because of side effects.^[67]

Some people prefer to take leukotriene antagonists rather than use a steroid inhaler because steroids can have more serious side effects. But these extra side effects only tend to happen with high doses of steroids. They don't happen if you use a normal dose through an inhaler.

Leukotriene antagonists have been linked with a condition called **Churg-Strauss syndrome**. But this is very rare. People with Churg-Strauss syndrome get very severe asthma along with other symptoms, such as a rash and numbness in the hands and feet. If it's not treated, it can lead to heart and kidney problems, and severe breathing difficulties. It can be treated with high-dose steroid tablets.

It's not clear whether leukotriene antagonists actually cause Churg-Strauss syndrome. But your doctor will want to keep an eye out for side effects just in case.

Some people taking montelukast have found they get changes in their mood. In severe cases, these can be bad enough for someone to feel suicidal. If you're concerned about any thoughts or feelings you have while you're taking montelukast, talk to your doctor as soon as you can.

How good is the research on leukotriene antagonists to prevent symptoms?

We found six studies that looked at using leukotriene antagonists for preventing asthma symptoms compared with having no treatment. ^[62] ^[63] ^[64] ^[65] ^[66] ^[68]

The largest study included 762 patients. ^[62] It was a **randomised controlled trial**. All the patients used a **quick-relief inhaler** to treat symptoms when they happened. Some patients also took a leukotriene antagonist called zafirlukast (Accolate) and some took a dummy treatment (a **placebo**).

- The people who took zafirlukast had fewer symptoms and woke up at night less often because of their asthma.
- Zafirlukast helped people's lungs work a bit better.

The other studies all had similar results; they found that adding a leukotriene antagonist helped prevent asthma more than adding a placebo. ^[63] ^[64] ^[65] ^[66]

We found many studies that compared leukotriene antagonists with **steroid inhalers**. We found one big summary of the research. This kind of summary is called a **systematic review**. ^[67] Researchers carefully compared the results of 15 good-quality studies (randomised controlled trials). The studies included nearly 5,000 patients.

- People who took leukotriene antagonists were more likely to need steroid tablets (because their asthma was out of control).
- People who took steroid inhalers were less likely to have an asthma attack and had fewer symptoms than those taking leukotriene antagonists.

Theophylline tablets plus a steroid inhaler to prevent symptoms

In this section

[Do they work?](#)

[What are they?](#)

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[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on theophylline tablets to prevent symptoms?](#)

This information is for people who have asthma. It tells you about theophylline pills plus a steroid inhaler, a treatment used to prevent symptoms of asthma. It is based on the best and most up-to-date research.

Do they work?

They may help. If you are using steroids from an inhaler but are still having asthma symptoms, taking theophylline tablets may help you breathe more easily. But it doesn't seem to have any other effects.

Theophylline tablets don't seem to work any better alongside a steroid inhaler than drugs called [leukotriene antagonists](#) and [long-acting beta-2 agonists](#) .

What are they?

Theophylline is a drug that helps your airways open up so you can breathe more easily in the morning and evening. It's known as a **long-acting bronchodilator**. That's because it works for a long time, and it makes the airways (bronchial tubes) open up (dilate). 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 tablet or as syrup. It can also be injected. There are a lot of brand names for this kind of drug. Here are some of them:

- Nuelin SA
- Slo-Phyllin
- Uniphyllin Continus.

Theophylline can be used along with a steroid inhaler. Steroids are a type of anti-inflammatory drug. They reduce the amount of swelling in the walls of your air passages. This should prevent you getting symptoms.

Steroids used to treat asthma are not the same as the steroids that athletes and bodybuilders use to build up muscle. The full name for steroids used in asthma is **corticosteroids**.

How can they help?

Taking theophylline tablets as well as steroids from an inhaler may improve your breathing. ^[69] But it may not make any difference to your other symptoms or how likely you are to have a bad asthma attack.

Taking theophylline tablets as well as steroids from an inhaler doesn't seem to be any better than taking: ^[70] ^[71]

- A leukotriene antagonist and steroids from an inhaler
- A long-acting beta-2 agonist (a long-acting inhaler) and steroids from an inhaler

Asthma in adults

- Beta-2 agonist tablets and steroids from an inhaler.

How do they work?

The main purpose of theophylline is to help keep the air passages in your lungs open. This makes it easier for air to get into your lungs. Experts are not sure exactly how theophylline works. But it seems to keep muscles relaxed.

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

Can they be harmful?

Theophylline tablets may make you feel sick and give you a headache. Theophylline can make you irritable, too. It can also cause seizures and abnormal heart rhythms. All of these side effects are more likely to happen if you are taking a dose that is too high for you.

A disadvantage of theophylline is that it is difficult to get the dose right.^[72] There isn't much difference between the dose of theophylline that may help you breathe better and the dose that may cause 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.

Elderly people are especially at risk of side effects.^[73] That's because an older person's liver doesn't get rid of theophylline as well as a younger person's liver does.

Theophylline can also cause problems if you take it at the same time as some other drugs.

How good is the research on theophylline tablets to prevent symptoms?

There isn't a lot of evidence about taking theophylline as well as using a steroid inhaler to prevent symptoms.

We found one good-quality study (a randomised controlled trial) with 155 people who were still getting asthma symptoms despite using steroid inhalers.^[74] It compared three treatments:

- A steroid inhaler plus theophylline
- A steroid inhaler plus a dummy treatment (a placebo)
- A higher dose of steroids from an inhaler.

Asthma in adults

People who used steroids from an inhaler and theophylline had a greater improvement in their breathing tests than people taking the other treatments.^[74] But the difference between treatments wasn't big enough to be sure it hadn't happened by chance.

Several studies have compared theophylline with other asthma treatments. It doesn't seem to be any better than other treatments, such as leukotriene antagonists, long-acting inhalers or beta-2 agonist tablets.^{[70] [75]}

Being treated by a specialist

In this section

[Does it work?](#)

[What is it?](#)

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[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on being treated by a specialist?](#)

This information is for people who have asthma. It looks at how care from a specialist might help with asthma. It is based on the best and most up-to-date research.

Does it work?

Probably. If you're treated by an asthma specialist, you'll probably do better than if you're treated by a doctor who doesn't specialise in asthma, especially if your asthma is bad.

What is it?

A specialist in asthma is someone who has had special training in treating asthma. In the UK, many GPs and practice nurses (who are often called asthma nurse specialists) have had special training in managing asthma. Some hospital doctors specialise in caring for people with lung diseases. They're often called chest physicians or respiratory physicians.

How can it help?

People with asthma who see a specialist may be less likely to need emergency treatment. But we can't say for certain.^{[76] [77]}

How does it work?

Specialists are likely to know more about:

- Diagnosing and treating diseases that affect the lungs
- The problems that people with asthma have
- The advantages and disadvantages of different treatments
- How to change a treatment to suit an individual patient.

Asthma in adults

Many doctors don't treat asthma as well as they should. ^[78] ^[79] For example, they sometimes don't prescribe the right drugs for a patient's particular kind of asthma. Doctors who specialise in lung diseases may be more likely to choose the best treatment.

Can it be harmful?

There is no evidence that being treated by a specialist is harmful.

How good is the research on being treated by a specialist?

There isn't much evidence that specialist doctors are better than GPs at treating asthma.

People seem to do better when they are treated by a specialist. But many of the studies were small. So the results may not be reliable. ^[77]

One study of 324 people found that people seeing an asthma nurse specialist had to go to the Accident and Emergency (A&E) department less often. ^[76] But it is not possible to say for certain that this was because of the nurse's help. There may be other reasons why patients went to A&E less often. For example, they may have had milder asthma to start with.

Leukotriene antagonists and a steroid inhaler to prevent symptoms

In this section

[Do they work?](#)

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[Can they be harmful?](#)

[How good is the research on leukotriene antagonists and steroid inhalers to prevent symptoms?](#)

This information is for people who have asthma. It tells you about leukotriene antagonists plus a steroid inhaler, a treatment used to prevent symptoms of asthma. It is based on the best and most up-to-date research.

Do they work?

We're not sure. There may be some benefit in using a leukotriene antagonist together with a steroid inhaler. But there's no research to say that this combination is better than adding other treatments to a steroid inhaler. So doctors often recommend a [long-acting inhaler](#) or a higher dose of steroids, rather than a leukotriene antagonist.

What are they?

Leukotrienes are chemicals that your body makes. They help your body deal with infections and things like dust or germs that you breathe in. If you have asthma, your body may overreact when you breathe them in. So your body makes extra leukotrienes. They're one of the chemicals that cause your breathing problems.

Asthma in adults

Leukotriene antagonists are drugs that stop leukotrienes doing their job. You take them as tablets. These are the two leukotriene antagonists (and their brand names) available in the UK:

- montelukast (Singulair)
- zafirlukast (Accolate).

Leukotriene antagonists can be taken together with a steroid inhaler. Steroids are a type of anti-inflammatory drug. They reduce the amount of swelling in the walls of your air passages. This should prevent you getting symptoms.

Steroids used to treat asthma are not the same as the steroids that athletes and bodybuilders use to build up muscle. The full name for steroids used in asthma is **corticosteroids**. Your body makes corticosteroids naturally to reduce inflammation.

Here are the different types of steroid inhaler (with their brand names):

- beclometasone (Beclazone, QVAR)
- budesonide (Pulmicort)
- fluticasone (Flixotide)
- mometasone (Asmanex)
- ciclesonide (Alvesco).

Most people take steroids at least twice a day. This should stop the walls of your air passages getting swollen. The dose you take will depend on which drug you're taking. Your doctor will tell you which dose is right for you.

You normally breathe these drugs in using an inhaler. The drug is stored in a small aerosol can attached to a mouthpiece. When you breathe in, some of the drug is released. Taking the drug this way means it gets straight to your lungs.

You'll probably use a **metered-dose inhaler** (or MDI for short). You can press down on the aerosol can to release a dose of the drug while you breathe in.

To learn more, see [How to use an inhaler](#) .

If you find it difficult to use your inhaler, you may like to try another type of inhaler. For instance, some inhalers use a spray, others use a powder.

Or you may need to use special equipment to help you breathe in the drugs. To learn more, see [Spacers and nebulisers](#) .

Asthma in adults

Leukotriene antagonists and steroids keep your asthma in check. They won't help treat your symptoms when they happen. The easiest way of treating your symptoms is to use a [quick-relief inhaler](#) .

To learn more, see [Treating your asthma from day to day](#) .

How can they help?

If you use a steroid inhaler but you're still getting symptoms, adding a leukotriene antagonist may help: ^[80]

- Relieve your asthma symptoms
- Improve your breathing tests.

Adding a leukotriene antagonist is probably just as good as increasing your dose of steroids from an inhaler. ^[81] But it probably won't help you have fewer bad asthma attacks. ^[82]

A [long-acting inhaler and a steroid inhaler](#) will probably work better than taking leukotriene antagonists and using a steroid inhaler. ^[83] ^[44] ^[45]

How do they work?

When you get asthma symptoms, it may be because you've breathed in something that you are allergic to. Your **immune system** overreacts and releases chemicals into your blood. Some of these chemicals are leukotrienes. They make the air passages in your lungs swell and become narrower. So you find it harder to breathe. Leukotrienes also cause your air passages to make extra mucus, which makes you cough.

Leukotriene antagonists stop leukotrienes doing their job. So your air passages are more likely to stay open and you should find it easier to breathe. You won't have as much mucus in your lungs, so you're less likely to get a cough.

Steroids reduce the swelling. And they also help prevent further swelling. When the swelling goes down, the air passages will open up and you'll be able to breathe more easily. So you're less likely to wheeze, cough or have a feeling of tightness in your chest.

If your air passages are less swollen, they're less likely to react to the things that trigger your asthma symptoms. This may explain why people who take steroids have fewer symptoms (attacks).

Steroids also reduce the amount of mucus that builds up in your air passages.

Can they be harmful?

Leukotriene antagonists

Side effects from leukotriene antagonists aren't common. But leukotriene antagonists can cause mild side effects, including: ^[63]

- Headaches
- Feeling sick.

Leukotriene antagonists have been linked with a condition called **Churg-Strauss syndrome**. But this is very rare. People with Churg-Strauss syndrome get severe asthma along with other symptoms, such as a rash and numbness in the hands and feet. If it's not treated, it can lead to heart and kidney problems, and severe breathing difficulties. It can be treated with high-dose steroid tablets.

It's not clear whether leukotriene antagonists actually cause Churg-Strauss syndrome. But your doctor will want to keep an eye out for side effects just in case.

Some people taking montelukast have found they get changes in their mood. In severe cases, these can be bad enough for someone to feel suicidal. If you're concerned about any thoughts or feelings you have while you're taking montelukast, talk to your doctor as soon as you can.

Steroid inhalers

Using a steroid inhaler may give you: ^[33]

- A sore throat
- A hoarse or croaky voice
- A **fungal** infection (thrush) in your mouth or your throat.

But not everybody gets these problems. For example, only about 1 in 50 people who take a drug called fluticasone get an infection in their mouth. ^[33]

You're less likely to get side effects if you:

- Use a **spacer** to breathe in your medicine.
- Rinse out your mouth after using your inhaler.

You might have heard that taking steroids for a long time can make your bones weaker. But this shouldn't happen if you use an inhaler with the normal dose. ^[38]

Asthma in adults

If you're very ill, you may need to take higher doses of inhaled steroids. If this happens, you may get extra side effects from the drugs.

How good is the research on leukotriene antagonists and steroid inhalers to prevent symptoms?

We found two summaries of the research.^[82] ^[84] More than 2,000 people took part in the studies. The summaries found that people who took leukotriene antagonists and steroids did not get fewer bad asthma attacks than people who took only steroids.

A small study of 38 people looked at the effects of a taking a different leukotriene antagonist called zafirlukast.^[85] Those who took this drug twice a day for four weeks as well as using the steroid inhaler had:

- Improved scores in breathing tests
- Improved asthma symptoms.

But seven people pulled out of the study because their asthma got worse.

Some research has found that a higher dose of steroids seems to work just as well as taking a leukotriene antagonist.^[81]

Long-acting inhalers seem to be just as good as, or even better than, leukotriene antagonists.^[83] ^[44] ^[86] ^[45]

Avoiding allergens

In this section

[What are allergens?](#)

[What the research tells us about dust mites](#)

This information is for people who have asthma. It looks at whether avoiding allergens, such as those from dust mites or pollution, can improve your asthma.

We haven't looked at the research on this treatment in the same detail we have for the other treatments we cover. (To learn more, see Our method). But we've included some information because you might be interested.

What are allergens?

There may be things in your home and outdoors that can trigger your asthma.^[87] These are known as allergens. For example, you may find that being around pollen or pets brings on symptoms. Staying away from these things may help to keep your asthma under control.

Asthma in adults

How allergens trigger asthma

When you breathe in an allergen, your immune system overreacts because it thinks the allergen is dangerous. Your airways become inflamed and full of mucus. The muscles in your airways also tighten, the air passages get narrower and you have trouble breathing. It all happens very quickly.

About 30 in 100 to 50 in 100 people with asthma get these symptoms again six to 10 hours after they breathe in an allergen. This is called a **late reaction**.^[88] Some doctors call all asthma triggers allergens, but others group them into allergens and environmental factors.

- The most common allergens are droppings from dust mites, pollen, and flakes of skin or hair from animals (dander).
- Environmental factors include smoke and air pollution.

How to avoid allergens

You can take these steps to avoid allergens. We don't know for sure whether they work, but they may be worth trying.^[89] ^[90]

- Keep away from the things that start your asthma attacks, such as pollen or animals.
- Make certain you wash your hands after touching things that trigger your asthma (a friend's dog or cat, for example).
- Keep perfumes and other things with a strong smell out of your home.

Some people try to get rid of dust mites from their homes. This might involve regular dusting, using covers on pillows and mattresses, replacing carpets with wooden floors or using chemicals to kill dust mites. Unfortunately, these things don't seem to help people's asthma.^[91]

What the research tells us about dust mites

Unfortunately, the evidence suggests that trying to avoid dust mite allergens doesn't make much difference to your asthma. The trouble seems to be that it's just not possible to get rid of enough of the dust mite allergens to make a difference.

One big summary of the evidence looked at all the studies that had been done on reducing dust mite allergens, including using mattress covers and chemicals to kill the mites.^[91]

The summary found that these measures didn't make any difference to people's peak flow test results, their asthma symptoms, or how much asthma medicine they needed to use.

Breathing techniques

In this section

[What do breathing techniques involve?](#)

[How can they help?](#)

This information is for adults with asthma. It looks at breathing techniques that aim to help with asthma symptoms. These techniques are meant to be used together with your usual asthma drugs, not instead of them.

We haven't looked at the research on this treatment in the same detail we have for the other treatments we cover. (To learn more, see Our method). But we've included some information because you might be interested.

What do breathing techniques involve?

There are several different breathing techniques used to help improve asthma. One of the best-known is called Buteyko breathing, named after the doctor who developed the technique. Another is called the Papworth technique. It was developed by physiotherapists. Some people also try breathing techniques from yoga, such as pranayama breathing.

All the techniques aim to correct breathing that is too fast, or too deep. This is sometimes called 'dysfunctional breathing'. You may also hear it called 'overbreathing' or 'hyperventilation'.

Breathing techniques aim to help people control their breathing. This means focusing on things such as breathing through their nose, slowing their breathing, and relaxing the muscles used in breathing.

People usually learn the Buteyko method through classes for four or five days. The Papworth Method is also taught in about five sessions.

The Buteyko breathing technique teaches people:

- To breathe through their nose, not their mouth
- Ways to clear their nose to help with breathing
- Ways to keep their mouth closed so they breathe through their nose (this can involve wearing tape over their mouth when sleeping)
- How to check whether they are overbreathing
- Ways to stop overbreathing by doing breath-holding exercises
- Lifestyle changes to help reduce overbreathing, such as eating less and doing less stressful exercises.

Asthma in adults

The Papworth method also involves learning relaxation techniques, learning which muscles to use when breathing, and avoiding breathing too deeply or too fast.

People who use breathing techniques should not suddenly stop taking their asthma medicine. They should still carry a [quick-relief inhaler](#) with them and also continue to use preventers such as [inhaled steroids](#) if this is part of their treatment.

How can they help?

We don't know whether special breathing techniques help. Although some studies suggest that they can improve people's symptoms and quality of life, not enough research has been done to know for certain. Also, the studies have looked at several different breathing techniques. This makes it difficult to compare their findings. ^[92]

Here's what some of the research says so far.

In one study, 39 people with asthma were given either Buteyko training or general asthma and relaxation training. It found that those who had Buteyko training used less asthma medicine and did less overbreathing than the group who had general asthma education. The Buteyko group also seemed to have a slightly better quality of life, although the difference between the groups wasn't that big. ^[93]

In a study of the Papworth Method, 85 people were given either training in Papworth breathing, or usual medical care. Six and 12 months later, people who'd had the training had fewer symptoms of asthma. They also breathed more slowly in tests. ^[94]

A third study compared Buteyko breathing with a device that mimics the pranayama breathing technique from yoga. ^[95] People who used Buteyko breathing had a drop in asthma symptoms and they used their quick-relief inhaler less often. There was no real change in the group using the pranayama device.

Omalizumab

In this section

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on omalizumab?](#)

This information is for people who have asthma. It tells you about omalizumab, a treatment used for asthma.

Yes, having omalizumab in addition to your standard asthma treatments is likely to help, if you have severe asthma.

What is it?

Omalizumab (brand name Xolair) is a treatment for severe asthma that is caused by an allergy. It's recommended when other standard treatments aren't working, and for people who are getting severe asthma attacks several times a year. It is only used by specialists.

Omalizumab is given as an injection just under your skin.

How can it help?

People who take omalizumab in addition to their standard treatment are likely to have fewer serious asthma flare-ups, need fewer emergency visits to hospital, and have less severe symptoms of breathlessness, compared to people who had a dummy (placebo) treatment.

How does it work?

Omalizumab works by blocking the action of a substance called IgE, which attaches itself to particular white blood cells that are involved when tissues become inflamed. This prevents release of substances that cause inflammation in the lungs.

Prevention of inflammation can mean the airway does not become so swollen and constricted, so you get fewer asthma symptoms.

Can it be harmful?

Some people get pain and redness at the point they've had the injection. You may also get pain in the joints, tiredness, and ear pain.

Omalizumab can cause severe side effects, usually within two hours of an injection, but sometimes 24 hours or more later. However, this is rare.

How good is the research on omalizumab?

We found one summary of the research (a systematic review) that included seven trials comparing omalizumab with a dummy (placebo) drug, in addition to standard treatment. Overall, the summary found that omalizumab helped reduce asthma severity.^[96]

Quick-relief medicines to treat symptoms in the A&E department

In this section

[Do they work?](#)

[What are they?](#)

[How can they help?](#)

[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on quick-relief inhalers to treat symptoms in the A&E department?](#)

Asthma in adults

This information is for people who have asthma. It tells you about using quick-relief medicines to treat asthma in the A&E department. It is based on the best and most up-to-date research.

Do they work?

Yes. If your symptoms get so bad that you need to go to the hospital Accident and Emergency (A&E) department, taking quick-relief medicines (or relievers) through a [spacer or a nebuliser](#) should help your breathing.

You should use your own quick-relief inhaler while you're waiting for emergency care.

You shouldn't need to have injections of these drugs. They don't work any better than breathing the drugs through a nebuliser.

What are they?

Quick-relief inhalers are the main treatments used to help relieve breathing problems in people with asthma. As their name suggests, they get to work quickly. They should help your symptoms within a few minutes.

The most common drugs (with their brand names) used are:

- salbutamol (Ventolin)
- terbutaline (Bricanyl).

Both of these drugs belong to a type called **short-acting beta-2 agonists**.

Your doctor may refer to these drugs as **bronchodilators** because they open up (dilate) the airways (bronchial tubes).

Many people also take these drugs through inhalers to treat mild symptoms when they happen. If you're given these drugs in the A&E department, you'll breathe the drugs in through a spacer or a nebuliser. A spacer is a tube that attaches to an inhaler. It helps you get more of the drug into your lungs. A nebuliser is a machine with a facemask that you breathe through.

To learn more, see [Spacers and nebulisers](#) .

If you use a nebuliser, you can breathe the drugs continuously, at regular intervals or only when you feel you need them ('on demand').

- If you take them continuously, you sit or lie down with a mask over your mouth and nose. The mask is attached to a nebuliser. You breathe the drugs in for about one hour or until your symptoms ease off.
- If you take them at regular intervals, you sit or lie down with a mask over your mouth and nose. The mask is attached to a nebuliser. A nurse or doctor then starts the nebuliser at regular intervals, such as once every two hours.

Asthma in adults

- If you take them when you need them, you sit or lie down with the mask over your mouth and nose. You start the nebuliser when you feel your symptoms are getting worse. You may have this kind of treatment if you're admitted to hospital.

The amount of drug you get into your lungs is about the same whichever way you take them. You can also have an injection if you prefer.

How can they help?

If you need quick-relief medicines in the A&E, taking them through a nebuliser or a spacer seems to work equally well. ^[97]

Having them through a nebuliser also works just as well as having them through a drip (also called an IV or intravenous infusion). ^[98]

If you're taking quick-relief medicines through a nebuliser, it's better to take them continuously than at regular intervals because: ^[99]

- You're less likely to be admitted to hospital
- The results of your breathing tests will be better.

If you don't take your quick-relief medicines continuously, it's better to take them when you need them (on demand) than at regular intervals (for example, every four hours). ^[100] You may spend less time in hospital.

How do they work?

When you get symptoms of asthma, it's because the air passages in your lungs have become narrower. The small muscles in the walls of your air passages squeeze together and close up the passages.

Quick-relief inhalers work by loosening these muscles. So the air passages open wider, making it easier for air to get in and out of your lungs.

Breathing in the quick-relief inhaler means that the drug goes straight to your air passages and gets to work straight away. But if your asthma is very bad, you'll find it difficult to get enough of the drug into your lungs if you use a normal inhaler. Using a spacer or a nebuliser helps get the drug to where it's needed.

If you have an injection, the drug gets to your lungs through your bloodstream.

Can they be harmful?

The most common side effect is shaking or trembling, especially in your hands. It's called **tremor**. It's normally quite gentle and most people don't find it a problem.

Asthma in adults

It's more likely to happen if you use a spacer or a nebuliser than if you use an ordinary inhaler. That's because you get a higher dose of the drug.^[29] High doses may also increase your heart rate. These problems are equally likely to happen with a spacer or a nebuliser.^[97]

You're just as likely to get side effects if you take quick-relief drugs continuously through a nebuliser as if you take them at intervals.

But, by taking quick-relief inhalers only when you feel you need them ('on demand'), you're less likely to get a faster heart rate than if you breathe in the drugs every few hours, whether you need them or not.^[100]

Some other side effects are:^[98]

- High blood pressure
- Headache
- Nausea or vomiting.

You may be slightly less likely to get side effects if you have injections instead of breathing in the drugs.^[98]

How good is the research on quick-relief inhalers to treat symptoms in the A&E department?

There has been quite a lot of research on the different ways of taking quick-relief inhalers (also called short-acting beta-2 agonists) to relieve symptoms in the Accident and Emergency (A&E) department.

We found one summary of the research evidence.^[99] Researchers carefully compared the results from eight studies. This way of looking at all the evidence is called a **systematic review**. All the studies were **randomised controlled trials**.

About 460 people took part in the studies. All the people in the studies used a machine called a nebuliser to breathe in quick-relief medicine. Some people breathed the drug in continuously. Others used the nebuliser at regular intervals.

People breathing the drug continuously:

- Were less likely to be admitted to hospital
- Performed better in breathing tests two to three hours after taking their medication.

Another study involved 46 patients who either had these inhalers every four hours or when they felt they needed it ('on demand').^[100]

Asthma in adults

- Patients who took treatment only when they felt they needed it were able to leave hospital one day sooner than those who had treatment regularly.
- They also took half as much medicine as those on regular doses and fewer patients got heart problems.

We found a review that compared **spacers** and **nebulisers**.^[97] The review compared the results of 13 studies. More than 400 adults took part. Some patients used a spacer to take quick-relief inhalers in the Accident and Emergency (A&E) department. Others used a nebuliser.

- On average, the two groups got similar scores in tests to measure their breathing.
- People in both groups were equally likely to be admitted to the hospital. And they spent about the same time in the A&E department.

We also found a review that compared using a nebuliser with having quick-relief drugs given to you in your veins through a drip (also called an IV or intravenous infusion).^[98] This review compared the results of six studies, which included 337 people altogether.

People who breathed quick-relief drugs through a nebuliser got similar scores on breathing tests to people who received these drugs intravenously.

We looked at one other review of 15 studies. It showed that breathing quick-relief drugs through a nebuliser was just as effective as having them intravenously: both for improving symptoms and improving scores in breathing tests.^[101]

Steroids in the A&E department

In this section

[Do they work?](#)

[What are they?](#)

[How can they help?](#)

[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on steroids in the A&E department?](#)

This information is for people who have asthma. It tells you about using steroids to treat asthma in the A&E department. It is based on the best and most up-to-date research.

Do they work?

Yes. If your asthma symptoms are so bad that you need to go to Accident and Emergency, steroids can help to keep you recover. They may stop you needing to stay in hospital.

You can take them as tablets or have injections. Or you can breathe them through an inhaler. All these types of steroids reduce your chances of having to stay in hospital. But when steroids are given in hospital for severe asthma attacks, they're usually given as tablets.

Asthma in adults

If you keep taking steroids for a while after you leave the A&E department, you're less likely to have another bad asthma attack.

What are they?

Steroids are a type of anti-inflammatory drug. They prevent the air passages in your lungs swelling, which lets more air get into your lungs.

The steroids used to treat asthma are called **corticosteroids**. They are not the same as the **anabolic steroids** that athletes and bodybuilders use to build up muscle. In fact, asthma steroids are like the steroids produced naturally by our bodies to deal with inflammation.

Most people who have asthma have a steroid inhaler that they use regularly to prevent symptoms. It helps to keep asthma under control. To learn more, see [Steroid inhalers to prevent symptoms](#) .

If your asthma symptoms are so bad that you need to go to the A&E department, steroids are usually one of the first treatments you'll get. But the dose of steroids you get in the A&E will be much higher than the dose you might take every day.

In the A&E department most people get steroid tablets. If you can't take tablets for some reason, you'll probably have injections.^[21] You may also have steroids that you breathe in.

You'll also be given other treatments for your asthma in the A&E department. To learn more, see [Treating your asthma in hospital](#) .

When your symptoms are under control, your doctor may give you some steroid tablets to take at home. Or you may have an injection of steroids before you go home. Both these extra treatments make it less likely that you'll have to come back to A&E.^[102] You may need to carry on using a steroid inhaler after you finish your tablets.

How can they help?

If you have a bad asthma attack and need treatment in hospital, steroid tablets reduce your chances of needing to stay in hospital.^[102] ^[103] Steroid injections work too. Tablets and injections seem to be about as good as each other.

Some research shows that high doses of inhaled steroids can also help people being treated for an asthma attack in hospital.^[104] ^[105] But doctors know that tablets and injections work well, so don't tend to use inhaled steroids.^[9]

When you leave the A&E department:

- Taking steroid tablets or a high dose of inhaled steroids for 7 to 10 days afterwards can lower your chances of having another asthma attack.^[102]

Asthma in adults

- Having a steroid injection just before you leave A&E can lower your chances of having another asthma attack.^[102] This seems to work just as well as tablets.

How do they work?

If you have asthma, the walls of the air passages in your lungs may be swollen and the air passages may have too much mucus in them. This makes the passages narrower than usual.

Steroids reduce the swelling. And they also help to stop further swelling. When the swelling goes down, the air passages will open up and you'll be able to breathe more easily. So you're less likely to wheeze, cough or have a feeling of tightness in your chest.

Steroids also reduce the amount of mucus that builds up in your air passages.

Low doses of steroids prevent you getting asthma symptoms. But if your symptoms get bad, higher doses of steroids can help you breathe. They make it easier for you to breathe.

Can they be harmful?

Taking high doses of steroids for a long time may cause side effects, which can sometimes be serious. But when steroid tablets or injections are used as an emergency treatment for severe asthma, they're only given for a few days. Because you'll only be taking them for a short time, you are unlikely to get serious side effects.^[28]

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

How good is the research on steroids in the A&E department?

There's good evidence that taking steroids can help you recover if you need to go to Accident and Emergency (A&E) because of your asthma. Several large reviews of the research show that steroids help.

It's clear that having steroid tablets or injections can help people having an asthma attack avoid having to stay in hospital.^[102] ^[103] Some research shows that high-dose steroid inhalers may work too, although doctors normally prefer to use tablets.^[104]

Ipratropium and a quick-relief inhaler in the A&E department

In this section

[Do they work?](#)

[What are they?](#)

[How can they help?](#)

[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on ipratropium and quick-relief inhalers in the A&E department?](#)

This information is for people who have asthma. It tells you about using ipratropium to treat asthma in the A&E department. It is based on the best and most up-to-date research.

Do they work?

Yes. If you get bad asthma symptoms (a [bad attack](#)), then taking ipratropium as well as using your quick-relief inhaler can help your lungs work better.

And if you have this combination of treatments, you're less likely to need to stay in hospital than if you just use your quick-relief inhaler.

What are they?

Ipratropium is a drug that widens the air passages in your lungs. This lets more air in and out of your lungs. So you should find it easier to breathe.

Your doctor may call ipratropium a **bronchodilator** because it dilates (opens up) the bronchial tubes (airways). It works a little more slowly than the quick-relief inhalers salbutamol or terbutaline. You take it if your asthma is out of control.

One brand name for ipratropium is Atrovent.

Ipratropium is often used together with a quick-relief inhaler. If you're being treated in hospital for a severe asthma attack, and a quick-relief inhaler isn't helping on its own, you might have ipratropium too. Quick-relief inhalers also help you to breathe more easily by opening up your airways. Their effects only last between three and six hours. But they work in a slightly different way to ipratropium. And they work slightly faster.

You can get ipratropium and quick-relief drugs as inhalers. But if you take these drugs in the A&E department, you'll probably breathe the drugs in through a **spacer** or a **nebuliser**. A spacer is a tube that attaches to an inhaler. It helps you get more of the drug into your lungs. A nebuliser is a machine with a facemask that you breathe through.

To learn more, see [Spacers and nebulisers](#) .

How can they help?

You can take this combination of treatments in the first hour or so after you go to the A&E department with bad asthma symptoms. It should help with your symptoms and reduce the chance that you'll have to stay in hospital.

Taking a combination of ipratropium and a quick-relief inhaler in this way works better than taking a quick-relief inhaler on its own. If you take both treatments, you will probably: [\[106\]](#)

- Get higher scores in tests that measure your breathing
- Get better more quickly
- Be less likely to need to stay in hospital.

Asthma in adults

Taking a combination of ipratropium, a quick-relief inhaler and a steroid inhaler also works better than taking a [quick-relief inhaler plus a steroid inhaler](#). Your lungs are likely to work better three hours after taking this combination of three treatments than if you take just the two inhalers. ^[107]

How do they work?

Ipratropium and quick-relief inhalers work by loosening the muscles in the walls of your airways. So the airways open wider and you can breathe more easily.

They work in slightly different ways. Trying to fix the problem in two different ways should be more likely to work than fixing it in one way.

Can they be harmful?

Ipratropium may give you a dry mouth, nose, and throat. The drug stops these parts of your body from making mucus and saliva.

The most common side effect of quick-relief inhalers is shaking or trembling, especially in your hands. It's called **tremor**. It's normally quite gentle and most people don't find it a problem. It's more likely to happen if you take the medicine through a spacer or a nebuliser. ^[97] That's because you get a high dose of medicine. High doses may also increase your heart rate.

The side effects that happen when you take both ipratropium and a quick-relief inhaler don't seem to be much worse than if you only take a quick-relief inhaler. ^[106]

How good is the research on ipratropium and quick-relief inhalers in the A&E department?

There is quite a lot of evidence for taking both ipratropium and a quick-relief inhaler together if you need treatment in your hospital Accident and Emergency (A&E) department.

In one large review of the research: ^[106]

- People who took a quick-relief inhaler and ipratropium got higher scores in tests to measure their breathing. This means their lungs were working better
- The people who had both treatments were less likely to have to stay in hospital.

Oxygen in the A&E department

In this section

[Does it work?](#)

[What is it?](#)

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[Can it be harmful?](#)

[How good is the research on oxygen in the A&E department?](#)

Asthma in adults

This information is for people who have asthma. It tells you about using oxygen as a treatment for asthma in the A&E department. It is based on the best and most up-to-date research.

Does it work?

Yes. Oxygen can be a lifesaving treatment for people with severe asthma. ^[108]

Some research has shown it's best not to breathe in pure (100 percent) oxygen when you have severe asthma. Breathing in a lower concentration than 100 percent oxygen works better.

What is it?

If you go to the hospital Accident and Emergency (A&E) department because of a severe asthma attack, you'll probably be given oxygen to breathe through a mask. This helps you breathe and gets more oxygen into your bloodstream.

Oxygen makes up about a fifth (20 percent) of the air you normally breathe. If you're given oxygen in A&E, you'll breathe in air that contains a higher percentage of oxygen, probably 40 percent to 60 percent. ^[109]

You keep breathing the extra oxygen until there's enough oxygen in your bloodstream.

How can it help?

Breathing in extra oxygen through a mask helps get oxygen into your bloodstream while you're recovering from your asthma.

One study has found that you'll be able to breathe better if you don't breathe 100 percent oxygen in the A&E department, but breathe a lower concentration. ^[108]

How does it work?

Every cell in your body needs oxygen to work properly. If you don't get enough oxygen, you'll pass out eventually and you may die.

If your asthma gets very bad, you'll find it hard to breathe. So you won't get much air into your lungs. And your body won't get the oxygen it needs.

So breathing in extra oxygen should help get enough oxygen into your bloodstream and around your body.

Can it be harmful?

Breathing in 100 percent oxygen can increase the amount of carbon dioxide in your blood more than breathing in a weaker concentration. ^[108] This can sometimes make breathing problems worse. Breathing in extra oxygen through a mask could be safer at a lower oxygen concentration. But oxygen is unlikely to harm you. It could save your life.

How good is the research on oxygen in the A&E department?

We know that breathing in oxygen is an important treatment for people who have severe asthma symptoms. It's been used all over the world for many years.

One type of medical trial compares people having a treatment with people who don't have it. But doctors can't do that sort of study with oxygen. People who don't get oxygen when they're having a severe asthma attack could die. Instead, doctors have looked at different concentrations of oxygen, to see which one works best.

We found one study that compared two different concentrations of oxygen given over 20 minutes.^[110] The study included 78 people admitted to an emergency department. Half of the people were given 100 percent oxygen and the rest breathed in a concentration of 28 percent oxygen. The people who had 28 percent oxygen could breathe better in tests.

Magnesium sulfate in the A&E department

In this section

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[Can it be harmful?](#)

[How good is the research on magnesium sulfate in the A&E department?](#)

This information is for people who have asthma. It tells you about using magnesium sulfate to treat asthma in the A&E department. It is based on the best and most up-to-date research.

Does it work?

We don't know. If you need to go to the hospital Accident and Emergency (A&E) department because your asthma is out of control, and if your symptoms are very bad, a magnesium sulfate drip may help you breathe more easily. However, there isn't enough research to know for certain.

A drip is when medicine is given through a tube directly into a vein. It is also called an IV or **intravenous infusion**.

What is it?

Magnesium is a mineral that you get from food. It does many different jobs in your body, and it can widen the airways in your lungs.

When magnesium sulfate is used to treat asthma it is usually given as a drip. The magnesium travels through your bloodstream to your lungs.

You may also be given magnesium through a **nebuliser** together with a quick-relief drug such as salbutamol.^[111] ^[112]

Asthma in adults

In the A&E department, you can have this treatment to help you breathe more easily. Doctors often try magnesium sulfate when other treatments haven't worked.^[111] The drip will probably last about 20 minutes.^[113]

How can it help?

We're not sure if a magnesium sulfate drip does help. Different studies have had different results.

In one review of the research, magnesium sulfate helped people with severe asthma symptoms breathe better.^[114] It also helped stop them avoid having to stay in hospital. It didn't seem to help people who had mild symptoms.

However, some research has found that magnesium doesn't help. In a second review, a magnesium sulfate drip didn't help people avoid having to stay in hospital after a severe asthma attack.^[115]

Magnesium sulfate through a nebuliser along with the quick-relief drug salbutamol may also help you to breathe more easily.^[116]

How does it work?

Magnesium helps to widen the air passages in your lungs. This lets air get in and out of your lungs more easily. So breathing is easier. But no one knows exactly how it works. It seems to work in several different ways. It may reduce any swelling in your airways.^[117]

Can it be harmful?

There isn't much research on side effects. One study found that side effects were common, but they weren't serious. About 6 in 10 people who took magnesium sulfate got side effects.^[118]

Some people got:

- A burning feeling where the drug goes into the vein
- Itchy skin
- Red skin.

How good is the research on magnesium sulfate in the A&E department?

We found two reviews of the research.^[115] ^[114] Different studies said different things, so it's hard to say how well magnesium works for a severe asthma attack.

Asthma in adults

- The first found that, overall, magnesium sulfate helped people's lungs work better. ^[114] It also meant that people were less likely to need to stay in hospital. But it only helped people with severe asthma.
- Overall, the second review found that magnesium didn't help people's breathing, and didn't help people avoid having to stay in hospital. ^[115]

We also found a summary of studies in which people took magnesium sulfate and a quick-relief drug, salbutamol, using a nebuliser. ^[116] This treatment helped people's lungs work better. But we need more research to know how well magnesium sulfate works compared with other treatments.

Using a ventilator in the A&E department

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on using a ventilator in the A&E department?](#)

This information is for people who have asthma. It tells you about using a ventilator in the A&E department to treat severe asthma. It is based on the best and most up-to-date research.

Does it work?

Yes. Doctors agree that ventilators can save the lives of people with the most severe asthma symptoms.

What is it?

A ventilator is a machine that pushes air into your lungs. It's only used for people whose breathing has become so bad that they aren't getting enough oxygen into their bloodstream.

If your asthma is stopping you breathing properly, you'll get exhausted and drowsy. If you're not treated, you'll eventually black out and you may die. ^[119]

When you use a ventilator, you'll probably have a tube put in your mouth or nose. The tube goes down your throat and into your windpipe. You'll be given drugs to help you relax. The tube is attached to the ventilator. Some people can use a ventilator with a facemask instead of a tube in the throat.

A computer checks the mixture of oxygen and other gases in the air that you breathe in and out. The computer also controls how much air goes into your lungs and how often.

When you can breathe again on your own, you can stop using the ventilator.

How can it help?

If you're finding it so hard to breathe that you're in danger of dying, using a ventilator may save your life. ^[120] ^[121] ^[122] ^[123] ^[124] ^[125] ^[126]

If you're not breathing enough, your body isn't getting the oxygen it needs. If the amount of oxygen in your body drops too low, you'll die. So ventilation helps to get oxygen quickly back into your bloodstream.

How does it work?

Asthma can make it hard to breathe. A ventilator forces air into your lungs. It does your breathing for you so you get the oxygen that you need.

While you're using the ventilator, your doctors have time to give you other treatments to help you breathe. So you should be able to breathe on your own when you stop using the ventilator.

Can it be harmful?

Ventilators force air into your lungs. This extra pressure can cause some problems. Doctors will monitor you very closely to check for side effects.

Side effects include: ^[120] ^[127]

- Low blood pressure. This happens to about 1 in 5 people who use a ventilator. You may get extra treatment to bring your blood pressure back to normal. This problem should go away after you stop using the ventilator
- Abnormal heartbeat. This happens to about 1 in 10 people who use a ventilator. You may get extra treatment for it. This problem should go away after you stop using the ventilator
- Burst eardrum. This happens to about 1 in 7 people. It's painful but it should heal by itself
- Muscle weakness. This happens to at least 1 in 10 people. It's more likely to happen if you have certain kinds of drugs to help you relax. It goes away after you stop using the ventilator.

There is a small risk of dying when you use a ventilator. This may be because of the ventilator but it may be because your asthma is so bad. Some types of ventilator are more likely to cause death than other types.

If you have to stay in bed for a long time, you may get blood clots in a deep vein in your leg. This is called **deep vein thrombosis**. It's a serious condition because the clot could travel to your heart or lungs. If a clot gets stuck in a blood vessel in your lungs, it's called a **pulmonary embolism**. You can die if this isn't treated.

How good is the research on using a ventilator in the A&E department?

Doctors are convinced that ventilators can help people who are in danger of dying because their asthma is stopping them breathing properly.

One type of medical study compares people having a treatment with people who don't have it. It's hard to do that kind of study for people having severe asthma attacks. Without ventilation people could die. One small study did compare proper ventilation with ventilation that was too weak to help.^[128] People who had proper ventilation were more likely not to need to stay in hospital.

There have been two studies comparing different ways of using a ventilator.^[121] ^[122] A more gentle type of ventilation called **controlled ventilation** is less likely to cause death than some other types of ventilation.

Helium and oxygen in the A&E department

In this section

[Does it work?](#)

[What is it?](#)

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[Can it be harmful?](#)

[How good is the research on helium and oxygen in the A&E department?](#)

This information is for people who have asthma. It tells you about using helium and oxygen to treat asthma in the A&E department. It is based on the best and most up-to-date research.

Does it work?

We don't know whether breathing in a mixture of helium and oxygen helps to treat severe asthma in the hospital Accident and Emergency (A&E) department.

Some research suggests that breathing in extra oxygen works just as well as breathing in the mixture.

What is it?

If you go to the hospital A&E department because you have severe asthma symptoms (a severe attack), you'll probably be given extra oxygen to breathe through a mask. This helps you breathe and gets more oxygen into your bloodstream.

To learn more, see [Oxygen in the A&E department](#) .

In some hospitals, you may be given a mixture of helium and oxygen. This mixture is called **heliox**. The helium also helps you breathe.

Different hospitals may use different amounts of helium and oxygen in the mixture. In the studies we looked at, two mixtures were commonly used:^[129]

Asthma in adults

- 20 percent oxygen and 80 percent helium
- 30 percent oxygen and 70 percent helium.

How can it help?

Breathing in extra oxygen through a mask may help get oxygen into your bloodstream while you're recovering from your asthma.

But there's no evidence that breathing a mixture of helium and oxygen works better than breathing extra oxygen. ^[129]

How does it work?

Oxygen makes up about a fifth of the air you breathe. The rest is nitrogen and other gases. Every cell in your body needs oxygen to work properly. If you don't get enough oxygen, you'll pass out.

If your asthma gets very bad, you'll find it hard to breathe. So you won't get much air into your lungs. And your body won't get the oxygen it needs.

Helium is a gas that's lighter than air. So it's easier to breathe in. If you're struggling to breathe because of your asthma, using a mixture of helium and oxygen may be helpful.

Some doctors think breathing a mixture of oxygen and helium through a mask should help get extra oxygen into your bloodstream and around your body. But there's no evidence that the mixture works better than standard oxygen. It's also expensive.

Can it be harmful?

Side effects are rare. We found two reports of side effects: ^[129]

- One patient didn't get enough oxygen from the mixture of helium and oxygen.
- Another patient felt dizzy when they breathed the mixture.

How good is the research on helium and oxygen in the A&E department?

We found one summary of the research. ^[129] Researchers carefully compared the results from six different studies, involving 358 adults. This way of looking at all the evidence is called a **systematic review**.

Some of the people in the studies had air or **oxygen**, and others had a mixture of helium and oxygen (the mixture is sometimes called heliox). The review found that on most measures, the mixture of helium and oxygen didn't work any better than standard oxygen.

We need more research to know if heliox is really worthwhile.

Further informations:

Some common triggers for asthma

Allergens

Most people with asthma get symptoms when their immune system overreacts to things in the air. ^[2] These things are called allergens.

The most common allergens are:

- House dust mites
- Pollen
- Flakes of skin or hair from animals (dander).

If you are allergic to house dust mites, it isn't the mites themselves that trigger asthma symptoms. It's their droppings.

When you breathe in an allergen, your body thinks the allergen is dangerous. Your immune system overreacts. It pumps lots of chemicals into your blood. These chemicals make the airways swollen and inflamed. The muscles in the airways also tighten, the air passages get narrower and you have trouble breathing. It all happens very quickly.

About 30 in 100 to 50 in 100 people with asthma get these symptoms again, 6 to 10 hours after they breathe in an allergen. This is called a late reaction. ^[2]

Smoke and air pollution

Breathing in tobacco smoke can cause asthma. ^[3] And if you already have asthma, smoke can trigger the symptoms (give you an asthma attack).

Tobacco smoke contains many different chemicals. Some of these chemicals can make the tubes in your lungs swollen or narrower. So, some people get asthma symptoms when they go into a smoky room.

Air pollution probably doesn't cause asthma. But it can make your symptoms worse. These are some of the chemicals that can cause asthma symptoms:

- Nitrogen dioxide (NO₂)
- Ozone
- Sulphur dioxide (SO₂).

Asthma in adults

If there are warnings that air pollution is bad in your area, you may want to stay indoors.

Some people get an asthma attack when they breathe in cold air.^[4] This may happen when you leave your home and go outside.

Exercise

Many people with asthma find that their symptoms are worse when they exercise. Doctors call this exercise-induced asthma.

It's more likely to happen if you exercise in cold and windy conditions.^[2] ^[5] So you're more likely to get symptoms if you're skiing or ice skating than if you're swimming in a heated pool. Some people get symptoms when they leave their home on a cold day.^[2]

Your symptoms may start during exercise. But more often they start within five to 15 minutes of stopping exercise. They may start up to 30 minutes after you stop.

Some people can 'run through' their symptoms. As they continue to exercise, their symptoms slowly go away.^[5] And if you use your [reliever inhaler](#) (usually blue) before you exercise, it may prevent you getting symptoms. However, if you use your inhaler frequently to prevent exercise-induced asthma, it may start working less well for this.^[6]

Medicines that may trigger an asthma attack

Aspirin and NSAIDs

About 1 in 10 people with asthma are allergic to aspirin and other nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen (Nurofen).^[2] There are many different NSAIDs. They are painkillers and they can help with inflammation. If you're allergic to these drugs, there's also a 1 in 10 chance that you'll get asthma symptoms when you eat food or drinks that contain a food colouring called tartrazine (E102). If you need to take painkillers and you've had a bad reaction to an NSAID, it's a good idea to tell your doctor so he or she can advise you about alternatives.^[7]

Beta-blockers

If you have asthma, you should not take beta-blockers. These drugs can bring on your symptoms. And your asthma medicines may not work as well.

There are many different beta-blockers. Atenolol (Tenormin) and propranolol (Inderal) are examples. Many people take beta-blockers as a treatment for high blood pressure and other conditions. To learn more, see [Beta-blockers](#) in our section on high blood pressure.

Some eye drops used for treating a condition called glaucoma also contain beta-blockers. You shouldn't use such eye drops if you have asthma.

Chemicals that may trigger an asthma attack

Chemicals used in industry or agriculture can trigger asthma symptoms in some people. ^[2]

Common examples are:

- Chemicals that contain platinum, chrome or nickel
- Some paints, solvents and dyes
- Enzymes

Other illnesses

Colds, flu, and chest infections don't cause asthma, but they can make your symptoms worse. ^[4]

If you get **hay fever** (also called **seasonal** or **intermittent rhinitis**), you should treat the symptoms because they can make your asthma more difficult to control.

Hay fever usually happens during the spring, summer and autumn. But some people get a type of hay fever throughout the year. This condition is called **perennial** or **persistent rhinitis**. Like hay fever, it makes your asthma harder to control.

Stress

Many people with asthma find that their symptoms get worse if they are worried or upset about something. ^[2]

Some people are more affected by stress than others.

How can I tell when my asthma is getting out of control?

You should see your GP if: ^[10]

- You're waking up at night more than usual with asthma symptoms
- The blue inhaler (reliever) you use to treat your symptoms quickly doesn't help your breathing for very long or doesn't help at all.

You should call 999 or go to the hospital Accident and Emergency (A&E) department if: ^[10]

- It's hard to talk because of your asthma

Asthma in adults

- Your nose opens wide when you breathe
- Your skin is pulled in around your ribs and neck when you breathe
- Your heartbeat or pulse is very fast
- You're finding it hard to walk
- Your lips or fingernails turn grey or blue.

At least once a year, your GP, or a practice nurse with special training in asthma, should check that your asthma is well controlled.

They may ask you about your symptoms:^[7]

- Have you had difficulty sleeping because of your asthma symptoms (including cough)?
- Have you had your usual symptoms during the day (cough, wheeze, chest tightness or breathlessness)?
- Has your asthma stopped you doing anything (doing your job or housework, for example)?

Depending on your answers, they may decide to change your treatment. They may also measure your lung function with a peak flow test. People whose lung function is poor, or who have had bad symptoms or lots of asthma attacks, may need stronger treatment. But if your asthma is under control, your treatments may be reduced.

How bad is my asthma?

There is no formal way of grading asthma in the UK. But your GP may describe your asthma as 'mild' or 'severe' depending on how often you get symptoms and how bad they are. For example, if you have mild asthma you might get symptoms more than once a week, but not every day. If your asthma is more severe you may get symptoms most days and sometimes at night.

Some people have what doctors call 'brittle' or 'difficult to treat' asthma. This means you have to take high doses of [preventer drugs](#) (usually steroids, which is short for corticosteroids) and you also often need to use your [reliever](#) (the blue inhaler). Your symptoms may also get worse quite suddenly and you may need to be treated in hospital.

Your doctor may also talk about how bad your asthma is according to the treatments you need to keep it under control.^[15] Doctors talk about 'steps'. Each step shows what

Asthma in adults

treatment (or treatments) you need to control your asthma. Step 1 needs the fewest treatments and step 5 needs the most.

Doctors in the UK use the 'stepwise' approach to treating asthma.^[15] They talk about 'stepping up' treatment, when they increase the dose or the number of treatments you need. If your asthma is well controlled your GP may reduce the dose or take some treatments away. This is called 'stepping down'. Your GP will always try to give you the smallest amount of medicines that keep your asthma under control.

This is what the different steps mean:

Step	Medicines needed to control asthma
Step 1	You sometimes need to use a reliever (usually a blue inhaler).
Step 2	You need to use a preventer treatment (usually an orange or brown steroid inhaler) as well as a reliever (usually a blue inhaler).
Step 3	You need an extra treatment on top of the ones in Step 2. This is usually a long-acting reliever.
Step 4	You need a higher dose of steroid or another treatment, as well as Step 3 treatments.
Step 5	You need to take steroid tablets regularly. You should be seen by a specialist asthma doctor, usually one who is based in hospital.

To learn more about how asthma is treated, see [Treating your asthma from day to day](#) and [Treating your asthma in hospital](#) .

Treating your asthma from day to day

Everyone's asthma is different. So, the medicines you take may well be different to someone else's. For detailed information about individual treatments, see [Everyday treatments for asthma](#) .

Most people with asthma use an inhaler

You'll probably have a [quick-relief inhaler](#) to use when you get symptoms.^[7] It contains a type of drug called a short-acting beta-2 agonist. These inhalers are usually blue.

- You'll usually need two puffs on the inhaler to ease your symptoms.
- You should carry your inhaler with you at all times.
- If you don't get symptoms often, this may be all the treatment you need.

Asthma in adults

If exercise tends to bring on symptoms of asthma, you should use your blue inhaler before starting exercise.^[7]

If you still get symptoms

- You can use another type of inhaler to prevent your symptoms.^[7] This [preventer inhaler](#) contains a type of drug called a steroid (short for corticosteroid). It helps your lungs work better. Preventer inhalers are usually brown.
- You'll usually use this inhaler twice a day, in the morning and at night.
- The dose of steroid you need will depend on how often you get symptoms and how bad they are.
- If you've been taking an inhaled steroid and you're still getting symptoms, your doctor may recommend a higher dose of steroids or another drug on top of your steroid inhaler. Adding a new treatment will probably work better than increasing your dose of steroids.^[7]

If you've tried using an inhaled steroid but you're still getting symptoms

- You can try a drug called a [long-acting beta-2 agonist](#) on top of an inhaled steroid.^[7] This may help to control your symptoms better. You must only use a long-acting beta-2 agonist together with a steroid inhaler. Using a long-acting beta-2 agonist on its own can be dangerous.^{[16] [17]} This is the preferred additional treatment if you are getting symptoms despite taking steroids at 200 to 800 micrograms a day. You will probably have just one inhaler containing long-acting beta-2 agonists and steroids together.^[18]
- An alternative is tablets to help prevent symptoms. These are called [leukotriene antagonist tablets](#). You should keep using your steroid inhaler while you're taking these tablets.

Changing your treatment

- Your doctor will usually see you at least once a year to check that your asthma is under control.
- If your symptoms don't happen often, you may be able to take a lower dose of your medicine. And if you've been getting symptoms often, you may need a higher dose. Doctors call this the 'stepwise' approach to treating asthma.^[7] If you need a higher dose, it's called 'stepping up'. If you can take a lower dose, it's 'stepping down'.

Asthma in adults

- Doctors try to give you the lowest dose of medicine that will prevent you from getting symptoms. The lower the dose, the less likely you are to get side effects.

How you can take your treatments

- By breathing them in. This way of taking your drugs is the least likely to cause side effects. Most of the drug goes directly to your lungs where it's needed. So you shouldn't get many side effects and there's no delay in getting your treatment.
- By taking a tablet. Most people find that pills are easy to take. But when you take a tablet, you're more likely to get side effects than if you breathe in the drug. However, if you need to take steroid tablets for just a short time it's probably easier to take tablets than to breathe in the drug. And the risk of side effects is very small because you'll only need to take the tablets for a week or two.
- By having an injection. Injections hurt and they also need to be given by a doctor or nurse. This might mean there is a delay in getting your treatment. And you may get more side effects than if you take a pill or breathe in your drugs.

Your inhalers

Many of the inhalers used nowadays are called 'CFC-free'. CFC stands for chlorofluorocarbons. It is a chemical that was used in inhalers to help push the medicine out. However, the makers of asthma inhalers are stopping the use of CFCs because they damage the environment. They're now using other chemicals instead and eventually all asthma inhalers will be CFC-free. These inhalers work just the same as those that contain CFCs. But you may notice that your medicine tastes slightly different.

Being involved in decisions about your treatment

Some people don't want to be too involved in deciding how their asthma is treated. You may be happy to let your doctor do all of this for you. But many people with asthma want to have a say in how they are treated.^[19] Your doctor should encourage you to be involved in choosing your treatment. But, if they don't and you want to be more involved, you may need to tell them. One way you can try to get more involved is by asking your doctor for a written action plan (see below). You can also ask them for more information about your treatments and why you need them.

Having a written action plan

If you have asthma, you should have a written action plan from your doctor.^[7] Your action plan should give you advice about how to manage your asthma. Action plans have been shown to improve the health of people with asthma.^{[7] [20]} Patients who have a written action plan are less likely to need to be treated in hospital than those who do not have an action plan. But many doctors are not giving their patients written action plans yet. So you may have to ask for one.

Treating your asthma in hospital

If your symptoms are very bad (you have a [severe asthma attack](#)), you may need to go to the Accident and Emergency (A&E) department.

You'll probably need several different treatments.^{[21] [22]} What treatments you get depends on how bad your asthma is and where you're being treated. Different hospitals use slightly different treatments.

We've described the treatments that you're most likely to have.^[7]

- You're likely to be given a [quick-relief inhaler](#) with a [spacer](#) . If you can't use the inhaler you'll be given treatment through a [nebuliser](#) which delivers the drug as an easy-to-inhale fine mist. Quick-relief drugs help to open up your airways so that you can breathe more easily. If your asthma is bad, you may need four to eight puffs every 15 minutes or so. If you start feeling better, you can use it less often.
- You're likely to be given some [steroids](#) . The full name for these drugs is corticosteroids. They help to reduce the swelling in the walls of your airways so that more air can get into your lungs. Many people with asthma take steroids regularly. But in the A&E department, you may need a higher dose than you normally take. Steroids in A&E are usually given as tablets.
- If you show signs of having insufficient oxygen, you will be given [oxygen](#) to breathe in through a mask or nasal tubes. You may have oxygen and inhaled beta agonist drugs through the same machine (a nebuliser)
- You may also be given a drug called [ipratropium](#) . This is another drug that can help to open up your airways.
- If your symptoms still don't get any better, you may be given [magnesium sulfate](#) as an infusion straight into your vein. This may help your airways open up to make your breathing easier.
- If nothing seems to be helping and you're finding it harder to breathe, you may have to use a [ventilator](#) to help your breathing. A ventilator is a machine that pushes oxygen in and out of your lungs. You'll probably use the machine for up to 48 hours.
- When you feel better and go home, you may need to keep taking extra steroids. You'll probably need to take them for a week.
- You'll need to go over your action plan and treatment with your doctor. This is very important in helping to stop you getting more asthma attacks.

Questions your GP may ask

Here are some of the questions your GP may ask to find out whether you have asthma:

- How does it feel when you have breathing problems?
- Do you cough or wheeze? Does your chest feel tight?
- Is there anything that seems to bring on your symptoms?
- How long have you been having problems?
- Do you get symptoms during the day or at night?
- Do your breathing problems affect your everyday life?
- Did you have asthma, [eczema](#) , or [hay fever](#) when you were a child?
- Does anyone in your family have asthma, eczema, or hay fever?
- Are you taking aspirin, ibuprofen (Nurofen), or a beta-blocker? If so, do they make your symptoms worse?
- Do you have any pets?
- Do you smoke or breathe in second-hand smoke?
- What is your job? Is there anything in your workplace that might be causing your symptoms?

Tests for asthma

There are several tests that help your doctor find out what's causing your breathing problems. These tests can help your doctor decide whether you have asthma or another condition. ^[25] Your GP can do some of these tests but for others you may need to be referred to a chest specialist at a hospital outpatient clinic.

If your doctor is still unsure if you have asthma, you may be given a trial of asthma drugs (a [steroid inhaler](#) or a [quick-relief inhaler](#)) to see if they help. If the drugs help you, your doctor can then diagnose asthma and work out a treatment plan.

Tests your doctor can do

Peak flow test



A peak flow meter measures how well your lungs are working.

This test measures how quickly you can breathe out. People with asthma can't breathe out as much air as people who don't have asthma because their airways are narrowed.

Peak flow meters come in several different shapes and sizes. They often look like a baby's bottle. You take a deep breath, then breathe out as hard as you can into a mouthpiece. There is a scale down the side of the meter that measures how quickly you breathe out.

Your doctor may give you this test before and after you take a drug (a **bronchodilator**) that helps to open up your airways. If you do better in the test after taking the drug, it's usually a sign that you have asthma.

If you have asthma, you may need to do this test at home every day. You'll need to write down the results each day. This helps your doctor see how your asthma changes. It helps your doctor check whether your treatment is working.

Tests you may have at an outpatient clinic

Spirometry

This is another test to measure how well your lungs are working. It's more accurate than the peak flow test but you can't do it at home. Some GPs have the equipment at their surgery, but others will need to refer you to hospital for the test.

A **spirometer** is a tube and mouthpiece attached to a computer with a display. You breathe out as hard as you can into the mouthpiece. The spirometer measures two things:

- How much air you breathed out in the first second. Doctors call this **forced expiratory volume in the first second** (or FEV1 for short)

Asthma in adults

- How much air you breathed out during the whole test. Doctors call this your **forced vital capacity** (or FVC for short).

Your doctor may give you this test before and after you take a drug (a bronchodilator) that helps to open up your airways. This will help your doctor decide whether you have asthma or another condition called [COPD](#) .

Methacholine challenge test

Most people with asthma get symptoms when they breathe in a chemical called methacholine. If you have asthma and you inhale methacholine, you'll find it harder to breathe. And you'll get lower scores in the other tests for asthma.

This test is very safe. If your breathing gets too difficult, the test can be easily stopped. And you can reverse the effects of the methacholine by taking one of the common asthma treatments.

Skin-prick test

A skin-prick test may help doctors find out if anything in the environment causes your asthma symptoms. A doctor or a nurse will put tiny amounts of things that cause allergies (allergens) like pollen or pet fur under your skin. They use a tiny needle. If your skin becomes red and swollen, you may be allergic to whatever was on the needle, and this may be causing your asthma. But these tests don't always work.

Chest x-ray

Your doctor may advise you to have an x-ray of your chest. This is a way of checking that you don't have an infection or another condition with similar symptoms.

How to use an inhaler

There are several different types of inhaler. The most common type is a **metered-dose inhaler** (or MDI for short).

Using a metered-dose inhaler (MDI)

- Take off the cap and shake the inhaler.
- Stand up and breathe out.
- Put the mouthpiece in your mouth.
- Breathe in slowly. As you start to breathe in, push down on the top of the inhaler and keep breathing in slowly.

Asthma in adults

- Close your mouth and hold your breath for 10 seconds.
- Breathe out.

If you have problems using your inhaler, be sure to tell your doctor, nurse, or pharmacist. You may find that a different type is easier to use.

You may need an extra piece of equipment called a **spacer**. Or you can breathe drugs in using a machine called a **nebuliser**.

To learn more, see [Spacers and nebulisers](#) .

Spacers and nebulisers

Using a spacer

A spacer (or holding chamber) makes it easier to use an inhaler. There are many kinds of spacer. Some have a mouthpiece, others have a mask. ^[10]

- Put the mouthpiece of the spacer in your mouth or put the mask over your nose and mouth.
- Spray the asthma medicine into the spacer once.
- Take a deep breath and hold it for 10 seconds.
- Breathe out into the spacer.
- Breathe in again, but do not spray the medicine again.

Using a nebuliser

A nebuliser is a machine that turns an asthma drug into a fine spray, which you breathe in. You breathe it through a mask.

Nebulisers are bulky but you can take large doses of medicine with them. They are much more expensive than spacers and take more looking after. ^[10]

Asthma in adults



A nebuliser helps you take a larger dose of medicine.

Glossary:

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.

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.

NSAIDs

NSAID stands for nonsteroidal anti-inflammatory drug. NSAIDs help with pain, inflammation and fever. They are called 'nonsteroidal' because they don't contain any steroids. Aspirin and ibuprofen are both NSAIDs.

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.

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'.

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.

enzymes

Enzymes are chemicals in your body. They have lots of different functions, including playing a part in helping to digest food and starting other chemical reactions that keep the body working.

eczema

Eczema is a very itchy rash. It may be dark and bumpy and release fluid. Scratching makes it worse. You can get eczema anywhere on your body, but it is most common on the wrists, the insides of the elbows and the backs of the knees. If you have asthma or allergies you are more likely to get eczema than someone who doesn't have these conditions.

hay fever

You get hay fever when your immune system reacts too strongly to pollen or mould. Your doctor may call it seasonal allergic rhinitis. The most common symptoms are sneezing, a runny or blocked nose, and red, itchy eyes. You may also cough or wheeze.

systematic reviews

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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.

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.

seizure

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

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.

fungus

A fungus is an organism that is sometimes considered to be a type of plant. A fungus lives by feeding on other organisms. The mushrooms we eat in salads are fungi, but so are candida and cryptococcus, which can cause infections in people's bodies.

intravenous infusion

When a medicine or a fluid, such as blood, is fed directly into a vein, it's called an intravenous infusion (or IV). To give you an intravenous infusion, a nurse, technician or a doctor places a narrow plastic tube into a vein (usually in your arm) using a needle. The needle is then removed and the fluid is infused (or dripped) through the tube into the vein.

nebuliser

A nebuliser is a machine that creates a mist containing asthma medicine, which is breathed in through a mask or mouthpiece.

Sources for the information on this leaflet:

1. Duff AL, Platts-Mills TA. Allergens and asthma. *Pediatric Clinics of North America*. 1992; 39: 1277-1291.
2. McFadden ER Jr. Diseases of the respiratory system: asthma. In: Fauci AS, Braunwald E, et al (editors). *Harrison's principles of internal medicine*. 15th edition. McGraw-Hill, New York, NY; 1998.
3. Eisner MD. Environmental tobacco smoke and adult asthma. *Clinics in Chest Medicine*. 2002; 23: 749-761.
4. McFadden, ER Jr. Asthma: Diseases of the respiratory system. In: Braunwald E, Hauser SL, Fauci AS, et al (editors). *Harrison's principles of internal medicine, volume 2*. 15th edition. McGraw-Hill, New York, U.S.A.; 2001.
5. Lemanske RF Jr, Busse WW. Asthma. *Journal of Allergy and Clinical Immunology*. 2003; 111 (supplement 1): S502-S519.
6. Bonini M, Di Mambro C, Calderon MA, et al. Beta₂-agonists for exercise-induced asthma (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.
7. British Thoracic Society/Scottish Intercollegiate Guidelines Network. British guideline on the management of asthma, a national clinical guideline. January 2012. Available at <http://www.sign.ac.uk/pdf/sign101.pdf> (accessed on 4 March 2014).
8. Asthma UK. Facts for journalists. Available at <http://www.asthma.org.uk/news-centre/facts-for-journalists/> (accessed on 4 March 2014).
9. British Thoracic Society/Scottish Intercollegiate Guidelines Network. British guideline on the management of asthma, a national clinical guideline. January 2012. Available at <http://www.sign.ac.uk/pdf/sign101.pdf> (accessed on 4 March 2014).
10. Children's National Medical Center. Help kids control their asthma. June 2009. Available at <http://childrensnational.org/files/PDF/ForPatients/PatientEducation/Asthma.pdf> (accessed on 4 March 2014).

Asthma in adults

11. Lugogo NL, Kraft M. Epidemiology of asthma. *Clinics in Chest Medicine*. 2006; 27: 1-15.
12. Rees J. ABC of asthma: prevalence. *BMJ*. 2005; 331: 443-445.
13. Kelly WJ, Hudson I, Phelan PD, et al. Childhood asthma in adult life: a further study at 28 years of age. *BMJ Clinical Research Edition*. 1987; 294: 1059-1062.
14. Lange P, Parner J, Vestbo J, et al. A 15-year follow-up study of ventilatory function in adults with asthma. *New England Journal of Medicine*. 1998; 339: 1194-1200.
15. British Thoracic Society/Scottish Intercollegiate Guidelines Network. British guideline on the management of asthma, a national clinical guideline. January 2012. Available at <http://www.sign.ac.uk/pdf/sign101.pdf> (accessed on 4 March 2014).
16. Crane J, Pearce N, Flatt A, et al. Prescribed fenoterol and death from asthma in New Zealand, 1981-83: case-control study. *Lancet*. 1989; 1: 917-922.
17. U.S. Food and Drug Administration. FDA Drug Safety Communication: Drug labels now contain updated recommendations on the appropriate use of long-acting inhaled asthma medications called Long-Acting Beta-Agonists (LABAs). February 2010. Available at <http://www.fda.gov/Drugs/DrugSafety/PostmarketDrugSafetyInformationforPatientsandProviders/ucm213836.htm> (accessed on 5 March 2014).
18. British Thoracic Society and Scottish Intercollegiate Guidelines Network. British guideline on the management of asthma. *Thorax*. 2003; 58 (supplement 1): S1-S94.
19. Caress A-L, Beaver K, Luker K, et al. Involvement in treatment decisions: what do adults with asthma want and what do they get? Results of a cross sectional survey. *Thorax*. 2005; 60: 199-205.
20. Gibson PG, Powell H, Coughlan J, et al. Self-management education and regular practitioner review for adults with asthma (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.
21. FitzGerald JM, Grunfeld A. Acute life-threatening asthma. In: FitzGerald JM, Ernst PP, Boulet LP, et al (editors). *Evidence based asthma management*. Decker, Hamilton, Canada; 2000.
22. Nahum A, Tuxen DT. Management of asthma in the intensive care unit. In: FitzGerald JM, Ernst PP, Boulet LP, et al (editors). *Evidence based asthma management*. Decker, Hamilton, Canada; 2000.
23. Weiss ST. Epidemiology and heterogeneity of asthma. *Annals of Allergy, Asthma, and Immunology*. 2001; 87 (supplement 1): S5-S8.
24. Taylor DR, Cowan JO, Greene JM, et al. Asthma in remission: can relapse in early adulthood be predicted at 18 years of age? *Chest*. 2005; 127: 845-850.
25. British Thoracic Society/Scottish Intercollegiate Guidelines Network. British guideline on the management of asthma, a national clinical guideline. January 2012. Available at <http://www.sign.ac.uk/pdf/sign101.pdf> (accessed on 4 March 2014).
26. Walters EH, Walters J, Gibson P, et al. Inhaled short acting beta2-agonists use in asthma: regular versus as needed treatment (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.
27. British Thoracic Society/Scottish Intercollegiate Guidelines Network. British guideline on the management of asthma, a national clinical guideline. January 2012. Available at <http://www.sign.ac.uk/pdf/sign101.pdf> (accessed on 4 March 2014).
28. British National Formulary. Selective beta2 agonists. Section 3.1.1.1. British Medical Association and Royal Pharmaceutical Society of Great Britain. Also available at <http://bnf.org> (accessed on 4 March 2014).
29. Ahrens RC. Skeletal muscle tremor and the influence of adrenergic drugs. *Journal of Asthma*. 1990; 27: 11-20.
30. Salpeter SR, Ormiston TM, Salpeter EE. Meta analysis: respiratory tolerance to beta2-agonists use in patients with asthma. *Annals of Internal Medicine*. 2004; 140: 802-813.

Asthma in adults

31. British National Formulary. Corticosteroids. Section 3.2. British Medical Association and Royal Pharmaceutical Society of Great Britain. Also available at <http://bnf.org> (accessed on 4 March 2014).
32. Adams N, Bestall J, Jones PW. Inhaled budesonide for chronic asthma in children and adults. In: The Cochrane Library. Wiley, Chichester, UK.
33. Adams NP, Bestall JC, Lasserson TJ, et al. Fluticasone versus placebo for chronic asthma in adults and children (Cochrane Review). In: The Cochrane Library. Wiley, Chichester, UK.
34. Manning P, Gibson PG, Lasserson TJ. Ciclesonide versus other inhaled steroids for chronic asthma in children and adults. In: The Cochrane Library. Wiley, Chichester, UK.
35. Pauwels RA, Pedersen S, Busse WW, et al. Early intervention with budesonide in mild persistent asthma: a randomised, double-blind trial. *Lancet*. 2003; 361: 1071-1076.
36. Hatoum HT, Schumock GT, Kendzierski DL. Meta-analysis of controlled trials of drug therapy in mild chronic asthma: the role of inhaled corticosteroids. *Annals of Pharmacotherapy*. 1994; 28: 1285-1289.
37. Adams NP, Bestall JB, Malouf R, et al. Beclomethasone versus placebo for chronic asthma. In: The Cochrane Library. Wiley, Chichester, UK.
38. Jones A, Fay JK, Burr M, et al. Inhaled corticosteroid effects on bone metabolism in asthma and mild chronic obstructive pulmonary disease (Cochrane review). In: The Cochrane Library. Wiley, Chichester, UK.
39. Nathan RA, Nayak AS, Grant DF, et al. Mometasone furoate: efficacy and safety in moderate asthma compared to beclomethasone dipropionate. *Annals of Allergy, Asthma and Immunology*. 2001; 86: 203-210.
40. Ni Chroinin M, Greenstone IR, Danish A, et al. Long-acting beta2-agonists versus placebo in addition to inhaled corticosteroids in children and adults with chronic asthma (Cochrane review). In: The Cochrane Library. Wiley, Chichester, UK.
41. Bateman E, Nelson H, Bousquet J, et al. Meta-analysis: effects of adding salmeterol to inhaled corticosteroids on serious asthma-related events. *Annals of Internal Medicine*. 2008; 149: 33-42.
42. Shrewsbury S, Pyke S, Britton M. Meta-analysis of increased dose of inhaled steroid or addition of salmeterol in symptomatic asthma (MIASMA). *BMJ*. 2000; 320: 1368-1373.
43. Greenstone IR, Ni Chroinin MN, Masse V, et al. Combination of inhaled long-acting beta2-agonists and inhaled steroids versus higher dose of inhaled steroids in children and adults with persistent asthma (Cochrane Review). In: The Cochrane Library. Wiley, Chichester, UK.
44. Chervinsky P, Nelson HS, Bernstein DI, et al. Comparison of mometasone furoate administered by metered dose inhaler with beclomethasone dipropionate. *International Journal of Clinical Practice*. 2002; 56: 419-425.
45. Ducharme FM, Lasserson TJ, Cates CJ. Long-acting beta2-agonists versus anti-leukotrienes as add-on therapy to inhaled corticosteroids for chronic asthma. In: The Cochrane Library. Wiley, Chichester, UK.
46. Lasserson TJ, Cates CJ, Ferrara G, et al. Combination fluticasone and salmeterol versus fixed dose combination budesonide and formoterol for chronic asthma in adults and children. In: The Cochrane Library. Wiley, Chichester, UK.
47. Busse WW, Shah SR, Somerville L. Comparison of adjustable- and fixed-dose budesonide/formoterol pressurized metered-dose inhaler and fixed-dose fluticasone propionate/salmeterol dry powder inhaler in asthma patients. *The Journal of Allergy and Clinical Immunology*. 2008; 121: 1407-14.
48. Salpeter SR, Ormiston TM, Salpeter EE. Meta analysis: respiratory tolerance to beta2-agonists use in patients with asthma. *Annals of Internal Medicine*. 2004; 140: 802-813.
49. U.S. Food and Drug Administration. FDA drug safety communication: New safety requirements for long-acting inhaled asthma medications called long-acting beta-agonists (LABAs). February 2010.

Asthma in adults

- <http://www.fda.gov/drugs/drugsafety/postmarketdrugsafetyinformationforpatientsandproviders/ucm200776.htm> (accessed on 4 March 2014).
50. Cates CJ, Cates MJ. Regular treatment with salmeterol for chronic asthma: serious adverse events. In: The Cochrane Library. Wiley, Chichester, UK.
51. Cates CJ, Cates MJ, Lasserson TJ. Regular treatment with formoterol for chronic asthma: serious adverse events. In: The Cochrane Library. Wiley, Chichester, UK.
52. Rodrigo GJ, Moral VP, Marcos LG, et al. Safety of regular use of long-acting beta agonists as monotherapy or added to inhaled corticosteroids in asthma. A systematic review. *Pulmonary Pharmacology and Therapeutics*. 2009; 22: 9-19.
53. Salpeter SR, Buckley NS, Ormiston TM, et al. Meta-analysis: effect of long-acting beta-agonists on severe asthma exacerbations and asthma-related deaths. *Annals of Internal Medicine*. 2006; 144: 904-912.
54. Nelson HS, Weiss ST, Bleecker ER, et al. The salmeterol multicenter asthma research trial. *Chest*. 2006; 129: 15-26.
55. British Thoracic Society/Scottish Intercollegiate Guidelines Network. British guideline on the management of asthma, a national clinical guideline. January 2012. Available at <http://www.sign.ac.uk/pdf/sign101.pdf> (accessed on 4 March 2014).
56. Medicines and Healthcare products Regulatory Agency. Asthma: long-acting beta2 agonists. December 2006. <http://www.mhra.gov.uk/Safetyinformation/Generalsafetyinformationandadvice/Product-specificinformationandadvice/index.htm> (accessed on 4 March 2014).
57. Gibson PG, Coughlan J, Wilson AJ, et al. Self-management education and regular practitioner review for adults with asthma (Cochrane review). In: The Cochrane Library. Wiley, Chichester, UK.
58. Castro M, Zimmermann NA, Crocker S, et al. Asthma intervention program prevents readmissions in high healthcare users. *American Journal of Respiratory and Critical Care Medicine*. 2003; 168: 1095-1099.
59. Gallefoss F, Bakke PS. The effect of patient education in asthma, a randomized controlled trial. *Tidsskrift for Den Norske Laegeforening*. 2002; 122: 2702-2706 [in Norwegian].
60. Tapp S, Lasserson TJ, Rowe B. Education interventions for adults who attend the emergency room for acute asthma. In: The Cochrane Library. Wiley, Chichester, UK.
61. Huang TT, Li YT, Wang CH. Individualized programme to promote self-care among older adults with asthma: randomized controlled trial. *Journal of Advanced Nursing*. 2009; 65: 348-58.
62. Fish JE, Kemp JP, Lockey RF, et al. Zafirlukast for symptomatic mild-to-moderate asthma: a 13-week multicenter study. *Clinical Therapeutics*. 1997; 19: 675-690.
63. Suissa S, Dennis R, Ernst P, et al. Effectiveness of the leukotriene receptor antagonist zafirlukast for mild-to-moderate asthma: a randomized, double-blind, placebo-controlled trial. *Annals of Internal Medicine*. 1997; 126: 177-183.
64. Nathan RA, Bernstein JA, Bielory L, et al. Zafirlukast improves asthma symptoms and quality of life in patients with moderate reversible airflow obstruction. *Journal of Allergy and Clinical Immunology*. 1998; 102: 935-942.
65. Baumgartner RA, Martinez G, Edelman JM, et al. Distribution of therapeutic response in asthma control between oral montelukast and inhaled beclomethasone. *European Respiratory Journal*. 2003; 21: 123-128.
66. Israel E, Chervinsky PS, Friedman B, et al. Effects of montelukast and beclomethasone on airway function and asthma control. *Journal of Allergy and Clinical Immunology*. 2002; 110: 847-854.
67. Ducharme FM, Hicks GC. Anti-leukotriene agents compared to inhaled corticosteroids in the management of recurrent and/or chronic asthma (Cochrane review). In: The Cochrane Library. Wiley, Chichester, UK.
68. Awad N, Joshi J, Naidu MUR, et al. Comparative evaluation of the efficacy of zafirlukast 20mg tablets versus placebo in patients with mild to moderate asthma. *Indian Practitioner*. 2002; 55: 303-321.

Asthma in adults

69. Lim S, Jatakanon A, Gordon D, et al. Comparison of high dose inhaled steroids, low dose inhaled steroids plus low dose theophylline, and low dose inhaled steroids alone in chronic asthma in general practice. *Thorax*. 2000; 55: 837-841.
70. Yurdakul AS, Calisir HC, Tunctan B, et al. Comparison of second controller medications in addition to inhaled corticosteroid in patients with moderate asthma. *Respiratory Medicine*. 2002; 96: 322-329.
71. Xuejun G, Huanying W, Qingyun L. Treatment of chronic moderate asthma by corticosteroid inhalation with controlled released theophylline or beta2 agonist. *Chinese Journal of Practical Internal Medicine*. 2001; 21: 141-142.
72. British National Formulary. Theophylline. Section 3.1.3. British Medical Association and Royal Pharmaceutical Society of Great Britain. Also available at <http://bnf.org> (accessed on 4 March 2014).
73. Ramsdell J. Use of theophylline in the treatment of COPD. *Chest*. 1995; 107 (supplement): S206-S209.
74. Lim S, Jatakanon A, Gordon D, et al. Comparison of high dose inhaled steroids, low dose inhaled steroids plus low dose theophylline, and low dose inhaled steroids alone in chronic asthma in general practice. *Thorax*. 2000; 55: 837-841.
75. Xuejun G, Huanying W, Qingyun L. Treatment of chronic moderate asthma by corticosteroid inhalation with controlled released theophylline or beta2 agonist. *Chinese Journal of Practical Internal Medicine*. 2001; 21: 141-142.
76. Griffiths C, Foster G, Barnes N, et al. Specialist nurse intervention to reduce unscheduled asthma care in a deprived multiethnic area: the east London randomised controlled trial for high risk asthma (ELECTRA). *BMJ*. 2004; 328: 144.
77. Eastwood AJ, Sheldon TA. Organisation of asthma care: what difference does it make? A systematic review of the literature. *Quality in Health Care*. 1996; 5: 134-143.
78. Spevetz A, Bartter T, Dubois J, et al. Inpatient management of status asthmaticus. *Chest*. 1992; 102: 1392-1396.
79. Daley J, Kopelman RI, Comeau E, et al. Practice patterns in the treatment of acutely ill hospitalized asthmatic patients at three teaching hospitals: variability in resource utilization. *Chest*. 1991; 100: 51-56.
80. Huang CJ, Wang CH, Liu WT, et al. Zafirlukast improves pulmonary function in patients with moderate persistent asthma receiving regular inhaled steroids: a prospective randomized control study. *Chang Gung Medical Journal*. 2003; 26: 554-560.
81. Price DB, Hernandez D, Magyar P, et al. Randomised controlled trial of montelukast plus inhaled budesonide versus double dose inhaled budesonide in adult patients with asthma. *Thorax*. 2003; 58: 211-216.
82. Ducharme F. Addition of anti-leukotriene agents to inhaled corticosteroids for chronic asthma (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.
83. Fish JE, Israel E, Murray JJ, et al. Salmeterol powder provides significantly better benefit than montelukast in asthmatic patients receiving concomitant inhaled corticosteroid therapy. *Chest*. 2001; 120: 423-430.
84. Joos S, Miksch A, Szecsenyi J, et al. Montelukast as add-on therapy to inhaled corticosteroids in the treatment of mild to moderate asthma: a systematic review. *Thorax*. 2008; 63: 453-62.
85. Huang CJ, Wang CH, Liu WT, et al. Zafirlukast improves pulmonary function in patients with moderate persistent asthma receiving regular inhaled steroids: a prospective randomized control study. *Chang Gung Medical Journal*. 2003; 26: 554-560.
86. Yurdakul AS, Calisir HC, Tunctan B, et al. Comparison of second controller medications in addition to inhaled corticosteroid in patients with moderate asthma. *Respiratory Medicine*. 2002; 96: 322-329.
87. Morgan WJ, Crain EF, Gruchalla RS, et al. Results of a home-based environmental intervention among urban children with asthma. *New England Journal of Medicine*. 2004; 351: 11.
88. McFadden ER Jr. Diseases of the respiratory system: asthma. In: Fauci AS, Braunwald E, et al (editors). *Harrison's principles of internal medicine*. 15th edition. McGraw-Hill, New York, NY; 1998.
89. British Thoracic Society/Scottish Intercollegiate Guidelines Network. British guideline on the management of asthma, a national clinical guideline. January 2012. Available at <http://www.sign.ac.uk/pdf/sign101.pdf> (accessed on 4 March 2014).

Asthma in adults

90. Global Initiative for Asthma. Pocket guide for asthma management and prevention. Available at <http://www.ginasthma.org/documents/1> (accessed on 4 March 2014).
91. Gøtzsche PC, Johansen HK. House dust mite control measures for asthma. In: The Cochrane Library. Wiley, Chichester, UK.
92. Freitas DA, Holloway EA, Bruno SS, et al. Breathing exercises for adults with asthma (Cochrane review). In: The Cochrane Library. Wiley, Chichester, UK.
93. Bowler S, Green A, Mitchell C. Buteyko breathing techniques in asthma: a blinded randomised controlled trial. *Medical Journal of Australia*. 1998; 169: 575-578.
94. Holloway EA, West RJ. Integrated breathing and relaxation training (the Papworth method) for adults with asthma in primary care: a randomised controlled trial. *Thorax*. 2007; 62: 1039-42.
95. Cooper S, Osborne J, Newton S, et al. Effect of two breathing exercises (Buteyko and pranayama) in asthma: a randomised controlled trial. *Thorax*. 2003; 58: 674-679.
96. Walker S, Monteil M, Phelan K, et al. Anti-IgE for chronic asthma in adults and children (Cochrane review). In: The Cochrane Library. Wiley, Chichester, UK.
97. Cates CJ, Bara A, Crilly JA, et al. Holding chambers (spacers) versus nebulisers for beta-agonist treatment of acute asthma (Cochrane review). In: The Cochrane Library. Wiley, Chichester, UK.
98. Travers A, Jones AP, Kelly K, et al. Intravenous beta2-agonists for acute asthma in the emergency department (Cochrane review). In: The Cochrane Library. Wiley, Chichester, UK.
99. Camargo CA, Spooner CH, Rowe BH. Continuous versus intermittent beta-agonists for acute asthma (Cochrane review). In: The Cochrane Library. Wiley, Chichester, UK.
100. Bradding P, Rushby I, Scullion J, et al. As-required versus regular nebulized salbutamol for the treatment of acute severe asthma. *European Respiratory Journal*. 1999; 13: 290-294.
101. Travers AH, Rowe BH, Barker S, et al. The effectiveness of IV beta-agonists in treating patients with acute asthma in the emergency department: a meta-analysis. *Chest*. 2002; 122: 1200-1207.
102. Rowe BH, Spooner CH, Ducharme FM, et al. Corticosteroids for preventing relapse following acute exacerbations of asthma (Cochrane review). In: The Cochrane Library. Wiley, Chichester, UK.
103. Rowe BH, Keller JL, Oxman AD. Effectiveness of steroid therapy in acute exacerbations of asthma: a meta-analysis. *American Journal of Emergency Medicine*. 1992; 10: 301-310.
104. Edmonds ML, Camargo CA Jr, Brenner BE, et al. Replacement of oral corticosteroids with inhaled corticosteroids in the treatment of acute asthma following emergency department discharge: a meta-analysis. *Chest*. 2002; 121: 1798-1805.
105. Rodrigo GJ. Rapid effects of inhaled corticosteroids in acute asthma: an evidence-based evaluation. *Chest*. 2006; 130: 1301-1311.
106. Rodrigo GJ, Castro-Rodriguez JA. Anticholinergics in the treatment of children and adults with acute asthma: a systematic review with meta analysis. *Thorax*. 2005; 60: 740-746.
107. Rodrigo GJ, Rodrigo C. Triple inhaled drug protocol for the treatment of acute severe asthma. *Chest*. 2003; 123: 1908-1915.
108. Rodrigo GJ, Rodriguez Verde M, Peregalli V, et al. Effects of short-term 28% and 100% oxygen on PaCO₂ and peak expiratory flow rate in acute asthma: a randomized trial. *Chest*. 2003; 124: 1312-1317.
109. British Thoracic Society/Scottish Intercollegiate Guidelines Network. British guideline on the management of asthma, a national clinical guideline. January 2012. Available at <http://www.sign.ac.uk/pdf/sign101.pdf> (accessed on 4 March 2014).
110. Rodrigo GJ, Rodriguez Verde M, Peregalli V, et al. Effects of short-term 28% and 100% oxygen on PaCO₂ and peak expiratory flow rate in acute asthma: a randomized trial. *Chest*. 2003; 124: 1312-1317.

Asthma in adults

111. Nannini LJ Jr, Pendino JC, Corna RA, et al. Magnesium sulfate as a vehicle for nebulized salbutamol in acute asthma. *American Journal of Medicine*. 2000; 108: 193-197.
112. Hughes R, Goldkorn A, Masoli M, et al. Use of isotonic nebulised magnesium sulphate as an adjuvant to salbutamol in treatment of severe asthma in adults: randomised placebo-controlled trial. *Lancet*. 2003; 361: 2114-2117.
113. British Thoracic Society/Scottish Intercollegiate Guidelines Network. British guideline on the management of asthma, a national clinical guideline. January 2012. Available at <http://www.sign.ac.uk/pdf/sign101.pdf> (accessed on 4 March 2014).
114. Rowe BH, Bretzlaff JA, Bourdon C, et al. Magnesium sulfate for treating exacerbations of acute asthma in the emergency department (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.
115. Mohammed S, Goodacre S. Intravenous and nebulised magnesium sulphate for acute asthma: systematic review and meta-analysis. *Emergency Medicine Journal*. 2007; 24: 823-830.
116. Blitz M, Blitz S, Beasley R, et al. Inhaled magnesium sulphate in the treatment of acute asthma (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.
117. Cairns CB, Kraft M. Magnesium attenuates the neutrophil respiratory burst in adult asthmatic patients. *Academic Emergency Medicine*. 1996; 3: 1093-1097.
118. Bloch H, Silverman R, Mancherje N, et al. Intravenous magnesium sulfate as an adjunct in the treatment of acute asthma. *Chest*. 1995; 107: 1576-1581.
119. British Thoracic Society/Scottish Intercollegiate Guidelines Network. British guideline on the management of asthma, a national clinical guideline. January 2012. Available at <http://www.sign.ac.uk/pdf/sign101.pdf> (accessed on 4 March 2014).
120. Williams TJ, Tuxen DV, Scheinkestel CD, et al. Risk factors for morbidity in mechanically ventilated patients with acute severe asthma. *American Review of Respiratory Disease*. 1992; 146: 607-615.
121. Darioli R, Perret C. Mechanical controlled hypoventilation in status asthmaticus. *American Review of Respiratory Disease*. 1984; 129: 385-387.
122. Menitove SM, Goldring RM. Combined ventilator and bicarbonate strategy in the management of status asthmaticus. *American Journal of Medicine*. 1983; 74: 898-901.
123. Higgins B, Greening AP, Crompton GK. Assisted ventilation in severe acute asthma. *Thorax*. 1986; 41: 464-467.
124. Lam KN, Mow BM, Chew LS. The profile of ICU admissions for acute severe asthma in a general hospital. *Singapore Medical Journal*. 1992; 33: 460-462.
125. Mansel JK, Stogner SW, Petrini MF, et al. Mechanical ventilation in patients with acute severe asthma. *American Journal of Medicine*. 1990; 89: 42-48.
126. Lim TK. Status asthmaticus in a medical intensive care. *Singapore Medical Journal*. 1989; 30: 334-338.
127. Behbehani NA, Al-Mane F, D'yachkova Y, et al. Myopathy following mechanical ventilation for acute severe asthma: the role of muscle relaxants and corticosteroids. *Chest*. 1999; 115: 1627-1631.
128. Ram FS, Wellington S, Rowe B, et al. Non invasive positive pressure ventilation for treatment of respiratory failure due to severe exacerbations of asthma. In: *The Cochrane Library*. Wiley, Chichester, UK.
129. Rodrigo G, Pollack C, Rodrigo C, et al. Heliox for nonintubated acute asthma patients (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.

Asthma in adults

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