Asthma

Asthma is a common condition that affects the airways. The typical symptoms are wheeze, cough, chest tightness, and shortness of breath. Symptoms can range from mild to severe. Treatment usually works well to ease and prevent symptoms. Treatment is usually with inhalers. A typical person with asthma may take a preventer inhaler every day (to prevent symptoms developing), and use a reliever inhaler as and when required (if symptoms flare up). This leaflet gives a general overview of asthma. There are other separate leaflets in this series, called *'Asthma - Peak Flow Diary'* , *'Asthma - Peak Flow Meter'* and *'Inhalers for Asthma'*.

What is asthma and whom does it affect?

Asthma is a condition that affects the smaller airways (bronchioles) of the lungs. From time to time the airways constrict (narrow) in people who have asthma. This causes the typical symptoms. The extent of the narrowing, and how long each episode lasts, can vary greatly.

Asthma can start at any age, but it most commonly starts in childhood. At least 1 in 10 children, and 1 in 20 adults, have asthma. Asthma runs in some families, but many people with asthma have no other family members affected.

What are the symptoms of untreated asthma?

The common symptoms are cough and wheeze. You may also become breathless, and develop a feeling of chest tightness. Symptoms can range from mild to severe between different people, and at different times in the same person. Each episode of symptoms may last just an hour or so, or persist for days or weeks unless treated.

What are the typical symptoms if you have mild untreated asthma?

You tend to develop mild symptoms from time to time. For example, you may develop a mild wheeze and a cough if you have a cold or a chest infection, or during the hay fever season, or when you exercise. For most of the time you have no symptoms. A child with mild asthma may have an irritating cough each night, but is often fine during the day.

What are the typical symptoms if you have moderate untreated asthma?

You typically have episodes of wheezing and coughing from time to time. Sometimes you become breathless. You may have spells, sometimes long spells, without symptoms. However, you tend to be wheezy for some of the time on most days. Symptoms are often worse at night, or first thing in the morning. You may wake some nights coughing or with a tight chest. Young children may not have typical symptoms. It may be difficult to tell the difference between asthma and recurring chest infections in young children.

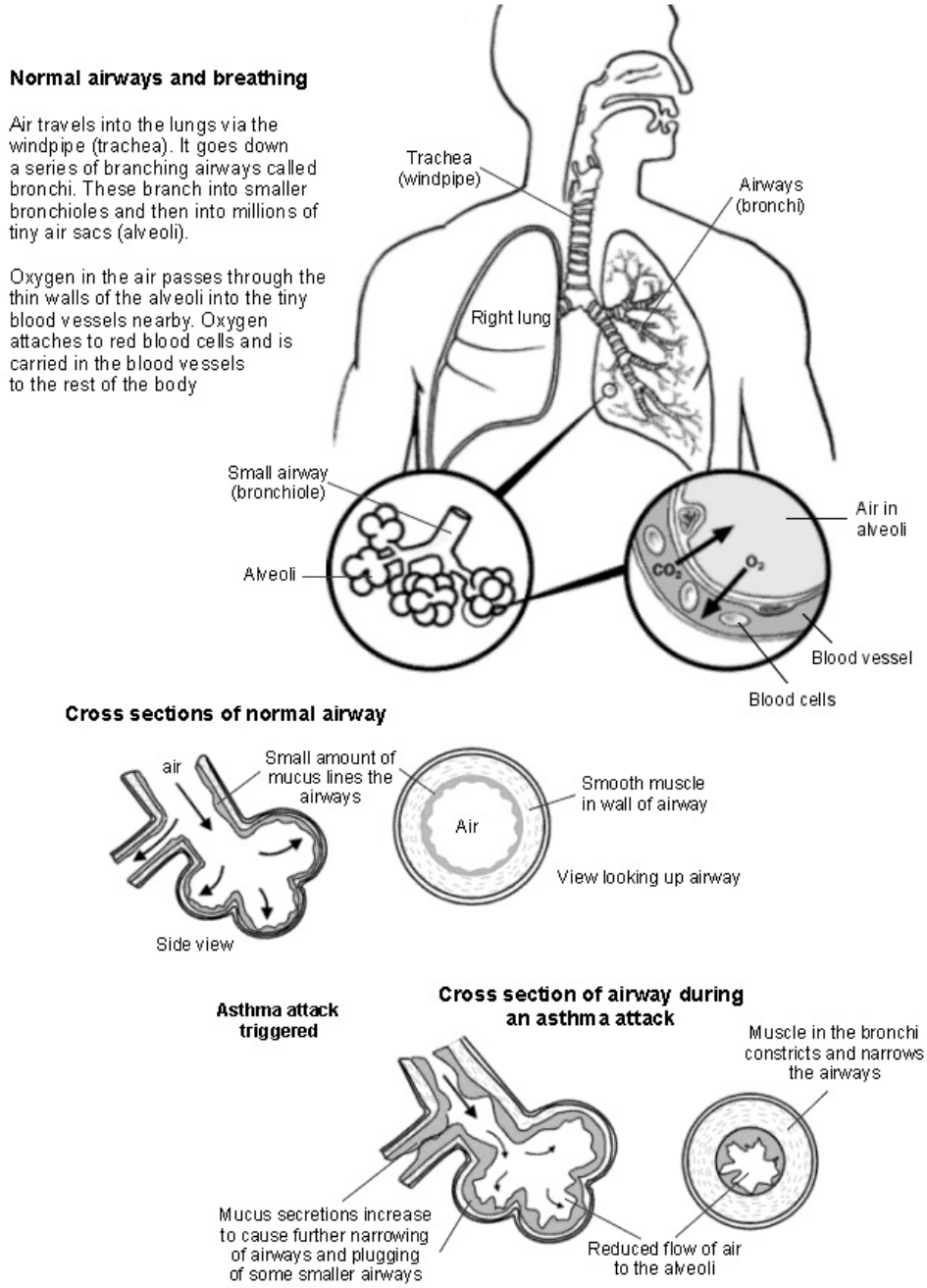
What are the typical symptoms of a severe attack of asthma?

You become very wheezy, have a tight chest, and have difficulty in breathing. You may find it difficult to talk because you are so breathless. Severe symptoms may develop from time to time if you normally have moderate symptoms. Occasionally, severe symptoms develop suddenly in some people who usually just have mild symptoms.

What causes asthma?

Asthma is caused by inflammation in the airways. It is not known why the inflammation occurs. The inflammation irritates the muscles around the airways, and causes them to squeeze (constrict). This causes narrowing of the airways. It is then more difficult for air to get in and out of the lungs. This leads to wheezing and breathlessness. The inflammation also causes the lining of the airways to make extra mucus which causes cough and further obstruction to airflow.

The following diagram aims to illustrate how an episode of asthma develops.



What can make asthma symptoms worse?

Asthma symptoms may flare up from time to time. There is often no apparent reason why symptoms flare up. However, some people find that symptoms are triggered, or made worse, in certain situations. It may be possible to avoid certain triggers which may help to reduce symptoms. Things that may trigger asthma symptoms include the following:

- **Infections**. Particularly colds, coughs, and chest infections.
- **Pollens and moulds**. Asthma is often worse in the hay fever season.

- **Exercise**. However, *sport and exercise are good for you if you have asthma* . If necessary, you can use an inhaler before exercise to prevent symptoms from developing. But, as a rule, exercise-induced asthma often represents undertreated asthma. If it occurs, it may indicate a need to step up your usual preventer treatment (see below).
- **Certain drugs**. For example, about 1 in 50 people with asthma is allergic to aspirin which can trigger symptoms. Other drugs that may cause asthma symptoms include: anti-inflammatory painkillers such as ibuprofen (eg Nurofen®), diclofenac, etc, and betablockers such as propranolol, atenolol, or timolol. This includes betablocker eye drops used to treat glaucoma.
- **Smoking and cigarette fumes**. If you smoke and have asthma, you should make every effort to stop. See a practice nurse for help if you find it difficult. Passive smoking can make asthma worse too. Even where adults smoke away from the presence of children, smoke on clothes, hair, etc, may make asthma worse. All children deserve to live in a smoke-free home. In particular, children with asthma.
- **Other fumes and chemicals**. For example, fumes from paints, solvents and pollution. The increase in air pollution may be a reason why asthma is becoming more common.
- **Emotion**. Asthma is not due to 'nerves', but such things as stress, emotional upset, or laughing may trigger symptoms.
- **Allergies to animals**. For example, pet cats, dogs, and horses. Animals do not trigger symptoms in most cases, but some people notice that their symptoms become worse when close to certain animals.
- **House dust mite**. This is a tiny creature which lives in mattresses and other fabrics around the home. If you are allergic to it, it may make symptoms worse. It is impossible to get rid of house dust mite completely. To greatly reduce their number takes a lot of time and effort and involves: using special mattress covers, removing carpets, removing or treating soft toys, etc. However, if symptoms are difficult to control with treatment, and you are confirmed to be allergic to house dust mite, then it may be worth considering trying to reduce their number. See separate leaflet called *'House Dust Mite and Pet Allergy'* .
- **Some foods**. This is uncommon. Food is not thought to be a trigger in most cases.

Some people *only* develop symptoms when exposed to a certain trigger. For example, exercise-induced asthma. As mentioned above, exercise can make symptoms worse for many people with asthma. But, some people only develop symptoms when they exercise, and are fine the rest of the time. Another example is that some people only develop symptoms when exposed to specific chemicals.

How is asthma diagnosed?

Sometimes symptoms are typical, and the diagnosis is easily made by a doctor. If there is doubt then some simple tests may be arranged. The two commonly used tests are called spirometry and assessment with a peak flow meter.

Spirometry

This test measures how much air you can blow out into a machine called a spirometer. Two results are important: the amount of air you can blow out in one second (called forced expiratory volume in 1 second (FEV1)) and the total amount you can blow out in one breath (called forced vital capacity (FVC)). Your age, height and sex affect your lung volume. So, your results are compared with the average predicted for your age, height and sex.

A value is calculated from the amount of air that you can blow out in one second divided by the total amount of air that you blow out in one breath (called FEV1/FVC ratio). A low value indicates that you have narrowed airways which are typical in asthma (but a low value can occur in other conditions too). Therefore, spirometry may be repeated after treatment. An improvement in the value after treatment to open up the airways is typical of asthma.

Note: spirometry may be normal in people with asthma who do not have any symptoms when the test is done. Remember, the symptoms of asthma typically come and go. Therefore, a normal result does not rule out asthma. But, if your symptoms suggest that you have asthma, ideally the test should be repeated when your symptoms are present.

Assessment with a peak flow meter

This is an alternative test. A peak flow meter is a small device that you blow into. A doctor or nurse will show you how. It measures the speed of air that you can blow out of your lungs. No matter how strong you are, if your airways are narrowed, your peak flow reading will be lower than expected for your age, size, and sex. If you have untreated asthma, then you will normally have low and variable peak flow readings. Also, peak flow readings in the morning are usually lower than the evening if you have asthma.

You may be asked to keep a diary over two weeks or so of peak flow readings. Typically, a person with asthma will usually have low and variable peak flow readings over several days. Peak flow readings improve when the narrowed airways are opened up with treatment. Regular peak flow readings can be used to help assess how well treatment is working.

Other tests

If the diagnosis remains in doubt then a specialist may perform further, more complex tests. But these are not needed in most cases.

What are the treatments for asthma?

For most people with asthma, the symptoms can be prevented most of the time with treatment. So, you are able to get on with normal life, school, work, sport, etc.

Inhalers

Most people with asthma are treated with inhalers. Inhalers deliver a small dose of drug directly to the airways. The dose is enough to treat the airways. However, the amount of drug that gets into the rest of your body is small so side-effects are unlikely, or minor. There are various inhaler devices made by different companies. Different ones suit different people. A doctor or nurse will advise on the different types. See separate leaflet called *'Inhalers for Asthma'* for more details.

Drugs delivered by inhalers can be grouped into relievers, preventers and long-acting bronchodilators:

- **A reliever inhaler** is taken as required to ease symptoms. The drug in a reliever inhaler relaxes the muscle in the airways. This makes the airways open wider, and symptoms usually quickly ease. These drugs are also called bronchodilators as they dilate (widen) the bronchi and bronchioles (airways). There are several different reliever drugs. For example, salbutamol and terbutaline. These come in various brands made by different companies. If you only have symptoms every now and then, then the occasional use of a reliever inhaler may be all that you need. However, if you need a reliever inhaler three times a week or more to ease symptoms, a preventer inhaler is usually advised.

- **A preventer inhaler** is taken every day to *prevent* symptoms from developing. The drug commonly used in preventer inhalers is a steroid. There are various brands. Steroids work by reducing the inflammation in the airways. When the inflammation has gone, the airways are much less likely to become narrow and cause symptoms. It takes 7-14 days for the steroid in a preventer inhaler to build up its effect. Therefore, it will not give any immediate relief of symptoms. However, after a week or so of treatment, the symptoms have often gone, or are much reduced. It can take up to six weeks for maximum benefit. You should then continue with the preventer inhaler every day even when your symptoms have gone - to prevent symptoms from coming back. You should then not need to use a reliever inhaler very often, (if at all).

- **A long acting bronchodilator** may be advised in addition to a preventer inhaler. One may be needed if symptoms are not fully controlled by the preventer inhaler alone. The drugs in these inhalers work in a similar way to reliever inhalers, but work for up to 12 hours after taking each dose. They include salmeterol and formoterol. (Some brands of inhaler contain a steroid plus a long-acting bronchodilator for convenience.)

Spacer devices are used with some types of inhaler. They are commonly used by children, but many adults also use them. A spacer is like a small plastic chamber that attaches to the inhaler. It holds the drug like a reservoir when the inhaler is pressed. A valve at the mouth end ensures that the drug is kept within the spacer until you breathe in. When you breathe out, the valve closes. So, you don't need to have good co-ordination to inhale the drug if you use a spacer device. A face mask can be fitted on to some types of spacers, instead of a mouthpiece. This is sometimes done for young children and babies who can then use the inhaler simply by breathing in and out normally through the mask.

Tablets to open up the airways

Most people do not need tablets as inhalers usually work well. However, in some cases a tablet (or in liquid form for children) is prescribed *in addition* to inhalers if symptoms are not fully eased by inhalers alone. Various tablets may be used which aim to open up the airways. Some young children use liquid medication instead of inhalers.

Steroid tablets

A short course of steroid tablets (such as prednisolone) is sometimes needed to ease a severe or prolonged attack of asthma. Steroid tablets are good at reducing the inflammation in the airways. For example, a severe attack may occur if you have a cold or chest infection.

Some people worry about taking steroid tablets. However, a short course of steroid tablets (for a week or so) usually works very well, and is unlikely to cause side-effects. Most of the side-effects caused by steroid tablets occur if you take them for a long time (more than several months), or if you take frequent short courses of high doses.

Omalizumab

Omalizumab is a drug that is only used in a small number of people who have severe persistent allergic asthma that has not been controlled by other treatments. So, it is not a common treatment. It is given by injection. It works by interfering with the immune system to reduce inflammation in the airways which is present in asthma.

What are the dosages of treatment?

Everyone is different. The correct dose of a preventer inhaler is the lowest dose that prevents symptoms. A doctor may prescribe a high dose of a preventer inhaler at first, to 'get on top of symptoms' quickly. When symptoms have gone, the dose may then be reduced by a little every few weeks. The aim is to find the lowest regular dose that keeps symptoms away.

Some people with asthma put up with symptoms. They may think that it is normal still to have some symptoms even when they are on treatment. A common example is a night-time cough which can cause disturbed sleep. But, if this occurs and your symptoms are not fully controlled - tell your doctor or nurse. Symptoms can often be prevented - for example, by adjusting the dose of your preventer inhaler, or by adding in a long-acting bronchodilator.

A typical treatment plan

A common treatment plan for a typical person with moderate asthma is:

- A preventer inhaler (usually a steroid inhaler), taken each morning and at bedtime. This usually prevents symptoms throughout the day and night.
- A reliever inhaler may be needed now and then if breakthrough symptoms occur. For example, if symptoms flare up when you have a cough or cold.
- If exercise or sport causes symptoms, then a dose of a reliever inhaler just before the exercise usually prevents symptoms.
- The dose of the preventer inhaler may need to be increased for a while if you have a cough or cold, or during the hay fever season.
- Some people may need to add in a long-acting bronchodilator, or tablets, if symptoms are not controlled with the above.

At first, adjusting doses of inhalers is usually done on the advice of a doctor or nurse. In time, you may agree an asthma action plan with your doctor or nurse.

What is an asthma action plan

An asthma action plan is a plan agreed by you with your doctor or nurse. The plan enables you to make adjustments to the dose of your inhalers, depending on your symptoms and/or peak flow readings. The plan is tailored to individual circumstances. The plan is written down, usually on a standard form, so you can refer to it at any time. Research studies suggest that people who complete personal asthma action plans find it easier to manage their asthma symptoms and that their plan helps them to go about their lives as normal. Asthma UK provides asthma action plans which you can download for adults at www.asthma.org.uk/control and for children at www.asthma.org.uk/myasthma

Does asthma go away?

There is no once-and-for-all cure. However, about half of the children who develop asthma grow out of it by the time they are adults.

For many adults, asthma is variable with some good spells and some spells that are not so good. Some people are worse in the winter months, and some worse in the hay fever season. Although not curable, asthma is treatable. Stepping up the treatment for a while during bad spells will often control symptoms.

Some other general points about asthma

- **It is vital that you learn how to use your inhalers correctly**. In some people, symptoms persist simply because they do not use their inhaler properly, and the drug from the inhaler does not get into the airways properly. See your practice nurse or doctor if you are not sure if you are using your inhaler properly.
- **See a doctor or nurse if symptoms are not fully controlled**, or if they are getting worse. For example, if:
    - A night-time cough or wheeze is troublesome.
    - Sport is being affected by symptoms.
    - Your peak flow readings are lower than normal.
    - You need a reliever inhaler more often than usual.

  An adjustment in inhaler timings or doses may control these symptoms.
- **See a doctor urgently if you develop severe symptoms** that are not eased by a reliever inhaler. In particular, if you have difficulty talking due to shortness of breath. You may need emergency treatment with high-dose reliever drugs and other treatments, sometimes in hospital. A severe asthma attack can be life-threatening.
- **You should have an influenza immunisation every autumn** (the flu jab) if you need continuous or repeated use of high-dose inhaled steroids and/or take steroid tablets and/or have had an episode of asthma which needed hospital admission.

Further help and information

Asthma UK

Summit House, 70 Wilson Street, London EC2A 2DB
Asthma Helpline: 0845 7 01 02 03 Web: www.asthma.org.uk
Offers help and advice, and campaigns for a better deal for people with asthma.

Further reading & references

- Asthma, Clinical Knowledge Summaries (2007)
- Asthma (in children) - corticosteroids, NICE Technology Appraisal Guidance (November 2007)
- Asthma (uncontrolled) - omalizumab, NICE Technology Appraisal Guidance (November 2007); Omalizumab for severe persistent allergic asthma

- Asthma (in adults) - corticosteroids, NICE Technology Appraisal (March 2008); Corticosteroids for the treatment of chronic asthma in adults and children aged 12 years and over
- British Guideline on the Management of Asthma, British Thoracic Society (BTS) and Scottish Intercollegiate Guidelines Network - SIGN (May 2008); latest revision May 2011
- No authors listed; Inhaler devices for asthma. Drug Ther Bull. 2000 Feb;38(2):9-14.
- Corticosteroids - inhaled, Clinical Knowledge Summaries (August 2010)

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