

# ***Asthma in school childhood***



Hans Bisgaard

Pediatrician, Professor, Consultant, DMSci.



Thanks to Robin Rønn and Franz Hoffstetter for  
the wall graffitis, illustrating this book.

1st edition published March of 1997; 7,000 copies.

2nd edition published December 2001; 5,000 copies.

3rd edition published in June 2006, online at [www.copsac.dk](http://www.copsac.dk)

Hans Bisgaard, Pediatrician

Professor, Consultant, DMSci.

Danish Pediatric Asthma Centre

Copenhagen University Hospital, Gentofte.

June 2006

© Hans Bisgaard

[bisgaard@copsac.dk](mailto:bisgaard@copsac.dk)

[www.dbac.dk](http://www.dbac.dk)



# Content

Introduction.....	6
Symptoms.....	9
What is asthma?.....	10
How Do You Get Asthma? .....	12
Prevention of Asthma .....	14
Allergens .....	16
Asthma Medicine .....	19
How is the Medicine administered? .....	21
Steroids.....	24
Topical steroids.....	26
Control.....	28
Parental tasks .....	30
The Doctor’s Tasks .....	32
Managing Medicine Dosage.....	33

## Introduction

Asthma is the most common chronic disease in children. Unfortunately, asthma is becoming increasingly prevalent and nobody knows exactly why. Fortunately the treatment of asthma is improving all the time and is now so effective that children with asthma can live completely normal lives. The treatment is simple and without major side effects.

If parents fail to give their child the medicine in fear of side effects, childhood asthma may pose serious problems for the child. Insufficient treatment of asthma may result in reduced quality of life and chronic lung problems in the longer term, whereas proper treatment of asthma may relieve daily symptoms and preserve normal lung capacity.

Asthma is treated preventively with inhaled steroids, but such treatment is feared more than the disease itself by some parents. The children rarely object to the treatment because they are the ones suffering from

the symptoms. The reluctance of the parents is often due to old misperceptions, incorrect or incomplete information about treatment of asthma with steroids. The misperceptions live on, partly perhaps, because many doctors are too busy to take the time to explain about the comprehensive research supporting this treatment. The research has established an abundance of knowledge about asthma and treatment with inhaled steroids.

The environment plays a big part in asthma. Tobacco smoke and allergies are main factors triggering and perpetuating the disease. A common sense approach to smoking and allergies often results in alleviation of the disease.

The doctor provides advice and suggestions about the best course of treatment for asthma, but the parents alone decide whether or not they want to follow the doctor's advice. For the best possible treatment of

childhood asthma, doctor and family must unite in a common approach based on information and trust. At some level, the parents must educate themselves and become their own asthma experts to ensure that their children receive the very best treatment.

This book was written for parents of children with asthma in order to explain what we know about asthma and the treatment of the disease in children. The objective is to provide the parents with the opportunity to gain insight into the disease and the treatment options so they can join with their doctor in taking responsibility for proper treatment of their children.





PLAY



## Symptoms

The main symptom of asthma is recurring episodes of shortness of breath. Typically, the symptoms vary widely. Most of the time, children with asthma feel fine, but during the asthma attacks they have difficulty breathing. Some compare it to breathing through a straw, far too narrow.

In periods with asthma symptoms and attacks the child is often uncomfortable, moody and lacking in appetite.

Asthma episodes may also manifest themselves in coughing, especially at night. During severe asthma attacks, breathing is markedly encumbered and accompanied by wheezing. The symptoms are often most severe at night, oftentimes causing the children to prop themselves up with pillows behind the back because they find that sitting up makes breathing a little easier.

Most of the time, however, the symptoms are less pronounced and even hard for the parents to notice because children rarely complain. This results in many children living with 'hidden' and, thus, untreated asthma. They put up with discomfort that adults would never tolerate. Hidden asthma symptoms include coughing at night or when the child laughs, cries or yells. Some children with hidden asthma suffer from frequent cases of pneumonia.

Strenuous activity triggers passing symptoms in most children with asthma. This is often misconstrued as the child being in bad physical shape, unfit to do sports, adverse to physical games or perhaps only interested in computer games. The reality is that children with asthma naturally avoid physical activity that may trigger an asthma episode. They get trapped in a vicious circle of avoiding physical activity and getting into worse shape, when, in fact, physical activity is as good for children with asthma as for everybody



## What is asthma?

Asthma is a disease of the lungs.

The lungs consist of airways branching like a tree into still smaller airways. The airways are surrounded by bundles of muscles and coated on the inside by a thin layer of mucous. The airways end in tiny air sacs where the fresh oxygen we breathe in from the air is exchanged for the carbon dioxide in the blood.

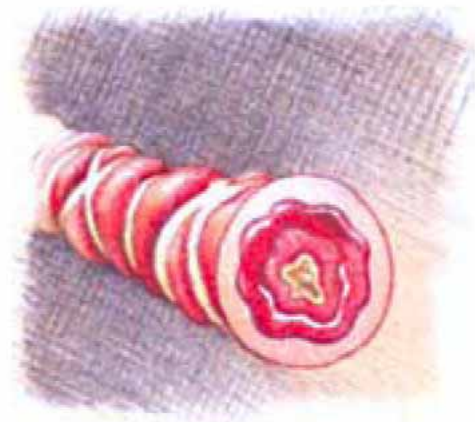
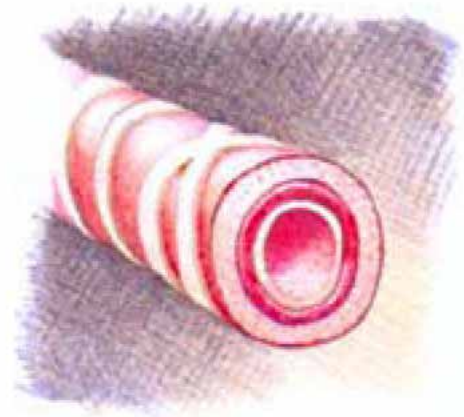
Asthma is a chronic inflammation of the airways. But we are not talking about an inflammation caused by bacteria, which can be cured with antibiotics, or a viral inflammation. Without treatment, the asthma inflammation may damage the lungs over time and impair lung functions. In other words, asthma is a basic chronic inflammation of the small airways, the cause of which is unknown, but which makes the airways “twitchy” and susceptible to irritation.

We do know that a number of environmental factors and allergies trigger, perpetuate and exacerbate the disease. Infections, allergic reactions, tobacco smoke, strong

odors, air pollutants, etc. irritates the “twitchy” airways causing the muscles around them to cramp up resulting in the airways constricting and closing up.

Asthma is often without allergy, but when allergy is present it often contributes to worsening of the lung disease. Allergies are best described as defects in the immune defense of the body causing unnatural reactions when exposed to otherwise innocuous foreign proteins (allergens), such as grass pollen. Battle-ready allergy cells explode and release a cascade of substances, such as histamine and leukotriene, triggering an asthma attack and worsening the inflammation of the airways.

*Asthma and allergy are two distinct conditions. Asthma is a lung disease of chronic inflammation of the airways, and allergy can exacerbate asthma. Many children with asthma have no relevant allergy, and many children with allergies have no asthma. But if a child has asthma and allergies, the allergies may exacerbate the asthma.*



## How Do You Get Asthma?

Asthma is a hereditary disease. Children inherit genetic predisposition for health and disease from their parents which is coded into the chromosomes. Typically, some genetic factors are group related, such as fair hair and blue eyes. Similarly, a predisposition to asthma is often seen in people who are also genetically disposed to allergy, hay fever and eczema. If you have one of these conditions you are likely to be predisposed to the others, as well.

Children with asthma often have close relatives with asthma, hay fever or eczema. The greater the number of first degree relatives with any of these conditions, the greater the risk that the child has the same genetic predisposition. The predisposition for allergy is also closely related to these conditions. This is particularly unfortunate because of the adverse effect allergies have on the other conditions.

It is possible to be genetically predisposed to a disease without the disease ever breaking out. But the genetic predisposition is still carried on in the next generation.



Typically, asthma varies in intensity throughout life. In many cases it disappears. Sometimes, the symptoms go away for some time only to reappear later. It appears that approximately one in three school aged children diagnosed with asthma grows out of the disease before reaching adulthood.

Many factors increase the risk of asthma breaking out in genetically predisposed children. Passive smoking is an extremely important factor. The asthma symptoms often start with a severe virus infection in the lungs.



In school aged children allergies are among the most common triggers of the disease breaking out. Tobacco smoke, infections and allergies are the most common triggers for asthma in genetically predisposed children. For this reason, it is important for children with a hereditary genetic disposition for asthma to avoid conditions where these triggers are present.

Increases in recent years in the prevalence of childhood asthma indicate that children without hereditary predisposition towards the disease are also at risk. The

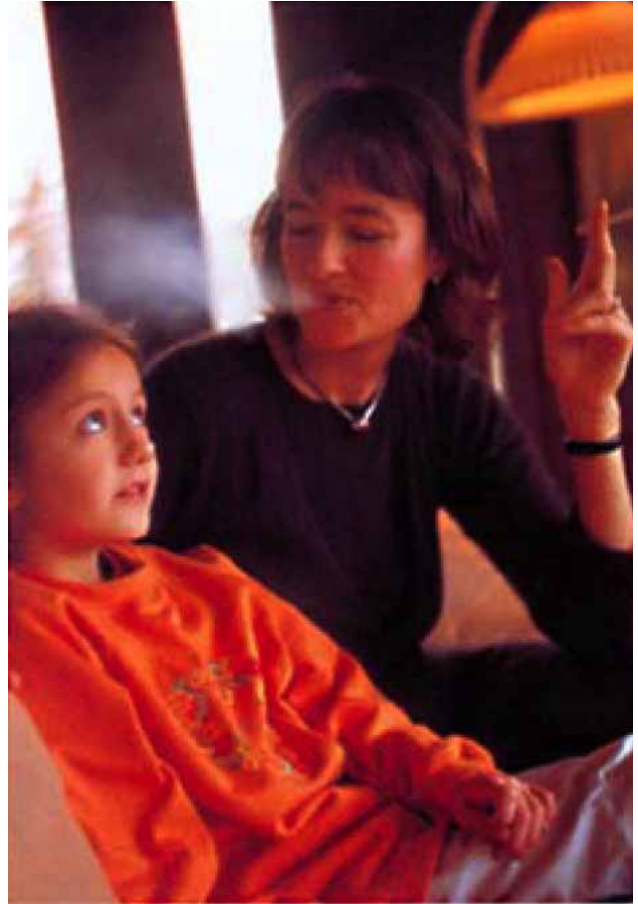
exact explanation is not known, but it seems certain that the increased prevalence of asthma and allergies is a consequence of our "Western" lifestyle. Speculation centers on air pollution, the growing presence of chemicals in our food, dietary habits, reduced exposure to infections and other lifestyle factors. But in truth, nobody knows for sure why asthma and allergies are becoming increasingly common.

## Prevention of Asthma

Smoking, infections and allergies are the three major factors in the triggering of asthma in a genetically predisposed child and exacerbating asthma in children who already suffer from the disease. Protecting the children against these three threats at all times, thus, becomes extremely important.

Tobacco smoke poses a significant risk in terms of the development and perpetuation of the chronic asthma inflammation. Children living in homes where smoking occurs have smaller lung capacity than children not exposed to passive smoking.

Smoking is also a significant risk factor in the development of allergies and increased frequency of infections in the airways. While passive smoking is the number one environmental factor in the development of childhood asthma it is also one of the few factors that can be entirely eliminated. Smoking in the home of a child with a predisposition for asthma is completely unacceptable. Children must never be forced into being passive smokers. The same goes without saying for schools, institutions and other care situations where



smoking should never be allowed. It can never be right that children should be forced into taking more medicine because their parents or others around them daily expose them to tobacco smoke.

About two out of three school aged children with asthma also suffer from allergies. Allergies can exacerbate the asthma inflammation, and therefore all children receiving preventive treatment should be tested for allergies. Fortunately, many allergies have little or no effect on asthma. Allergens affecting asthma are almost exclusively those that we breathe in. Food rarely triggers asthma episodes.

The most common allergens absorbed through breathing include dust mites, animal dander and pollen. If the child is allergic to dust mites or animal dander it is possible to limit the allergens in the environment. This may decrease the intensity of the asthma disease, but rarely children are cured of asthma because of the elimination of the allergens alone. Children with asthma are likely to develop new allergies, and it would be unwise to keep any kind of furry animals.



Most asthma episodes are caused by viral infections such as the common cold. Viral infections cannot be treated and therefore increased vigilance is required at the first sign of an on-coming viral infection. Perhaps the answer is a temporary increase in dosage of the preventive medicine.

Cold and humid air may also trigger asthma episodes.

## Allergens

Allergens are the triggers of allergies and asthma. Dust mites, pollen, animal dander and mold are the most common allergens.

*Dust mites are microscopic (0.1 mm) animals* The mites are unable to move around and usually it is primarily the bedrooms where precautions must be made. Symptoms of dust mite allergies mostly manifest themselves at night and in the morning following contact with dust mites in bed.

Dust mites thrive on heat, humidity and human scale which makes the bed an ultimate environment for dust mites. Dust mites mainly reproduce in times of high indoor humidity, so the only sure way of keeping your home free of dust mites is to maintain a humidity of below 45% as dust mites cannot survive at this level.

Many homes have higher humidity and the causes vary: Rain water seeping in through cracks, incorrect

insulation, lack of ventilation, too many potted plants, steam from bathrooms and cooking, tumbler exhaust and many other factors all add to the humidity. Mainly, however, high humidity in the home stems from the way the home was built allowing the humidity to penetrate the foundation along with insufficient exchange of air in the house.

You can bring down the humidity by increasing the airflow. Bedrooms should be aired out briefly and thoroughly every morning and night and preferably be equipped with air vents. Bathrooms, kitchens, laundry rooms and other rooms with high humidity should be constantly aired out and fitted with airshafts.

Common house cleaning does not keep out the dust mites, but it is still obvious that keeping the bedroom clean is useful. Smooth surfaces are easier to clean, but use water sparingly, as it also adds to the humidity. Frequent vacuum cleaning of the



mattresses is necessary to remove the dust mites and their excrements and wash the bed linens frequently and the duvets and pillows once every three months. Some synthetic non-allergenic bed linens are made to be washed again and again, and some down and feather duvets tolerate machine washing at 55 degrees Centigrade (130 degrees Fahrenheit), the temperature at which dust mites die. After a period of this kind of regular cleaning regime, you may, in some cases, check for the presence of dust mites in the bed environment before deciding if further sanitizing steps need to be added to the cleaning routine.

*Pollen* is plant dust. The most important types include tree pollen (March through May), grass pollen (May through July) and mugwort pollen (August). The levels of pollen in the air vary from day to day and from season to season. Pollen levels are highest in dry sunny weather. Rain and humidity lower pollen levels. Daily pollen levels are announced in some radio and TV news shows.

*Animal fur* allergies can be due to the presence of any furry animal, such as dogs, cats and horses. Avoiding contact with animal fur is problematic because of the large general population of pets in our homes. In many countries the number of pets surpasses the number of children. Animal furs are extremely powerful allergens. People with allergies may be affected by the presence of very little fur even if it is only found on the clothes of visitors with pets in their homes. Getting rid of all animal allergens may take a long time if you have had pets in your home, and it can be many months after removing an animal from the home before all the symptoms disappear.

Because a child is allergic to one animal does not necessarily mean that the child will have allergic reactions to all animals. But the allergy is an indication that the child has a tendency to develop allergies. It is worth remembering that nobody is born with allergies, but many are born with the predisposition to develop allergies. Typically, children develop allergies towards

the allergens to which they are exposed the most. If you have a cat, you typically become allergic to cats. Children allergic to cats will not necessarily become allergic to dogs, but the cat allergy demonstrates that they have the predisposition to develop further allergies. It is advisable not to keep any kind of furry animals if your child is diagnosed with asthma or allergies

*Mold (fungus)* relatively rarely is found to be a significant allergen. The mold fungus levels are highest from July until the first winter frost, but mold funguses are present all year-round.

Testing your child for allergies is fairly simple. Minute amounts of various allergens are injected into the skin. Within 15 minutes skin reactions in the form of reddening or swelling indicate what substances, if any, the child is allergic to. Allergies may also be determined via a blood test.



## Asthma Medicine

As a basic principle, asthma should be treated with preventive medicine as well as medicine for acute relief.

### *Acute-relief or Rescue Medicine (muscle relaxant)*

Short-acting (examples: Bricanyl® and Ventoline®) Rescue medicine such as Bricanyl is taken for acute relief of asthma symptoms. This medicine relaxes the muscles surrounding the airways, dilating the air passages and making it easier to breathe. It also helps clear mucous from the lungs. The medicine is similar to the adrenaline in the body. Muscle relaxants should be taken when needed, i.e. every time asthma symptoms occur. They take full effect in 2-5 minutes and are rapidly broken down. The effects of the medicine disappear in 4-6 hours and therefore it may be necessary to take a new dose every 4 hours. There are no harmful side effects, but some children experience palpitations. This is quite harmless. The medicine causes no adaptation, nor is it addictive.

### Long-acting (examples: Oxis®, Foradil® and Serevent®)

Long-acting muscle relaxants work like short-acting muscle relaxants but with 12 hours instead of 4-6 hours of relief. Oxis and Foradil are as fast acting as the short term brands while the full effect of Serevent occurs only after 10-30 minutes. Long-acting medicine may be used in children needing a supplement to the preventive steroid treatment.

### *Preventive (Controller) medicine*

Local steroid (examples: Spirocort® and Flixotide®). The rescue medicines described above have no effect on the asthma inflammation. It is extremely important to treat more than just the acute asthma symptoms. The underlying cause, the chronic asthma inflammation, must be treated, as well. This can only be accomplished effectively with topical steroids normalizing the inflammation in the air passages. Treatment with relief medication only, would be comparable to painting over rust.

### *Combined Therapy Medicine*

(examples: Symbicort® (budesonide + formoterol) and Seretide® (fluticasone + salmeterol)). Combined therapy medicine contains steroid as well as long acting rescue medicine. Appropriate for children unable to control their asthma symptoms through other treatment.

### *Anti-leukotriene (Singulair)*

Like an anti-histamine blocks histamine, anti-leukotriene blocks one of the substances (leukotriene) produced in the body of asthma and hay fever patients. This makes anti-leukotriene useful against both asthma and hay fever. Anti-leukotriene prevents some asthma inflammation, which cannot be controlled with steroids, but it is generally less effective than steroids. Anti-leukotriene is used only as a supplementary steroid in school aged children for whom normal steroid doses prove insufficient. When anti-leukotriene treatment is added the steroid dose can be reduced.

Anti-leukotriene is taken preventively once a day as a chewing tablet. It takes effect in a few hours and lasts for 24 hours. No side effects are associated with anti-leukotriene

### *Other Treatments*

Danish pediatricians do not recommend vaccinating children with asthma against allergies. The efficacy has yet to be convincingly demonstrated in children, and it is uncertain whether or not the possible effects of the vaccine continue after the cessation of vaccinations. First and foremost, however, is the concern that the vaccinations may induce shock in some patients.

Many parents opt for so-called alternative treatments of their children. These include acupuncture, zone therapy, and natural medicine. There is no evidence that these therapies work.

Over-the-counter cough remedies and decongestants have no effect on asthma. The prevalence of asthma has increased dramatically in recent years. Research into this disease is intensifying, and there is reason to expect a number of new treatment regimes in the years to come.

## How is the Medicine administered?

Proper and consistent administration of the medicine at all times is vital for effective treatment of asthma. Otherwise you risk that the child receives wrong doses or even no medicine at all.

*Mixtures and tablets* are swallowed and absorbed from the stomach into the bloodstream and circulated around the body before reaching the lungs. This causes the medicine to be diluted before reaching its intended target in the lungs, and allows it to affect the entire body. This is why it is more effective to administer the medicine directly into the lungs of the child through an Inhaler.

Currently, there are three types of inhalers to produce a puff of medicine for direct inhalation into the lungs; sprays with spacers, dry powder inhalers and nebulizers.

*Spray* Always remember to shake the spray immediately before use or you risk that there will be no medicine in the puff to be inhaled. Inhaling medicine directly from a spray can be tricky. The inhaling must be well timed within the same second that the spray is activated. Most children have trouble getting this timing right. For this reason the spray must always be used with a spacer. The spacer delivers the puff into the spacer, where the fine particles are airborne for up to 30 seconds allowing ample time for the inhalation.





*Dry powder inhalers* such as the TURBUHALER® and the DISKOS® are well suited for children, because the medicine is formed only when the child inhales strongly. No coordination or propellant is needed, only the child's ability to inhale. It is important, however to make sure that the child inhales with adequate force each and every time. Usually, children must be of school age to properly and consistently use a dry powder inhaler.



*Nebulizers* are used in hospitals for acute asthma patients. The advantage of this device is that it creates a large puff of medicine so that a child in distress need not inhale or wear a tight-fitting mask over his or her nose and mouth. For home use, nebulizers are impractical and outdated. They are slow, expensive and clumsy with an imprecise drug delivery and significant waste of medicine.



## Steroids

Steroids offer the most effective treatment of asthma. Steroid treatment prevents asthma attacks and allows the child to live a normal life. No significant side effects are associated with topical steroids administered in proper doses. When talking about steroids in asthma treatment the term, adrenal hormone, is often substituted for the term steroid with both terms referring to substances providing the effect similar to cortisone. This group of steroids is unrelated to sex hormones or anabolic steroids.

Steroids suppress the chronic inflammation of the airways. As the inflammation is alleviated, the swelling of the mucous membrane goes down and normal function of the air passages is restored. The airways become less delicate, surrounding muscle tissue becomes less "twitchy", and the asthma symptoms disappear.

Allergic reactions are also lessened by steroid treatment. The allergy cells become less irritable and less likely to

explode when coming in contact with substances the child is allergic to. Even after many years of steroid treatment the steroids remain equally effective and the required dose remains unchanged. Steroids are not addictive.

The steroid treatment is for prevention and does not work as a muscle relaxant. It cannot open the air passages during an acute asthma episode. Steroid prevents the attack. As no immediate effect is apparent from the steroids discipline is required to continue taking the medicine as prescribed. Steroid treatment of asthma compares in many ways to brushing your teeth to prevent cavities. Tooth brushing is of little use against the cavity once the cavity has appeared. The disease is prevented only through diligent daily treatment. In other words, always remember to keep up the steroid treatment also in times of no asthma symptoms.

Steroids for asthma treatment can be divided into



groups. It is extremely important to distinguish between them at all times:

- 1) Systemic steroids work in the lungs, as well as the rest of the body where it is broken down slowly. Prednisone is an example of a systemic steroid administered by injection or tablets. It is used only during severe asthma attacks. It can save lives or shorten the duration of an attack. A brief therapy of a few weeks is usually without side effects. Longer-term systemic steroid therapy may affect adversely the growth of the child.
- 2) Topical steroids are highly effective locally in the lungs and rapidly broken down when absorbed into the bloodstream.



## Topical Steroids

The topical steroids are synthetic and designed to mimic the effects of cortisone locally, i.e. in the lungs where the disease is located. It is different from cortisone or any other adrenal cortex hormone. The substance circulates only briefly in the bloodstream. It is not associated with side effects because it is broken down rapidly and works only in the lungs.

When used as directed no effect is seen in the growth of the child, whereas the growth may be adversely affected by severe untreated asthma. In some instances, treatment with steroids may precipitate a growth spurt in the children, because unchecked asthma may have hampered growth previously.

You must be aware that a topical steroid is a medicine. Like most other medicines taking higher steroid doses than prescribed may cause side effects. Many months of treatment with larger doses than those recommended carries the risk of inhibiting growth.



Administering smaller doses of topical steroid than prescribed is also counterproductive. Under-treated asthma can damage the lung capacity and lower the quality of life of the child. It is most healthy for the child to reach the balance where the symptoms are eliminated by the lowest possible steroid dose.

In a few children, topical steroids may be associated with side effects such as thrush in the mouth and hoarseness. The risk of thrush can be lowered by rinsing the mouth or by tooth brushing after every treatment. If the thrush recurs anyway, it is easily treatable. Hoarseness may be uncomfortable, but disappears when the dosage is lowered. Thirty years of research has found no other side effects from topical steroids administered at the recommended dose.

Topical steroids are not addictive. Treatment can cease from one day to the next, if warranted by the asthmatic condition of the patient.

Untreated asthma can cause a serious decline in the quality of life of the asthmatic child and result in serious lung damage in the worst cases. Conversely, we never see patients suffering from severe side effects from topical steroid treatment. This leads to the conclusion that the effects of under-treatment of asthma are far worse than the potential side effects from topical steroid treatment.

## Control

Nobody knows the small signs of asthma in the child better than the parents. This is not always enough, however. Once the parents or the child becomes aware of the symptoms of an on-coming asthma attack, the lung capacity has already been seriously affected. What they notice is just the tip of the iceberg.

The state of the asthma can be monitored daily by measuring the lung capacity with a peak flow meter. Each morning and evening, before the medicine is taken, the child's ability to blow forcefully into the peak flow meter is recorded in a diary. Mark the peak flow rate of each day in a chart. Such a chart provides a continuous illustration of the progress of the treatment and the state of the disease, so that adjustments can be made when the lung capacity deviates from normal. The peak flow rate varies widely even in healthy children. Defining the "normal" peak flow of a child is as difficult as determining the height of a normal man. Even within the normal range the variation is great. More relevant is comparing the child's peak flow from day to day.

Usually, a child's peak flow is constant from day to day. When the asthma is under control the air passages are open, and the child can exhale forcefully (high peak flow rate). During an asthma attack the airways are constricted, emptying the air out of the lungs becomes harder and slower, and the peak flow rate goes down. A drop in peak flow rate by more than 15 percent is an indication that the asthma disease is worsening. Charting the child's peak flow rates makes it possible to monitor the disease just like you monitor the temperature of children with infections.

You must, of course, be alert to other symptoms, as well. With a stethoscope the doctor can listen for wheezing of constricted air passages. Parents can listen for the same wheezing by putting an ear to the child's chest. Neither provides reliable control, however, as the child's asthma may cause no audible wheezing.

Typically, the asthma disease fluctuates day-to-day, week-to-week, throughout the year and through life.



In many children symptoms disappear in summer, while others are healthy in the winter. Some children have symptoms only when they run or have a cold. Others feel their asthma when they are with animals or near other things that affect them. It is important to remember that asthmatic children's lungs work normally in between attacks. In fact, this is the case most of the time. This is why diagnosing asthma can be difficult. A throat infection, a fractured arm and many other diagnoses are readily obvious at your doctor's office. But asthma can be tricky because it rarely occurs while seeing the doctor. Measuring the lung capacity and bringing the peak flow chart for the doctor to see may be helpful.



## Parental tasks

First and foremost, the parents must understand and teach their child that asthma is a chronic disease to be treated preventively with daily medication. We know from studies that only about half of the medicine prescribed is actually taken by the patients. The basic attitude in most people is that medicine is best avoided. Generally, this may be a good point of view, but not when it comes to children with asthma.

Thankfully, children with asthma mostly feel fine and free of symptoms. In the absence of symptoms the disease becomes distant and strangely abstract, and taking medicine in those circumstances may become a conflicted duty. It may be difficult to take medicine for a disease you cannot feel. But it is exactly this preventive medicine that makes it possible for asthmatic children to keep feeling well.

As the children grow up educating them on this disease is extremely important. The conflicts over medicine usually grow stronger in the teenage years unless the

children are made to understand the importance of the preventive measures. It is already hard to accept the chronic nature of the disease. As a teenager it is also hard to feel that you are different. Some asthmatic teenagers may be seen rejecting the daily dose of medicine as a sign of seeking independence from their parents. Therefore, it is imperative that the parents thoroughly educate their child from the outset. Other factors may contribute to resistance from the asthmatic child. Perhaps the family has had to give away a pet because of asthma and allergies, or a member of the family has had to quit horseback riding. Grownups may resent or experience discomfort from having to quit smoking. All of this may cause feelings of guilt in the child and even denial of the disease and the need to treat it preventively, inhibiting the best possible treatment.

Combining the taking of medicine with another daily ritual, such as teeth brushing may be helpful. Taking

the daily dose of steroid medicine just before teeth brushing offer the additional advantage of cleaning the mouth from residual medicine. Most importantly, the taking of the medicine must become a natural and unproblematic part of the daily routine. The disease should be as small a part of the child's life as possible.

Asthma families usually experience two high points along their way towards a well-treated and well-regulated asthma. The first high point is the day the diagnosis is finally made and a course of treatment is set in motion, often after years of discomfort and uncertainty. The other is the day when the child and his or her family accept the disease and the treatment as part of the daily routine. Too often, the fear of the medicine and hoping for a cure become sources of constant frustration, which makes life unnecessarily hard and the treatment irregular.

## The Doctor's Tasks

The best possible treatment of a child with asthma is based on close cooperation between the child, the parents, their family doctor and a pediatrician specializing in asthma.

Most asthmatic children are well served by seeing a specialist once or twice a year. This could be in a hospital

children's ward where allergy testing, advanced lung capacity measurements, lung x-rays and other tests and examinations can be performed.

In between, the child should be seen regularly by a general practitioner to ensure that the treatment is satisfactory





## Managing Medicine Dosage

Asthma is a chronic disease, but the symptoms may vary and fluctuate widely. Rescue medicine (Bricanyl and Ventoline) is administered as needed. When in doubt it is better to take a dose, is the rule of thumb. We never see children admitted to a hospital because they took too much medicine, but every day, children are admitted who could have stayed at home if only they had been given slightly more medicine. Adjustments in the daily treatment are primarily made by administering rescue medicine.

The doctor determines the dosage of the preventive medicine. But as part of a good plan the parents may increase the dose when they see signs that the disease is getting worse. As mentioned above, the asthma symptoms vary depending on the time of year, infections, allergies and other circumstances. Therefore, the parents must be able to make adjustments and increase the dosage of preventive medicine in order to prevent an attack. Attention must be paid to changes in

symptoms, and a need for increased doses of Bricanyl for some time is also a sign of worsening asthma.

Changes in the peak flow chart may indicate a worsening condition. A decline of more than 15 percent below the child's normal peak flow can be an indication that something needs to be done. At clear signs of intensification of the disease the steroid dose can be quadrupled. The higher dose should be maintained for two weeks after the child feels better again, whereupon normal dosage may be resumed.

Sticking to the increased dose for weeks following the attack is necessary because the asthma attack actually continues far beyond the outward disappearance of symptoms, including the return to normal peak flow. More advanced measurements can detect remnants of the attack long after the disappearance of the symptoms. So remember: At the first signs of a worsening condition the steroid dose must be

immediately increased. It is only reduced back to normal dose level after two weeks of the child feeling well again.

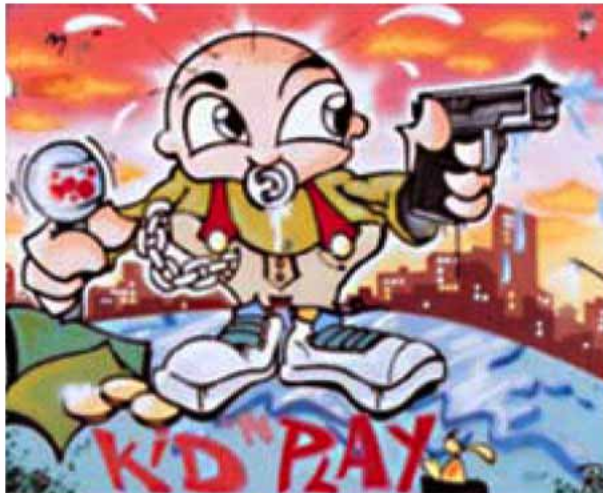
Finding the correct daily dose can be difficult because a better effect does not always follow an increase in dosage. You cannot add to the dose the way you spoon more sugar into your coffee in order to make the coffee sweeter. The steroid effect is better compared with the effect of aspirin. The effect of four aspirin is not much greater than the effect of two. Similarly, the main effect from the steroid derives from the first 400 daily micrograms. Higher doses do not produce proportionately stronger effects. Thus, small adjustments in dosage become meaningless and may lead to overdosing with no added effect.

Also remember, that incremental adjustments up or down of steroid doses over a few days are equally futile, because the effect of steroids builds and disappears slowly. Treatment with steroids should be managed like

a super tanker: It takes a lot of time from the new course is set until the ship actually turns. Similarly, a week may go by before you see the effects of a changed steroid dose and up to several weeks before an improperly decreased steroid dose manifests itself in a worsening of the asthma.

Often, periods of a worsening asthma condition can be anticipated. For instance, many patients suffer setbacks certain times of the year. This may happen during pollen seasons in spring or summer, mold in the autumn, or perhaps from dust mite allergies or infections during the autumn and winter. If such a pattern emerges, preventive measures can be taken through early preventive treatment. At other times, the preventive topical steroid treatment may be temporarily suspended. The setting of correct dosages for a child with asthma can be difficult and is often best arrived at in consultation with a pediatrician specializing in asthma.









Recommended by:



Sponsored by AstraZeneca A/S

